



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

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

Tel: (702) 388-6125

TO: Joseph Holonich, Director, HLPD, M/S 4 H 3
FROM: Sr. On-Site Licensing Representatives Office, Las Vegas
DATE: MARCH 3, 1993
SUBJECT: OFFICE OF GEOLOGIC DISPOSAL (OGD) WEEKLY HIGHLIGHTS FOR THE
WEEKS ENDING FEBRUARY 12 AND FEBRUARY 19, 1993; YUCCA MOUNTAIN
SITE OFFICE (YMSO) FIELD ACTIVITY REPORTS ENDING FEBRUARY 5
AND FEBRUARY 12, 1993

Please find enclosed the above-referenced reports.

There is nothing requiring specific management attention in the reports.

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

JSP:nan
Enclosures as stated

NOTE TO CHARLOTTE - Also enclosed: LLNL YMP Status Report - January 1993
and LANL Monthly Activity Report - December, 1992

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

WBS 1.2.9.2
QA: N/A

FEB 26 1993

Lake H. Barrett, Acting Director, Civilian Radioactive Waste Management,
HQ (RW-1) FORS

OFFICE OF GEOLOGIC DISPOSAL (OGD) WEEKLY HIGHLIGHTS FOR THE WEEK ENDING
FEBRUARY 19, 1993

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

A. Site Characterization Planning

Field Operations

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

On Job Package (JP) 92-3, UZ-16, drilling continues with the LM-300 drill rig. As of February 17, 1993, Reynolds Electrical & Engineering Co., Inc. (REECO), had cored to a depth of 1519.03 feet. The 12 1/2-inch ream is down to 1518 feet.

Drilling continues with the Joy 1 rig at NRG-6. It had been cored to a depth of 714.25 feet as of February 17, 1993.

Construction activities continue on JP 92-20, Exploratory Studies Facility (ESF) North Portal Pad and Access Road. REECO continues the following: hauling fill from borrow pit 1 to the north ESF pad, excavation of the north drainage ditch, rock bolts installation at the ESF box cut, and removal and storage of topsoil at borrow pit 1.

Sample Management Facility

Approximately 210 boxes of core were laid out for examination by the U.S. Geological Survey (USGS) and Civilian Radioactive Waste Management System Management and Operating Contractor (CRWMS M&O).

Specimens of core were shipped as follows: 182 specimens to USGS, 6 specimens to Sandia National Laboratories (SNL), and 12 specimens to Los Alamos National Laboratory (Los Alamos).

*Rec'd via letter dtd
3/3/93*



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FEB 22 1993

Lake H. Barrett, Acting Director, Civilian Radioactive Waste Management,
HQ (RW-1) FORS

OFFICE OF GEOLOGIC DISPOSAL (OGD) WEEKLY HIGHLIGHTS FOR THE WEEK ENDING
FEBRUARY 12, 1993

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

A. Site Characterization Planning

Field Operations

The Site Manager and Field Operations Center (FOC) staff participated in and provided logistical support for four major tours this reporting period. They have finalized the plans for security services and logistical support for the forthcoming general public open house and site tour on February 20, 1993. Approximately 300 visitors are expected from Las Vegas, Pahrump, and Amargosa, Nevada.

The Site Manager, as Chairperson of the Field Change Control Board (FCCB), and the FCCB Secretary processed 25 Field Change Requests (FCR) on February 4, 1993. These FCRs were related to changes in the specifications and/or drawings for Job Package (JP) 92-20, Exploratory Studies Facility (ESF) North Portal Pad and Access Road.

Excavation continues on JP 92-20 with the following activities: Reynolds Electrical & Engineering Co., Inc. (REECO), began the cut on the second phase of the box cut, continues fill at the ESF pad, and continues excavation of the north and south drainage ditches. REECO completed installation of the fencing and discing of vegetation at borrow pit 1. They also have begun removal of two feet of topsoil from the borrow pit and placing it at the topsoil storage area.

Sample Management Facility

Approximately 200 boxes of core were laid out for examination by the U.S. Geological Survey (USGS) and Los Alamos National Laboratory (Los Alamos).

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Drilling operations were supported for UE25 UZ-16 and USW NRG-6. Processing of core and cuttings from UE25 UZ-16 and USW NRG-6 continued.

Processing of Specimen Removal Requests for USGS, Los Alamos, and Sandia National Laboratories (SNL) continued.

Sixty feet of Calico Hills core drilled at UE25 UZ-16 were logged (100 percent recovery). The current depth of the borehole is 1459 feet.

Regarding USW NRG-6, 118 feet of core drilled were logged. The current depth of the borehole is 485 feet.

The Sample Overview Committee meeting was hosted on February 9, 1993. Specimen requests for USGS, Los Alamos, and University of Nevada, Reno (UNR) were discussed and recommendations were made.

Site Investigations

Two drill crews will be working a day shift and a swing shift (4 p.m. to 12 a.m.) through March 5, 1993.

Drilling continues with the Joy 1 rig at NRG-6. As of February 8, 1993, REECO had cored to a depth of 424.17 feet. The six-inch Odex casing was down to 351.08 feet. The Odex casing will not be extended any deeper in this hole unless borehole conditions warrant.

On JP 92-3, UZ-16, drilling continues with the LM-300 drill rig. As of February 8, 1993, the borehole had been cored to a depth of 1449.20 feet.

Technical Analysis

Ardyth Simmons, Yucca Mountain Site Characterization Project Office (YMPO), conducted a review of the Technical Data Parameter Dictionary. Jeremy Boak, YMPO, and Civilian Radioactive Waste Management System Management and Operating Contractor (CRWMS M&O) staff will meet with Electric Power Research Institute and Edison Electric Institute to discuss regulatory strategy regarding the National Academy of Sciences review of U.S. Environmental Protection Agency standards.

Regulatory Interactions

Issue Resolution

Revisions to the action plans for all Issue Resolution Working Groups have been completed; the revisions will be transmitted via InfoSTREAMS for YMPO signatures.

Advisory Committee on Nuclear Waste (ACNW) Interactions

A letter was sent to the ACNW addressing their concerns expressed during their field trip to Yucca Mountain, Nevada, in October 1992.

ESF Task Force Activities

A milestone was met on February 9, 1993, when the Tunnel Boring Machine (TBM) vendor proposals were received. The following milestones represent the near-term plan for ESF activities:

Award TBM Contract	April 1993
Start Excavating TBM Launch Chamber	April 2, 1993
Award Subcontract for Underground Construction	June 1993

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

The YMPO approved two SPs this week: SP 8.3.1.2.2.2, Revision 1, "Water Movement Test," and SP 8.3.1.15.1.8, "In-Situ Design Verification."

STUDY PLAN BREAKDOWN

In Screening Review	0
In YMPO and U.S. Department of Energy (DOE)/Headquarters (HQ) Review	3
Awaiting Comment Resolution	12
Awaiting Author Revision	3
In YMPO/HQ Verification Audit	5
Preparing to Submit or Awaiting YMPO Approval	0
Awaiting Submission to the U.S. Nuclear Regulatory Commission (NRC)	3
NRC Phase 1 Review	21
NRC Acceptance	32
Total	79

SCP/SP Status:

Total SPs Assigned to Cover 106 Studies	104
SPs Not Yet Submitted for Review	36
SPs Submitted for Initial Review	68
Revised SPs Submitted for Review	5
Revised ESF SPs Submitted for Review	6
Total SPs Submitted for Review	79

State of Nevada Comments Status:

Received Comments from the State of Nevada	17
Responses Transmitted to the State of Nevada	10

NRC Comments Status:

Received Comments from NRC	19
Responses Transmitted from OGD to DOE/HQ	16

B. Project Planning and Control

The participant Planning and Control System (PACS) cost/schedule status data for January 1993 was received. The status was uploaded from the participant workstations to PACS. The new data was calculated through the PACS rollup in all participant data bases, and the participant data was combined in the central PACS project-level data base.

Work Breakdown Structure (WBS), Planning and Scheduling Account status, and Cost Performance Reports were produced and distributed to the participants.

Preparation of the fiscal year 1993 Cost/Schedule Baseline Document, Revision 1, was completed. This revision contains all approved baseline changes.

C. Quality Assurance (QA) Implementation

Determination of Importance and Grading Enhancement

Implementation

The Early Classification of Natural Barriers (ECNB) workshop report has been completed and provided to the Assessment Team (AT). The AT recommendation on classification has been delayed until February 19, 1993.

The AT has initiated the phase-out approach for cancellation of Administrative Procedure 6.17Q, Classification of Items Important to Safety and Waste Isolation. The following are included in the approach: completion of the ECNB workshop, operational CRWMS M&O classification and determination of importance processes, revision of the AT Classification of Items Management Plan (YMP/92-25),

development and approval of necessary implementing line procedures for the future role of the AT, and an overall description of the process (including the results of the QA Requirements Document Implementation Matrix).

The CRWMS M&O/INTERA presentations on Probabilistic Risk Assessment (PRA) were provided to the AT on February 10, 1993. This was in response to recommendations made by the AT on PRA of underground openings, which will be part of the review by the AT of classification of the Engineered Systems.

D. Public Outreach and Institutional Activities

Twenty-eight Girl Scouts and six sponsors attended the YMP Geology Badge Workshop at the Las Vegas Yucca Mountain Information Office on February 6, 1993. Concurrent workstations were staffed by YMP geologists during the four-hour workshop, involving activities on fossils, hydrology and faulting, volcanoes, and rocks and minerals.

Richard Arnold, a consultant, gave an educational presentation on Native American Indian culture to 100 members of the Las Vegas Gem Club on February 8, 1993. Mr. Arnold also provided presentations on February 11, 1993, to 800 students at Robert E. Lake Elementary School and to 40 members of the Chemehuevi District Round Table, both in Las Vegas.

Todd Kaish, CRWMS M&O, gave an introduction to nuclear energy pretour presentation to 120 students from the Booker Sixth Grade Center on February 11, 1993.

A. C. Robison, YMPO, participated on a panel at the 1993 Congressional Information Program Leadership Workshop, hosted by the American Nuclear Energy Council in West Palm Beach, Florida, on February 12, 1993. The panel discussed "Meeting the Waste Challenge." Approximately 100 people were in attendance.

Tours to Yucca Mountain were conducted on February 10, 1993, for two guests from the Swedish Embassy, and on February 11, 1993, for approximately 120 students from Booker Sixth Grade Center.

Institutional and External Affairs (IEA) staff completed two newspaper advertisements and flyers publicizing tours and the monthly speaker series presentations.

The IEA staff delivered and set up a new YMP work exhibit for Churchill County on February 8, 1993. They also attended a state/local government meeting in Hawthorne, Nevada, on February 9, 1993.

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II. ANALYSIS & VERIFICATION DIVISION

The staff participated in several meetings: the Geophysics Integration Task Force meeting February 9-10, 1993, in Las Vegas; the EXCOM meeting on the National Environmental Policy Act of 1969 compliance strategy on February 10, 1993, in Washington D.C.; and the Hydrology Integration Task Force meeting on February 11, 1993, in Livermore, California.

Review was initiated of the Nuclear Waste Technical Review Board (NWTBR) 6th Report to Congress comment responses. Review comments are due to RW-30 on February 11, 1993.

III. GENERAL INFORMATION ITEMS

Lawrence Livermore National Laboratory

A simple gravity feed flow-through system has been successfully tested. The flow rate is controlled by tube diameter and fluid head. Elimination of the pumps saves money and reduces down-time due to leaks and power outages. More lines can be run because the pump space and environment are no longer constraints.

The approved test matrix for flow-through testing with spent-fuel specimens at Pacific Northwest Laboratories consists of twenty separate tests with a total of 17 different test conditions. Eighteen of the tests are completed. Preliminary results have also been obtained for the remaining two test conditions, but these tests are being repeated because the results are inconsistent with the others.

Los Alamos

The staff began processing samples collected from the Paintbrush nonwelded unit in five neutron access boreholes (USW UZN-11, USW UZN-27, USW UZN-37, USW UZN-53, and USW UZN-54) for chlorine-36 analysis.

Regarding the caisson experiment, the manifold for the individual solution samplers for the caisson was fabricated. The ceramic cup and hollow-fiber filter solution samplers are in the fabrication process. A special work permit to authorize work in the caisson was submitted to the Los Alamos Health and Safety Division.

The volume-location relations of volcanic centers in the Yucca Mountain region were evaluated using a three-dimensional, distance-weighted, least-squares method. It was found that the constructed volume-location surface parallels the location of the regression-fit line of the location of volcanic centers. We believe that as a result of this preliminary finding, the surface of maximum eruption volume parallels the northwest trend of the Crater Flat volcanic zone, one of the major structural models for the Yucca Mountain region.

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REECo

The staff began to develop training modules for Miner Training prior to excavating the starter tunnel. Also, at the request of the CRWMS M&O, Job Safety Analyses are being prepared for the excavation of the starter tunnel.

A photograph mission was coordinated with UNR, USGS, and Johnson Controls to the YMP FOC, Test Cell C, and Yucca Mountain. The photographs will be used in developing historical earthquake and seismicity technical information displays. Rocks were also collected for display.

A historical oil spill was discovered at the C-Hole Complex while cleaning up two unrelated, nonreportable stains. It is suspected that the stained areas are related to drilling operations August 10, 1983, through June 27, 1985. The amount of oil or the volume of stained soil is not known at this time. An off-normal occurrence report has been submitted.

SNL

Planning continued for fielding the construction monitoring activities in the ESF north ramp starter tunnel. These activities will be conducted under SP 8.3.1.15.1.8, "In Situ Design Verification." Meetings were held with Los Alamos to coordinate and define input to the Test Planning Package (TPP). A new SNL PACS summary account for these activities was created under WBS 1.2.4.2.1.1.4. An experiment procedure (EP) is being written to describe the test activities and procedures that will be used. The EP will form the basis for the technical input to the TPP.

Progress was made in the development of a method to carry out batch sorption studies in unsaturated media in order to better quantify potential retardation of radionuclide transport at Yucca Mountain. A method to measure the concentration of aqueous uranium in wet sand using laser excitation was demonstrated at the Massachusetts Institute of Technology. A Nd-YAD laser was used to obtain a time-dependent fluorescence signal from a 2ppm uranium solution without use of a fluorescence enhancer.

USGS

With the aid of DOE lawyers, John Whitney has rewritten the Erosion Topical Report to meet DOE regulatory language requirements.

The staff completed and submitted for approval 1:6000-scale geologic cross sections depicting the north ramp, south ramp, and the main Topopah-level drift alignments beneath Yucca Mountain. These cross sections, which incorporate lithologically-significant subdivisions of the Topopah Springs Formation and mapped subdivisions of the Tiva

Canyon Formation, will be incorporated into the digitized data base for an integrated computer-interactive lithostratigraphic synthesis of surface and subsurface information.

The staff set grid points in Split Wash and began mapping. Eighteen areas were located and six were mapped at a scale of 1:240. To date, 24 areas in Split Wash have been mapped.

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 coordinated by the Speakers Bureau; contact Jacqueline Brandt at (702) 794-7896 or Theresa Hirsch at (702) 794-7759 for additional information. Exhibits are coordinated by Genevieve McNeill at (702) 794-7116, Public Update Meetings are coordinated by Joanna Magruder at (702) 794-7056, and tours are coordinated by Carleen Hill at (702) 794-7375 or Bradley Bush at (702) 794-5347.

<u>Date</u>	<u>Event</u>	<u>Location</u>	<u>YMPO Contact</u>
A. <u>DOE/HQ Meetings</u>			
No significant meetings this week.			
B. <u>CRWMS M&O/DOE Meetings</u>			
No significant meetings this week			
C. <u>Internal and DOE/Nevada Field Office (NV) Meetings</u>			
Wednesday, February 17	DOE/NV Monthly Program Review	Las Vegas, NV	C. Gertz
D. <u>NRC Interactions</u>			
Wednesday- Thursday, March 31- April 1	NRC Site Visit (P)	Las Vegas, NV	T. Bjerstedt
Monday, May 3	Management Meeting on Topical Report (P)	Las Vegas, NV	T. Bjerstedt
Monday, May 17	Technical Exchange - Program Planning and Integration (P)	Video- Conference	T. Bjerstedt

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<u>Date</u>	<u>Event</u>	<u>Location</u>	<u>YMPO Contact</u>
D. <u>NRC Interactions</u> (Continued)			
Tuesday, May 18	Technical Exchange - Office of Civilian Radioactive Waste Management (OCRWM) Technical Baseline Documents (P)	Video- Conference	T. Bjerstedt
Monday, June 7	NRC Management Meeting for Interactions Scheduling (P)	Las Vegas, NV	T. Bjerstedt
Tuesday, June 8	Technical Exchange - Geophysics Integration (P)	Las Vegas, NV	T. Bjerstedt
Wednesday, June 9	Technical Exchange - Volcanism (P)	Las Vegas, NV	T. Bjerstedt
Wednesday, July 28	Technical Exchange - ESF Title II Design (P)	TBD	T. Bjerstedt
E. <u>NWTRB Interactions</u>			
Wednesday, March 3	NWTRB Meeting with NRC Commissioners (P)	Rockville, MD	J. Cooper
Tuesday- Friday, April 20-23	NWTRB Full Board Meeting (P)	Reno, NV	J. Cooper
May TBD	NWTRB Environment and Public Health Panel (P)	Las Vegas, NV	J. Cooper
Tuesday- Saturday, June 1-12	NWTRB International Trip	TBD	J. Cooper
Monday- Thursday, July 12-15	NWTRB Full Board Meeting (P)	Denver, CO	J. Cooper
Tuesday- Friday, October 19-22	NWTRB Full Board Meeting (P)	Las Vegas, NV	J. Cooper

<u>Date</u>	<u>Event</u>	<u>Location</u>	<u>YMPO Contact</u>
F. <u>ACNW Interactions</u>			
Wednesday- Thursday, February 24-25	ACNW 51st Meeting (P)	Bethesda, MD	A. Gil
Wednesday- Thursday, March 24-25	ACNW 52nd Meeting (P)	TBD	A. Gil
Wednesday- Thursday, April 28-29	ACNW 53rd Meeting (P)	TBD	A. Gil
Wednesday- Thursday, May 19-20	ACNW 54th Meeting (P)	TBD	A. Gil
Wednesday- Thursday, June 23-24	ACNW 55th Meeting (P)	TBD	A. Gil
Wednesday- Thursday, July 21-22	ACNW 56th Meeting (P)	TBD	A. Gil
Wednesday- Thursday, August 25-26	ACNW 57th Meeting (P)	TBD	A. Gil
Wednesday- Thursday, September 22-23	ACNW 58th Meeting (P)	TBD	A. Gil
Wednesday- Thursday, October 27-28	ACNW 59th Meeting (P)	TBD	A. Gil
Monday- Tuesday, November 22-23	ACNW 60th Meeting (P)	TBD	A. Gil
Wednesday- Thursday, December 15-16	ACNW 61st Meeting (P)	TBD	A. Gil

<u>Date</u>	<u>Event</u>	<u>Location</u>	<u>Speaker</u>
G. <u>State and Public Interactions</u>			
Tuesday, February 16	State Legislature Natural Resources Committee	Las Vegas, NV	C. Gertz
Tuesday, February 16	Construction Specification Institute	Las Vegas, NV	J. Carlson
Wednesday, February 17	Nevada State Education Association	Las Vegas, NV	T. Bjerstedt
Wednesday, February 17	Boulder City Rotary Club	Boulder City, NV	C. Gertz
Wednesday, February 17	Martin Luther King Elementary School	Las Vegas, NV	R. Arnold
Wednesday, February 17	Orr Junior High School	Las Vegas, NV	M. Pitterle
Thursday, February 18	Lions Club	Las Vegas, NV	D. Bradford
Thursday, February 18	Galena High School	Reno, NV	A. Gil
Friday, February 19	McQueen High School	Reno, NV	A. Gil
Saturday, February 20	Boy Scouts Geology Merit Badge Workshop	Las Vegas, NV	E. Harle
Monday, February 22	Yucca Mountain Lecture Series (P)	Las Vegas, NV	K. Wirtz
Tuesday, February 23	Orr Junior High School	Las Vegas, NV	J. Clark
Tuesday, February 23	Paradise Certoma	Las Vegas, NV	K. Beall
Tuesday, February 23	Iowa State University	Ames, IA	C. Gertz
Wednesday, February 24	Yucca Mountain Lecture Series (P)	Pahrump, NV	K. Wirtz

<u>Date</u>	<u>Event</u>	<u>Location</u>	<u>Speaker</u>
G. <u>State and Public Interactions</u> (Continued)			
Wednesday, February 24	Tonopah Middle School	Las Vegas, NV	T. Kaish
Friday, February 26	Meadows School	Las Vegas, NV	J. Blink
Friday- Sunday, February 26-28	DOE Regional Science Bowl, University of Nevada, Las Vegas	Las Vegas, NV	E. Harle
Sunday, February 28	Yucca Mountain Lecture Series (P)	Beatty, NV	K. Wirtz
Monday, March 1	Meadows School	Las Vegas, NV	J. Blink
Monday- Saturday, March 1-13	Jason Telepresence Project, Cheyenne High School	Las Vegas, NV	E. Harle
Tuesday, March 2	Waste Management '93	Tucson, AZ	C. Gertz B. Reilly
Saturday, March 6	Cadet Girl Scouts Geology Workshop	Las Vegas, NV	E. Harle
Tuesday, March 9	Telephone Pioneers of America	Las Vegas, NV	G. Fasano
Thursday, March 11	Beatty Chamber of Commerce	Beatty, NV	A. Robison
Thursday, March 11	American Nuclear Society	Denver, CO	C. Gertz
Thursday, March 11	Meadows School	Las Vegas, NV	T. Kaish
Saturday, March 13	Cadet Girl Scouts Field Trip	Las Vegas, NV	E. Harle
Wednesday, March 17	Nevada Environmental Health Association	Las Vegas, NV	T. Pysto D. Sorensen

<u>Date</u>	<u>Event</u>	<u>Location</u>	<u>Speaker</u>
G. <u>State and Public Interactions</u> (Continued)			
Thursday, March 18	Orr Junior High School	Las Vegas, NV	J. Cooper
Thursday, March 18	Gabbs Junior High School	Las Vegas, NV	T. Kaish
Thursday, March 18	Kenny C. Guinn Junior High School	Las Vegas, NV	A. Gil
Wednesday, March 24	Thurman White Middle	Las Vegas, NV	T. Kaish
Friday, March 26	Reserve Officers Association	Las Vegas, NV	G. Fasano
Tuesday, April 6	Orr Junior High School	Las Vegas, NV	W. Wilson
Saturday, April 10	Girl Scouts Geology Workshop	Las Vegas, NV	E. Harle
Thursday, April 15	Teamsters Local 14	Las Vegas, NV	K. Beall
Thursday, April 15	American Nuclear Society (ANS)/ American Society of Mechanical Engineers	New York, NY	C. Gertz
Monday, April 19	Orr Junior High School	Las Vegas, NV	A. Gil
Thursday, April 22	DOE 20th Annual Science Now	Las Vegas, NV	A. Robison
Saturday, April 24	Boy Scouts Atomic Energy Merit Badge Workshop	Las Vegas, NV	E. Harle
Tuesday, May 4	Underground Structures, Colorado School of Mines	Golden, CO	C. Gertz
Saturday, May 8	Boy Scouts Atomic Energy Merit Badge Workshop	Las Vegas, NV	E. Harle

<u>Date</u>	<u>Event</u>	<u>Location</u>	<u>Speaker</u>
G. <u>State and Public Interactions</u> (Continued)			
Monday, June 14	Rapid Excavation & Tunneling Conference	Boston, MA	C. Gertz
Tuesday- Friday, August 17-20	Second International Mixed Waste Symposium	Baltimore, MD	C. Gertz
Monday- Wednesday, September 27-29	Industrial & Engineering Chemistry Division Symposium	Atlanta, GA	C. Gertz

<u>Date</u>	<u>Event</u>	<u>Location</u>
H. <u>Exhibits Scheduled</u>		
Monday- Thursday, February 15-18	Society for Mining and Metallurgy	Reno, NV
Saturday, February 20	Public Open House (P)	Las Vegas, NV
Sunday- Thursday, February 28- March 4	Waste Management Symposia, Waste Management '93	Tucson, AZ
Saturday, March 27	Public Open House (P)	Las Vegas, NV
Saturday, April 24	Public Open House (P)	Las Vegas, NV
Wednesday, May 19	Public Open House (P)	Las Vegas, NV
Wednesday- Friday, May 19-21	Geological Society of America 1993 Combined Cordilleran & Rocky Mountain Section Meeting	Reno, NV

<u>Date</u>	<u>Event</u>	<u>Escorts</u>
I. <u>Tours Scheduled</u>		
Tuesday, February 16	State Legislature Natural Resources Committee	TBD
Thursday, February 18	University of Minnesota	M. Voegele
Saturday, February 20	Public Open House (P)	Various Escorts
Wednesday, February 24	Tonopah Middle School	TBD
Thursday, February 25	Senior Tripsters	TBD
Wednesday, March 3	Science & Engineering Research Semester Students	TBD
Thursday, March 4	Breakfast Exchange Club	TBD
Thursday, March 4	National Conference of State Legislatures	TBD
Friday, March 5	Waste Management '93	TBD
Monday, March 8	University of Colorado	TBD
Thursday, March 11	Meadows School	TBD
Thursday, March 18	Gabs School	TBD
Tuesday, March 23	Dave Rossin, President, ANS, and Guy Arlotto, NRC	TBD
Wednesday, March 24	Thurman White Middle School	TBD
Saturday, March 27	Public Open House (P)	Various Escorts

<u>Date</u>	<u>Event</u>	<u>Escorts</u>
I. <u>Tours Scheduled</u> (Continued)		
Monday, March 29	Eureka County	TBD
Thursday, April 1	Orr Junior High School	TBD
Monday, April 19	Hydrology Field Trip	A. Flint
Tuesday, April 20	Round Mountain High School	TBD
Friday, April 23	OCRWM Field Test Teachers	TBD
Saturday, April 24	Public Open House (P)	Various Escorts
Monday, April 26	High-Level Waste Conference	TBD
Wednesday, May 5	USGS Headquarters	B. Craig
Thursday, May 6	Pahrump Junior High	TBD
Wednesday, May 19	Public Open House (P)	Various Escorts
Monday, June 21	Girl Scouts Wider Opportunity Program	TBD
Tuesday, August 17	Senior Tripsters	TBD

YMP:VFI- 2493


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 1.2.9.2
QA: N/A

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Lake H. Barrett, Acting Director, Civilian Radioactive Waste Management,
HQ (RW-1) FORS

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Sample Management Facility

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At UE25 UZ-16, 80 feet of core drilled were logged. The Prow Pass contact is at 1499 feet. The current depth at UZ-16 is 1539 feet.

Regarding USW NRG-6, 234 feet of core drilled were logged. The Topopah Springs Middle Nonlithophysal contact is at 711 feet. The current depth at USW NRG-6 is 720 feet.

Site Investigations

No significant items to report.

Technical Analysis

The CRWMS M&O Performance Assessment (PA) staff attended the UZ-16 Vertical Seismic Profiling Meeting February 9-10, 1993, in Las Vegas, Nevada. The CRWMS M&O's preliminary waste isolation evaluation of the data acquisition phase of UZ-16 was presented. Because CRWMS M&O and SNL staffs had different opinions regarding the impact of and need for various borehole seals, a follow-up meeting is scheduled for February 26, 1993.

On February 11, 1993, the CRWMS M&O PA staff participated in the Hydrologic Integration Task Force meeting at Lawrence Livermore National Laboratory (LLNL). The emphasis of the meeting was the saturated zone and its interaction with the thermal aspects of the potential repository.

The Early Classification of Natural Barriers (ECNB) Workshop Report to the Assessment Team (AT) was finalized and discussed at the AT meeting on February 16, 1993.

The CRWMS M&O completed the preliminary draft of a white paper entitled, "Technical Considerations in Evaluating the Advantages and Disadvantages of Alternate Thermal Loading Strategies." The document describes the following: regulatory requirements affecting alternate loading strategies, technical perceptions of the impact of alternate loading strategies, technical aspects associated with alternate loading strategies, and performance implications of alternate loading strategies. The preliminary draft is being circulated for comments.

Work on Surface-Based Testing (SBT)/ESF Test Interference Evaluations primarily involved finalizing or continuing the following:

1. ESF - revising drafts of isolation evaluation reports for ramp/drift sizes and the use of tracers, fluids, and materials (TFM) in excavations

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2. UZ-1/UZ-14 - drill pad hydrocarbon spill remediation evaluations and drilling
3. UZ-16 - seismic studies and borehole sealing evaluations
4. NRG-4 and NRG-5 - waste isolation evaluations for access road and pad construction
5. SBT - TFM evaluations for both SBT and environmental and radiological monitoring programs

Regulatory Interactions

Issue Resolution

Comment response packages, including the revised Erosion Topical Report, have been transmitted to the Erosion Topical Report reviewers. Their concurrence with comment resolution and the report's revision are to be completed by February 22, 1993.

Advisory Committee on Nuclear Waste (ACNW) Interactions

The ACNW 51st Meeting is scheduled for February 24-27, 1993, in Bethesda, Maryland. The committee will be discussing the acceptance of scientific evidence based on expert judgment. They will also be reviewing the U.S. Nuclear Regulatory Commission (NRC) staff views on possible impacts on the high-level waste program by the Energy Policy Act of 1992.

Mined Geologic Disposal System Annotated Outline (MGDS AO)

The MGDS AO, Revision 2, has been transmitted via InfoSTREAMS to the CRWMS M&O Publications Support Department.

ESF Task Force Activities

The following milestones represent the near-term plan for ESF activities:

Award Tunnel Boring Machine (TBM) Contract	April 1993
Start Excavating TBM Launch Chamber	April 2, 1993
Award Subcontract for Underground Construction	June 1993

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

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

STUDY PLAN BREAKDOWN

In Screening Review	0
In YMPO and U.S. Department of Energy (DOE)/Headquarters (HQ) Review	2
Awaiting Comment Resolution	11
Awaiting Author Revision	5
In YMPO/HQ Verification Audit	4
Preparing to Submit or Awaiting YMPO Approval	1
Awaiting Submission to the NRC	3
NRC Phase 1 Review	21
NRC Acceptance	32
Total	79

SCP/SP Status:

Total SPs Assigned to Cover 106 Studies	104
SPs Not Yet Submitted for Review	36
SPs Submitted for Initial Review	68
Revised SPs Submitted for Review	5
Revised ESF SPs Submitted for Review	6
Total SPs Submitted for Review	79

State of Nevada Comments Status:

Received Comments from the State of Nevada	17
Responses Transmitted to the State of Nevada	10

NRC Comments Status:

Received Comments from NRC	19
Responses Transmitted from OGD to DOE/HQ	16

B. Project Planning and Control

The project-level data base of January 1993 cost/schedule data was rolled; project cost performance reports and status reports were produced for Project Manager Carl Gertz, Division Directors, project work breakdown structure (WBS) element managers, and CRWMS M&O functional managers.

Analyses of January 1993 cost/schedule status data were prepared for the Division Directors and project WBS element managers.

The implementation plan for revising the project baseline was completed, and responded to the Energy System Acquisition Advisory Board action items.

C. Quality Assurance (QA) Implementation

The REECO Audit YMP-93-06 was completed. The QA Elements Status is as follows: 1, 2, 5, 6, 13, 16, 17, and 18 were satisfactory; 19 no implementation; 12 unsatisfactory. One significant Corrective Action Request (CAR) was written dealing with:

- (1) calibration not performed in accordance with procedures, and
- (2) procedures were not revised or new procedures generated.

Nine CARs remain open for YMPO.

The Yucca Mountain QA Division has received all QA Requirements Document Implementation Plans from the affected organizations. These Plans are being evaluated and measures have been initiated in order to execute status tracking.

Determination of Importance and Grading Enhancement

Quality (Q) List and Q-List Procedure Development

Resolution has been provided by the YMPO Assistant to the Deputy Project Manager and Deputy Project Manager for disputed comment responses regarding Implementing Line Procedure 1.3/Office of the Project Manager.

Management Control (MC) List and Procedure Development

Four of the five reviewers have agreed to responses to both Drafts A and B comments on the proposed Administrative Procedure (AP) 5.40 (MC Requirements List Development). Dispute resolution on the remaining comments was completed.

Implementation

The Analysis/Evaluation Package for the ECNB was prepared and is in AT concurrence.

The YMPO has requested a plan from the CRWMS M&O on how Probabilistic Risk Assessment will be used during classification and determination of importance evaluations on underground openings.

The AT is reviewing the first four Determination of Importance Evaluations (DIE) developed under the CRWMS M&O DIE process.

Development of the basis for operation of the AT following cancellation of AP 6.17Q continues.

D. Public Outreach and Institutional Activities

A tour to Yucca Mountain, Nevada, was conducted on February 16, 1993, for approximately 20 guests from the State Legislature Natural Resources Committee. Carl Gertz gave a pretour briefing to the group. Another tour was conducted on February 18, 1993, for approximately 20 students from the University of Minnesota who are studying the geology of the Southern Great Basin.

Several general project overview presentations were provided this week. John Carlson, Technical and Management Support Services (T&MSS), gave an overview with an emphasis on economic impact to the Construction Specification Institute on February 16, 1993, in Las Vegas. Mindy Wadkins, T&MSS, gave an overview to the Boulder City Rotary Club on February 17, 1993, in Boulder City, Nevada. Approximately 55 people attended these two presentations. Thomas Bjerstedt, YMPO, gave an overview/debate for 30 teachers and support personnel at the Nevada State Education Association on February 17, 1993. Robert Loux, State of Nevada; Kati Smith, Nevada Nuclear Waste Study Committee; and Chris Brown, Citizens Alert; were also present. April Gil, YMPO, provided an overview to students at Galena High School on February 18, 1993, and McQueen High School on February 19, 1993, both in Reno, Nevada. Approximately 400 students attended those presentations.

David Merritt, T&MSS, gave a geology presentation to approximately 150 students at Orr Junior High School on February 17, 1993, in Las Vegas.

Richard Arnold, a consultant, gave a Native American Indian cultural presentation to 300 students at Martin Luther King Jr. Elementary School on February 17, 1993, in Las Vegas.

The DOE "Yucca Mountain Studies," a 30-page booklet providing general information about Yucca Mountain site characterization activities, was printed. This booklet will be released as public information.

The Institutional and External Affairs (IEA) graphics staff completed development of a Yucca Mountain visual data base which allows convenient access to over 5,500 separate selections of appropriate images to support presentations and other needs.

The IEA staff provided support for a YMP technical exhibit displayed at the Society of Mining and Metallurgy Conference in Reno, February 15-18, 1993. Approximately 550 people were provided with information.

II. ANALYSIS & VERIFICATION DIVISION

The staff participated in several meetings this week: the Idaho National Engineering Laboratory PA meeting February 16-18, 1993, in Albuquerque, New Mexico; the planning meeting for the Waste Package Design briefing February 16-17, 1993, in Las Vegas; and the Management Briefing on the Transportation System Requirements Document on February 17, 1993, in Washington, D.C. They also attended a public meeting on 803 report on February 17, 1993, in Washington, D.C.

III. GENERAL INFORMATION ITEMS

LLNL

The final two geochemical code user manuals entitled, "EQPT, A Data File Preprocessor for the EQ3/6 Software Package, User's Guide and Related Documentation, Version 7.0, Part II" and "EQ6, A Computer Program for Reaction Path Modeling of Aqueous Geochemical Systems: Theoretical Manual, User's Guide and Related Documentation, Version 7.0, Part IV," by Thomas Wolery and Stephanie Daveler were approved by YMPO and published.

Los Alamos

George Guthrie and Robert Raymond visited the Nevada Test Site to collect dust samples for the fibrous minerals study. Paleo-dust accumulations were sampled beneath boulders and in crevices. Samples were also taken at dust-accumulation stations and from the fine material deposited in the Cyclone collector at UE25 UZ-16.

Regarding volcanism, the staff reviewed scientific notebooks containing information on thermoluminescence studies conducted at Ohio State University. The staff revised probability calculations of the recurrence rate of volcanic events and of the probability of disruption of the repository. The revised data show that the probability of magmatic disruption of the repository is less than 1 in 10,000 years.

SNL

Christopher Rautman is developing geostatistically-based property distribution simulations for the 1993 Total Systems PA effort. Indicator variograms have been generated for geostatistical simulation of welded versus nonwelded lithologies. Input for these simulations is derived by digitizing grids on the Scott and Bonk (1984) geologic cross section. These property distribution simulations will be used for two-dimensional sensitivity simulations to examine the potential for subsurface ponding and associated rapid flow. They will also be used to help quantify uncertainty in stratigraphic thicknesses to be used in one-dimensional PA calculations.

USGS

Representatives from USGS, SNL, CRWMS M&O, and DOE conferred regarding physical property testing to be used in NRG holes. The USGS discussed special handling of the core from NRG drillholes to preserve in situ moisture content and reevaluated the requirements for the size and number of samples needed for geotechnical testing. Engineers from USGS and CRWMS M&O choose samples from the upper part of NRG-6. The USGS reviewed the drilling work program for the UE25 NRG-3 north ramp borehole and provided comments to Raytheon Services Nevada (RSN).

The staff presented to DOE, CRWMS M&O, and RSN an overview of drilling operations and results from NRG-2, and a summary of possible structural geometry of the valley west of the Bow Ridge Fault, with implications for what rocks might be encountered at ramp grade along the north ramp. The presentation included illustrated geometric constructions to assist the design and drilling groups in interpretation of geologic constraints impacting drilling difficulties in NRG-2. The presentation also included suggestions for additional drilling at the NRG-2 site to aid in describing subsurface geology along the ramp alignment and to explain lithostratigraphic controls on apparent poor ground penetrated by the NRG-2 hole.

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 coordinated by the Speakers Bureau; contact Jacqueline Brandt at (702) 794-7896 or Theresa Hirsch at (702) 794-7759 for additional information. Exhibits are coordinated by Genevieve McNeill at (702) 794-7116, Public Update Meetings are coordinated by Joanna Magruder at (702) 794-7056, and tours are coordinated by Carleen Hill at (702) 794-7375 or Bradley Bush at (702) 794-5347.

<u>Date</u>	<u>Event</u>	<u>Location</u>	<u>YMPO Contact</u>
A. <u>DOE/HQ Meetings</u>			
Tuesday- Wednesday, March 16-17	Quarterly Review	Video- Conference	C. Gertz
B. <u>CRWMS M&O/DOE Meetings</u>			
No significant meetings this week.			

<u>Date</u>	<u>Event</u>	<u>Location</u>	<u>YMPO Contact</u>
C. <u>Internal and DOE/Nevada Field Office (NV) Meetings</u>			
Thursday, March 4	Monthly Performance Measurement	Las Vegas, NV	C. Gertz
Wednesday, March 10	Technical Project Officers Meeting	Las Vegas, NV	C. Gertz
D. <u>NRC Interactions</u>			
Monday, May 3	Management Meeting on Topical Report (P)	Las Vegas, NV	T. Bjerstedt
Monday, May 17	Technical Exchange - Program Planning and Integration (P)	Video- Conference	T. Bjerstedt
Tuesday, May 18	Technical Exchange - Office of Civilian Radioactive Waste Management (OCRWM) Technical Baseline Documents (P)	Video- Conference	T. Bjerstedt
Monday- Tuesday, May 24-25	NRC Site Visit (P)	Las Vegas, NV	T. Bjerstedt
Monday, June 7	NRC Management Meeting for Interactions Scheduling (P)	Las Vegas, NV	T. Bjerstedt
Tuesday, June 8	Technical Exchange - Geophysics Integration (P)	Las Vegas, NV	T. Bjerstedt
Wednesday, June 9	Technical Exchange - Volcanism (P)	Las Vegas, NV	T. Bjerstedt
Wednesday, July 28	Technical Exchange - ESF Title II Design (P)	TBD	T. Bjerstedt

<u>Date</u>	<u>Event</u>	<u>Location</u>	<u>YMPO Contact</u>
<u>E. Nuclear Waste Technical Review Board (NWTRB) Interactions</u>			
Wednesday, March 3	NWTRB Meeting with NRC Commissioners (P)	Rockville, MD	J. Cooper
Tuesday- Friday, April 20-23	NWTRB Full Board Meeting (P)	Reno, NV	J. Cooper
May TBD	NWTRB Environment and Public Health Panel (P)	Las Vegas, NV	J. Cooper
Tuesday- Saturday, June 1-12	NWTRB International Trip	TBD	J. Cooper
Monday- Thursday, July 12-15	NWTRB Full Board Meeting (P)	Denver, CO	J. Cooper
Tuesday- Friday, October 19-22	NWTRB Full Board Meeting (P)	Las Vegas, NV	J. Cooper
<u>F. ACNW Interactions</u>			
Wednesday- Thursday, February 24-25	ACNW 51st Meeting (P)	Bethesda, MD	A. Gil
Wednesday- Thursday, March 24-25	ACNW 52nd Meeting (P)	Bethesda, MD	A. Gil
Wednesday- Thursday, April 28-29	ACNW 53rd Meeting (P)	Bethesda, MD	A. Gil
Wednesday- Thursday, May 19-20	ACNW 54th Meeting (P)	Bethesda, MD	A. Gil
Wednesday- Thursday, June 23-24	ACNW 55th Meeting (P)	TBD	A. Gil
Wednesday- Thursday, July 21-22	ACNW 56th Meeting (P)	TBD	A. Gil

<u>Date</u>	<u>Event</u>	<u>Location</u>	<u>YMPO Contact</u>
F. <u>ACNW Interactions</u> (Continued)			
Wednesday- Thursday, August 25-26	ACNW 57th Meeting (P)	TBD	A. Gil
Wednesday- Thursday, September 22-23	ACNW 58th Meeting (P)	TBD	A. Gil
Wednesday- Thursday, October 27-28	ACNW 59th Meeting (P)	TBD	A. Gil
Monday- Tuesday, November 22-23	ACNW 60th Meeting (P)	TBD	A. Gil
Wednesday- Thursday, December 15-16	ACNW 61st Meeting (P)	TBD	A. Gil

<u>Date</u>	<u>Event</u>	<u>Location</u>	<u>Speaker</u>
G. <u>State and Public Interactions</u>			
Saturday, February 20	Boy Scouts Geology Merit Badge Workshop	Las Vegas, NV	E. Harle
Monday, February 22	Yucca Mountain Lecture Series (P)	Las Vegas, NV	K. Wirtz
Tuesday, February 23	Orr Junior High School	Las Vegas, NV	J. Clark
Tuesday, February 23	Paradise Certoma	Las Vegas, NV	K. Beall
Tuesday, February 23	Iowa State University	Ames, IA	C. Gertz
Wednesday, February 24	Yucca Mountain Lecture Series (P)	Pahrump, NV	K. Wirtz
Wednesday, February 24	Tonopah Middle School	Las Vegas, NV	T. Kaish
Friday, February 26	Meadows School	Las Vegas, NV	J. Blink

<u>Date</u>	<u>Event</u>	<u>Location</u>	<u>Speaker</u>
G. <u>State and Public Interactions</u> (Continued)			
Friday- Sunday, February 26-28	DOE Regional Science Bowl, University of Nevada, Las Vegas	Las Vegas, NV	E. Harle
Sunday, February 28	Yucca Mountain Lecture Series (P)	Beatty, NV	K. Wirtz
Monday, March 1	Meadows School	Las Vegas, NV	J. Blink
Monday- Saturday, March 1-13	Jason Telepresence Project, Cheyenne High School	Las Vegas, NV	E. Harle
Tuesday, March 2	Waste Management '93	Tucson, AZ	C. Gertz B. Reilly
Saturday, March 6	Cadet Girl Scouts Geology Workshop	Las Vegas, NV	E. Harle
Tuesday, March 9	Telephone Pioneers of America	Las Vegas, NV	G. Fasano
Thursday, March 11	Beatty Chamber of Commerce	Beatty, NV	A. Robison
Thursday, March 11	American Nuclear Society (ANS)	Denver, CO	C. Gertz
Thursday, March 11	Meadows School	Las Vegas, NV	T. Kaish
Saturday, March 13	Cadet Girl Scouts Field Trip	Las Vegas, NV	E. Harle
Wednesday, March 17	Nevada Environmental Health Association	Las Vegas, NV	T. Pysto D. Sorensen
Wednesday, March 17	National Conference of American Indians	Las Vegas, NV	C. Gertz
Thursday, March 18	Orr Junior High School	Las Vegas, NV	J. Cooper
Thursday, March 18	Gabbs Junior High School	Las Vegas, NV	T. Kaish

<u>Date</u>	<u>Event</u>	<u>Location</u>	<u>Speaker</u>
G. <u>State and Public Interactions</u> (Continued)			
Thursday, March 18	Kenny C. Guinn Junior High School	Las Vegas, NV	A. Gil
Tuesday, March 23	Dave Rossin, President, ANS	Las Vegas, NV	C. Gertz
Wednesday, March 24	Thurman White Middle School	Las Vegas, NV	T. Kaish
Friday, March 26	Reserve Officers Association	Las Vegas, NV	G. Fasano
Tuesday, April 6	Orr Junior High School	Las Vegas, NV	W. Wilson
Saturday, April 10	Girl Scouts Geology Workshop	Las Vegas, NV	E. Harle
Thursday, April 15	Teamsters Local 14	Las Vegas, NV	K. Beall
Thursday, April 15	ANS/American Society of Mechanical Engineers	New York, NY	C. Gertz
Monday, April 19	Orr Junior High School	Las Vegas, NV	A. Gil
Thursday, April 22	DOE 20th Annual Science Now	Las Vegas, NV	A. Robison
Saturday, April 24	Boy Scouts Atomic Energy Merit Badge Workshop	Las Vegas, NV	E. Harle
Tuesday, May 4	Underground Structures, Colorado School of Mines	Golden, CO	C. Gertz
Saturday, May 8	Boy Scouts Atomic Energy Merit Badge Workshop	Las Vegas, NV	E. Harle
Wednesday, May 19	International Right of Way Association	Las Vegas, NV	G. Fasano

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<u>Date</u>	<u>Event</u>	<u>Location</u>	<u>Speaker</u>
G. <u>State and Public Interactions</u> (Continued)			
Monday, June 14	Rapid Excavation & Tunneling Conference	Boston, MA	C. Gertz
Tuesday- Friday, August 17-20	Second International Mixed Waste Symposium	Baltimore, MD	C. Gertz
Monday- Wednesday, September 27-29	Industrial & Engineering Chemistry Division Symposium	Atlanta, GA	C. Gertz

<u>Date</u>	<u>Event</u>	<u>Location</u>
H. <u>Exhibits Scheduled</u>		
Saturday, February 20	Public Open House (P)	Las Vegas, NV
Sunday- Thursday, February 28- March 4	Waste Management Symposia, Waste Management '93	Tucson, AZ
Saturday, March 27	Public Open House (P)	Las Vegas, NV
Saturday, April 24	Public Open House (P)	Las Vegas, NV
Wednesday, May 19	Public Open House (P)	Las Vegas, NV
Wednesday- Friday, May 19-21	Geological Society of America 1993 Combined Cordilleran & Rocky Mountain Section Meeting	Reno, NV

<u>Date</u>	<u>Event</u>	<u>Escorts</u>
I. <u>Tours Scheduled</u>		
Saturday, February 20	Public Open House (P)	Various Escorts
Wednesday, February 24	Tonopah Middle School	TBD

<u>Date</u>	<u>Event</u>	<u>Escorts</u>
I. <u>Tours Scheduled</u> (Continued)		
Thursday, February 25	Senior Tripsters	TBD
Tuesday, March 2	University of Goteborg	TBD
Wednesday, March 3	Science & Engineering Research Semester Students	TBD
Thursday, March 4	Breakfast Exchange Club	TBD
Thursday, March 4	National Conference of State Legislatures	TBD
Friday, March 5	Waste Management '93	TBD
Monday, March 8	University of Colorado	TBD
Thursday, March 11	Meadows School	TBD
Tuesday, March 16	National Congress of American Indians	G. Fasano
Thursday, March 18	Gabs School	TBD
Tuesday, March 23	Dave Rossin, President, ANS, and Guy Arlotto, NRC	TBD
Wednesday, March 24	Thurman White Middle School	TBD
Saturday, March 27	Public Open House (P)	Various Escorts
Monday, March 29	Eureka County	TBD
Thursday, April 1	Orr Junior High School	TBD
Monday, April 19	Hydrology Field Trip	A. Flint

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<u>Date</u>	<u>Event</u>	<u>Escorts</u>
I. <u>Tours Scheduled</u> (Continued)		
Tuesday, April 20	Round Mountain High School	TBD
Friday, April 23	OCRWM Field Test Teachers	TBD
Saturday, April 24	Public Open House (P)	Various Escorts
Monday, April 26	High-Level Waste Conference	TBD
Wednesday, May 5	USGS Headquarters	B. Craig
Thursday, May 6	Pahrump Junior High	TBD
Wednesday, May 19	Public Open House (P)	Various Escorts
Monday, June 21	Girl Scouts Wider Opportunity Program	TBD
Tuesday, August 17	Senior Tripsters	TBD

YMP:VFI-2638



Carl P. Gertz
Project Manager



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Yucca Mountain Site Characterization
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WBS1.2.7.3
QA: N/A

FEB 23 1993

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 February 5, 1993 and February 12, 1993:

1. Field Operations Center, (YMSO)

A. Management and Administration

- a. The Site Manager and FOC staff participated in and provided operational and logistical support to several tours conducted during this period. These were: Green Valley High School, Foreign Press, New Zealand Geothermal Group, Swedish Embassy and Booker 6th Grade Center.
- b. Provided operations and administrative support to the Yucca Mountain Site Manager and his DOE staff.
- c. Provided operations support for field site characterization activities in the field.
- d. Completed paperwork, signatures and other administrative procedures for issuing vehicles, first aid kits, fire extinguishers and other necessary equipment to personnel performing field duty.
- e. Processed twenty (20) work order requests.
- f. Performed end-of-day building lock-up and security tasks.
- g. Faxed report to NORSOC and HQ/OCRWM (Dean Stucker) concerning antifreeze spill at J-13. Also faxed two reports to NV, as requested by Site Manager.
- h. One additional FOC staff now able to access ORPS.
- i. Represented Site Manager at NTS Users Meeting and the NTS Space Allocation Committee meeting. Requested office and warehouse space in Area 25 or Area 23.

- j. Provided Site manager with prioritized list of personnel needing underground safety training.
- k. Designed and had made "Coyote Covers" for FOC trash receptacles to prevent animals from foraging in trash.
- l. Provided duty control and support for drilling operations on swing shift.
- m. Began FOC parking lot stripping.
- n. Completed initial "Field Activities Video Report" for Site Manager. This will be a monthly report.
- o. Produced still and video photography document on the use of tractors and discs at the Fran Ridge Borrow Pit.
- p. Produced short film, "Excavation Activities at Yucca Mountain", depicting heavy equipment at the site.
- q. Coordinated military rotary wing flyover to allow Johnson Controls to shoot still and video views of Yucca Mountain.
- r. The Bullfrog Planning Commission continuing with development of data base for Facilities Management Program.
- s. Escorted DOE EDD staff person to TTR for final inspection of modular Units.
- t. The Site Manager prepared the Job Package Authorization Letter for JP 93-01, Drilling of Borehole NRG-3.
- u. Performed review of the Administrative Procedure (AP) on property management.
- v. Completed CPAF items on GIS output tracking and concept diagram and initial equipment list for the VARS system.
- w. Revised FOC Emergency Duty Roster.
- x. Provided support for drilling operations on the evening shift.
- y. Coordinated continuation of FOC parking lot painting.

B. Project Safety and Health, (DOE/SAIC)

- a. Briefed Project Management on the impacts and changes that are proposed in the OSHA Reform Act legislation.
- b. Arranged CPAF objectives for next quarter (Mar-May).
- c. Attended demonstration by on fall protection devices.
- d. Reviewed JP 93-01 for safety requirements.
- e. Staff member attended meeting of DOE Order 5480.9 committee to resolve comments.
- f. Held meeting with REECO, M&O, DOE, and T&MSS training to discuss responsibilities in DOE Order 5480.9.
- g. Staff attended meeting on how Stratamaster hydraulic shaft was damaged during maintenance.
- h. Surveillances conducted: ESF = 2 and J-13 Maintenance area = 1; UZ-16; NRG-6; SAA at maintenance shop.
- i. Lighting survey conducted on NRG-6, night of 2/4.
- j. Collected bulk samples from NRG-6 for silica analysis.
- k. Worked on T&MSS Training on underground training needs.
- l. Occurrence Reports - one waiting for FM Signature.
 - 1. REECO - 7 outstanding: 1 awaiting FM Signature; 1 rejected (09/33/92); 2 - 10 day notification (11/23/92 and 12/28/92) and 3 notifications (01/28/93; 01/29/93 and 02/03/93).
 - 2. SAIC - 2 outstanding: 1 - 10 day update (12/09/92); and 1 notification (01/18/92).

2. Raytheon Services Nevada, (RSN)

A. Field Support

- a. Geologic mapping survey of Ghost Dance Fault is ongoing.
- b. Survey of Geologic Mapping of North Portal Box Cut have been completed. Calculations are complete.
- c. Field Engineering continues to check Trench 14 Daily to ensure suitability for operations.

- d. Issued eight (8) work initiations (WI's) in support of ongoing and upcoming job packages.
- e. Field Engineering providing support to JP 91-9/Rev 3, JP 92-2; JP 92-5, JP 92-7, JP 92-8, JP 92-10, JP-92-12, JP 92-19 and JP 92-20, as required.
- f. Resurvey of Trench CF-1 and Trench 8 scheduled 2/8.
- g. Verified vertical alignment on LM-300, at UZ-16 location.
- h. Completed resurvey for environmental corridor of access road at NRG-4. Calculations remain.
- i. Survey of UZ-1 pad, as-built, is complete. Calculations remain.

B. Quality Control

- a. Continued verification of activities on UZ-16 borehole utilizing the LM-300 Drill Rig; activities on NRG-6 utilizing the Joy #1 Drill Rig.
- b. Surveillance inspection performed and found acceptable on trenches in Stagecoach Road and also in Crater Flats.
- c. Laid out approximately 200 boxes of core for examination by USGS and LANL.

4. YMP Hydrologic Research Facility, (USGS)

- a. Numerous personnel were at the YMP site during this period accomplishing some of the following items of work:
 - o Experimental cluster testing.
 - o Describing soil profiles in Midway Valley Trenches.
 - o Conducting geodetic leveling studies.
 - o Mapping of Ghost Dance Fault.
 - o Log core for deep UZ use from UZ-16 drill site.
 - o Field checking surficial mapping of Forty Mile Wash.
 - o Cleaning exposures and mapping of Busted Butte Trenches.
 - Mapping at Fran Ridge.
 - Movement of USGS trailer off UZ-1 pad.
 - Monitor tracer gas injection at UZ-16 and NRG-6.

5. Reynolds Electrical and Engineering Co., Inc., (REECO)

Activities conducted during week ending February 5, 1993:

A. Drilling

- a. JP 92-3, UZ-16, LM-300, cored to 1,418.98 feet, reamed to 1,398.87 feet. Deviation survey 1379 feet - 2 degrees.
- b. JP 92-11, NRG-6, Joy #1, cored to 367.44 feet, reamed to 344.87 feet. Dropped inner barrel while rerunning barrel. Partially recovered tools. Ran in hole with Odex 115 hammer, hammered from 367.44 to 370.46 feet, ran junk bashed with nor recovery. Picked up CHD 134 Core Barrel, cored from 370.46 feet to 377.41.

B. Logistics

- a. Continued requisitioning supplies, materials, and service for YMP Field Operations Center.
- b. Supported tours during the week.

C. Construction

- a. JP 92-20, ESF North Portal Pad and Facilities... REECO continued cut and fill pad; continued excavation of north and south drainage channels; completed fencing at Borrow Pit #1; disking vegetation to borrow pit into topsoil. Completed Began cut on 2nd phase of boxcut.

Activities conducted during week ending February 12, 1993:

A. Drilling

- a. JP 92-3, UZ-16, LM-300, cored to 1,499.26 feet, reamed to 1,483.17 feet. Deviation survey 1478 feet -2 degrees.
- b. JP 92-11, NRG-6, Joy #1, cored to 625.59 feet. Deviation survey 410 feet - 1 degree 15 minutes; 510 feet - 1 degree 45 minutes; 610 feet - 1 degree 28 minutes.

B. Logistics

- a. Continued requisitioning supplies, materials, and services for YMP Field Operations Center.
- b. Supported tours during the week.

C. Construction

- a. JP 92-20, ESF North Portal Pad and Facilities...REECO completed excavation of 2nd phase of boxcut; began hauling fill from borrow pits #1 to the pad; began installation of rockbolts at the boxcut; continued excavation of north drainage channel; continued removal and storage of topsoil at borrow pit #1.

6. Los Alamos National Laboratory, (LANL)

- a. USGS has prepared Job Safety Analysis covering the geologic surface mapping of the box cut.
- b. Developed a list of ESF Scientific Participants needing immediate starter tunnel access and submitted to the M&O.
- c. Second Phase of mapping scheduled for 2/8.
- d. Monitored construction at the North Portal box cut.
- e. Split rock bolting was initiated February 11, 1993.
- f. Safety and scaling aspects of the rock face were discussed with the CRWMS and M&O contractor and REECO.

7. Document and Records Center, (CRWM, S M&O)

Activities during week ending February 5, 1993:

- a. Received and Issued to following Controlled Documents:

FCRs

FCR 93/105, Rev. 0, "Additional pipe Bedding Controls."
FCR 93/118, Rev. 0, "Changes to the Highwall Support Drawing YMP-025-1-MING-MG142."
FCR 93/122, Rev. 0, "Clarification to SP09 Sect. 02165 Rock Bolts and Accessories."
FCR 93/123, Rev. 0, "Changes to Drawing YMP-025-1-CIVL-GP102, Rev. 2."

- b. Reproduction: 14,670 pages copied.
7,300 square feet of drawings.
- c. Documents Issued: 1,015 controlled documents.
240 uncontrolled documents.
- d. DTAR logoffs: 107.

Activities during week ending February 12, 1993:

a. Received and Issued to following Controlled Documents:

FCRs

FCR 93/126, Rev. 0, "Remove Field Verification Plans from Job Package 92-05, Revision 1."

FCR 93/113, Rev. 1, Reissue.

FCR 93/135, Rev. 0, "Replacement of ASTM D1557-78 with ASTM D1557-91."

FCR 93/136, Rev. 0, "Modify the List of Related to Agree with the Drawings."

FCR 93/101, Rev. 1, Reissue.

b. Reproduction: 9,170 pages copied.
120 square feet of drawings.

c. Documents Issued: 274 controlled documents.
6 uncontrolled documents.

d. DTAR logoffs: 74.

8. Field Training, (SAIC)

a. Training was conducted for GET 1.1. A total of 43 people attended.

b. 24 GET 1.5 exams were administered. All examines passed.

c. Training was conducted for Red Cross Standard First Aid. A total of nine people attended.

Winfred A. Wilson

Winfred A. Wilson
Site Manager



Lawrence Livermore National Laboratory

LLYMP9302028
February 18, 1993

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 - January 1993
SCP: N/A

Attached is the January 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 510-422-7854 or Jim Blink in Las Vegas at 702-794-7157.

Sincerely,

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.



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LAWRENCE LIVERMORE NATIONAL LABORATORY YUCCA MOUNTAIN PROJECT

JANUARY 1993 TECHNICAL HIGHLIGHTS AND STATUS REPORT

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

JANUARY 1993

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

1) **1.2.2.2.2 (Hydrologic Properties of the Waste Package Environment).** Calculation of the SCP-CDR thermal loading case (47.5 MTU/acre) by B. Ross (an SNL subcontractor), indicates that a bulk permeability of 50 darcy ($5.0 \times 10^{-11} \text{ m}^2$) is sufficiently large to allow large-scale, buoyant gas-phase convection to significantly lower repository temperatures relative to the conduction-only case ($\Delta T = 9.5^\circ\text{C}$ at $t = 1000 \text{ yr}$). LLNL's SCP-CDR thermal loading case (49.2 MTU/acre), indicates that 84 darcy is sufficiently large to significantly lower repository temperatures relative to what is effectively a conduction-only case ($\Delta T = 13.1^\circ\text{C}$ at $t = 1000 \text{ yr}$). For 27.1 MTU/acre (30-yr-old SNF and 20 kW/acre), LLNL's calculations indicate that a k_b of about 100 darcy is sufficiently large to result in large-scale, buoyant gas-phase convection significantly affecting repository temperatures and the UZ moisture distribution for $t > 1000 \text{ yr}$. Note that 27.1 MTU/acre and a k_b of 100 darcy result in the same Rayleigh number as Ross' SCP-CDR thermal loading case with a k_b of 50 darcy. Therefore, LLNL's determination of the "threshold" thermal loading and bulk permeability conditions for which sub- or marginal-boiling performance begins to become significantly affected by large-scale, buoyant gas-phase convection is corroborated by Ross' analysis.

2) **1.2.2.2.4 (Engineered Barrier System (EBS) Field Tests).** The first draft of the Study Plan for the Engineered Barrier System Field Tests (SCP 8.3.4.2.4.4) is in internal review. The first draft of the Scientific Investigation Plan for the Large Block Test was completed.

3) **1.2.2.2.5 (Characterization of the Effects of Man-Made Materials on Chemical & Mineralogical Changes in the Post-Emplacement Environment).** In anticipation of concern about organic materials (including diesel fumes and exhaust) that may be introduced into the ESF, a program of study is being designed to assess the present capabilities of the GEMBOCHS computer database in this area, and to identify deficiencies. This program is distinct from the literature review of colloids, completed in 1991, which included some organic materials, but did not address chemical stability (and conversely, reactivity) or degradation. A decision making strategy for identifying the database deficiencies of greatest concern, and thus the direction of experimental work, is being developed in tandem with this program.

4) **1.2.2.3.1.1 (Waste Form Testing - Spent Fuel).** Test specimen preparations have been started on ATM-106 fuel (PWR fuel with burnup $\sim 48 \text{ MWd/kgM}$ and fission gas release $\sim 18\%$) in both oxidized (O/M ~ 2.4) and unoxidized forms. Flow-through dissolution tests will be started on these specimens as soon as they have been prepared and their surface areas have been measured. Plans were made at PNL to start a dry bath oxidation test at 255°C using a variety of fuels in order to determine

real time transition to U_3O_8 . An addendum to the test plan is being written. Plans are also being formulated for the restart of the Thermogravimetric Apparatus oxidation systems (TGAs). A new data acquisition system is being purchased, and the systems are being reassembled. B. Hanson, a graduate student from UC Berkeley, will arrive at PNL at the end of February to do his dissertation research using the TGAs.

5) **1.2.5.4.2 (Waste Package Performance Assessment)**. Modeling has been done to determine whether spent fuel cladding breach will occur for a variety of repository configurations. The phenomenon involves the temperature history of the cladding, stress from internal gas pressure, and creep toward eventual failure of the cladding by creep rupture. The creep rate is strongly temperature dependent. Some repository configurations will preserve a median spent fuel rod from creep rupture and some will not. For example, a configuration with 21 PWR assemblies per package, 33 GWdays/MTU burnup, 30-year age at emplacement, and 72 foot spacing of packages will give creep only up to about 25% of the limit, and has an areal mass loading (AML) of 71 MTU/acre, (about 1.5 times the SCP Conceptual Design Report AML) enough to provide substantial dryout of the host rock within and above the repository.

1.2.1 SYSTEMS ENGINEERING

1.2.1.1 Systems Engineering Coordination and Planning

No significant activities.

1.2.1.5 Special Studies

W. Simecka, C. Newbury (YMPO), N. Elkins, H. Kalia, G. Zyvoloski (LANL), L. Costin, J. Pott, E. Ryder (SNL), D. Stahl, E. Cikanek, W. Nelson, S. Saterlie, S. Nesbit, R. Datta (M&O) and J. Wang (LBL) visited LLNL on January 6 to discuss thermal testing in the ESF. At that meeting, T. Buscheck gave a presentation entitled "Repository-Heat-Drive Hydrothermal Flow: Analysis, Model Validation, and Testing".

T. Buscheck made a presentation entitled "Repository-Heat-Driven Hydrothermal Flow: Discussion of Conceptual Models, Numerical Models, Physical Data, and Assumptions" at YMPO on January 22.

M. Revelli represented LLNL at the January 19-21 workshop in Las Vegas for the Evaluation of Natural Barriers Important to Waste Isolation. The workshop was convened by YMPO to assist the Assessment Team (in accordance with AP 6.17Q) with the identification of natural barriers appropriate for placement on the Q-list. The scope of this assessment was limited to the SCP design and strategy; several items including human intrusion, repository expansion areas, and "extended-dry" repository concepts, were not take into consideration for this evaluation. Results of the Natural Barrier Evaluation Workshop wee presented in a report to the Assessment Team (draft 1/27/93).

1.2.1.6 Configuration Management

Affected document notices (ADNs) were completed for CRs 92/147, 93/040, 93/084 and 93/106.

1.2.2 WASTE PACKAGE

1.2.2.1 Waste Package Coordination and Planning

LLNL reviewed the draft LANL memorandum "Determination of Tracer Requirements for Construction-related Water and Compressed Air Usage in the ESF Starter Tunnel" and determined that these changes will have no negative impacts on either LLNL ESF testing or on waste package performance, based on currently available information.

B. Viani participated in the January Geochemistry Integration Task (GIT) teleconference meeting. B. Viani participated in organizing the GIT sponsored meeting focused on coupled hydrological/geochemical processes in the thermally altered zone.

1.2.2.2 Waste Package Environment

The following paper was approved and will be presented at the International High Level Radioactive Waste Management Conference in Las Vegas, April 26-30:

"Alternative Strategies - A Means for Saving Money and Time on Yucca Mountain" by D. Wilder.

1.2.2.2.1 Chemical and Mineralogical Properties of the Waste Package Environment

Plans continue for the site visit to LLNL of the New Zealand collaborators B. Christenson, W. Giggenbach and A. Reyes on February 5. Arrangements have been made for them to also visit the Project Office and the Yucca Mountain site on February 8. The purpose of their visit is to discuss specific locations in the New Zealand hydrothermal system that may be useful for geochemical model validation exercises.

Development of a plan for model validation at the New Zealand site continued, with an extended outline of required activities developed in draft form. This information will be folded into the revised study plan for this task.

Installation of software to enhance our capability to model equilibrium/disequilibrium domains in the vicinity of waste packages was completed for the Silicon Graphics Indigo/XS-24 system. This will expand our ability to visualize the evolution of chemical environments as the thermal regime around waste packages changes. Testing of the package will continue in February.

Coordination activities continued between various project participants regarding coupling of geochemical and hydrological processes.

The paper by W. Glassley entitled "Validation of Hydrogeochemical Codes Using the New Zealand Geothermal System" was approved by YMPO. It will be published in the proceedings of the CEC Natural Analog Working Group meeting that was held in Toledo, Spain on October 5-9, 1992 and will also be published as an LLNL preprint.

Discussions were held regarding PACS workscope statements.

1.2.2.2 Hydrologic Properties of the Waste Package Environment

The first draft of the Study Plan for the Near Field Environment Hydrology Task is in the internal technical review process.

Model Calculations

Work continued to analyze the preliminary scoping calculations of the hydrothermal performance of the repository, using the new model which represents hydrothermal flow in the upper 1000 m of the saturated zone (SZ) as well as within the unsaturated zone (UZ). With respect to both bulk permeability, k_b , and the impact of large-scale, buoyant gas-phase convection on thermal performance and moisture redistribution, past work has primarily focused on intermediate- to high-AML (Areal Mass Loading, expressed in metric tons of uranium per acre - MTU/acre) cases for which rock dry-out primarily occurs as a result of boiling. Permeability values considered range from 1.9×10^{-7} darcy (corresponding to no fractures) to 84 darcy (corresponding to one 1000- μ m-fracture per meter). The reference- k_b case has a k_b of 0.28 darcy (corresponding to three 100- μ m-fractures per meter). (One darcy is approximately 10^{-12} m²). Current work is examining the impact of large-scale, buoyant gas-phase convection on thermal performance and moisture redistribution for low- to intermediate-AML (27.1 to 49.2 MTU/acre) cases for which dry-out primarily occurs under sub-boiling conditions.

Intermediate to High Thermal Loads

Before discussing the impact of buoyant gas-phase convection on sub-boiling performance, it is necessary to summarize what has been learned about the impact of buoyant gas-phase convection on boiling performance. In cases for which rock dry-out is primarily driven by boiling (intermediate- to high-AMLs), it was found that thermo-hydrological performance can be classified into three distinct categories with respect to k_b . The low- k_b category ($k_b < 0.01$ darcy) corresponds to situations in which fracture density and connectivity throttle the rate of boiling and dry-out. Because heat flow is dominated by heat conduction, it is vertically symmetrical about the heater horizon. The low k_b results in large gas-phase pressure gradients that elevate the boiling temperature, thereby resulting in higher peak temperatures. The intermediate- k_b category ($0.01 < k_b < 10$ darcy) corresponds to situations in which the fracture density and connectivity are sufficient to promote boiling that is not substantially throttled by flow resistance in the fractures. Because k_b is not sufficiently large to promote substantial large-scale buoyant gas-phase convection, local boiling pressure gradients dominate the large-scale, buoyant, gas-phase pressure gradients, resulting in steam flow and condensate generation that is vertically symmetrical about the repository horizon. The heat convective effects in

the heat-pipe zone have a local, transient effect on the temperature distribution, but because convection does not significantly enhance the heat loss from the boiling zone to the far-field, the duration of boiling conditions is not significantly reduced.

The high- k_b category ($k_b > 10$ darcy) corresponds to situations in which fracture density and connectivity are sufficiently large to allow large-scale, buoyant gas-phase gradients to dominate the local boiling pressure gradients, causing significant asymmetry in the vertical temperature distribution. For this category of thermo-hydrological performance, $k_b = 84$ darcy was considered. Although far-field convection completely dominates the direction of steam flow, causing all of the steam to be driven to the upper condensation zone, heat flow is still dominated by heat conduction, and the duration of the boiling period, t_b , is not substantially reduced (for high AMLs) relative to the intermediate- k_b case. Because large-scale buoyant convection enhances the heat loss for the boiling zone to the far-field, heat convection has a definite influence on heat flow (e.g., lowering peak temperatures), yet it accounts for less than 50% of the overall heat flow; therefore, this situation is referred to as convection-influenced heat flow. The term convection-dominated heat flow is reserved for cases in which convection accounts for more than 50% of overall heat flow.

Low to Intermediate Thermal Loads

For 27.1 MTU/acre (30-yr-old Spent Nuclear Fuel (SNF), and Areal Power Density (APD) of 20 kW/acre), bulk permeabilities of 0.28, 84, 168, 410 and 840 darcy were considered. It was realized that the average k_b in the UZ is not likely to approach the latter two values of k_b ; however, calculations may be applicable to the local thermo-hydrological performance in highly fractured areas such as shear or fault zones. The primary purpose of this study was to identify the averaged conditions (thermal loading and k_b) required to result in heat flow being dominated by large-scale, buoyant gas-phase convection. Also considered were an intermediate and high bulk permeability for 49.2 MTU/acre (10-yr-old SNF and an APD of 57 kW/acre, corresponding to the reference SCP-CDR thermal loading); these values are 0.28 darcy and 84 darcy. Note that the high value is only a factor of two greater than some of the k_b values that have been measured in TSw2 (the host rock for the repository horizon).

Intermediate (Reference SCP-CDR) Thermal Loads

For the 49.2 MTU/acre reference SCP-CDR thermal loading case, large-scale buoyant gas-phase convection occurring in the high- k_b (84 darcy) case reduces the duration of the boiling period, t_{bp} , from 666 yr to only 117 yr, relative to the intermediate- k_b (0.28 darcy) case. The peak temperature at the center of the repository, T_{peak} , is also reduced from 100.3 to 97.3°C. At $t = 1000$ yr, the temperature at the center of the repository is reduced by 13.1°C relative to the k_b case. Interestingly, B. Ross (an SNL subcontractor) has conducted a calculation for a case with nearly the same AML (47.5 MTU/acre), with the primary differences being that he assumes 30-yr-old SNF, yielding an APD of 35 kW/acre, and a k_b of 50 darcy. At $t = 1000$ yr, Ross found that buoyant gas-phase convection has reduced the temperature at the center of the repository by approximately 9.5°C, relative to the conduction-only calculation. When one takes into account that the Rayleigh number for this case is

approximately 45% less than that applicable to LLNL's calculation, the two models are seen to be in reasonably good agreement. Moreover, the shape of the temperature curves predicted by the two different models are very similar.

For cases which never get significantly above the nominal boiling point, large-scale, buoyant, gas-phase convection can significantly affect the duration of boiling. This buoyant convective effect can only significantly impact repository temperatures if substantial quantities of water vapor are transported from the repository horizon to the far-field. The transport of water vapor (and latent heat) that is sufficiently large to reduce repository temperatures is also associated with dramatic changes in the moisture redistribution. Simply put, in order for the hydrological (buoyant gas-phase) flow system to dominate heat flow generated by the repository, that repository-generated heat flow must have had a dominant impact on the hydrological flow system, including both liquid-phase and gas-phase flow.

For the reference SCP-CDR case, the intermediate k_b (0.28 darcy) results in a very small vertical dry-out zone thickness, h_{dz} . For example, at $t = 100$ yr, h_{dz} is only 12.2 m. The maximum h_{dz} (14.4 m) occurs at $t = 300$ yr. At $t = 1000$ yr, the dry-out zone has nearly re-wetted back to ambient saturation. For the high- k_b case, h_{dz} at $t = 300$ yr is 23.3 m, nearly twice the h_{dz} of the intermediate- k_b case. Although boiling ceases at $t = 117$ yr, h_{dz} continues to increase as a result of the large-scale, buoyant, gas-phase convection of water vapor under sub-boiling conditions, resulting in $h_{dz} = 109$ m at $t = 1000$ yr. At $t = 5000$ yrs, h_{dz} has grown to 167 m and the overlying condensate zone (where $S_1 > 90\%$) is 213 m in thickness. It was also found that the net increase in liquid saturation, S_1 , within the condensate zone exceeds the net decrease in S_1 within the dry-out zone. This indicates that large-scale, buoyant gas-phase convection is transporting water vapor from the lower dry-out zone (which in turn is supplied by water that is imbibed from the SZ) faster than the rate at which buoyant gas-phase convection can transport water vapor to the atmosphere.

Incidentally, it was assumed that the large values of k_b are also applicable to the nonwelded vitric PTn even though preliminary data indicate that the PTn may be sparsely fractured. Had a smaller k_b been applied to the PTn, this unit would effectively act as a barrier to the upward convection of water vapor, thereby enhancing the net rate of condensate buildup in the upper TSw2 and TSw1, relative to these calculations. It should also be noted that the model used the Equivalent Continuum Model (ECM) assumptions which preclude the occurrence of nonequilibrium fracture flow. Water vapor which is being generated "ubiquitously" throughout the connected fracture system is likely to return as spatially heterogeneous channelized fracture flow. Because this channelized fracture flow will probably exceed the ability of the local gas-phase flow system to evaporate that flow, this will result in nonequilibrium fracture flow persisting for some depth below the condensation zone. It is important to realize that a k_b of 84 darcy is not likely to be applicable throughout the UZ. However, within shear or fault zones, the local value of k_b is likely to be at least that large. Therefore, these calculations indicate the possibility of condensate generated above the repository draining back to the repository horizon (and possibly down to the water table) for tens of thousands of years following the end of the boiling period for the reference SCP-CDR thermal loading case.

Low Thermal Load

For 27.1 MTU/acre (30-yr-old SNF, yielding an APD of 20 kW/acre), the intermediate- k_b case (0.28 darcy) results in virtually no net change in liquid saturation distribution; however, significant sub-boiling refluxing of water vapor and condensate does occur. This sub-boiling refluxing occurs as large-scale, buoyant, gas-phase convection drives water vapor upward to where it condenses and drains downward. The intermediate- k_b case does not result in an upward mass flow rate of water vapor that is sufficiently large to exceed the mass flow rate at which condensate returns. For $k_b = 84$ darcy, large-scale, buoyant gas-phase convection begins to have a noticeable (but very small) effect on temperatures and moisture distribution. For $k_b = 168$ darcy, large-scale buoyant gas-phase convection has a minor impact on thermal performance, but a substantial impact on moisture redistribution, particularly for $t > 5000$ yr. For $k_b = 410$ darcy, large-scale buoyant gas-phase convection has a more substantial effect on thermal performance and moisture redistribution, particularly for $t > 1000$ yr. For example, h_{dz} is 150 m at $t = 5000$ yr and the overlying condensate zone (where $S_1 > 90\%$) has a vertical thickness of 173 m (extending all the way to the ground surface). The thermal perturbation to the liquid saturation distribution persists for more than 100,000 yr. The effect of large-scale buoyant gas-phase convection for $k_b = 840$ darcy has a very substantial effect on thermal performance and moisture redistribution, particularly for $t > 600$ yr.

The average k_b in the UZ is not likely to approach the largest two values of k_b used above; however, these calculations are probably indicative of local thermo-hydrological performance in highly fractured areas such as shear or fault zones. Even for 30-yr-old SNF (an APD of 20 kW/acre), the large-scale, buoyant gas-phase convection of water vapor will result in persistent condensate drainage in highly fractured zones for tens of thousands of years. Because some of this condensate drainage will occur as nonequilibrium fracture flow, it is likely to return to the repository horizon (and possibly to the water table). Therefore, if the definition of a "cold" repository is one that does not significantly perturb the ambient hydrological system, it appears very unlikely that a "cold" repository can be achieved.

B. Ross' analysis indicates that it requires about 1000 yr for large-scale, buoyancy-driven gas-phase convection cells in the UZ to become fully developed. LLNL's calculations also indicate that it requires about 1000 yr for large-scale, buoyant gas-phase convection cells to begin to significantly impact thermo-hydrological performance under sub-boiling conditions. Therefore, regardless of how substantial buoyant gas-phase convective effects may eventually become, the peak repository temperature, T_{peak} , for 30-yr-old SNF (which generally occurs within the first 600 yr) is not significantly influenced by large-scale gas-phase convective effects. For 30-yr-old SNF (an APD of 20 kW/acre), T_{peak} is 59.9, 59.9, 58.8 and 59.0°C for k_b s of 0.28, 84, 414, and 840 darcy, respectively.

Summary

Ross' SCP-CDR thermal loading case (47.5 MTU/acre), indicates that a k_b of 50 darcy ($5.0 \times 10^{-11} \text{ m}^2$) is sufficiently large to allow large-scale, buoyant gas-phase convection to significantly lower repository temperatures relative to the conduction-only case

($\Delta T = 9.5^\circ\text{C}$ at $t = 1000$ yr). LLNL's SCP-CDR thermal loading case (49.2 MTU/acre), indicate that 84 darcy is sufficiently large to significantly lower repository temperatures relative to what is effectively a conduction-only case ($\Delta T = 13.1^\circ\text{C}$ at $t = 1000$ yr). For 27.1 MTU/acre (30-yr-old SNF and 20 kW/acre), LLNL's calculations indicate that a k_b of about 100 darcy is sufficiently large to result in large-scale, buoyant gas-phase convection significantly affecting repository temperatures and the UZ moisture distribution for $t > 1000$ yr. Note that 27.1 MTU/acre and a k_b of 100 darcy result in the same Rayleigh number as Ross' SCP-CDR thermal loading case with a k_b of 50 darcy. Therefore, LLNL's determination of the "threshold" thermal loading and bulk permeability conditions for which sub- or marginal-boiling performance begins to become significantly affected by large-scale, buoyant gas-phase convection is corroborated by Ross' analysis.

Laboratory Experiments

Work continued to measure electrical resistivity as a function of moisture content of Topopah Spring tuff samples from U3hg-1 and GU-3 holes at room temperature. Four samples with different thicknesses were prepared from each rock type for the measurements. A gold electrode was deposited on the flat surfaces of the cylindrical disc samples. Two-electrode electrical resistance measurements were done on each of the four samples. The measurements have been completed in the drying phase. These measurements were made by using distilled water (DW) as pore fluid, DW has an electrical conductivity of $\sim 0.4 \mu\text{S}/\text{cm}$ at 20°C . The same measurements will be repeated using a synthetic water with an electrical conductivity similar to that of J-13 water, which is about 33 siemens/m at 20°C . The purpose of following this experimental procedure is to determine the effect of the electrical conductivity of pore fluid on the relationship between the bulk electrical conductivity of a rock sample and the degree of saturation in it.

Work continued to investigate the different imbibition rates of water into a rock sample when the sample is either in a vapor environment or in liquid water. To understand the mechanism of the imbibition, capillary tubes of various inside diameters (ID) were put in a constant humidity chamber which will be set at various levels of humidity. The imbibition rate of water into each capillary tube will be determined. Last month it was found that a 100 micron ID is too large for the tubes to retain any moisture when they are put in a 95 - 98% relative humidity environment. Capillary tubes with ID ~ 33 microns have been obtained. They will be put in a 95 - 100% relative humidity environment and in liquid water. The amount of the imbibed water under these boundary conditions will be determined.

An experiment was started to determine the effect of fracture surface coatings on the imbibition of water into the matrix. Eight Topopah Spring tuff samples machined from Busted Butte outcrops were prepared for this purpose. Liquid water imbibition rates will be determined in these samples.

Meetings

The following papers were approved and will be presented at the International High Level Radioactive Waste Management Conference in Las Vegas, April 26-30:

1) "The Analysis of Repository-Heat-Driven Hydrothermal Flow at Yucca Mountain" by T. Buscheck and J. Nitao, and

2) "Large-Scale In Situ Heater Tests for Hydrothermal Characterization at Yucca Mountain", by T. Buscheck, D. Wilder and J. Nitao.

These papers are also available as LLNL preprints.

The paper by G. Danko (University of Nevada, Reno) and T. Buscheck (LLNL) entitled "Single-Hole In Situ Thermal Probe for Hydrothermal Characterization at Yucca Mountain" for presentation at the International High Level Radioactive Waste Conference in Las Vegas, April 26-30, was submitted to YMPO for approval.

The following papers were submitted to the American Nuclear Society Journal, Nuclear Technology:

1) "Implications of Episodic Nonequilibrium Fracture-Matrix Flow on Repository Performance" by J. Nitao, T. Buscheck and D. Chesnut,

2) "The Impact of Repository-Heat-Driven Hydrothermal Flow on Hydrological Performance at Yucca Mountain" by T. Buscheck and J. Nitao, and

3) "Large-Scale In Situ Heater Tests for the Characterization of Hydrothermal Flow at Yucca Mountain" by T. Buscheck, D. Wilder and J. Nitao.

W. Lin attended the workshop on flow and transport in unsaturated fractured rocks, on January 25-28 in Tucson, AZ. He presented some results of using electrical resistivity tomography in the laboratory and in the field to monitor water flow.

1.2.2.2.3 Mechanical Attributes of the Waste Package Environment

Plans were started for laboratory scale block testing in support of Study Plan 8.3.4.2.4.3 and the Large Block Test. This included interviewing technicians for support of the testing, and review of instrumentation systems for physical property measurements.

1.2.2.2.4 Engineered Barrier System (EBS) Field Tests

H. Kalia, and N. Elkins (LANL) visited LLNL on January 5 to discuss the thermal testing program.

The first draft of the Study Plan for the Engineered Barrier System Field Tests (SCP 8.3.4.2.4.4) is in internal review.

Large Block Test (LBT)

W. Lin collected some small pieces of Topopah Spring tuff from the Fran Ridge outcrop for determining the present moisture content in the rock. This information will be used in the design of the Large Block Test.

As requested, LLNL-YMP has reviewed its planned FY93 field work for the use of Tracers, Fluids, and Materials (TFM). The only field work planned is the Large Block Test at the Fran Ridge Test Pits.

The first draft of the Scientific Investigation Plan for the Large Block Test was completed.

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

The revision of the Man-Made Materials Study Plan has begun. The revisions are primarily those made necessary by the changes in Study Plan requirements during the period that the Man-Made Materials task was not funded.

In the anticipation of concern about organic materials (including diesel fumes and exhaust) that may be introduced into the ESF, a program of study is being designed to assess the present capabilities of the GEMBOCHS computer database in this area, and to identify deficiencies. This program is distinct from the literature review of colloids, completed in 1991, which included some organic materials, but did not address chemical stability (and conversely, reactivity) or degradation. A decision making strategy for identifying the database deficiencies of greatest concern, and thus the direction of experimental work, is being developed in tandem with this program.

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

Spent Fuel Dissolution

One set of low-oxygen dissolution experiments at LLNL was completed. Two more room-temperature dissolution experiments at 2% oxygen are on-going using the newly developed gravity-flow systems. These are included in the test matrix. The two lowest-oxygen room temperature experiments, also part of the test matrix, were begun late in the month. Dissolution cells and associated tubing for the remaining reduced-oxygen, higher temperature runs have been fabricated. To increase the progress of these experiments, the systems are being assembled in another laboratory where additional are available. The room temperature runs are being completed in the original laboratory.

The last two tests at PNL of the original spent fuel flow-through test matrix (a total of 20 tests) are still in progress to reevaluate some results that appear inconsistent with the others.

Equipment that will allow the BET surface areas of spent fuel test specimens to be measured has been installed in the Bldg. 325 hot cells at PNL, and initial operation tests have been satisfactorily completed on an unirradiated UO₂ specimen with a

known surface area. Surface area measurements on spent fuel specimens will begin by early February.

Test specimen preparations have been started on ATM-106 fuel (PWR fuel with burnup ~48 MWd/kgM and fission gas release ~18%) in both oxidized (O/M ~2.4) and unoxidized forms. Flow-through dissolution tests will be started on these specimens as soon as they have been prepared and their surface areas have been measured.

Spent Fuel Oxidation

A paper by R. Stout, E. Kansa and A. Wijesinghe entitled "Kinematics and Thermodynamics of Non-Stoichiometric Oxidation Phase Transitions in Spent Fuel" was presented at the MRS meeting in Boston, MA on November 30-December 4 and is now available as an LLNL preprint.

The abstract by R. Stout, E. Kansa and A. Wijesinghe entitled "Kinematics and Thermodynamics Across a Propagating Non-Stoichiometric Oxidation Phase Front in Spent Fuel Grains" for presentation at the ASME Micromechanical Random Media Conference at the University of Virginia on June 6-9 was submitted to YMPO.

Dry Bath Testing

Plans were made at PNL to start a dry bath test at 255°C using a variety of fuels in order to determine real time transition to U₃O₈. An addendum to the test plan is being written. Tests are being conducted to determine the stability of the dry baths at the higher temperature. The moisture probes had to be sent back to the factory for sensor replacement and calibration. The remaining dry baths continue to run without incident.

Plans are being formulated for the restart of the Thermogravimetric Apparatus systems (TGAs). A new data acquisition system is being purchased, and the systems are being reassembled. B. Hanson, a graduate student from UC Berkeley, will arrive at PNL at the end of February to do his dissertation research using the TGAs.

Materials Characterization Center (MCC) Hot Cell Activities

The paper entitled "Methodology for Determining MCC Spent Fuel Acquisitions" by S. Marschman, R. Einziger (PNL) and R. Stout (LLNL) was reviewed by LLNL-YMP technical staff and returned to the first author with review comments.

1.2.2.3.1.2 Waste Form Testing - Glass

D-20-27 Unsaturated Testing of WVDP and DWPF Glass

The N2 tests (SRL actinide-doped glass) continue with no sampling period occurring this month. These tests have been in progress for 356 weeks (almost 7 years). The N3 tests (ATM-10, a West Valley actinide-doped glass) continue and have been in progress for 274 weeks.

1.2.2.3.2 Metal Barriers

The paper by R. Van Konynenburg, W. Halsey, W. Clarke, D. McCright (LLNL) and G. Gdowski (KMI, Inc.) entitled "Selection of Candidate Container Materials for the Conceptual Waste Package Design for a Potential High Level Nuclear Waste Repository at Yucca Mountain" was approved by YMPO and will be published as an LLNL report in February. This completes Milestone T363 and T364 (Waste Package Plan milestone M08).

1.2.2.3.3 Other Materials

This WBS element has not been funded in FY93.

1.2.2.3.4 Integrated Testing

1.2.2.3.4.1 Integrated Radionuclide Release: Tests and Models

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

Epoxy mounted clinoptilolite crystals were polished in preparation for secondary ion mass spectroscopy (SIMS) analysis. D. Phinney was given the sample and developed a tentative SIMS analysis protocol.

Optimum etching times and temperatures for developing autoradiography film were identified. Development of techniques to obtain high contrast "positives" from radiography film were initiated.

Interactions of Actinide-bearing Solutions with Rock Core Samples

Programming and hardware changes to the flow-through apparatus were begun to automate the measurement of fluid flux.

The saw-cut core was sterilized in situ by subjecting it to two heat treatments at 140°C. Room temperature hydraulic measurements were begun.

Work continued on the Transmission Electron Microscopy (TEM) analysis of Milli-Q water to be used in the flow-through system. Results now indicate that the silica particles previously observed are no longer present and that filtration of the Milli-Q water resulted in a very low background of suspended particles. Analysis of holey-carbon coated TEM grids supplied by various vendors showed that a significant difference exists in the background colloidal particle load on the grids. Grids with the lowest background of particles were ordered.

1.2.2.3.4.2 Thermodynamic Data Determination

A summary of FY92 and projected FY93 NEA activities was provided to YMPO in preparation for OCRWM interactions with the NEA in February.

1.2.2.3.5 Nonmetallic Barrier Concepts

This WBS element has not been funded in FY93.

1.2.2.4 Design, Fabrication, and Prototype Testing

1.2.2.4.3 Container/Waste Package Interface Analysis

The following paper was approved and will be presented at the International High Level Radioactive Waste Management Conference in Las Vegas, April 26-30:

"Drift Emplaced Waste Package Thermal Response" by D. Ruffner, G. Johnson, E. Platt, J. Blink (LLNL) and T. Doering (M&O).

1.2.3 SITE INVESTIGATIONS

1.2.3.1 Site Investigations Coordination and Planning

This WBS element has not been funded in FY93.

1.2.3.2 Geology

1.2.3.2.1.2.1 Natural Analogue of Hydrothermal Systems in Tuff

This WBS element has not been funded in FY93.

1.2.3.4 Geochemistry

1.2.3.4.2 Geochemical Modeling

The 10-page Rev. 0 of "Software Requirements Specification (SRS) for EQ3/6, Version 8" received final review and approval by the Task Leader. The 26-page Rev. 0 of "Software Design Documentation (SDD) for EQ3/6, Version 8" was submitted to the Task Leader for review and approval.

The Lahey F77L EM/32 Fortran compiler was received and is being installed on the 486 PC. It is expected to provide significantly improved error detection than the compiler on the SPARCstation. Future versions of EQ3/6 will be supported on both platforms.

1.2.3.10 Altered Zone Characterization

YMPO has notified LLNL of its decision to fund this WBS element with FY92 underrun funds; however, the funds have not yet been furnished to LLNL in an Approved Financial Plan (AFP).

1.2.5 REGULATORY

1.2.5.1 Regulatory Coordination and Planning

This WBS element has not been funded in FY93.

1.2.5.2 Licensing

1.2.5.2.2 Site Characterization Program

LLNL staff assisted the M&O in the preparation of responses to "Open Items" dealing with Engineered Barrier System and Near Field Environment issues, resulting from the NRC's Site Characterization Analysis review of the YMP Site characterization Plan.

The LLNL reviewer, J. Nitao, accepted and signed off on Study Plan 8.3.1.2.2.2.2, R1, "Water Movement Test".

The LLNL reviewer, D. Carpenter, accepted and signed off on Study Plan 8.3.1.17.4.4, "Quaternary Strike-Slip Faulting Proximal to the Site Within Northeast-Trending Fault Zones".

The LLNL reviewer, B. Viani, reviewed Study Plan 8.3.1.3.4.1/3 "Batch Sorption Studies and Development of Sorption Models" and submitted his comments.

The LLNL reviewer, D. Chesnut, reviewed Study Plan 8.3.1.8.5.2 "Characterization of Igneous Intrusive Features" and Study Plan 8.3.1.15.2.2 "Characterization of the Site Ambient Thermal Conditions" and submitted his comments.

1.2.5.3 Technical Data Management

1.2.5.3.4 Geologic and Engineering Materials Bibliography of Chemical Species (GEMBOCHS)

The prototyping of an Ingres WINDOWS/4GL front-end for D0OUT began. When completed, this mouse-driven software will permit GEMBOCHS users to point-and-click their way to rapid generation of customized thermodynamics datafiles for use with geochemical packages such as EQ3/6 and GT.

Ingres/Net was installed on Nodes s60 and s05 of the local Sun network.

The modification of the CNGBOCHS documentation began per last month's revision of the software. The final document will be available in February.

J. Johnson attended the Ingres classes, "Designing Ingres Databases" on January 11-12 and "Designing Ingres Applications" on January 13-14 at Ingres Headquarters in Alameda, CA.

1.2.5.3.5 Technical Data Base Input

No significant activities.

1.2.5.4 Performance Assessment

1.2.5.4.2 Waste Package Performance Assessment

Modeling has been done to determine whether spent fuel cladding breach will occur for a variety of repository configurations. The phenomenon involves the temperature history of the cladding, stress from internal gas pressure, and creep toward eventual failure of the cladding by creep rupture. The creep rate is strongly temperature dependent. The model parametrizes the cladding's temperature time history as a function of several repository design parameters. This has been parametrized for the compact repository (large spent fuel packages in drifts), using thermal calculations from the paper "Drift Emplaced Waste Package Thermal Response" by D. Ruffner, G. Johnson, E. Platt, J. Blink (LLNL) and T. Doering (M&O) for the drift and container-surface temperatures, and using an analysis of an equal-sized transportation container (with an adjustment for a disposal-only function) to get the edge-to-center temperature rise as a function of container heat generation rate. The creep rate and creep failure equations are taken from Chin and Gilbert, (Nuclear Tech. 85, 57, 1989). Some of the repository configurations used in the parametric study of Ruffner et al. will preserve a median spent fuel rod from creep rupture and some will not. For example, the configuration with 21 PWR assemblies per package, 33 GWdays/MTU burnup, 30-year age at emplacement, and 72 foot spacing of packages will give creep only up to about 25% of the limit, and has an AML of 71 MTU/acre (about 1.5 times the SCP Conceptual Design Report AML), enough to provide substantial dryout of the host rock within and above the repository (ref: T. Buscheck and J. Nitao, 3rd IHLRWM Conf., 1992).

1.2.9 PROJECT MANAGEMENT

1.2.9.1 Management and Coordination

No significant activities.

1.2.9.1.2 Technical Project Office Management

W. Clarke and J. Blink attended the TPO meeting in Las Vegas on January 20. W. Clarke, J. Blink and D. Wilder attended the TAG meeting in Las Vegas on January 21. D. Wilder made a presentation on the extended dry concept.

LLNL-YMP staff briefed the Fission Energy and Safety Systems Program of LLNL on the Yucca Mountain Project on January 14.

J. Blink described current LLNL programs at the Southern Nevada ASME meeting in Las Vegas on January 21.

J. Blink presented hands-on science classes to 225 students and 13 teachers at the John S. Park Elementary School in Las Vegas on January 13.

J. Blink attended the software advisory group (SAG) meeting on January 7, the Infrastructure Cost Reduction meeting on January 22, the Test Coordination Office

ESF monthly status meeting on January 25 and the ALARA Committee meeting on January 28; all four meetings were in Las Vegas.

1.2.9.2 Project Control

1.2.9.2.2 Participant Project Control

The December FTE report was submitted to YMPO. The report format was changed and requires more extensive data. The reporting system had to be modified to collect the information required. The December actual schedule progress and costs were submitted via the PACS reporting system. Variance analysis explanations were developed for several P&S accounts for activity undertaken during the 1st quarter of FY93.

The updated Cost Plan will include December actuals.

The process is continuing to prepare a capital acquisition plan for four computer systems which exceed \$15k each. While these systems were identified in the PACS planning base, LLNL did not submit the acquisition plans to support the Information Resource Management (IRM) requirements.

Inputs were completed for the FY95 IRM Long Range Plan. The plans data include a site software profile.

Training began for additional staff resource personnel for project control activities. This resource consists of a Computer Technologist, T. Henson (.5 FTE) to develop the local area network (LAN), trouble shoot small system problems, install software and to conduct limited training and a Project Control Technician, P. Krantz who is being trained to assist in IRM activities, Property Management and PACS activities.

The response was completed to a GAO questionnaire that addresses the entire Nuclear Waste Fund for the past four years. Also a response was made to internal LLNL questions concerning data provided on the questionnaire.

The effort is continuing to automate the transfer of data between the laboratory financial systems and the PACS workstation. Several iterations have been submitted; however, extensive work remains to be accomplished before the software will meet requirements.

An FTE analysis was submitted to YMPO. Work continued to update the manpower matrix to ensure correct distribution of manpower and to verify the current individuals who are using YMP cost accounts.

A planning meeting was held to define the LAN requirements and options and a schedule for its implementation.

J. Podobnik and P. Krantz attended a Project Information Resource Manager Council Committee meeting in Las Vegas on January 13.

1.2.11 QUALITY ASSURANCE

1.2.11.1 Quality Assurance Coordination and Planning

The LLNL-YMP QA Manager, Dean Wolfe has resigned effective January 22 in order to accept a position with Bechtel. M. Revelli was named interim QA Manager and the position was posted.

The 1993 surveillance and audit schedules were updated and reissued.

1.2.11.2 Quality Assurance Program Development

Work began to review the QARD that was issued by OCRWM at the end of December. Work also began on the first draft of the QARD Matrix and the transition plan as required by OCRWM and YMPO. Personnel attended users training in Las Vegas on the QARD Requirements Matrix database. Due to the YMP audit of LLNL activities, this QARD work was interrupted. An extension was requested to the January 29th due date for the implementation plan.

QP-1.0, Rev. 3 (Organization) and QP-16.0, Rev. 4 (Corrective Action) were completed and distributed. Change Notice 1.0-3-1 (Organization) was completed and distributed.

1.2.11.3 Quality Assurance Verification

An extension was requested for all outstanding YM CARs (91-056, 92-064, 92-065 and 93-017) resulting from previous DOE Audits and Surveillances. All of these CARs involve one or more procedural revisions and will be resolved in concert with the QARD implementation plan.

1.2.11.3.1 Quality Assurance Verification - Audits

Audit YMP-93-04 was conducted of LLNL by DOE during the week of January 11-14. There were no findings adverse to quality noted. The LLNL QA Program was judged to be effectively implemented in the areas audited.

It was requested that DOE audit YMP-93-13 be rescheduled from June to July to allow for completion of LLNL independent internal audit prior to the DOE audit.

1.2.11.3.2 Quality Assurance Verification - Surveillance

Surveillance Report S93-03 (Document Control and Records) was issued. Surveillance Report S93-14 (Organization) was completed and issued.

CAR-LLNL-026 was completed, verified and transmitted to YMPO.

1.2.11.4 Field Quality Assurance/Quality Control

This WBS element has not been funded in FY93.

1.2.11.5 Quality Assurance - Quality Engineering

Support continued for the Waste Form Characterization area.

1.2.12 INFORMATION MANAGEMENT

1.2.12.2 Records Management

1.2.12.2.2 Local Records Center Operation (LRC)

Document Control issued two new revisions and one change notice under controlled distribution. Routine follow-up for receipt acknowledgments continues.

1.2.12.2.3 Participant Records Management

A total of 186 items were logged into the LLNL-YMP tracking system. This includes 31 records/records packages that were processed through to the CRF. Eleven action items were closed.

All 1991 records have been cross referenced from the database to microfilm. The 1992 records are now being entered.

1.2.12.2.5 Document Control

LLNL received no funding under this WBS. Work performed to complete LLNL's obligation in this WBS is funded under WBS 1.2.12.2.2.

1.2.13 ENVIRONMENT, SAFETY AND HEALTH

1.2.13.1 Environment, Safety and Health Coordination and Planning

This WBS element has not been funded in FY93.

1.2.15 SUPPORT SERVICES

1.2.15.2 Administrative Support

No significant activities.

1.2.15.3 Yucca Mountain Site Characterization Project (YMP) Support for the Training Mission

Twenty four different self-study assignments were issued, and 157 people were trained to these assignments. Currently, there are 66 participants on the project who are to be trained and/or tracked.

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