



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: Paul T. Prestholt and John W. Gilray  
Sr. On-Site Licensing Representatives

DATE: July 23, 1992

SUBJECT: OFFICE OF GEOLOGIC DISPOSAL (OGD) WEEKLY HIGHLIGHTS FOR THE  
WEEK OF JULY 10, 1992, and YUCCA MOUNTAIN SITE OFFICE (YMSO)  
FIELD ACTIVITY REPORT FOR THE WEEKS ENDING JULY 3 and JULY 10,  
1992

Please find enclosed the above-referenced reports.

There is nothing requiring specific management attention in  
the reports.

nan

c: w/encs.: Charlotte Abrams, M/S 4 H 3  
Rosetta Virgilio, M/S 4 H 3  
Dean Kunihiro, Region 5

NOTE: Also enclosed is the LLNL June Project Status Report

190035

9208030296

WM-11  
102  
NH03  
11



**Department of Energy**  
Yucca Mountain Site Characterization  
Project Office  
P. O. Box 98608  
Las Vegas, NV 89193-8608  
JUL 17 1992

WBS 1.2.9.2  
QA: N/A

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

OFFICE OF GEOLOGIC DISPOSAL (OGD) WEEKLY HIGHLIGHTS FOR THE WEEK ENDING  
JULY 10, 1992

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

On July 4, 1992, two aftershocks were recorded with magnitudes of 3.3 and 3.8 on the Richter scale and another aftershock, magnitude 4.4, was recorded July 5, 1992, at 6:54 a.m. UTZ about 7 kilometers deep in the crust at 36.730 N, 116.268 W, which is the approximate location of Little Skull Mountain. Later, July 5, 1992, and again on July 6, 1992, there were two more aftershocks at the same general location with a magnitude of about 3.

A. Site Characterization Planning

Field Operations

Due to a dust emission problem, drilling activities on UZ-16 borehole were shut down July 6-7, 1992. The Site Manager received the industrial vacuum loader ("bag house"), which was loaned to YMP by the Nevada Weapons Program, to rectify the dust emission problem associated with the drilling. The "bag house" was tested and approved for utilization by the U.S. Department of Energy (DOE) and the Regulatory & Site Evaluation Division. Reynolds Electrical & Engineering Co., Inc. (REECO), began production coring on July 8, 1992. The UZ-16 borehole has been reamed to 118 feet.

An initial damage assessment of \$905,000 was received from Raytheon Services Nevada (RSN) on the damage to four buildings in Area 25 caused by the earthquake on June 29, 1992. REECO is also preparing a detailed estimate, based on their assessment, which was completed on July 6, 1992. Their estimate will be provided to the Site Manager next week. Of the four buildings that were damaged, the Field Operations Center and Yucca Mountain Site Office were damaged the most.

Sample Management Facility

Processing of core from NRG-1 was completed, while processing of core and cuttings from UZ-16 continued. The Sample Overview Committee meeting, which was held on July 7, 1992, was supported. A borehole security survey of existing holes in Area 25, Solitario Canyon, and the Nevada Test Site (NTS) was conducted.

Exploratory Studies Facility (ESF) Task Force Activities

The 90 percent design review status is on schedule. In addition to those in the 50 percent review, the 90 percent review is comprised of 80 drawings, 38 analyses, and 52 specifications. It is currently undergoing 90 percent management technical review.

<u>Drawings</u>	<u>Analyses</u>	<u>Specifications</u>
80 Through Engineering	38 Initial Draft	52 Initial Draft
80 Through Computer-Aided Draft Design	38 Final Draft	52 Final Draft
80 Through Review	38 Through Review	52 Through Review

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

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In Screening Review .....	0
In YMPO and Headquarters (HQ) Review .....	0
Awaiting Comment Resolution .....	12
Awaiting Author Revision .....	6
In YMPO/HQ Verification Audit .....	8
Preparing to Submit or Awaiting YMPO Approval .....	3
Awaiting Submission to the U.S. Nuclear Regulatory Commission (NRC) .....	0
NRC Phase 1 Review .....	14
NRC Acceptance .....	27
Total .....	70

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SCP/SP Status:

Total SPs Assigned to Cover 106 Studies .....	103
SPs Not Yet Submitted for Review .....	39
SPs Submitted for Initial Review .....	64
Revised SPs Submitted for Review .....	6
Total SPs Submitted for Review .....	70

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State of Nevada Comments Status:

Received Comments from the State of Nevada ..... 10  
Responses Transmitted to the State of Nevada ..... 5

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NRC Comments Status:

Received Comments from NRC ..... 14  
Responses Transmitted from OGD to DOE/HQ ..... 6

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B. Project Planning and Control

Participant scheduling inputs for the Mission 2001 planning exercise were received. The schedule data was integrated into the Long-Range Plan/Integrated Project Schedule for production of the revised project schedule. It is anticipated that additional Mission 2001 replanning data will be received from the participants.

C. Quality Assurance Implementation

Determination of Importance and Grading Enhancement (DIGE)

Continuation of Existing Process

The transition process, which consists of the cancellation of Administrative Procedure (AP) 5.28 and the new Revision 1 of AP 6.17Q, continues.

Quality (Q) List and Q-List Procedure Development

Sandia National Laboratories (SNL) continues progress in their Items Important to Waste Isolation (IITWI) and Items Important to Safety activities. Training preparations of AP 6.17Q, for use in training new Assessment Team (AT) members, continue.

Implementation

Establishment of the new AT continues, with emphasis on the selection of AT members. An AP 6.17Q, Revision 1, implementation plan is being prepared for YMPO approval. Technical Direction Letters to SNL and RSN, which request submittal of the plan for writing the implementing procedures for review and approval by YMPO, are currently in the approval/signature cycle.

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Task Management

Revision 1 of the DIGE Management Plan has been approved and is in distribution.

D. Public Outreach and Institutional Activities

YMPO Institutional and External Affairs (IEA) staff researched and gathered information, in response to numerous media requests, which resulted from last week's earthquakes.

IEA staff drafted a response to recent newspaper editorials for Carl Gertz, Project Manager.

A tour to NTS and Yucca Mountain (YM), Nevada, was conducted on July 6, 1992, for Senator Richard Bryan and Press Secretary James Mulhall. Nick Aquilina (Manager, DOE Nevada Field Office), Carl Gertz, and other DOE and contractor staff accompanied them on the tour.

Steven Mattson, Technical & Management Support Services, gave a general overview presentation to the University of California, Santa Barbara, summer session on July 7, 1992, in Santa Barbara, California. There were approximately 25 attendees.

Carl Gertz provided a general overview presentation, "Update on Major New Work," to members of the Nuclear Waste Technical Review Board (NWTB) on July 7, 1992, in Denver, Colorado. The presentation included the latest information on the earthquake at the Rock Valley study area, which is located near Little Skull Mountain.

Max Powell, YMPO, gave an educational presentation to a Henderson Community College summer session history class of 20 students on July 8, 1992, in Henderson, Nevada.

Dale Van Natta, Civilian Radioactive Waste Management System Management and Operating Contractor (CRWMS M&O), coordinated a literature exchange between the CRWMS/M&O Technical Information Center and the Clark County Nuclear Waste Division Library.

Todd Kaish, CRWMS/M&O, is coordinating tours of the Oconee Power Plant for affected county representatives and state university professors and administrators.

A tour to YM was conducted on July 8, 1992, for 25 guests from the University of Georgia. On July 10, 1992, a tour to YM was provided for 15 guests from the University of Nevada, Las Vegas (UNLV) Summer Camp.

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The YMP exhibit was set up and staffed for the Land Faire Conference at the Mirage Hotel in Las Vegas, Nevada, on July 9, 1992.

IEA staff began preparations for the White Pine County Town Forum, which will be held on July 16, 1992, in Ely, Nevada. At the invitation of White Pine County, the State of Nevada and YMPO are scheduled to provide brief presentations and answer questions.

## II. ANALYSIS & VERIFICATION DIVISION

Staff participated in the Management Review of the 90 percent complete ESF Design Package 1A in Las Vegas, Nevada, July 6-7, 1992. They also participated in a meeting on July 9, 1992, in Denver, Colorado. The "Fast Paths" report, which is being prepared jointly by the Geochemistry and Hydrology Integration Groups, was discussed.

Staff attended the quarterly NWTRB Full Board Meeting July 7-8, 1992, in Denver, Colorado; and the Mine Waste Management and Remediation Conference July 7-10, 1992, in Butte, Montana.

On July 10, 1992, a meeting between the NRC staff and Nuclear Management and Resources Council was attended in Rockville, Maryland. The revision of 10 CFR Part 100, Appendix A ("Seismic and Geologic Siting Criteria for Nuclear Power Plants"), was discussed.

## III. GENERAL INFORMATION ITEMS

### CRWS/M&O

DOE signed off the update for the ESF Design Requirements document. The update to remove the criteria letters from Appendix A on the Technical Requirements for the Yucca Mountain Surface-Based Testing was also signed off and issued.

### SNL

The Performance Assessment (PA) evaluation for the neutron holes Phase II activities was completed. An activity was initiated to assist RSN in providing PA input, with the objective of identifying IITWI for the ESF Design Package 1A.

### Los Alamos National Laboratory (Los Alamos)

Los Alamos was audited by DOE—the third audit in a set of three mini-audits for the year. The focus was on organization, deficiencies, and data transfer.

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>
<b>A. <u>DOE/HQ Meetings</u></b>			
Wednesday, July 22	OCRWM Biweekly Seminar	Washington, DC	C. Gertz
<b>B. <u>CRWMS M&amp;O/DOE Meetings</u></b>			
Wednesday, July 22	CRWMS M&O Program Review	Vienna, VA	C. Gertz
Tuesday, July 28	Monthly Managers Review	Las Vegas, NV	R. Barton
<b>C. <u>Internal and DOE/NV Meetings</u></b>			
Wednesday, July 22	NV Managers Program Review	Las Vegas, NV	C. Gertz
<b>D. <u>NRC Interactions</u></b>			
Wednesday, July 22	Technical Exchange - Three-Bucket Approach	Rockville, MD	T. Bjerstedt
Thursday, July 23	Agreement on Format and Content of Yucca Mountain SPs	Rockville, MD	T. Bjerstedt
Tuesday, August 25	Technical Exchange - Resolution of Volcanism Related Concerns	Video- Conference	T. Bjerstedt
Wednesday- Thursday, September 16-17 (Tentative)	Technical Exchange - Midway Valley	LV/NTS/YM	T. Bjerstedt
Tuesday, September 29	Technical Exchange - Functional Analysis of 10 CFR 60	San Antonio, TX	T. Bjerstedt

<u>Date</u>	<u>Event</u>	<u>Location</u>	<u>YMPO Contact</u>
<b>D. <u>NRC Interactions</u> (Continued)</b>			
Wednesday, October 28	Technical Exchange - Total System Performance Assessment	Albuquerque, NM	T. Bjerstedt
Tuesday, November 17	Technical Exchange - Volcanism	Rockville, MD	T. Bjerstedt
Wednesday, November 18	Interaction Planning Meeting	Rockville, MD	T. Bjerstedt
<b>E. <u>NWTRB Interactions</u> (P)</b>			
Tuesday- Wednesday, October 13-14	NWTRB Full Board Meeting	Las Vegas, NV	A. Simmons
Thursday- Friday, October 15-16	NWTRB Panel on SG&G	Las Vegas, NV	A. Simmons
<u>Date</u>	<u>Event</u>	<u>Location</u>	<u>Speaker</u>
<b>F. <u>State and Public Interactions</u></b>			
Thursday, July 16	Town Forum White Pine County	Ely, NV	A. Robison
Tuesday, July 28	Yucca Mountain Lecture Series (P)	Las Vegas, NV	A. Flint
Wednesday, July 29	Nevada Department of Transportation	Sparks, NV	P. Standish
Thursday, July 30	Yucca Mountain Lecture Series (P)	Beatty, NV	A. Flint
Wednesday, August 5	UNLV Alumni Center	Las Vegas, NV	C. Gertz G. Milligan
Thursday, August 6	Rotary Club of Las Vegas	Las Vegas, NV	C. Gertz
Monday, August 31	Nuclear Information & Records Management Association Symposium	San Francisco, CA	C. Gertz

<u>Date</u>	<u>Event</u>	<u>Location</u>	<u>Speaker</u>
<b>F. <u>State and Public Interactions</u> (Continued)</b>			
Thursday, September 17	American Nuclear Society	Lynchburg, VA	C. Gertz
Monday, September 21	Emerging Technologies for Hazardous Waste Management	Atlanta, GA	C. Gertz
Tuesday, September 29	American Institute of Professional Geologists	Lake Tahoe, NV	J. Younker
Wednesday, October 7	North American Tunneling Conference	Boston, MA	C. Gertz
Thursday, October 8	Massachusetts Institute of Technology (MIT)	Cambridge, MA	C. Gertz
Thursday, October 22	LV Chamber of Commerce	Las Vegas, NV	C. Gertz
Friday, October 30	Colorado School of Mines	Golden, CO	C. Gertz

<u>Date</u>	<u>Event</u>	<u>Location</u>
<b>G. <u>Exhibits Scheduled</u></b>		
Thursday, July 16	Town Forum White Pine County	Ely, NV
Friday, July 17	Public Open House (P)	Las Vegas, NV
Tuesday- Wednesday, July 28-29	Department of Transportation Railroad Safety Meeting	Sparks, NV
Wednesday- Sunday, August 12-16	Nevada State Fair	Reno, NV

<u>Date</u>	<u>Event</u>	<u>Location</u>
<b>G. <u>Exhibits Scheduled</u> (Continued)</b>		
Thursday- Saturday, August 20-22	Nevada League of Cities	Winnemucca, NV
Saturday, August 22	Public Open House (P)	Las Vegas, NV
Friday- Sunday, September 18-20	Home Show	Las Vegas, NV
Friday- Sunday, September 18-20	Pahrump Harvest Festival	Pahrump, NV
Saturday, September 26	Public Open House (P)	Las Vegas, NV
Sunday- Wednesday, September 27-30	American Institute of Professional Geologists	Lake Tahoe, NV
<u>Date</u>	<u>Event</u>	<u>Escorts</u>
<b>H. <u>Tours Scheduled</u></b>		
Monday, July 13	French Utility Officials	R. Gonzales
Friday, July 17	Public Open House (P)	Various Escorts
Wednesday, July 29	<u>Las Vegas Review- Journal</u> Editorial Board	G. Fisher
Friday, July 31	British Government Officials	TBD
Saturday, August 22	Public Open House (P)	Various Escorts

<u>Date</u>	<u>Event</u>	<u>Escorts</u>
H. <u>Tours Scheduled</u> (Continued)		
Saturday, September 26	Public Open House (P)	Various Escorts
Saturday, October 17	Public Open House (P)	Various Escorts

YMP:VFI-4409

*Maxwell Blanchard*  
for Carl P. Gertz  
Project Manager



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

WBS 1.2.7.4  
QA: N/A

**JUL 15 1992**

Carl P. Gertz, Project Manager, YMP, NV

YUCCA MOUNTAIN SITE OFFICE (YMSO) FIELD ACTIVITY REPORT

The following are the significant field activities for the weeks ending July 3, 1992 and July 10, 1992:

1. Field Operations Center, (YMSO)

A. Management and Administration

- a. The Site Manager and FOC staff participated in and provided operational and logistical and support to several tours conducted during this period. These were: SAIC Technical Advisory Committee; Senator Richard Bryan and Staff; University of Georgia and UNLV Summer Camp.
- b. The Site Manager and several of the FOC staff participated in the damage walk through and assessment of several facilities on the "Ranch" due to the earthquakes on June 28th and 29th. Several aftershocks were felt on June 30th in the Yucca Mountain Site Office facility. Of the four facilities that had some damage, i.e. RSN Field Engineering Group; Samples Management Facility, Hydrologic Research Facility and the Site Office, the Site Office received the most extensive damage, structural as well as architecturally.
- c. Site Manager participated in the 90% management review of the ESF Title II Design, North Portal Area, Design Package 1A.
- d. Site Manager reviewed and commented on the draft contents of Job Package 92-12, Quaternary Faulting.
- e. Site Manager transmitted a letter of request to the Director, NTSO for approval of YMPO to install three seismographs inside of "X" Tunnel. Approval is expected to be granted to the Site Manager on July 13, 1992.
- f. As the staff meeting on July 9, 1992, the Site Manager, made available the video tape of the swearing - in ceremony of Doloris Rozzi, the new Director AD. Admiral Watkins also commented on enhancing equal employment opportunity and affirmative employment with DOE. Overwhelming positive feedback was received from many of the staff meeting attendees.

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- g. The Site Manager gave his concurrence and approval for the initial on-site Driving Safety Class that will be conducted at the FOC on July 23, 1992 from 1-3 p.m.

B. Photographic Service Coordination

- a. The level of support from Johnson Controls has been steadily increasing in direct correlation to field and institutional activities, and despite their "first priority" obligation to DNA.
- b. Response time in support of the Seismic event of 6/29/92 was impressive. As soon as a call was placed on 8:00 a.m. two photographers Von Moll and Rick Smith were assigned and traveled to Area 25 where they met with Marilyn Kamma and Rick Davis to proceed with damage report photography. Arrangements were also made to work that evening and the following evening to support negative processing and proof processing of the 200 images. Additionally a rush request for viewgraphs from the previous week's media tour were delivered to Las Vegas that evening.
- c. Half of the proofs (approx. 100) were completed the next day (6/30/92) for W. Wilson and Carl Gertz.
- d. From the First half of the proof set, fourteen of the images were selected and viewgraph order was rushed through as a priority over DNA work (for the third time in less than 30 days).
- e. On 7/2/92 a request for video coverage of X-Tunnel was orchestrated on very short notice and Frank Tyner postponed a mission for DNA to accommodate the YMP Project request (for the second time in less than 30 days). The videotape had to be duplicated and delivered to Carl Gertz in Las Vegas that same day (7/2/92), the fourteen viewgraphs and final set of proofs were also delivered at that time for Carl to take to the NWTRW meeting.
- f. On 7/6/92 David Wehner was assigned to photographically cover the Senator Bryan tour on another short notice request and pulled a long shift to accommodate the schedule.

C. Project Safety and Health

- a. Supported on going tours.
- b. Assisted Site Manager in personnel control and property assessment damage for earthquake.

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- c. Finalized drafts of 4 FOI's and submitted the S&H for review.
- d. Sampled extensively for three days at UZ-16 drill site.
- e. Assisted REECo IH in air sampling in FOC for asbestos as a result of building movement during earthquake.
- f. Continued development of functional appraisal protocol for respiratory protection program.
- g. Conducted S&H Advisory Committee Meeting, drafts of S&H FOI's distributed for review. Wrote minutes of meeting.
- h. Drafted functional appraisal protocol on respiratory program.
- i. Performed functional appraisal on USGS and RSN at site.
- j. Participated in 90% review of North Portal ESF drawings.
- k. Submitted report on ways to increase bag life on HAZ-VAC at UZ-16, in order to reduce employee exposure when replacing bags.
- l. Attended annual security briefing refresher.
- m. Continued air sampling for silica at UZ-16.

2. Raytheon Services Nevada, (RSN)

1. Field Support

- a. Survey crew continued work on Area 25 control net.
- b. The Field Engineering Group checks the trench walls on a daily basis in order to determine a suitability for continued operations.
- c. The Field Engineering Group supporting UZ-16 with Drilling Engineers on-site.
- d. Survey crew establishing control at existing Drill Hole sites.
- e. Survey crew supporting UZ-16, Midway Valley Trenches, and Phase II of the Test Pits.
- f. RSN supporting Phase II Trenching effort with on site soils engineers and construction monitoring.

- g. Survey obtained topographic information on proposed Hazardous Materials Storage Area.
- h. Soils Engineer checked out Midway Valley Trenching and Trench 14 for damage after earthquake and no damage reported.
- i. RSN Engineering conducted survey of earthquake damage to the FOC and other Area 25 buildings to determine preliminary estimate of repair.

2. Quality Control

- a. Monitored UZ-16 activities utilizing the LM-300. REECO experienced problems with the system. Haz-Vac truck brought in and connected to system; bypassing existing system. New vac system activated and resumed reaming and coring. Vac system overheats after continuous operation.

3. Sample Management Facility, (SMF/SAIC)

- a. Continued processing core and cutting from UZ-16 and NRG-1.
- b. Removed 13 cuttings specimens from UZN-53 for LANL.
- c. Removed 84 sealed core specimens from UZN-55 for USGS.
- d. Continued processing core and cuttings from UZ-16.
- e. Completed processing core from NRG-1.
- f. Supported Sample Overview Committee meeting, 07/07.
- g. Conducted borehole security survey for existing holes in Area 25, Solitario Canyon and NTS.

4. YMP Hydrologic Research Facility, (USGS)

- a. Normal data retrieval from instrumented holes on Yucca Mountain by Saturated Zone Group.
- b. Field personnel conducting neutron logging in the field.
- c. Meteorological Project collecting satellite data, precipitation data and synoptic scale weather chart information.
- d. Bob Dickerson, USGS/SAIC working at Yucca Mountain doing mapping.

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- e. Chris Menges, John Wesling and staff on-site to assess earthquake damage.
  - f. Joan Gomberg, USGS and UNR Staff on-site to assess seismic activity during and after earthquake activity.
  - g. Alan Riggs, USGS Marine Biologist in Amargosa Valley to assess earthquake damage to area and Devils Hole.
  - h. Peter Striffler at NTS for monitoring tracer gas injection during drilling at UZ-16.
  - i. Chris Menges and John Wesling in Midway Valley and Yucca Wash Area.
  - j. Grady O'Brien installing dataloggers for continuous monitoring water levels in addition to Chart Recorders.
  - k. Tracy Mendex-Vigo at NTS to assist seismic teams in earthquake and aftershock analysis.
  - l. UNR staff at NTS for earthquake and aftershock analysis.
5. Reynolds Electrical and Engineering Co., Inc., (REECO)

Activities conducted during week ending July 3, 1992:

1. Drilling

- a. JP 92-3, UZ-16, LM-300, cored to 118.68 feet and reamed to 112.01 feet. Drilling in test mode and taking air samples. Attempting to reduce dust emission from vacuum unit.

2. Logistics

- a. Continued requisitioning supplies, materials, and services for YMP Field Operations Center.
- b. Supported ongoing and continued preparations for upcoming tours.

3. Construction

- a. No construction activities.

Activities conducted during week ending July 10, 1992:

1. Drilling
  - a. JP 92-3, UZ-16, LM-300, reamed to 118.68 feet in test mode. Reduced dust emission to acceptable level. Cored 126.22 feet.
2. Logistics
  - a. Continued requisitioning supplies, materials, and services for YMP Field Operations Center.
  - b. Supported on-going and continued preparations for upcoming tours.
3. Construction
  - a. No construction activities.
6. Los Alamos National Laboratory, (LANL)
  - a. Los Alamos is supporting YMPO requested M&O efforts to resolve thermal testing strategy and requirements for Yucca Mountain.
  - b. Supported CRWMS and M&O efforts regarding development of position paper for heater test duration.
  - c. Participated ESF Phase 1A management review of design.
7. Documents and Records Center, (SAIC)

Activities during week ending July 10, 1992:

- a. Received and issued the following controlled documents:

Specifications:

02120, Rev 2, "Specifications for Site Clearing, JP 91-2".  
02222, Rev 2, "Specifications for Surface excavation , JP 91-1".  
02224, Rev 21, "Specifications for Dust Control, JP 91-1".

FCRS

FCR 92-099, "JP 92-4; Add Approval Sticker to Drawing and Specifications".

- b. Copied 2,262 pages.

Carl P. Gertz

-7-

JUL 15 1992

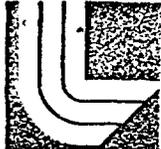
- c. Issued 105 requested controlled documents.
  - d. Reproduced 32 engineering copies.
  - e. Issued 9 uncontrolled documents.
  - f. Received 10 completed record packages from SMF.
  - g. DRC was closed 06/29 due to earthquake, and 07/06 due to drop floor repair.
  - h. Attended FOC staff meeting and AP-6.22Q training.
  - i. Provided support to M&O Records regarding transition of DRC, verified inventory of equipment, furniture, etc.
  - k. Met with Dee Moulder, REECO Controlled Documents Center, regarding their controlled documents.
  - l. Met with James Gardiner and Diane Harrison-Giesler, DOE, regarding Field Change Request for approved for construction sticker.
  - m. Supported Public Open House Tour, 06/27.
8. Field Training
- a. No GET training scheduled. GET 1.5 exam given to 2 people, both passed.
  - b. Training for AP-6.22Q, "Job Package Completion & Records", as conducted by Terry Grant. 10 personnel attended this training.

*Winifred A. Wilson*  
Winifred A. Wilson  
Site Manager

YMP:WAW-338

*Charlotte*

Lawrence Livermore National Laboratory



LLYMP9207009  
July 9, 1992

WBS 1.2.9  
"QA: N/A"

Carl Gertz, Project Manager  
Department of Energy  
Yucca Mountain Project Office  
P.O. Box 98518  
Las Vegas, Nevada 89193-8518

SUBJECT: Yucca Mountain Project Status Report - June 1992  
SCP: N/A

Attached is the June Project Status Report for LLNL's participation in the Yucca Mountain Project.

If further information is required, please contact Elizabeth Campbell of my staff at FTS 532-7854.

Sincerely,

A handwritten signature in cursive script, reading "W. L. Clarke", written over a horizontal line.

W. L. Clarke  
LLNL Technical Project Officer  
for YMP

WC/EC

cc  
Distribution

DISCLAIMER

The LLNL Yucca Mountain Project cautions that any information is preliminary and subject to change as further analyses are performed or as an enlarged and perhaps more representative data base is accumulated. These data and interpretations should be used accordingly.

LAWRENCE LIVERMORE NATIONAL LABORATORY YUCA MOUNTAIN PROJECT  
JUNE 1992 TECHNICAL HIGHLIGHTS AND STATUS REPORT

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- WBS 1.2.5.2.4 Technical Support Documentation (Blink)
- WBS 1.2.5.2.5 Study Plan Coordination (Blink)
- WBS 1.2.5.2.6 Semi-Annual Progress Reports (Campbell)

**1.2.9 Project Management**

- WBS 1.2.9.1.1 Management (Clarke)
- WBS 1.2.9.1.4 Records Management (Bryan)
- WBS 1.2.9.2 Project Control (Podobnik)
- WBS 1.2.9.3 Quality Assurance (Wolfe)

LAWRENCE LIVERMORE NATIONAL LABORATORY  
(LLNL)  
YUCCA MOUNTAIN PROJECT (YMP) STATUS REPORT

JUNE 1992

EXECUTIVE SUMMARY  
(Items Proposed for Reporting in YMPO or OGD Reports)

1) WBS 1.2.2.2 Scoping calculations for in situ heater tests in Busted Butte and the ESF were started. The calculated tests have three 4.6 m square drifts (12.8 m spacing) with seven 1.5 m square horizontal heaters (4.57 m long, spaced at 5.49 m intervals), each running at 5.5, 6.3, 8.25, 12.38, or 22 kW. The tests were evaluated with five criteria: Dry-out front velocity, extent and duration of hydrothermal perched condensate, peak rock temperature, temperature change rate, and dry-out zone volume. It was found that the dry-out zones will coalesce in the pillars between the drifts when the dry-out zone has extended about 14 m vertically and that this occurs at 4, 3.4, 2.5, 1.7 and 1.1 years, respectively. The corresponding peak rock temperatures are 213, 230, 264, 335, and 485°C. A 5-7 year test (with a 3-5 year full-power heating stage) can dry out a volume of rock 28 m thick and about 35 m wide with reasonable peak rock temperatures. An accelerated 18 month test (with a 12 month full-power heating stage) can dry out the same volume, but with very high peak rock temperatures. The accelerated test will also have dry-out front velocities that may preclude the thermal-hydrological-geochemical coupling that may be seen in a repository. A prototype test in Busted Butte that includes both low and high heater powers could evaluate the effectiveness of an accelerated test in the ESF.

2) WBS 1.2.1.4.2 The waste form alteration and release submodels of YMIM and PANDORA were compared. The differences between the base-case models were large and were understood. The differences are due to different model assumptions and base-case parameter values. The differences are within the range of possible system performances, and arise from differing intent. PANDORA intends to show presently supportable bounds on system performance, using conservatism to compensate for present uncertainties and for non-modeled features. YMIM is intended for sensitivity analysis or "what-if" analysis, exploring the implications of possible assumptions or parameter values. The main subject for YMIM's hypothesis analysis is the coupling among the many processes linking the engineered barrier system and the near field. Either program could be changed to substantially match the waste form alteration and release assumptions of the other, by data changes and a few model changes.

3) WBS 1.2.1.4.5 At the direction of YMPO, the most recent version of the EQ3/6 software package and a set of the pre-release code manuals was transmitted to NAGRA under the provisions of the U.S. Department of Energy/NAGRA bilateral agreement.

4) WBS 1.2.1.4.5 User manuals for the EQ3/6 software family have been written to satisfy the requirements of NUREG-0856. These documents correspond to Version 7.0 of the software, which is the currently released version. This version is

the subject of a qualification activity that is independent of code author. The last of the four user manuals was completed in December. Technical review has been completed for two of these, and they are being revised. QA and Software QA reviews are underway.

5) WBS 1.2.2.3.1.1 Tests with partially oxidized spent fuel fragments (U4O9) approximately 1 mm in size have been started. Results from these tests will be compared with earlier tests conducted with partially oxidized spent fuel grains (also U4O9) approximately 15  $\mu$ m in size. The combined results are expected to provide information on the effects of oxidation on effective spent fuel surface area (i.e., oxidation may make the grain boundaries more accessible to water, thereby increasing the effective surface area).

6) WBS 1.2.2.3.1.1 PNL will be recommending closeout of the MCC Hot Cell Activities in FY93. The cost to maintain the old spent fuel assemblies in Bldg. 324 hot cells is rising at a rate much higher than inflation. The projected FY93 budget for this activity will be insufficient to maintain the hot cells. PNL will also be recommending in the SFAP that the MCC no longer procure full assemblies for spent fuel ATMs. Based on past and current testing experience, YMP needs can be met by obtaining smaller rodlets from other programs. The new spent fuel samples along with the archive samples of the current ATMs will be kept and will be sufficient for the program's research needs. Finally, the remainder of the existing (excess) spent fuel can be designated as waste. Its disposal should then be funded by YMPO's environmental compliance budget. This action would serve two purposes. First, it would reduce the financial burden on the research WBS elements. Second, a large portion of the waste can be cleaned out while there is an opportunity to cost-share with other hot cell programs.

7) WBS 1.2.2.4.3 Repository scale thermal conduction calculations for drift emplaced robust waste packages are ongoing to address the temperature profiles throughout the repository, as a function of time, out to 10,000 years. The first twenty runs have produced enough data to derive parametric relationships for quantifying additional mass loading scenarios. The maximum drift wall temperatures have varied between 35°C and 390°C depending on the mass loading and the age of the fuel. These temperatures correspond to 13.6 MTUs/acre with 30 yr old fuel to 284.7 MTUs/acre with 10 yr old fuel. To date, only 33 GWD/MTU burnup spent fuel has been used in the calculations. The calculations determine the maximum temperatures around the drift as a function of time, plot temperature isotherms at various time steps out to 10,000 years, and determine the effect of backfilling at any specified time.

8) WBS 1.2.9.1.1 J. Blink served as the YMP Coordinator for the LESSON course at NTS on June 22-July 1. LESSON is a program to train K-8 teachers to present science in an inspirational hands-on style. As a part of the course, J. Blink conducted a tour of Yucca Mountain for the 23 Nye County teachers. The LESSON science kits were purchased for the teachers by the Nye Country commissioners using Nuclear Waste funds.

## 1.2.1 SYSTEMS

### 1.2.1.1 Management and Integration

W. Halsey, D. Wilder, T. Buscheck, J. Blink, D. Ruffner and J. Podobnik attended the YMPO/M&O strategy session in Las Vegas on June 2 to discuss the Busted Butte alternative for the Mission 2001 Exercise. Interim direction was received from DOE to include Busted Butte as a component of the Mission 2001 Exercise. Direction was subsequently reversed to omit Busted Butte from the Mission 2001 Exercise pending a formal decision process.

LLNL PACS logic and schedules were revised and submitted to the M&O for the Mission 2001 Exercise.

### 1.2.1.2 Systems Engineering

#### 1.2.1.2.4 Systems Engineering Implementation

No significant activities.

#### 1.2.1.2.5 Configuration Management and Plans and Procedures Control

It was determined that no LLNL controlled documents were effected by the closure of IMOU's 660014, 660018, and 660019.

#### 1.2.1.2.6 YMP Support to Management Systems Improvement Strategy

No significant activities.

### 1.2.1.3 Technical Data Base Management

#### 1.2.1.3.5 Technical Data Base Input

Work was completed on the requested review and revision of GEMBOCHS "parameter screens" that were drafted and forwarded by G. Heitland (SAIC). The revised screens were returned to SAIC and will be included in the YMP-TDB Parameter Dictionary.

J. Johnson presented a talk entitled "The GEMBOCHS Database and Software Library: Overview of Contents, Components, and Applications" at the quarterly meeting of the YMP-TDB Administrators Working Group in Las Vegas on June 30.

The Technical Data Workshop, intended to familiarize project investigators with recent developments in the technical data management system, has been tentatively rescheduled for July 27 at LLNL.

## 1.2.1.4 Performance Assessment

### 1.2.1.4.2 Waste Package Performance Assessment

The waste form alteration and release submodels of YMIM and PANDORA were compared. The differences between the base-case models were large and were understood. The differences are due to different model assumptions and base-case parameter values. The differences are within the range of possible system performances, and arise from differing intent. PANDORA intends to show presently supportable bounds on system performance, using conservatism to compensate for present uncertainties and for non-modeled features. YMIM is intended for sensitivity analysis or "what-if" analysis, exploring the implications of possible assumptions or parameter values. The main subject for YMIM's hypothesis analysis is the coupling among the many processes linking the engineered barrier system and the near field. Either program could be changed to substantially match the waste form alteration and release assumptions of the other, by data changes and a few model changes.

As requested at the May 27 DOE-EPRI PA meeting, T. Buscheck met with F. Schwartz of Ohio State University (who supports EPRI), on June 26 to discuss implementation of LLNL-YMP hydrothermal calculations into the EPRI total system PA model.

S. Daveler developed post-processing subroutines for V-TOUGH which can contour the duration of boiling conditions, or the duration which saturation conditions remain below a critical threshold. This capability is being used to support the YMIM performance assessment code.

### 1.2.1.4.5 Geochemical Modeling and Data Base Development

At the direction of YMPO, the most recent version of the EQ3/6 software package and a set of the pre-release code manuals was transmitted to NAGRA under the provisions of the U.S. Department of Energy/NAGRA bilateral agreement.

User manuals for the EQ3/6 software family have been written to satisfy the requirements of NUREG-0856. These documents correspond to Version 7.0 of the software, which is the currently released version. This version is the subject of a qualification activity that is independent of the code author. The last of the four user manuals was completed in December. Technical review has been completed for two of these, and the comments are being resolved. QA and Software QA reviews are underway.

DBAPP and D0OUT were used to generate two revised suites of thermodynamic datafiles (DATA0.[sup,nea,com,pit,hmw].R[15 and 16] that support the EQ3/6 geochemical software package (version 7.0). These new datafiles were then piped through EQPT to generate the corresponding DATA1 suites, which were then transferred to the Alliant FX/80 where they can be accessed by local users of EQ3/6.

The R14 datafiles were used with the EQ3/6 test case library. A few problems were detected and were reported to the GEMBOCHS Administrator. The R15 datafiles were partially checked by running them through the test library.

Local beta testing was performed of CNGBOCHS, an integrated INGRES-EMAIL-INTERLEAF system for processing change requests associated with the GEMBOCHS thermodynamic database and the EQ3/6 software package. Several modifications were incorporated as a consequence of this testing.

The Individual Software Plan (ISP) for D0OUT was generated and submitted to the LLNL-YMP Software Quality Manager for review.

A YMPO QA surveillance was conducted on EQ3/6 on June 15-17.

#### **1.2.1.4.7 Supporting Calculations for Postclosure Performance Analyses**

This WBS element has not been funded in FY92.

### **1.2.2 WASTE PACKAGE**

#### **1.2.2.1 Management and Integration**

LLNL staff met with R. Williams (EPRI) on June 4 at LLNL to discuss the status of the Engineered Barrier System (EBS).

LLNL PACS logic and schedules were revised and submitted to the M&O for the Mission 2001 Exercise.

W. Lin attended the SOC meeting on June 2 in Las Vegas.

#### **1.2.2.2 Waste Package Environment**

B. Viani, W. Glassley, T. Buscheck, D. Chesnut, W. Lin and J. Blink attended the geochemical and hydrology integration meeting in Denver, CO, June 9-11. The meeting focused on detecting and characterizing fast pathways for fluid transport at Yucca Mountain and on integrating geochemistry and hydrology. Of particular interest was the influence of man-made materials (e.g., cement, grout) on the hydrological and geochemical properties of the environment in the repository, and how excavation could modify the site properties. Reports from working groups and recommendations are being compiled and will be distributed later this year.

##### **1.2.2.2.1 Chemical and Mineralogical Properties of the Waste Package Environment**

Problems were identified with the version of EQ3/6 ported to the Iris Indigo workstation. Work is in progress to change these codes to accept new versions of the input files.

### Model Calculations

Work continues in post-processing a suite of hydrothermal calculations over a wide range of repository thermal loads and hydrologic conditions.

Staff began scoping calculations of in situ heater tests. These calculations are being conducted in support of the decisional analysis currently underway for the Yucca Mountain Test Facility (YMTF) at Busted Butte. A major objective of this study is to look at the trade-offs between test duration (and heating rate) and the primary hydrological, geochemical and geomechanical objectives of in situ heater tests. Because of the range of considered testing options (e.g. the ESF-only option versus the YMTF-ESF option), calculations were designed to address in situ heater tests which range from an 18 month duration (with a 12 month full-power heating stage) to a 5-7 year duration (with a 3-5 year full-power heating stage). During the latter stage of the test the heating rate will be ramped down in order to observe cool-down and re-wetting behavior.

Hydrologic and thermal properties and hydrostratigraphy used to model the reference case of previous modeling studies of repository-heat-driven hydrothermal flow were applied. Because of the presumed similarity in hydrostratigraphy between Busted Butte and the repository block at Yucca Mountain, these preliminary calculations are considered to be equally applicable to prototype tests at Busted Butte and to the ESF tests at Yucca Mountain.

The in situ heater tests are represented with two kinds of models. The drift-scale model is a two-dimensional cross-sectional model which explicitly represents the details of the heaters and heater drifts in the plane orthogonal to the drift axis. The initial suite of calculations assume three parallel 4.6 m x 4.6 m heater drifts, with 12.8 m center-to-center drift spacing, giving a mining extraction ratio of 36%. Smaller extraction ratios down to 25% will be considered in later calculations. Each drift contains seven 1.5 m x 1.5 m x 4.57 m drift emplaced heaters (roughly the same dimensions of a 21-pwr waste package) with 5.49 m center-to-center spacing between heaters. The heated length of each drift is 38.4 m. Because it is two-dimensional, the drift-scale model effectively assumes that the heater drifts are infinitely long (i.e., the heat loss which occurs due to heat flow parallel to the drift axes is neglected).

The radial "test-scale" model represents the 3-drift, 21-heater test configuration as a disk-shaped "homogenized" heat source with a radius of 21.665 m and a height of 1.5 m (which gives the same heated area as the actual 38.4 m x 38.4 m heater configuration). This model smears temperature effects at very early time, but is very representative after the dry-out zones between drifts have coalesced. The radial test-scale model has the advantage of accurately accounting for the overall heat balance. Comparisons between the drift-scale and test-scale models show outstanding agreement in rock temperature at the center of the heater array for the first four years of full-power heating for the case of 21 - 5.5kW heaters. The dry-out

performance also agrees well between the two kinds of models. These agreements indicate that axial losses from the heater array are negligible for the first four years.

Because of the limited time frame available for testing, all heater testing must be conducted at accelerated heating rates relative to actual repository thermal conditions. Therefore, the major challenge is to determine how much the heating rate can be accelerated without distorting the critical coupling between hydrothermal flow and geochemistry and geomechanics. Sizing of the temporal and spatial extent of the heater tests is based on five criteria:

- 1) the velocity of the dry-out front,
- 2) the spatial extent and duration of the hydrothermal perching of condensate,
- 3 the peak rock temperatures,
- 4) the time rate of change of temperature, and
- 5) the volume of the dry-out zone.

The first two criteria primarily relate to hydrothermal-geochemical coupling at the refluxing front which may result in the geochemical alteration of fracture and matrix properties. If the dry-out front is driven too quickly, there will be inadequate time for geochemical effects to be manifested. The third and fourth criteria relate to the potential of geomechanical and geochemical effects significantly altering the thermo-hydrological properties in a way which is not representative of repository conditions. The fifth criterion relates to the scale of the dry-out zone relative to the scale of the heterogeneity of the fracture properties (particularly the fracture spacing). If the dry-out zone is small relative to the scale of heterogeneity, dry-out and condensate drainage performance may be completely dominated by the local heterogeneity. Moreover, the validation of models which incorporate bulk-averages of matrix and fracture properties must pertain to a test where those bulk averages are statistically meaningful.

In order to hydrothermally perch condensate, it is necessary to effectively develop a "planar" heat source that precludes condensate from easily shedding along the sides of the boiling zone. This requirement necessitates coalescing the boiling zones between multiple heater drifts. Because thermal losses from the perimeter of the heated region cause temperature gradients from the center to the edge of the heated region, smaller tests are associated with higher peak temperatures than larger tests when trying to achieve a given vertical extent of dry-out.

Thus far, focus has been on boiling/condensation performance during dry-out and considerations of heating rates from 5.5 kW per heater to 22 kW per heater. With respect to the second criterion, it was determined that adequate coalescence of the dry-out zones will occur when the dry-out zone has extended approximately 14 m vertically for this power range. (Time to achieve a given dry-out was inversely proportional to power for these runs.) For larger drift spacing, this value may increase. For 5.5 kW heaters, 14 m of vertical dry-out was achieved in 4 years with a peak rock temperature of 213°C. For 6.3, 8.25, 12.38, and 22 kW heaters, 14 m of vertical dry-out was achieved in 3.4, 2.5, 1.7 and 1.1 years, respectively, with peak rock temperatures of 230, 264, 335, and 485°C, respectively. Therefore, in order to achieve coalescence between 12.8 m spaced heater drifts during an 18 month test, it

is necessary to drive rock temperatures to nearly 500°C. Moreover, the velocity of the dry-out front associated with the 22 kW accelerated-rate test is on the order of 10 m/yr which is much greater than the dry-out front velocities typical of repository conditions ( $\leq 1.0$  m/yr).

### Code Development

J. Nitao continues development of the prototype version of the NUFT code, focusing on the three-dimensional gridblock generator.

EXTOOL.XVIEW.2.15 and EXTOOL.XVIEW.2.16 which include new options for updating the graphics window and more options for choosing colortables were released.

### Laboratory Experiments

The feasibility study of using a resonant cavity to measure relative humidity in laboratory rock samples continued. The design of the resonant cavity is being improved.

The determination of the characteristic curves continued for the eight disc-type Topopah Spring Tuff samples from the 1312 foot level of the U3hg-1 hole and for the five Grouse Canyon tuff samples from G-Tunnel. A room temperature constant humidity chamber was used. Measurements have been completed at 50, 60, and 70% relative humidity levels at 20°C.

A test to study the feasibility of using a gas displacement method to measure suction potential vs saturation in high temperature rock was started.

### Meetings

B. Packer, J. Duguid and W. Matyskiela of the M&O, visited LLNL on June 24 to discuss hydrothermal-geomechanical coupling issues.

#### **1.2.2.2.3 Mechanical Attributes of the Waste Package Environment**

Continued interfacing with YMPO and OCRWM on Study Plan 8.3.4.2.4.3, "Characterization of the Geomechanical Attributes of the Waste Package Environment". Correspondence was received from the OCRWM reviewers, and it is anticipated that the two remaining comments can be mutually resolved in July. A minor change to the SCPB will be required.

S. Blair and D. Wilder attended the Workshop on Fractured Rock Masses in Lake Tahoe, CA on June 3-5 and the Rock Mechanics Symposium in Santa Fe, NM on June 8-11.

#### 1.2.2.2.4 Engineered Barrier System (EBS) Field Tests

J. Blink met with an M&O group to kickoff the heater test duration decision analysis on June 19. D. Wilder attended a meeting on thermal testing in Las Vegas with the M&O group leader, R. Sandifer, on June 24. Calculations were conducted at LLNL for several heater tests scenarios. These calculations will be incorporated in the M&O group report in early July.

J. Blink participated in the ESF design review in Las Vegas on June 1.

An abstract by D. Wilder entitled "Engineered Barrier Environment, Yucca Mountain" was submitted to the Fall Material Research Society Meeting to be held in Boston, MA on 11/30-12/4/92.

An abstract by D. Wilder entitled "Natural System Responses as a Basis for Engineering Decisions Regarding Thermal Loading, High Level Nuclear Waste Disposal" was submitted to the American Institute of Professional Geologists Symposium to be held in Lake Tahoe, CA on 9/27-30/92.

#### 1.2.2.2.5 Characterization of the Effects of Man-Made Materials on Chemical & Mineralogical Changes in the Post-Environment

The SCPB revision Rev. (8) necessary to create a Study Plan for this WBS element began QMP 06-04 review at YMPO.

### 1.2.2.3 Waste Form and Materials Testing

#### 1.2.2.3.1 Waste Form

##### 1.2.2.3.1.1 Waste Form Testing - Spent Fuel

D. Langstaff, L. Stewart (DOE), and M. McKinnon (PNL) visited LLNL on June 18 to discuss Waste Form Characterization.

#### Spent Fuel Dissolution

Four UO<sub>2</sub> pellets were analyzed by using Electron Spectroscopy for Chemical Analysis (ESCA) and Scanning Electron Microscopy (SEM). These pellets included one from the last series of runs showing high dissolution rates of uranium, one from the low dissolution-rate runs last fall, and two unused pellets from batches that were hydrogen-reduced at different times. The latest series had buffers saturated with 20% oxygen in argon. The similar runs last fall lost oxygen via permeation through the plastic tubing. Although there were differences in the surface chemistry, all pellets showed uranium at a higher oxidation state than UO<sub>2</sub>. The SEM analyses showed that the two pellets used in the dissolution runs experienced significant grain boundary and pore etching via dissolution of UO<sub>2</sub>. The buffer solutions before and after leaching, as well as the high purity water used in their preparation, were analyzed via Inductively Coupled Plasma Mass Spectrometry (ICP/MS). This highly sensitive technique for aqueous solutions can

detect impurities in part per trillion range. No unreacted chemical species were found. Dissolved oxygen concentration in the buffers is a possible cause of the high dissolution rates, although the reason for such a large effect is unclear. Experiments using single crystal  $UO_2$  and stainless steel systems with integral oxygen monitors are starting. These experiments eliminate the surface area and oxygen concentration uncertainties.

Flow-through testing with spent fuel specimens at PNL at reduced oxygen fugacities is in progress according to the approved test matrix.

Tests with partially oxidized spent fuel fragments ( $U_4O_9$ ) approximately 1 mm in size have been started. Results from these tests will be compared with earlier tests conducted with partially oxidized spent fuel grains (also  $U_4O_9$ ) approximately 15  $\mu m$  in size. The combined results are expected to provide information on the effects of oxidation on effective spent fuel surface area (i.e., oxidation may make the grain boundaries more accessible to water, thereby increasing the effective surface area). Equipment for measuring surface areas using the BET method has been modified to allow surface area measurements of spent fuel specimens inside a shielded hot cell. Installation of the equipment inside the hot cell has been started.

An abstract by R. Stout, E. Kansa, A. Wijesinghe (LLNL), E. Einziger, L. Thomas, S. Marschman and G. Buchanan (PNL) entitled "Kinematics and Thermodynamics of Non-Stoichiometric Oxidation Phase Transitions in Spent Fuel" was submitted to the Fall Material Research Society Meeting to be held in Boston, MA on 11/30-12/4/92.

### Spent Fuel Oxidation

The dry baths continue to operate. No significant activities to report.

### Materials Characterization Center (MCC) Hot Cell Activities

The report "Spent Fuel Acquisition Plan" (SFAP) is undergoing another rewrite at PNL (the MCC). As research efforts have progressed, the behavior of spent fuel has become better understood. This has caused acquisition strategies for testing to change. A fourth draft of the SFAP is projected to be ready in early July.

PNL will be recommending closeout of the MCC Hot Cell Activities in FY93. The cost to maintain the old spent fuel assemblies in Bldg. 324 hot cells is rising at a rate much higher than inflation. The projected FY93 budget for this activity will be insufficient to maintain the hot cells. PNL will also be recommending in the SFAP that the MCC no longer procure full assemblies for spent fuel ATMs. Based on past and current testing experience, YMP needs can be met by obtaining smaller rodlets from other programs. The new spent fuel samples along with the archive samples of the current ATMs will be kept and will be sufficient for the program's research needs. Finally, the remainder of the existing (excess) spent fuel can be designated as waste. Its disposal should then be funded by YMPO's environmental compliance budget. This action would serve two purposes. First, it would reduce the financial

burden on the research WBS elements. Second, a large portion of the waste can be cleaned out while there is an opportunity to cost-share with other hot cell programs.

#### 1.2.2.3.1.2 Waste Form Testing - Glass

This WBS element has received limited funding in FY92. These funds are being used to maintain the N2 and N3 tests at ANL.

The N2 tests (SRL actinide-doped glass) continue with no sampling period occurring this month. These tests have been in progress for 328 weeks. The N3 tests (ATM-10, a West Valley actinide-doped glass) continue and have been in progress for 246 weeks.

#### 1.2.2.3.2 Metal Barriers

On June 17, D. Jones, Head of the Chemistry and Metallurgy Department, University of Nevada, Reno began work as a Visiting Professor in the LLNL Summer Student Program. He will work on materials/corrosion projects funded by Yucca Mountain.

#### 1.2.2.3.3 Other Materials

This WBS element has not been funded in FY92.

#### 1.2.2.3.4 Integrated Testing

##### 1.2.2.3.4.1 Integrated Radionuclide Release

##### Determination of Elemental Profiles in Rocks, Minerals, and Glasses using the Ion Microscope

Additional tuff core wafers from diffusion experiments are currently being exposed to alpha particle sensitive film.

##### Interactions of Actinide-bearing Solutions with Rock Core Samples

The re-plumbing of the flow-through system has been completed. Flow testing will resume next month.

Transmission Electron Microscope (TEM) examination of colloids in fluids from spent fuel leaching experiments continued.

The photon correlation spectrometer was repaired and analysis of the particle size distribution of colloids in spent fuel leach fluids continued.

##### Source Term Development

Work continued on adsorption of uranium on goethite at elevated temperatures.

#### **1.2.2.3.4.2 Thermodynamic Data Determination**

An abstract by J. Rudnicki and R. Russo (LBL), entitled "Photothermal Deflection Spectroscopy Investigations of Uranium Electrochemistry" was submitted to the Fall Material Research Society Meeting to be held in Boston, MA on 11/30-12/4/92.

#### **1.2.2.3.5 Nonmetallic Barrier Concepts**

This WBS element has not been funded in FY92.

### **1.2.2.4 Design, Fabrication, and Prototype Testing**

#### **1.2.2.4.1 Waste Package Design**

This WBS element has not been funded in FY92.

#### **1.2.2.4.2 Container Fabrication and Closure Development**

This WBS element has not been funded in FY92.

#### **1.2.2.4.3 Container/Waste Package Interface Analysis**

Repository scale thermal conduction calculations for drift emplaced robust waste packages are ongoing to address the temperature profiles throughout the repository, as a function of time, out to 10,000 years. The first twenty runs have produced enough data to derive parametric relationships for quantifying additional mass loading scenarios. The maximum drift wall temperatures have varied between 35°C and 390°C depending on the mass loading and the age of the fuel. These temperatures correspond to 13.6 MTUs/acre with 30 yr old fuel to 284.7 MTUs/acre with 10 yr old fuel. To date, only 33 GWD/MTU burnup spent fuel has been used in the calculations. The calculations determine the maximum temperatures around the drift as a function of time, plot temperature isotherms at various time steps out to 10,000 years, and determine the effect of backfilling at any specified time.

### **1.2.5 REGULATORY AND INSTITUTIONAL**

#### **1.2.5.2 Licensing**

##### **1.2.5.2.1 NRC Interaction Support**

No significant activities.

##### **1.2.5.2.2 Site Characterization Program**

LLNL staff continued to support the Integrated Test Evaluation (ITE) task. M. Revelli participated in the June 2-4 ITE meeting in Las Vegas and the June 22 telecon. Summary write-ups of LLNL's Study Plans are nearly complete, and work is in progress to assess their contribution to the NRC Performance Objectives.

LLNL submitted comments to A. Simmons at YMPO on the Lawrence Berkeley Laboratory report entitled "A Review of Rainier Mesa Tunnel and Borehole Data and Their Possible Implications to Yucca Mountain Site Study Plans".

#### **1.2.5.2.4 Technical Support Documentation**

No significant activities.

#### **1.2.5.2.5 Study Plan Coordination**

LLNL provided the M&O with discussion points on LLNL's three unresolved comments on Study Plan 8.3.1.4.3.1, "Systematic Acquisition of Site-Specific Subsurface Information." The M&O represented LLNL at the comment resolution meeting.

#### **1.2.5.2.6 Semi-Annual Progress Reports**

The final draft of the 6th Progress Report (PR) was received on June 15. It was reviewed and found to be acceptable. The letter of acceptance was sent to YMPO on June 19.

### **1.2.9 PROJECT MANAGEMENT**

#### **1.2.9.1 Management and Integration**

##### **1.2.9.1.1 Management**

W. Clarke attended the TPO meeting in Las Vegas on June 12, and the YMPO Leadership Seminar in Las Vegas on June 25-26.

J. Blink participated in the YMP Safety Committee meeting on June 4 in Las Vegas.

J. Blink presented a lecture on Atomic Energy to the Partners in Education Workshop in Las Vegas on June 8. He also attended and served as the YMP Coordinator for the LESSON course at NTS on June 22-July 1. LESSON is a program to train K-8 teachers to present science in an inspirational hands-on style. As a part of the course, J. Blink conducted a tour of Yucca Mountain for the 23 Nye County teachers. The LESSON science kits were purchased for the teachers by the Nye Country commissioners using Nuclear Waste funds.

J. Blink and T. Quinn participated in the Software Advisory Group meeting in Las Vegas on June 15. J. Blink and D. Wolfe participated in the Quality Integration Group meeting in Las Vegas June 17-19. These meetings resolved SAG and QIG comments on the draft QARD revision.

##### **1.2.9.1.4 Records Management**

Document Control issued two new documents under controlled distribution. Routine follow-up for receipt acknowledgments continues.

A total of 166 items were logged into the LLNL-YMP tracking system. This includes 19 records/records packages that were processed through to the CRF. Four action items were closed.

### 1.2.9.2 Project Control

The May FTE Report was submitted to YMPO, and the June Cost Plan was prepared. The PACS actual cost and schedule data for the period ending May 29 were also submitted to YMPO.

LLNL's submissions for the Mission 2001 Exercise were completed. The task required substantial overtime and was complicated by inexperience with the new workstation, software problems, and changes to project strategy regarding Busted Butte.

Work was initiated on analyzing the FY92 budget to produce a cost-to-close report by 5th and 6th level of the WBS. Recommendations will be provided to the LLNL TPO for adjusting budgets, and requests will be made to YMPO to authorize changes to the current WBS budgets.

### 1.2.9.3 Quality Assurance

Closure notification of Adverse Finding Reports AFR-LLNL-005, 008, and 012 were transmitted to YMPO. Corrective actions for these reports have now been completed and verified.

Audit Report 92-05 "LLNL-YMP Indoctrination, Training and Qualification of Personnel and Review of Technical Publications" was distributed. Two Corrective Action Reports were issued (CARs-012 and -013) as a result of this audit.

Internal Surveillance S92-04 "Document Control" was conducted.

Internal Surveillance S92-05 "Geochemical Modeling and Data Base" was conducted. One CAR was issued.

DOE conducted a surveillance of the LLNL Software Quality Assurance Program using EQ3/6 as a representative code. Two CARs were issued.

DOE conducted an Audit Scoping Meeting at LLNL on June 15-17 in preparation for the scheduled August 1992 audit.

D. Wolfe, LLNL-YMP QA Manager and LLNL's designated contact for review of the Quality Assurance Requirements and Description (QARD) Draft Revision 0B, completed review of the document and transmitted major comments requiring resolution to YMPO.