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August 26, 1993

Contract #: DE-AC01-91RW00134  
LV.NS.8/93.RGV-036

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

Attention: Vincent F. Iorii

Subject: Civilian Radioactive Waste Management System Management and Operating Contractor  
(CRWMS M&O) Monthly Activity Report, Month of July 1993

Enclosed is the subject report for the month of July 1993.

As an attachment to the report, Cost and Schedule data has been provided for July 1993 and Year-to-Date totals. Also, attached is a schedule for the current work and Variance Analysis Reports. The schedule resides in the CRWMS M&O Planning and Control System.

If you have any questions or need any additional information, please contact me at (702) 794-1971 or Laura M. Tate at (702) 794-7144.

Sincerely,

R. Glenn Vawter, Deputy Manager, Nevada Site  
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REC'D IN YMP

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ENCLOSURE 2

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TRW Inc.

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Enclosure

1. CRWMS M&O Monthly Activity Report
2. Cost and Schedule Data
3. Variance Analysis Reports

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# **MONTHLY ACTIVITY REPORT**

**JULY 1993**

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## EXECUTIVE SUMMARY - July 1993

### Highlights:

- As part of continuing Engineered Barrier System (EBS) Advanced Conceptual Design (ACD) activities, conducted evaluations of cladding life, Defense High Level Waste container shielding, thermal performance resulting from variations in fuel assembly individual heat loads, and initial costs of various sizes of waste packages and MPC overpacks.
- Evaluated effects of lubrication fluids on the corrosion behavior of candidate containment barrier materials. These materials could lead to microbiologically influenced corrosion of the waste packages. In conjunction with this study, an examination by the University of Nevada, Las Vegas (UNLV) Microbiological Laboratory developed a plan to enhance the usefulness of the work to the YMP.
- Determined borehole requirements and priorities in conjunction with the Engineering Design Group, Sandia National Laboratories (SNL), and YMP for the boreholes along the North Ramp and the Main Drift. Prepared a draft of the consolidated work scope for NRG-7. Prepared draft Consolidated Work scopes for planned boreholes SD-10 and SD-12, which are along the proposed main geologic drift and therefore can provide stratigraphic and rock quality data to meet engineering design needs. The draft documents were submitted to YMPO for review. Prepared a draft consolidated work scope for SD-9, which is located at the northern end of the main geologic drift.
- Revised the computer models for simulating Repository Waste Handling Building (WHB) design and operations to simulate a WHB that has lag storage instead of carts between the unloading and packaging cells. The revised model was used to optimize the WHB design and operations for handling both bare spent fuel and MPCs. Three cases were optimized: one for bare fuel and two for MPCs. Developed engineering and construction cost estimates for the WHB optimized in each of the three cases. The estimates were developed to support Systems Engineering Cost Studies.
- Received significant recent input from LLNL that will enable the waste package component of the Total System Performance Assessment (TSPA) model Repository Integration Program (RIP) to be implemented. Reviewed the Lawrence Livermore National Laboratory (LLNL) glass dissolution information and constructed a temperature- and pH-dependent glass dissolution rate for use in TSPA-II. Completed the interpretation of LLNL's 57 kW/Ac and 28.5 kW/Ac thermal-hydrologic modeling results for TSPA-II. Met with Los Alamos National Laboratories (Los Alamos) to decide on a mathematical dependency formula for temperature-dependent solubilities for radionuclides to be used in TSPA-II.

- Conducted Issue Resolution Steering Group video conference. Noticeable progress has been made on seismic hazard assessment methodology towards completion of the topical report by the end of FY 1993. Authors prepared and reviewed Draft of Topical Report. Incorporating comments into main body and appendices. Delivery of draft report to DOE scheduled for August 31, 1993. QAP-6.2 review will be completed and the report will be delivered to the Nuclear Regulatory Commission (NRC) by the end of FY 1993.
- Continued preparation of the Topical Report on Seismic Hazard Assessment Methodology. Began compiling revised text for the Topical Report appendices. Conducted a two-day meeting to review and further resolve input to the topical report on seismic hazard assessment methodology. Developed a new streamlined report that is supported by appendices, based on review comments from the Issue Resolution Steering Committee. The working group discussed the content of each section and made writing assignments to complete the next preliminary draft by August 12-13. Revised the annotated outline in preparation for submission to the NRC. Preparing a Baseline Change Request to change the delivery date to September 30, 1993.
- Inspected the Starter Tunnel daily regarding rock support in response to concerns addressed by USGS mappers. The Construction Management engineering geologist conducting the inspections has reported no indication of instability during July. This will continue to be an ongoing activity.
- Provided requirements for YMP forms generation, revision, and printing so YMP forms can be added onto the automated forms system. Although YMP forms will not be loaded until InfoSTREAMS Increment 2, this is a major step towards that goal. Once the forms are available on the automated forms system, all YMP participants will have access to electronically generate forms that are used YMP-wide. This will not only add to the efficiency, but will decrease the number of illegible forms that are created on the YMP.
- Placed a QA Design Support Team in the MGDS Design Group where it will perform an in-process QA review function as well as provide QA input for the design process. Also placed two Quality Engineers working "in-line" with designers to ensure compliance with QA requirements.

**MGDS-SYSTEMS ENGINEERING**  
**WBS 1.2.1**  
**July 1993**

**MANAGER:**

R. M. Sandifer

**OBJECTIVES:**

Provide overall Systems Engineering services in support of the YMP.

**PROGRESS DURING REPORT PERIOD:**

- Completed and submitted preliminary drafts of ESF Package 1B, Determination of Importance Evaluations (DIEs), for the 90% Design Review presentation.
- Coordinated Design Control Improvement Plan action items and revisions for presentation to DOE QA and delivery to NRC.
- Provided concurrence review of final draft of YMP Q-list (the list of system, structures, and components (SSCs) affecting Quality/Safety issues) and Mission Critical (MC)-List. These lists identify the SSC's selected as critical to the YMP or considered as Engineered Barriers to waste isolation. It is important to finalize this list of potential show-stoppers in order to continue construction activities and meet scheduled milestones.
- Completed resolution of comments received on the following directives:
  - AP-3.6Q, Draft A, Configuration Management. Draft B is being prepared by the Plans and Procedures Department (PPD).
  - AP-5.19Q, Physical Interface Control. Provided Draft B to all reviewers to complete the QAP 6.2 process.
  - AP-5.50, Rev.0, Informational/Organizational Interface Memorandums of Understanding. The document has been through YMP review and no disputes exist. PPD has distributed the document for approval signature.
- Provided Draft QAP-2-3, Revision 4, Classification of Items, to Assessment Team for preliminary review to facilitate its approval for use at MGDS in support of implementation of new QARD.
- Updated the Preliminary Safety Analysis Report, with the exception of the Test text and scenarios, and the report is now in final preparation for submittal to DOE for review.

- Completed and closed out Corrective Action Report (CAR) #201, subject Baseline Control, regarding dispositioned Baseline Change Procedures (BCPs)-02-93-0001, 0002, and 0003. Verification completed July 6, 1993. The corrective action was to amend records packages by having the Change Control Board (CCB) Chairperson check the disposition box, and sign and date for each of the BCP's that had not been previously signed-off.
- Completed responses to YM-CAR-93-016: All remedial/corrective actions to prevent recurrence have been performed. The final step to close the open CAR is the issuance of revision 3 to AP-3.5Q, which is in progress.

#### **DELIVERABLES, PUBLICATIONS, AND PRESENTATIONS:**

- Submitted the Value Engineering (VE) Quarterly Report to YMPO. The report includes a summary of VE activities and YMP benefits gained as a result of these activities, copies of major reports and other activity documentation, current VE issues, and VE activities planned for the remainder of FY 1993. This report is a contract deliverable.
- Provided briefing information to the YMPO Engineering and Development Division (EDD) Director for his presentation on July 13-14, 1993 addressing the Nuclear Waste Technical Review Board (NWTRB).
- Transmitted Multi-Purpose Canister (MPC) implementation cost analysis information to M&O/Vienna for incorporation into the MPC final report.

#### **ISSUES AND CONCERNS:**

- The 90% review of the ESF Design Title II, Package 2A surfaced concerns on the traceability of requirements. The concern relates specifically with the need to improve the traceability of requirements from the ESF Design Requirements to the Basis for Design (BFD) document, and ultimately down to the drawings. Comments were developed to address this area and the Systems Engineering group is working closely with the design organization to ensure this concern is resolved.

#### **PLANNED WORK FOR NEXT MONTH:**

- Continue systems studies on waste package allocation, waste emplacement mode, and repository thermal loading. The results of these studies provide information to DOE to assist in making key project decisions and contribute toward the licensing process.
- Assist the YMPO in developing an administrative procedure for the initiation of scientific or systems studies as defined in the new Systems Engineering Management Plan.

- Maintain the systems digest database. Work on the System Decision List and continue to develop MGDS Total System Life Cycle Cost (TSLCC) models.

**MAJOR NEAR TERM MILESTONES:**

- None.

**MGDS - WASTE PACKAGE**  
**WBS 1.2.2**  
**July 1993**

**MANAGER:**

R. M. Sandifer

**OBJECTIVE:**

Develop a licensable Waste Package/Engineered Barrier System that meets regulatory requirements with sufficient margin for uncertainty and any additional requirements of the waste management system.

**PROGRESS DURING REPORT PERIOD:**

- Worked with the MPC conceptual design team in Charlotte in providing a conceptual design of the MPC that would reduce the risk of it not being acceptable for disposal in the repository. Participated in meetings with DOE and Edison Electric Institute. Completed evaluations of criticality, thermal performance, and cost.
- Placed announcements in the Federal Register and Energy Daily, issued individual letters to potential presenters, and made arrangements for panel of experts and a facilitator in support of the Waste Package Workshop that will be held September 21 through 23, 1993.
- As part of continuing Engineered Barrier System (EBS) Advanced Conceptual Design (ACD) activities, conducted evaluations of cladding life, Defense High Level Waste container shielding, thermal performance resulting from variations in fuel assembly individual heat loads, and initial costs of various sizes of waste packages and MPC overpacks.
- Evaluated effects of lubrication fluids on the corrosion behavior of candidate containment barrier materials. These materials could lead to microbiologically influenced corrosion of the waste packages. In conjunction with this study, an examination by the UNLV Microbiological Laboratory developed a plan to enhance the usefulness of the work to the YMP.

**DELIVERABLES, PUBLICATIONS, AND PRESENTATIONS:**

- Gave two presentations to the NWTRB; one on modeling and testing that supports the thermal loading decision and natural analogues, and one on the compatibility of the MPC and MPU with repository thermal loading scenarios.

**ISSUES AND CONCERNS:**

- None.

**PLANNED WORK FOR NEXT MONTH:**

- Continue preparation of four presentations for NRC Technical Exchange Meeting on Substantially Complete Containment that will be held August 24 in Bethesda, Maryland.
- Formulate the MGDS portion of the MPC Conceptual Design Report.
- Facilitate the cutting of the large block at Fran Ridge. ▒

**MAJOR NEAR TERM MILESTONES:**

- None.

**MGDS - SITE INVESTIGATIONS**  
**WBS 1.2.3**  
**July 1993**

**MANAGER:**

C. T. Statton

**OBJECTIVES:**

Participate in test prioritization activities. Conduct interference analyses for near term drilling activities. Provide oversight and management for site characterization activities. Review Study Plan (SP) status for in process SPs. Support the Integrated Test Evaluation Task Force. Participate in reviews of work scope, budget schedule with the US Geological Survey (USGS), Los Alamos National Laboratory (Los Alamos), and Sandia National Laboratories (SNL) to support Mission 2001 validation effort.

**PROGRESS DURING REPORT PERIOD:**

- Organized and participated in a meeting with DOE, SNL, Lawrence Berkeley Laboratory (LBL), and USGS and assessed the usefulness of geophysical methods to obtain timely information on the Ghost Dance Fault at depth along the main drift alignment. Made a decision to pursue the proposal from LBL to carry out Vertical Seismic Profiling in Water Table (WT)-2 and a seismic reflection line along the road leading to WT-2 if funding is available. Reviewed three revised proposed Requests for Proposals for Seismic Reflection Profiling as part of the Geophysical Integrations Task Force Effort.
- Participated in Nye County - DOE Cooperative Drilling Planning Session. Reviewed pumping options for C-Well tests and technical components of the Nye County cooperative drilling initiative.
- Determined borehole requirements and priorities in conjunction with the Engineering Design Group, SNL, and YMP for the boreholes along the North Ramp and the Main Drift. Prepared a draft of the consolidated work scope for NRG-7. Prepared draft Consolidated Work scopes for planned boreholes SD-10 and SD-12, which are along the proposed main geologic drift and therefore can provide stratigraphic and rock quality data to meet engineering design needs. The draft documents were submitted to YMPO for review. Prepared a draft consolidated work scope for SD-9, which is located at the northern end of the main geologic drift.
- Prepared Test Interference Database/Global Test Interference Model for internal review. This is a contract deliverable.

- Evaluations for potential test interference from the following tests or construction activities were in progress during July:
  - Trenches to study the Solitario Canyon fault
  - Pumping tests at boreholes USW WT-1, UE-25 WT#12 and UE-25 WT#17
  - Large block experiment at Fran Ridge
  - North ramp extension beyond the Starter Tunnel
  - North Portal pad shop and change house buildings
  - North Portal wastewater pond
  - ESF explosives storage area
  - Sewer system for the north portal pad
  - North portal access road
  - Tracers, fluids and materials for the C-well test
  - Electric switchgear building
  - Conveyor system (for procurement)
  - Ghost Dance fault benching and pavement clearing
- Began planning for the Integrated Model development and methodology for Lynx to Dynamic Graphics data conversion. Coordinated discussions between YMPO and USGS to discuss data transfer from USGS Stratigraphy Model to the YMPO Integrated Data Model. Held discussions with software vendors on multi-seat licensing, on-site technical support and training programs.
- Integrated meeting with USGS, RSN, REECo, YMPO, and the M&O to resolve any design flaws in the packer assembly for use in the gas testing of UZ-16.
- Developed preliminary estimate of the schedule and work requirements for the Stratigraphic Compendium.
- Resolved comments made during a review of the transition plan for the Climate Modeling Studies, which outlines the transition of this effort from PNL to SNL.
- Began study of rock properties in proposed ESF area, as determined from existing borehole logging data.

#### **DELIVERABLES, PUBLICATIONS, AND PRESENTATIONS:**

- Prepared briefing on Surface Based Testing status for presentation at the Technical Project Officer (TPO) meeting.
- Completed a draft of the borehole catalog and transmitted it to YMPO. This is a contract deliverable.
- Delivered initial draft of colloid workshop summary to YMPO.

- Delivered the Second Draft of the FY 1994 Annual Plan for Site Investigations activities for the YMP. This draft includes planning data sheets for each element in WBS 1.2.3 (Site Investigations), and testing elements of WBS 1.2.2 (Waste Package), and WBS 1.2.4 (Repository). The data included in the Second Draft Annual Plan provided the basis for development of FY 1994 budget proposals.

**ISSUES AND CONCERNS:**

- None.

**PLANNED WORK FOR NEXT MONTH:**

- Continue Surface-Based Test Coordination, ESF Integration, Test Interference Evaluations, development of the Surface-Based Testing Activities catalog, and finalization of the Test Interference Data Base and the Global Test Interference Model.
- Continue development of the Long-Range Plan for Site Investigations.

**MAJOR NEAR TERM MILESTONES:**

- None.

**MGDS - REPOSITORY**  
**WBS 1.2.4**  
**July 1993**

**MANAGER:**

R. M. Sandifer

**OBJECTIVE:**

Provide services to design and develop a licensable repository facility (surface and subsurface).

**PROGRESS DURING THE REPORT PERIOD:**

- Revised the computer models for simulating Repository WHB design and operations to simulate a WHB that has lag storage instead of carts between the unloading and packaging cells. The revised model was used to optimize the WHB design and operations for handling both bare spent fuel and MPCs. Three cases were optimized: one for bare fuel and two for MPCs. Developed engineering and construction cost estimates for the WHB optimized in each of the three cases. The estimates were developed to support Systems Engineering Cost Studies.
- Provided technical input and support for development and review of the annotated outline for the MGDS Design Considerations Report. Finalized details of the TSLCC approach during MPC Taskforce meeting in Las Vegas.
- Provided technical users input and support for Integration of Meteorological Data Collection and Synthesis working group. Discussed needs for synthesized Meteorological data, i.e., design users require a value or range of values derived from the raw collected data. Currently the design users do not have this expertise on staff. Therefore, this function/activity must be performed by others as part of an integrated team. Also provided user input regarding what information is required and how synthesized data should be formatted and presented. Examples of useful synthesized data from other sources include National Weather Service information on Maximum/Minimum Temperatures, wind speeds and directions and precipitation and UBC seismic design zones.
- Completed 90% review of ESF Design Package 2A and provided comments on technical and Repository/ESF interface issues. In addition to performing technical review of the mining, ventilation, electrical and other technical aspects of the Package 2A Design, also reviewed the design to ensure that the ESF design was properly providing flexibility, waste isolation, and other interface aspects of a potential repository.

- Prepared responses to NRC Site Characterization Analyses (SCA) comments and questions related to sub-surface repository design and construction. The responses included issues of sealing, retrieval operation, shielding, and rock stability.

#### **DELIVERABLES, PUBLICATIONS, AND PRESENTATIONS:**

- Provided a briefing regarding the ESF/Repository design enhancement concepts to a where representatives of affected counties and the State of Nevada and Associate Director and YMPO Manager were present. The briefing was received with different degrees of acceptance by the audience.
- Developed technical information that was included in a presentation made during the Stakeholders Meeting/MPC Workshop in Crystal City, Virginia, July 1 and 2. The meeting responded to issues identified by stakeholders and a letter was drafted by Outreach for DOE to distribute to meeting attendees.
- Presented Repository ACD status and thermal loading implications to the NWTRB full board meeting on July 13- 14, 1993, in Denver, Colorado.

#### **ISSUES AND CONCERNS:**

- None.

#### **PLANNED WORK FOR NEXT MONTH:**

- Complete a preliminary draft of the subsurface portion of the BFD for ACD and obtain internal review and approval.
- Complete simulation model runs for waste package configurations to support System Analysis studies. Also provide WHB capital cost data to support Systems Analysis studies for the various waste package configuration.
- Issue White Paper on Site Generated Radioactive, Mixed and Hazardous Waste Treatment and Disposal, Revision B to M&O and YMPO. This is part of the task identified as ACD Waste Treatment Technology Study in Mission 2001 and is necessary to support Surface Facility Layout Activities and BFD. This paper provides the first step in the design and permitting of the treatment and disposal of site generated waste.

#### **MAJOR NEAR TERM MILESTONES:**

- None.

**MGDS - REGULATORY**  
**WBS 1.2.5**  
**July 1993**

**MANAGER:**

J. L. Younker

**OBJECTIVES:**

Provide all coordination and support for meetings with regulatory and oversight groups (e.g., NWTRB, NRC, ACNW). Track regulatory open items and commitments. Review proposed regulatory changes and determine impact on YMP plans and activities. Maintain the Regulatory Document Manual. Review YMP products to determine compliance with regulatory requirements and responsiveness to regulatory concerns. Develop regulatory documentation including the MGDS License Application Annotated Outline. Issue resolution topical reports, semi-annual Site Characterization Progress Reports, and the Regulatory Compliance Plan. Support the development of regulatory databases.

The M&O Performance Assessment (PA) function is responsible for conducting analyses that support programmatic decision-making and that address the determination of compliance with regulatory performance objectives. In addition, the PA function, through its management and integration role, aids the YMPO in the direction and management of scientific work and computer code development.

Systems Management and Integration function provides technical/management support as needed to M&O Systems activities and coordinates with DOE on strategies for increasing YMP viability.

**PROGRESS DURING REPORT PERIOD:**

Performance Assessment

- Received significant recent input from LLNL that will enable the waste package component of the TSPA model Repository Integration Program (RIP) to be implemented. Reviewed the LLNL glass dissolution information and constructed a temperature- and pH-dependent glass dissolution rate for use in TSPA-II. Completed the interpretation of LLNL's 57 kW/Ac and 28.5 kW/Ac thermal-hydrologic modeling results for TSPA-II. Met with Los Alamos to decide on a mathematical dependency formula for temperature-dependent solubilities for radionuclides to be used in TSPA-II.
- Prepared a briefing, for the August Program Review Board (PRB) meeting, comparing alternative measures of performance, in particular the fundamental assumptions behind the release limits in the recommended 40 CFR 191. Continue development of text for DOE

issues related to alternative environmental standards for Yucca Mountain. The supporting text will be used as a basis for DOE presentations to the National Academy of Sciences (NAS) panel that is developing recommendations for the EPA.

- Participated in a NAS working group and summarized the remaining issues concerning environmental standards and assigned them to working group members. Discussions of each issue are expected to be completed by October 15, 1993.
- Reviewed the radionuclide inventory of the defense high level waste (HLW) from four sources. Findings of earlier work on isotopes in spent nuclear fuel important to population doses from potential long term water transported MGDS releases were used to determine nuclides that are major dose contributors from HLW.

### Regulatory and Licensing

- Participated in the July 15 meeting in Denver, Colorado, of the DOE Task Force on the EPA Standard for Yucca Mountain. Reviewed the overall issues structure and planned future activities.
- In concert with YMPO, developed an action plan for handling the review and comment on the July 9 proposed rule change to 10 CFR Part 60 .
- Revised the protocol for ACNW interactions with YMPO per comments from RW-30. Informally transmitted the revised protocol to RW-30 and YMPO.
- Participate in the NWTRB Full Board Meeting in Denver, Colorado, July 13-14. In general, the Board seemed satisfied with the information presented and with the fact that OCRWM is not making a premature decision on thermal loading.
- At the request of DOE, reviewed the Draft "Cost of Repository Regulations" document prepared by T&MSS and provided comments to DOE.
- Conducted Issue Resolution Steering Group video conference. Noticeable progress has been made on seismic hazard assessment methodology towards completion of the topical report by the end of FY 1993. Authors prepared and reviewed Draft of Topical Report. Incorporating comments into main body and appendices. Delivery of draft report to DOE scheduled for August 31, 1993. QAP-6.2 review will be completed and the report will be delivered to the NRC by the end of FY 1993.
- Developed agenda and coordinated Appendix 7 meetings with DOE, NRC, USGS, EG&G, and SNL to be held on August 10-11 to brief NRC and the Center for Nuclear Waste Regulatory Analysis staff on LYNX and EARTH DYNAMIC GRAPHICS 3-D modeling capabilities. The meetings will be held in Las Vegas and Denver.

- Provided draft agenda, conducted a scoping meeting, and participated in DOE-NRC teleconference to finalize agenda for Technical Exchange on Substantially Complete Containment and Waste Package/EBS.
- Completed review of ESF Design Package 2A. Forward comments to review secretary on the BFD and the DIE. Evaluated oversight group observations and transmitted them to M&O Underground Design Manager.

### Site

- Continued preparation of the Topical Report on Seismic Hazard Assessment Methodology. Began compiling revised text for the Topical Report appendices. Conducted a two-day meeting to review and further resolve input to the topical report on seismic hazard assessment methodology. Developed a new streamlined report that is supported by appendices, based on review comments from the Issue Resolution Steering Committee. The working group discussed the content of each section and made writing assignments to complete the next preliminary draft by August 12-13. Revised the annotated outline in preparation for submission to the NRC. Preparing a Baseline Change Request to change the delivery date to September 30, 1993.
- Prepared briefing materials and participated in dry run for the NRC technical exchange on ESF Title II design.
- Participated in development of meeting summary and recommendations to DOE for the volcanism technical exchange.
- Initiated dispute resolution related to six comments on the Calcite-Silica Report.
- Screening reviews were completed for the following study plans: SP 8.3.1.15.1.3, R1, "Laboratory Determination of Mechanical Properties of Intact Rock;" and SP 8.3.4.2.4.4, "Engineered Barrier System Field Tests."
- Technical Reviews were conducted on the following study plans: SP 8.3.4.2.4.4, "Engineered Barrier System Field Tests;" and SP 8.3.1.5.1.1, "Characterization of Modern Regional Climate."
- Returned technical review comments to PI on SP 8.3.1.17.4.12, "Tectonic Models and Synthesis"
- Held Comment Resolution Meeting on the SP 8.3.1.2.2.4, R2, "Characterization of the Yucca Mountain Unsaturated Zone in the ESF".
- Verified comment resolution on the following study plans: SP 8.3.1.15.1.4, R1, "Laboratory Determination of the Mechanical Properties of Fractures;" SP 8.3.1.12.2.1,

R1, "Meteorological Data Collection at the Yucca Mountain Site;" and SP 8.3.1.8.1.2, "Physical Processes of Magmatism and Effects on the Proposed Repository."

- Completed review process on SP 8.3.1.12.2.1, R1, "Meteorological Data Collection at the Yucca Mountain Site".

## **DELIVERABLES, PUBLICATIONS, AND PRESENTATIONS:**

### Technical Data Management

- Compiled and published the third quarter Technical Data Catalog in accordance with DOE/NRC Site Specific Agreement.

### Regulatory and Licensing

- Presented the MGDS License Application Annotated Outline (LA AO) process to YMP WBS Managers and YMP participants. Briefing included information on overall LA AO process, repository licensing approach, scope and status of LA AO Revision 3, and use of InfoSTREAMS for LA AO development, review, and distribution.
- Transmitted quarterly update of NRC SCA open items resolution action plans and schedules to YMPO. Now project closing somewhat fewer open items by fiscal year's end than previously indicated.
- Transmitted comments on the NRC Draft Regulatory Guide, DG-3003, Format and Content for the License Application for the High-Level Waste Repository (FCRG) to YMPO. This is a contract deliverable.
- Prepared briefing for YMPO to present to OCRWM July 19 on the strategy and plans for ESF Title II Design Technical Exchange with NRC.
- Prepared status overheads and a revised action plan for Substantially Complete Containment in preparation for the Issue Resolution Steering Committee Meeting July 15.
- Transmitted a summary of 10 CFR Part 60 amendment history to YMPO Regulatory Interactions Branch.
- Submitted records package to YMPO for the following study plans: SP 8.3.1.12.2.1, R1, "Meteorological Data Collection at the Yucca Mountain Site;" SP 8.3.1.17.3.5, "Ground Motion at the Site from Controlling Seismic Events;" and SP 8.3.1.3.6.2, R0, "Diffusion".

## **ISSUES AND CONCERNS:**

- None.

## **PLANNED WORK FOR NEXT MONTH:**

### Performance Assessment

- Receive the remaining comments on the Draft Performance Assessment Management Plan. Comment resolution is in process. The goal is to have the comment responses back to the reviewers by August 6, 1993. Also received the final comments on the Performance Assessment Transition Plan and comment resolution will begin in August 1993.

### Regulatory and Licensing

- Participate in meeting of NAS Board on Radioactive Waste Management. Continue preparation and support of DOE positions on 1992 Energy Policy Act.
- Perform design review on ESF Package 1B, initial portion of North Ramp. Manage review by YMPO oversight and regulatory groups.
- Complete YMPO cost reduction proposals.
- Initiate preparation of compendium of NRC technical positions and DOE responses.
- Initiate program to coordinate gathering of meteorological data on the YMP to meet needs of all users.

### Site

- Continue preparation of a Topical Report on Seismic Hazard Assessment Methodology as part of the Issue Resolution initiative. Preparing a Baseline Change Request to change the delivery date to September 30, 1993.
- Continue development of Chapter 3 (Site Description) of the MGDS LA AO.

## **MAJOR NEAR TERM MILESTONES:**

### Regulatory and Licensing

- EBS Boundary Issue Resolution Letter Report, 9-30-93.
- Seismic Hazards Methodology Topical Report, 9-30-93.

**MGDS - EXPLORATORY STUDIES FACILITY**  
**WBS 1.2.6**  
**July 1993**

**MANAGER:**

R. M. Sandifer

**OBJECTIVES:**

Design and develop ESF to support in-situ site characterization. Facility to be developed considering licensing requirements for repository.

**PROGRESS DURING REPORT PERIOD:**

- The M&O provided ESF integration, construction management and design support to YMPO resulting in the following activities:
  - Tunneling activities continued at the North Portal Starter Tunnel. The Pilot Drift, North Slash, and South Slash were approximately 60.4 meters at month end. The upper level of the Starter Tunnel is complete at approximately 200 feet.
  - Completed the shotcreting of the Starter Tunnel from the lattice girders to station 0+60 meters.
  - Completed the shotcreting of the Jersey barriers of the drainage channel above the Starter Tunnel. This is required by the DIE to be completed before removing the bench from the tunnel.
  - Completed the grading of the concrete batch plant site and began placement and grading of base course on the site.
  - Completed the work of placing, grading and compacting base course on the North Portal Pad access road on July 14, 1993.
  - Started installation of the chain link fence around the laydown areas on the North Portal Pad.
- Inspected the Starter Tunnel daily regarding rock support in response to concerns addressed by USGS mappers. The Construction Management engineering geologist conducting the inspections has reported no indication of instability during July. This will continue to be an ongoing activity.
- Discussed means to maximize acquisition, distribution, and utilization of geotechnical data for design confirmation or modification and correction of potential excavation instability with USGS, USBR, Los Alamos, SNL, and M&O.
- Began the 90% Design Review for Package 2A July 19, 1993 as scheduled.

- Design activities continued for both Design Packages 1B and 2. Both packages were restructured to support the construction schedule for the balance of FY 1993 and FY 1994.

**DELIVERABLES, PUBLICATIONS, AND PRESENTATIONS:**

- Developed EDD TPO briefing on ESF activities for the month of July.

**ISSUES AND CONCERNS:**

- None.

**PLANNED WORK FOR NEXT MONTH/MAJOR NEAR TERM MILESTONES:**

- Continue support of excavation of the Starter Tunnel bench. This includes the installation, grouting and testing of the pattern rockbolts, installation of steel lattice girders, and the shotcreting of the tunnel and girders.
- Continue design activity on the Changehouse/Portal Control Building, the Main Warehouse, and the Shop/Warehouse. These facilities are to be located on the North Portal Pad.
- Conclude the 90% Design Review for Package 2A, and begin the 90% Design Review for Package 1B, August 2, 1993.
- Develop integrated ESF schedule for FY 1994.
- Facilitate start excavation of the Starter Tunnel lower bench August 21, 1993.

**MAJOR NEAR TERM MILESTONES:**

- None.

**MGDS - TEST FACILITIES**  
**WBS 1.2.7**  
**July 1993**

**MANAGER:**

D. B. Abel

**OBJECTIVES:**

Provide support services to the YMP Site Manager, provide field interface and coordination with Safety and Health Program, and provide field site management for M&O support staff.

**PROGRESS DURING REPORT PERIOD:**

- Coordinated Site Development Plan Committee and Nye County concerning location of facilities and available services, vendors, and suppliers located within Nye County. DOE Contracts and Administration personnel were involved in this discussion.
- Participated in the initial agenda discussions for upcoming YMP Tunnel Safety Symposium.
- Supported the DOE Site Manager by drafting the weekly activity reports and the monthly NORSOC report, and preparing the bi-weekly Job Package cost reports.
- Processed 50 temporary and five indefinite badge requests.

**DELIVERABLES, PUBLICATIONS, AND PRESENTATIONS:**

- Gave presentation to DOE Site Manager on status of TQM/Configuration Item Team status.

**ISSUES AND CONCERNS:**

- None.

**PLANNED WORK FOR NEXT MONTH:**

- Continue drafting reports for DOE Site Manager and processing badging requests.

**MAJOR NEAR TERM MILESTONES:**

- None.

**MGDS - PROJECT MANAGEMENT - NEVADA SITE**  
**WBS 1.2.9**  
**July 1993**

**MANAGER:**

D. B. Abel  
J. W. Frank

**OBJECTIVES:**

Provide overall Project Management and Project Control support for the M&O activities at the YMP site in Las Vegas, Nevada.

**PROGRESS DURING REPORT PERIOD:**

Plans and Procedures Department

- Provided requirements for YMP forms generation, revision, and printing so YMP forms can be added onto the automated forms system. Although YMP forms will not be loaded until InfoSTREAMS Increment 2, this is a major step towards that goal. Once the forms are available on the automated forms system, all YMP participants will have access to electronically generate forms that are used YMP-wide. This will not only add to the efficiency, but will decrease the number of illegible forms that are created on the YMP.
- Completed arrangements for establishing a PPD Branch Office at the Field Operations Center per request of the YMPO Project Control Branch (PCB). The office will be staffed by one Technical Writer beginning August 9, 1993. The writer will be available to assist authors "in the field" with the creation and editorial review of YMP documents.
- Completed preparation of the following design requirements documents:
  - YMP/CM-0019, Exploratory Studies Facility Design Requirements
  - YMP/CM-0022, Surface-Based Testing Facilities Requirements
  - YMP/CM-0023, Repository Design Requirements
  - YMP/CM-0024, Engineered Barrier Design Requirements
- Supported the YMP Procedure Revision Task for the QARD transition process. Thirty-two procedures have been submitted for revision: four have completed processing, and twenty-eight are in various stages of comment resolution.
- Prepared Draft YMP Style Guide. This is a useful tool that authors may use to prepare and revise YMP plans and procedures.

- Prepared Draft Document Action Request Tracking (DART) Users Manual. This manual is a detailed guide for users of the DART system.
- Processed eleven new Document Action Requests to submit documents into the QAP 6.2 review process; ten of which were put into the review cycle.

#### Project Control - WBS 1.2.9

- Responded to OCRWM HQ request for performance measurement indicators and measurement criteria and provided to OCRWM Acting Director.
- Completed comment resolution to PR-24 on FY 1993 Budget Validation.
- Provided cost performance data to the IG and responded to questions on participant funding allocations.
- Loaded and tested the May 1993 actuals for the Monitored Retrievable Storage (MRS) demonstration held July 14th.
- Supported Los Alamos Test Coordination Office in developing cost and schedule data for Job Package 93-10 large block experiment site preparation.
- Provided analysis to YMP Manager for activities to be accomplished in FY 1994, prepared packages and briefings for YMP Manager to discuss with RW-1 and the Secretary of Energy and OMB.
- Supported the development of budget scenarios and budget drills for FY 1994 and FY 1995 budgets to support OCRWM in an effort to get the program "off budget".
- Developed strategy for preparing the project work scope and budget data for RW-1 presentation on August 23.
- Supported the YMPO PCB Chief in the development of the participants work scope and budget splits for WBS elements 1.2.9, Project Management and 1.2.15, Support Services.

#### **DELIVERABLES, PUBLICATIONS, AND PRESENTATIONS:**

##### Plans and Procedures Department

- Provided PPD quarterly statistical analysis report for the third quarter for FY 1993 and year-to-date statistics to the YMPO PCB Chief per the Performance Evaluation Plan criterion.

### Project Control

- Prepared briefing inputs for financial and accomplishments charts for NWTRB meeting for YMP Manager.

### **ISSUES AND CONCERNS:**

- None.

### **PLANNED WORK FOR NEXT MONTH:**

#### Plans and Procedures Department

- Finish assisting YMP document authors with document revisions in the QA procedure revision task to meet QARD requirements by the August 30 scheduled completion date.
- Complete the DART Users Manual.
- Begin processing changes to OCRWM Headquarter QAPs as received per direction of YMP Quality Assurance Division. PPD will have responsibility for processing all future changes to 14 QAPs.

### Project Control

- Prepare and submit via PACS Participant Work Station preliminary FY 1994 budgets by P&S Account.
- Prepare for and support YMPO Division Directors for RW-1 FY 1994 Program Review.
- Prepare preliminary FY 1996 Internal Review Budget.
- Prepare YMP and M&O Annual Financial Plans.
- Provide final FY 1993 Approved Funding Plan changes.

### **MAJOR NEAR TERM MILESTONES:**

- None.

**MGDS - QUALITY ASSURANCE - NEVADA SITE**  
**WBS 1.2.11**  
**July 1993**

**MANAGER:**

J. A. Jackson

**OBJECTIVES:**

Provide overall QA support for the M&O activities at the YMP site in Las Vegas, Nevada.

**PROGRESS DURING REPORT PERIOD:**

- Placed a QA Design Support Team in the MGDS Design Group where it will perform an in-process QA review function as well as provide QA input for the design process. Also placed two Quality Engineers working "in-line" with designers to ensure compliance with QA requirements.
- Completed M&O audit of Las Vegas. Two potential CARs were identified: one on input sources to Waste Isolation Evaluations not being continually monitored for change as required by M&O QAPD Section 3, Section 3.1; and one on Determination of Importance Evaluations being prepared in accordance with plans and not procedures.

**DELIVERABLES, PUBLICATIONS, AND PRESENTATIONS:**

- None.

**ISSUES AND CONCERNS:**

- Commercial Grade procurement and dedication process are a major concern with DOE. The concern is both with how the specifications are written and how REECo procures and dedicates these items. A DOE audit of REECo the week of June 21, 1993 identified several problems in this area and several CARs were written (exact number unknown). Two of the CARs are directed at the M&O: one for the specifications and dedication process and one for the A/E accepting C of Cs as acceptance when the vendor has not been qualified (vendor supplied commercial grade materials).
- A DOE performed surveillance on the MGDS Design control area resulted in the initiation of four CARs: 1) contrary to the requirement in QAP-3-10, we did not list drawing design inputs either on the drawing or on a Drawing Design Inputs List, 2) a To Be Verified identifier was omitted on two drawings, 3) activities impacted by a Change Request were identified on the appropriate checklist, but were not explained as part of the change documentation, and 4) the CCB Secretary is not identifying the review method,

designating review organizations, or sending the change documentation package to all TPOs. This practice seems to be contrary to QMP-03-09, Revision 3.

**PLANNED WORK FOR NEXT MONTH:**

- Establish QA Steering Committee and QA Working Group.
- Provide ongoing support to the Design process improvement function.

**MAJOR NEAR TERM MILESTONES:**

- None.

**MGDS - INFORMATION MANAGEMENT**  
**WBS 1.2.12**  
**July 1993**

**MANAGER:**

J. W. Frank

**OBJECTIVES:**

Provide overall Information Resource Management, Records Management, Document and Drawing Management Services, and Publications Support for the M&O contract at the YMP site in Las Vegas, Nevada.

**PROGRESS DURING REPORT PERIOD:**

Publications Support Department

- Completed the new databases for action tracking, contract deliverables, Vienna items, and document review tracking in INGRES. Database for document review tracking is now being finalized. All databases are completed with the exception of public release document tracking, which will begin in about two weeks.
- Provided production support to:
  - Semi-Annual Progress Report (250 pages)
  - Design Specifications (1,607 pages)
  - MGDS Annotated Outline (40 pages)
  - Basis for Design (135 pages)
  - Site Characterization Plan (39 pages)
  - Annual Plan for Site Characterization (2,060 pages)
- Provided initial word processing services for 2,246 pages of text.
- Provided transcribing from tapes, technical editing, proofing, and formatting services for 5,227 pages of text.
- Processed 43 requests for technical information.
- Prepared required paperwork and for two public release documents, and compiled and transmitted the finished records packages to the Las Vegas Local Records Center (LVLRC). Forwarded a public release document for the Nuclear Information Records Management Association Symposium to M&O/Vienna for approval.

### Records Management

- No findings were identified as a result of a Performance Based Audit that was conducted on the LVLRC and the Document Control Center (DCC).
- A hands-on exercise was conducted to enable learning first hand about the Scanning and Imaging systems. We anticipate implementing a system in the near future.
- Participated in the two day Records Coordinators' Meeting that was held in Las Vegas. These meetings are held to encourage communication between Records Management organizations.
- Participated in a round table to allow Records Management and Document Control personnel to address issues related to the Interim Records Information System (IRIS), the IRIS versus Junior RIS, Records Inventory and Disposition Schedule (RIDS), Screening Criteria, Inclusion/Exclusion Criteria Lists and the Document Capture System (DCS).
- Indexed 49,343 record pages and microfilmed 46,273 pages, including M&O/Vienna.

### Drawing and Document Management Services

- Received approval on AP 1.5Q, "Distribution, Maintenance, and Use of Controlled and Managed Documents", and submitted it to the Document Control Center for distribution.
- Conducted the training and implementation of the Controlled Document Information System (CDIS) for M&O/Vienna.

### **DELIVERABLES, PUBLICATIONS, AND PRESENTATIONS:**

- None.

### **ISSUES AND CONCERNS:**

- None.

### **PLANNED WORK FOR NEXT MONTH:**

### Publications Support Department

- Complete YMP quarterly report and M&O monthly report.
- Complete processing of the Public Release Document records packages.
- Complete a 1994 ADP purchase plan for Publications Support.

### Records Management

- Assist YMP Records Manager with a revision to AP 1.18Q, Records Management: Las Vegas Record Source Implementation.
- Participate in Organizational Efficiency Meetings with PPD and Publication Support for future cross-training within organizations.

### Drawing and Document Management Services

- Issue CDIS User Manual by August 30, 1993.

### **MAJOR NEAR TERM MILESTONES:**

- None.

**MGDS - ENVIRONMENT, SAFETY, AND HEALTH**  
**WBS 1.2.13**  
**July 1993**

**MANAGER:**

F. Afshar

**OBJECTIVES:**

Provide overall Safety and Health integration support for the CRWMS M&O contract activities at the YMP site in Las Vegas, Nevada.

**PROGRESS DURING REPORT PERIOD:**

- Reviewed the 90% Design Review of Package 2A from a Safety and Health perspective and forwarded comments to the review team.

**DELIVERABLES, PUBLICATIONS, AND PRESENTATIONS:**

- Developed FY 1994 Budget Management Review Briefing presented to the YMP Manager.

**ISSUES AND CONCERNS:**

- Efforts to use dry construction methods or greatly reduce the amount of water used in dust control, during alcove work, may create possible respirable silica problems. Engineering controls need to be developed and implemented. Safety and Health personnel are working with the design team to ensure the controls are adequate.

**PLANNED WORK FOR NEXT MONTH:**

- Present additional Hazards Communication training for M&O personnel.
- Give Safety and Health Presentation to the Integration Working Group on August 19, 1993.

**MAJOR NEAR TERM MILESTONES:**

- None.

**MGDS - INSTITUTIONAL**  
**WBS 1.2.14**  
**July 1993**

**MANAGER:**

C. D. Van Natta

**OBJECTIVES:**

Within the framework of the Institutional Affairs organization, provide support to educational outreach and program development, including assistance in developing and maintaining university and community college programs and contacts. Provide backup support for enhancing public schools programs and interactions. Provide assistance to institutional/outreach programs, including staffing exhibits, assisting at public update meetings, and escorting tours.

**PROGRESS DURING REPORT PERIOD:**

- The leadership position taken by the M&O Institutional staff in several Nevada initiatives are believed to have contributed to developing a positive public image for the YMP. Events during July included an interview on KLVX-TV, as co-chair of the Nevada Business/Education collaborative, and appointment to the National Science Foundation Regional Conference Committee to plan a conference in Las Vegas in December, 1993.
- Initiated plans with the Community College of Southern Nevada and the University of Nevada, Las Vegas, to develop a computer graphics video produced by students to be used as part of the YMP educational outreach program.

**DELIVERABLES, PUBLICATIONS, AND PRESENTATIONS:**

- None.

**ISSUES AND CONCERNS:**

- None.

**PLANNED WORK FOR NEXT MONTH:**

- Initiate outreach integration planning.
- Continue planning for education conferences and adopt-a-park program.
- Evaluate Intern program.

- Complete final reviews of business precis.
- Write statement of work for community college intern program.
- Develop an options paper for visitor accommodations.

**MAJOR NEAR TERM MILESTONES:**

- None.

**MGDS - SUPPORT SERVICES**  
**WBS 1.2.15**  
**July 1993**

**MANAGER:**

D. B. Abel  
M. F. Penovich

**OBJECTIVES:**

Provide overall Training and Support Services for the M&O activities at the YMP site in Las Vegas, Nevada.

**PROGRESS DURING REPORT PERIOD:**

Administrative Services

- Continued ninth floor construction.

Training

- Training statistics:
  - Number of training classes held . . . . . 15
  - Number of M&O personnel receiving training . . . . . 109
  - Contact training hours . . . . . 191
  - Audits/Surveillances . . . . . 2
- Continued the following:
  - Providing training at the FOC for M&O personnel.
  - Coordinating project ESF underground safety and health training.
  - Providing metric overview training for M&O personnel.
  - Participating in the YMPO Safety & Health audit of the M&O S&H program.
- Coordinated Automated Forms System training for 45 M&O personnel.

**DELIVERABLES, PUBLICATIONS, AND PRESENTATIONS:**

- Presented the following training classes:
  - M&O Project Overview . . . . . 6 M&O personnel
  - Computer Security Awareness . . . . . 13 M&O personnel
  - Safety and Health Hazards Communications . . . . . 9 M&O personnel
  - TQM Awareness . . . . . 7 M&O personnel

Metric System Overview .....	6 M&O personnel
CM Overview .....	25 M&O and YMP participant personnel
QA training .....	1 M&O person in support of Design Review

**ISSUES AND CONCERNS:**

- None.

**PLANNED WORK FOR NEXT MONTH:**

Training

- Present routine M&O training per the August 1993 M&O training calendar:
  - Training at the FOC for M&O Personnel
  - M&O Program Indoctrination
  - M&O Project Overview
  - Advanced Stress Management
  - Computer Security Awareness
  - TQM Awareness
  - Hazards Communications
  - Fundamentals of Supervision and Management
  - Managing Interpersonal Relationships
  - Metric System Overview
  - Support for the M&O Design Control Improvement Program
- Integrate YMP training efforts in the underground Safety and Health training program.

Administrative Services

- Complete construction, fit-up, and occupancy of the ninth floor.

**MAJOR NEAR TERM MILESTONES:**

- None.

# Los Alamos

Los Alamos National Laboratory  
Los Alamos, New Mexico 87545

WBS 1.2.9.1  
QA N/A

July 15, 1993

TWS-EES-13-07-93-037

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

Dear Mr. Gertz:

## Highlights of the Los Alamos Monthly Activity Report—June 1993

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

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

Sincerely,

  
Julie A. Canepa

SHK/elm

Attachment: a/s

Cy w/att:

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

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

Cy w/o att.:

CRM-4, MS A150

I-344908

6

RPTS 1.3  
7-15-93

## June 1993 Highlights from Los Alamos

### WBS 1.2.3.2.1.1.1 Mineralogy/Petrology

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

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

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

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

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

#### **WBS 1.2.3.2.1.1.2 Alteration History**

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

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

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

#### **WBS 1.2.3.2.5 Volcanism**

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

Two field sessions were conducted. In the first, the thickness and clast-size distribution of the scoria-fall sheet formed during eruptions of the main cone were measured. In the second, revised contacts of the Qs<sub>6</sub>/Ql<sub>6</sub> unit were mapped on aerial photographs.

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

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

#### **WBS 1.2.3.3.1.2.2 Water-Movement Tracer Tests**

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

#### **WBS 1.2.3.4.1.3 Speciation/Solubility**

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

**Solubility.** We prepared solutions for a new series of experiments at 25°C in 0.1 M  $\text{NaClO}_4$  (i.e., the neutral electrolyte experiments).

We used absorption spectroscopy to determine the speciation of Np in an undersaturation experiment in UE25p #1 water at 60°C and pH 6; the spectrum deconvoluted into two peaks. We also determined that this equilibrium solution contains  $88.6 \pm 5.8\%$   $\text{NpO}_2^+$  and  $11.4 \pm 6.3\%$  neptunium carbonate complex.

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

#### **WBS 1.2.5.4.6 - Caisson Experiment**

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

# Los Alamos

Los Alamos National Laboratory  
Los Alamos, New Mexico 87545

WBS 1.2.9.1  
QA N/A

August 16, 1993

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

Dear Mr. Gertz:

## Highlights of the Los Alamos Monthly Activity Report—July 1993

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

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

Sincerely,



Julie A. Canepa

SHK/elm

Attachment: a/s

Cy w/att:

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

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

Cy w/o att.:

CRM-4, MS A150

I-346081  
BPH

## July 1993 Highlights from Los Alamos

### **WBS 1.2.3.2.1.1.1 Mineralogy/Petrology**

Staff continued to prepare specimens from UE-25 UZ-16 for bulk-sample XRD analysis.

Staff used instrumental neutron activation analysis to obtain calcite chemistry data for samples from UE-25 UZ-16, USW G-1, USW GU-3, USW G-4, and UE-25A #7. These data will be added to our calcite database. The chemical characteristics are being studied to understand the distinctions between saturated-zone and unsaturated-zone calcite precipitation. Subsamples of the same calcites are being studied for isotopic composition, age, and fluid inclusion data at the USGS.

Chemical data were also obtained for two clay separates from drill cores USW GU-3 and USW G-4, and for a clay separate from the portal at the north-ramp starter tunnel. These clays are being studied for further evidence of transport within fracture networks at Yucca Mountain.

Staff began preparing approximately thirty UZ-16 core samples for XRD analysis. We also analyzed a number of fracture samples using the Siemens system.

In May, D. Broxton collected outcrop samples to examine chemical and mineralogical variation in zeolitic tuffs in areas north and west of Yucca Mountain. This month, these samples were distributed for thin-section, XRD, and X-ray fluorescence analysis. Preliminary results were completed and they indicated that distribution of the zeolites and their chemistries reflect their proximity to hydrothermally altered areas.

### **WBS 1.2.3.2.1.1.2 Alteration History**

S. Levy, D. Bish, and D. Vaniman met with Steve Saterlie of the M&O to discuss possible geochemical and mineralogical assessments of various repository thermal load simulations. At this meeting, and in a follow-up conference call, we emphasized our concern that such simulations should address how lithologic variability across the mountain might contribute to the extent and intensity of repository hydrothermal effects.

D. Bish gave a presentation entitled "Alteration History of Yucca Mountain due to Thermal Effects: Analog for a Hot Repository?" to the Nuclear Waste Technical Review Board meeting on Thermal Loading: the Integration of Science and Engineering in Denver on 13 July. He highlighted three types of alteration at Yucca Mountain: (1) Saturated-zone alteration related to

the thermal effects of the Timber Mountain Caldera, which provides insight into the long-term thermal stability of zeolites and clays under saturated conditions. (2) Alteration in the Topopah Spring tuff related to cooling of the pyroclastic unit, which offers an opportunity to assess the variability associated with fracture-dominated hydrothermal alteration in the unsaturated zone during a relatively short geologic time period. (3) Comparisons of glassy and zeolitized nonwelded tuffs below the candidate host rock, which illustrate the changes in hydrologic properties of these rocks that would take place if a repository hydrothermal regime causes zeolitization of existing glassy nonwelded tuffs.

#### **WBS 1.2.3.2.5 Volcanism**

Staff completed simulation modeling using 1000 iterations for subsets of E1 based on homogeneous Poisson assumptions. Multiple distribution sets were modeled including normal, triangle, modified triangle, and Poisson, for data from the "Volcanism Status Report." The modeling was divided into two sets, and probability distributions of E1 (10% step increments) were obtained for both modeling sets.

Volcanism task members attended a two-day field trip to field verify a geologic map of the northwest area of Yucca Mountain and eastern Crater Flat. Map research and production was sponsored by the State of Nevada, and the map has been submitted to the Nevada Bureau of Mines for publication.

Field studies were conducted at Cinder Cone, a scoria cone and lava complex in the northeastern part of Mt. Lassen National Park. This volcanic center is reported to have erupted in historic time (last eruption 1850). Moreover, episodic eruptions from the center (4 to 5 eruptive intervals) may have occurred over a span of three centuries. This volcanic center provides an historic example of a small-volume basalt center that was thought to be a monogenetic center but actually exhibits polycyclic eruptive behavior. Additionally, the historic eruption is closely analogous to the inferred youngest stage of eruptive activity at the Lathrop Wells and Hidden Cone centers in the Yucca Mountain region.

Geologic mapping was completed at North Alkali Butte, a mixed hydrovolcanic-strombolian volcanic center in New Mexico.

#### **WBS 1.2.3.3.1.2.2 Water-Movement Tracer Tests**

The subcontractor, Hydro Geo Chem, completed chloride and bromide analyses of a soil profile collected to a depth of 70 cm from the vicinity of Test Cell C. These samples were collected to test the hypothesis that nuclear rocket tests conducted during Project Rover in the 1960's produced significant levels of chlorine-36, which may have subsequently contaminated the ream-bit cutting collection system used at UZ-N55.

J. Fabryka-Martin reported the current status of this activity at the TPO meeting on 30 July in Las Vegas. She presented a talk entitled "Preliminary Results from Chlorine-36 Studies."

#### **WBS 1.2.3.4.1.2.1 Batch Sorption Studies.**

J. Leckie at Stanford University completed a study of uranium sorption onto goethite and prepared a report on his findings. This report provides mechanistic information regarding the sorption process of actinides onto oxide minerals at Yucca Mountain. The report is in internal review.

#### **WBS 1.2.3.4.1.2.3 Sorption Models.**

Previous work on goethite crystal #9 had shown that this particular crystal exhibited a variety of surface features. This month the crystal was mounted in the AFM wet cell in preparation for imaging under water. Our results indicate that goethite surface reactions with water, especially pitting and roughening, are essentially instantaneous. This raises the question of whether highly sorbing surfaces are created during typical batch sorption experiments, leading to higher estimates of adsorption than might be observed under natural conditions. During the next two months, we will try to repeat these experiments using large hematite crystals. In future experiments, surfaces of this type will be reacted with various sorbers, and we will attempt to image the location and relative coverage of the adsorbed species.

#### **WBS 1.2.3.4.1.3 Speciation/Solubility**

**Speciation.** New carbon-13 NMR samples were prepared for the Np(VI) carbonate system between pH 9.5 - 5.7 using carbon-13 enriched carbonate. We continued to study the temperature dependence of the  $\text{NpO}_2^+$  carbonate system using Vis/NIR absorption spectroscopy.

Temperature data at 30, 50 and 90°C was collected for Np.

**Solubility.** Preparation for the solubility experiments in 0.1 M NaClO<sub>4</sub> at pH 6, 7, and 8.5 continued. The pH 6 and 7 solutions equilibrated at the target pH values quickly, but the pH 8.5 solution was much slower to equilibrate, probably because of the very low partial pressure of CO<sub>2</sub> required to meet this target value. The neptunium solubility experiments have now been started at all three pH values. The americium / neodymium experiments will start the first week in August, and the plutonium experiments will start the following week.

#### **WBS 1.2.3.4.14 Radionuclide Transport**

Staff submitted data that describes the diffusion of non-sorbing radionuclides through Yucca Mountain tuffs. These data indicate that the diffusion coefficient of non-sorbing radionuclides is approximately  $10^{-6}$  cm<sup>2</sup>/s. Radionuclides that exist in solution (such as pertechnetate) exhibit coefficients on the order of  $10^{-7}$  cm<sup>2</sup>/s, which is caused by charge and size exclusion.

#### **WBS 1.2.5.4.6 - Caisson Experiment**

The steady-state flow field is being established in the caisson. A problem developed with the lower-boundary condition during our attempt to saturate the caisson, and sand was discharged, causing a shift in the plate. As a result, approximately 40 percent of the porous cups are no longer functional because the lines have been clogged with sand. The lower boundary will be used to sample, but there are insufficient cups to control the pressure head. We will use instruments to measure steady-state flow and thus determine when to inject the tracers.

### Los Alamos Publications for July

1. Bish, D. L., "The Importance of Zeolites in a Potential High-Level Waste Repository at Yucca Mountain, Nevada," in *Zeolite '93: 4th International Conference on the Occurrence, Properties, and Utilization of Natural Zeolites, June 20-28, 1993*, Boise, Idaho, pp. 209-211 (1993).
2. Bish, D. L., "Thermal Behavior of Natural Zeolites," in *Zeolite '93: 4th International Conference on the Occurrence, Properties, and Utilization of Natural Zeolites, June 20-28, 1993*, Boise, Idaho, pp. 48-49 (1993).
3. Carlos, B., D. Bish, S. Chipera, and S. Craven, "Fracture- Lining Manganese Oxide Minerals in a Silicic Tuff," *Chemical Geology*, Vol. 107, pp. 47-69 (July 1993).
4. Carlos, B., S. Chipera, and D. Bish, "Distribution of Fracture-Lining Zeolites at Yucca Mountain, Nevada," in *Zeolite '93: 4th International Conference on the Occurrence, Properties, and Utilization of Natural Zeolites, June 20-28, 1993*, Boise, Idaho, pp. 60-61 (1993).
5. Chipera, S. J., D. L. Bish, and B. A. Carlos, "Equilibrium Modeling of the Formation of Zeolites in Fractures at Yucca Mountain, Nevada," in *Zeolite '93: 4th International Conference on the Occurrence, Properties, and Utilization of Natural Zeolites, June 20-28, 1993*, Boise, Idaho, pp. 67-69 (1993).

### Completed Los Alamos Milestones for June

- 3044 Measurement of Unsaturated Hydraulic Conductivity in Yucca Mountain Tuff
- 3212 Far-Field Transport of CO<sub>2</sub> : Retardation Mechanisms and Possible Validation Experiments
- 3142 Preliminary Assessment of Clinoptilolite: K-Ar Results from Yucca Mountain, Nevada, USA
- 3201 A Strategy for Validating a Conceptual Model for Radionuclide Migration in the Saturated Zone Beneath Yucca Mountain

### Completed Los Alamos Milestones for July

- 3188 SORBEQ - A One-Dimensional Model for Simulating Column Transport Experiments
- 3031 Actinide (IV) and Actinide (VI) Carbonate Speciation Studies by PAS and NMR Spectroscopies
- 3352 Distribution of Potentially Hazardous Phases in the Subsurface of Yucca Mountain
- 3343 K/Ar Dating of Clinoptilolites, Mordenite and Associated Clays from Yucca Mountain, Nevada