



Department of Energy

Washington, DC 20585

AUG 26 1992

Mr. Joseph J. Holonich, Director
Repository Licensing and Quality Assurance
Project Directorate
Division of High-Level Waste Management
Office of Nuclear Material Safety
and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Holonich:

The enclosed Yucca Mountain Site Characterization Project participant monthly status reports are forwarded for your information. If you have any questions on the enclosed reports, please contact Priscilla Bunton at (202) 586-8365.

Linda J. Desell

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

Enclosures:

- (1) EG&G/EM Progress Report, July 1992
- (2) Lawrence Livermore National Laboratories Yucca Mountain Project Status Report, June 1992
- (3) Los Alamos Monthly Activity Report, June 1992
- (4) REECO Yucca Mountain Project Status Report, July 1992

9209030093 920826
PDR WASTE PDR
WM-11

*NH03 1/1
102-8
WM-11*

cc:w/o encl.

C. Gertz, YMPO

cc: w/encl.

K. Hooks, NRC

R. Loux, State of Nevada

M. Baughman, Lincoln County, NV

J. Bingham, Clark County, NV

B. Raper, Nye County, NV

P. Niedzielski-Eichner, Nye County, NV

G. Derby, Lander County, NV

P. Goicoechea, Eureka, NV

C. Schank, Churchill County, NV

F. Mariani, White Pine County, NV

V. Poe, Mineral County, NV

E. Wright, Lincoln County, NV

J. Pitts, Lincoln County, NV

R. Williams, Lander County, NV

J. Hayes, Esmeralda County, NV

M. Hayes, Esmeralda County, NV

B. Mettam, Inyo County, CA

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

AUG 4 9 09 AM '00

WBS 1.2.9.1
QA N/A

July 20, 1992

TWS-EES-13-07-92-051

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

I-330254
②

Dear Mr. Gertz:

SUBJECT: LOS ALAMOS MONTHLY ACTIVITY REPORT—JUNE 1992

Attached is the Los Alamos Monthly Activity Report for June 1992. This internal document describes our technical work in detail; however, the report has not received formal technical or policy review by Los Alamos or the Yucca Mountain Site Characterization Project. Data presented in this document represent work progress, are not referenceable, and are not intended for release from the US Department of Energy. If you have changes to our distribution list, please call me at (505) 667-0916.

Sincerely,

Susan H. Klein
Susan H. Klein

SHK/elm

Attachment: a/s

Cy w/att:

- ✓ M. B. Blanchard, YMPO, Las Vegas, NV
- ✓ T. E. Blejwas, SNL, Albuquerque, NM
- ✓ R. L. Bullock, RSN, Las Vegas, NV
- ✓ V. J. Cassella, HQ/Washington, DC
- ✓ U. S. Clanton, YMPO, Las Vegas, NV
- ✓ W. L. Clarke, LLNL, Livermore, CA
- ✓ P. L. Cloke, SAIC, Las Vegas, NV
- ✓ J. L. Cooper, YMPO, Las Vegas, NV
- ✓ J. Docka, Weston, Washington, DC
- ✓ J. R. Dyer, YMPO, Las Vegas, NV
- ✓ L. D. Foust, CRWMS, M&O/TRW, Las Vegas, NV
- ✓ L. R. Hayes, USGS, Denver, CO
- ✓ C. Johnson, M&O/WCC, Las Vegas, NV
- ✓ N. Jones, M&O/TRW, Las Vegas, NV

- ✓ K. Krupka, PNL, Richland, WA
- ✓ M. Martin, M&O/TRW, Las Vegas, NV
- ✓ C. W. Myers, EES-DO, MS D446
- ✓ C. M. Newbury, YMPO, Las Vegas, NV
- ✓ P. T. Prestholt, NRC, Las Vegas, NV
- ✓ R. F. Pritchett, REECo, Las Vegas, NV
- ✓ R. L. Robertson, CRWMS, M&O, Fairfax, VA
- ✓ W. B. Simecka, YMPO, Las Vegas, NV
- ✓ A. M. Simmons, YMPO, Las Vegas, NV
- ✓ R. K. St. Clair, M&O/TRW, Las Vegas, NV
- ✓ M. Voegele, SAIC, Las Vegas, NV
- RPC File (2), MS M321
- TWS-EES-13-File, MS J521

Gertz (2)
See Dist List
Foust (M&O)
Johnson - w/o
Brodeur
Jones S
Johnson - w/o

26/8/92

Cy w/o att.:

- J. A. Canepa, EES-13, MS J521
- S. H. Klein, IS-11, MS J521
- CRM-4, MS A150



Jul 16 11 33 AM '00

LLYMP9207009
July 9, 1992

WBS 1.2.9
"QA: N/A"

I-329616

(signature)

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

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

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

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

Sincerely,

<i>Gertz (2)</i>	<i>W. L. Clarke</i>
<i>Blanchard</i>	W. L. Clarke
<i>Boak</i>	LLNL Technical Project Officer
<i>Dynn</i>	for YMP
<i>Weyer</i>	
<i>Harrison</i>	<i>Yester</i>
<i>Simmons</i>	<i>Brodsky</i>
<i>Simonek</i>	<i>Jones</i>
<i>Prui - w/o</i>	

WC/EC

cc:
Distribution

7/16/92

DISCLAIMER

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

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

TABLE OF CONTENTS

1.2.1 Systems

- WBS 1.2.1.1 Management and Integration
- WBS 1.2.1.2.4 Systems Engineering Implementation (Revelli)
- WBS 1.2.1.2.6 YMP Support to MSIS (Ruffner)
- WBS 1.2.1.3.5 Technical Database Input (Revelli)

Performance Analyses (Halsey)

- WBS 1.2.1.4.2 Waste Package Performance Assessment (Halsey)

Geochemical Modeling

- WBS 1.2.1.4.5 Geochemical Modeling & Database Development (Wolery/Johnson)
- WBS 1.2.1.4.7 Supporting Calculations for Postclosure Performance Analyses

1.2.2 Waste Package

- WBS 1.2.2.1 Management and Integration

Waste Package Environment (Wilder)

- WBS 1.2.2.2.1 Chemical & Mineralogical Properties of the Waste Package (Glassley)
- WBS 1.2.2.2.2 Hydrologic Properties of Waste Package Environment (Buscheck)
- WBS 1.2.2.2.3 Mechanical Attributes of the Waste Package Environment (Blair)
- WBS 1.2.2.2.4 EBS Field Tests (Lin)

Waste Form & Materials Testing (Stout/Clarke)

- WBS 1.2.2.3.1.1 Waste Form Testing - Spent Fuel (Stout)
- WBS 1.2.2.3.1.2 Waste Form Testing - Glass (Bourcier)
- WBS 1.2.2.3.2 Metal Barriers (Clarke)
- WBS 1.2.2.3.4.1 Integrated Radionuclide Release: Tests and Models (Viani)
- WBS 1.2.2.3.4.2 Thermodynamic Data Determination (Silva)

Engineering & Systems Analyses (Ruffner/Clarke)

- WBS 1.2.2.4.1 Waste Package Design (Ruffner)
- WBS 1.2.2.4.2 Container Fabrication & Closure Development (Clarke)
- WBS 1.2.2.4.3 Container/Waste Package Interface Analysis (Ruffner)

1.2.5 Regulatory and Institutional

- WBS 1.2.5.2.1 NRC Interaction Support (Blink)
- WBS 1.2.5.2.2 Site Characterization Program (Blink)
- WBS 1.2.5.2.4 Technical Support Documentation (Blink)
- WBS 1.2.5.2.5 Study Plan Coordination (Blink)
- WBS 1.2.5.2.6 Semi-Annual Progress Reports (Campbell)

1.2.9 Project Management

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

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

JUNE 1992

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

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

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

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

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

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

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

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

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

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

1.2.1 SYSTEMS

1.2.1.1 Management and Integration

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

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

1.2.1.2 Systems Engineering

1.2.1.2.4 Systems Engineering Implementation

No significant activities.

1.2.1.2.5 Configuration Management and Plans and Procedures Control

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

1.2.1.2.6 YMP Support to Management Systems Improvement Strategy

No significant activities.

1.2.1.3 Technical Data Base Management

1.2.1.3.5 Technical Data Base Input

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

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

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

1.2.1.4.2 Waste Package Performance Assessment

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

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

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

1.2.1.4.5 Geochemical Modeling and Data Base Development

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

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

DBAPP and D00UT were used to generate two revised suites of thermodynamic datafiles (DATA0.[sup,nea,com,pit,hmw].R[15 and 16] that support the EQ3/6 geochemical software package (version 7.0). These new datafiles were then piped through EQPT to generate the corresponding DATA1 suites, which were then transferred to the Alliant FX/80 where they can be accessed by local users of EQ3/6.

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

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

The Individual Software Plan (ISP) for D00UT was generated and submitted to the LLNL-YMP Software Quality Manager for review.

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

1.2.1.4.7 Supporting Calculations for Postclosure Performance Analyses

This WBS element has not been funded in FY92.

1.2.2 WASTE PACKAGE

1.2.2.1 Management and Integration

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

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

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

1.2.2.2 Waste Package Environment

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

1.2.2.2.1 Chemical and Mineralogical Properties of the Waste Package Environment

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

Model Calculations

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

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

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

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

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

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

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

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

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

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

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

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

Code Development

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

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

Laboratory Experiments

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

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

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

Meetings

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

1.2.2.2.3 Mechanical Attributes of the Waste Package Environment

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

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

1.2.2.2.4 Engineered Barrier System (EBS) Field Tests

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

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

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

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

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

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

1.2.2.3 Waste Form and Materials Testing

1.2.2.3.1 Waste Form

1.2.2.3.1.1 Waste Form Testing - Spent Fuel

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

Spent Fuel Dissolution

Four UO₂ pellets were analyzed by using Electron Spectroscopy for Chemical Analysis (ESCA) and Scanning Electron Microscopy (SEM). These pellets included one from the last series of runs showing high dissolution rates of uranium, one from the low dissolution-rate runs last fall, and two unused pellets from batches that were hydrogen-reduced at different times. The latest series had buffers saturated with 20% oxygen in argon. The similar runs last fall lost oxygen via permeation through the plastic tubing. Although there were differences in the surface chemistry, all pellets showed uranium at a higher oxidation state than UO₂. The SEM analyses showed that the two pellets used in the dissolution runs experienced significant grain boundary and pore etching via dissolution of UO₂. The buffer solutions before and after leaching, as well as the high purity water used in their preparation, were analyzed via Inductively Coupled Plasma Mass Spectrometry (ICP/MS). This highly sensitive technique for aqueous solutions can

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

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

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

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

Spent Fuel Oxidation

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

Materials Characterization Center (MCC) Hot Cell Activities

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

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

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

1.2.2.3.1.2 Waste Form Testing - Glass

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

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

1.2.2.3.2 Metal Barriers

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

1.2.2.3.3 Other Materials

This WBS element has not been funded in FY92.

1.2.2.3.4 Integrated Testing

1.2.2.3.4.1 Integrated Radionuclide Release

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

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

Interactions of Actinide-bearing Solutions with Rock Core Samples

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

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

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

Source Term Development

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

1.2.2.3.4.2 Thermodynamic Data Determination

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

1.2.2.3.5 Nonmetallic Barrier Concepts

This WBS element has not been funded in FY92.

1.2.2.4 Design, Fabrication, and Prototype Testing

1.2.2.4.1 Waste Package Design

This WBS element has not been funded in FY92.

1.2.2.4.2 Container Fabrication and Closure Development

This WBS element has not been funded in FY92.

1.2.2.4.3 Container/Waste Package Interface Analysis

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

1.2.5 REGULATORY AND INSTITUTIONAL

1.2.5.2 Licensing

1.2.5.2.1 NRC Interaction Support

No significant activities.

1.2.5.2.2 Site Characterization Program

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

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

1.2.5.2.4 Technical Support Documentation

No significant activities.

1.2.5.2.5 Study Plan Coordination

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

1.2.5.2.6 Semi-Annual Progress Reports

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

1.2.9 PROJECT MANAGEMENT

1.2.9.1 Management and Integration

1.2.9.1.1 Management

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

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

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

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

1.2.9.1.4 Records Management

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

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

1.2.9.2 Project Control

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

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

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

1.2.9.3 Quality Assurance

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

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

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

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

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

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

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

LLNL PROJECT STATUS REPORT DISTRIBUTION

EXTERNAL

PRELIMINARY STAMP

Dr. J. Bates
Chemical Technology Division
Argonne National Laboratory
9700 S. Cass Avenue
Argonne, Illinois 60439

H. Benton/D. Stahl
Ste P110
101 Convention Center Drive
Las Vegas, Nevada 89109

A. Berusch (RW-20)
OCRWM
Forrestal Building
Washington, DC 20585

M. Blanchard
Yucca Mountain Project Office
U.S. Department of Energy
P. O. Box 98518
Las Vegas, Nevada 89193-8518

T. Blejwas
Sandia National Laboratories
P.O. Box 5800
Albuquerque, NM 87185

J. Blink
LANL/Las Vegas
101 Convention Center Drive,
Suite 820
Las Vegas, NV 89109

J. Boak
Yucca Mountain Project Office
U.S. Department of Energy
P. O. Box 98518
Las Vegas, Nevada 89193-8518

S. Bodnar
TRW, Mail Stop 423
101 Convention Center Drive
Las Vegas, Nevada 89109-2005

M. Brodeur
Science Applications Int'l Corp
101 Convention Center Dr. # 407
Las Vegas, NV 89109-2005

J. Canepa
Los Alamos National Laboratory
P.O. Box 1663/N-5, MS J521
Los Alamos, NM 87545

P. Cloke
Science Applications Int'l Corp
101 Convention Center Dr. # 407
Las Vegas, NV 89109-2005

W. Dixon
Yucca Mountain Project Office
U.S. Department of Energy
P.O. Box 98518
Las Vegas, Nevada 89193-8518

J. Dyer
Yucca Mountain Project Office
U.S. Department of Energy
P.O. Box 98518
Las Vegas, Nevada 89193-8518

PRELIMINARY STAMP

R. Einziger
Battelle-Pacific Northwest
P.O. Box 999/MS P714
Richland, WA 99352

M. Fortsch
M&O
101 Convention Center Drive
Phase II, Suite P110
Las Vegas, NV 89109

L. D. Foust
Technical Project Officer
CRWMS M&O
101 Convention Center Drive
Phase II, Suite P110
Las Vegas, NV 89109



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

D. Harrison-Giesler
Yucca Mountain Project Office
U.S. Department of Energy
P.O. Box 98518
Las Vegas, Nevada 89193-8518

L. Hayes
U.S. Geological Survey
Box 25046/MS 425
Denver Federal Center
Denver, Colorado 80225

R. Hughey
Nuclear Energy Division
USDOE/SAN
1333 Broadway
Oakland, CA 94612

V. Iorri
Yucca Mountain Project Office
U.S. Department of Energy
P.O. Box 98518
Las Vegas, Nevada 89193-8518

C. Johnson
M&O
101 Convention Center Drive
Phase II, Suite P110
Las Vegas, NV 89109

H. Kalia
LANL/LV
101 Convention Center Drive #1024
Las Vegas, NV 89109-2005

PRELIMINARY STAMP
S. Marschman, P7-14
Battelle, Pacific Northwest
P.O. Box 999
Richland, WA 99352

J. Nelson
Science Applications Int'l Corp
101 Convention Center Dr. # 407
Las Vegas, NV 89109-2005

P. Prestholt
Nuclear Regulatory Commission
301 E. Stewart Ave. #203
Las Vegas, NV 89101

R. L. Robertson
TRW-Metro Place
2650 Park Tower Dr.
Suite 800
Vienna, VA 22180

W. Simecka
Yucca Mountain Project Office
U.S. Department of Energy
P.O. Box 98518
Las Vegas, Nevada 89193-8518

A. Simmons
Yucca Mountain Project Office
U.S. Department of Energy
P.O. Box 98518
Las Vegas, Nevada 89193-8518

H. Spieker
Nuclear Waste Mgmt System
M&O
101 Convention Center Drive
Suite #P110
Las Vegas, NV 89109-2005

J. Weston
Roy F. Weston, Inc.
955 L'Enfant Plaza, S.W.
Washington, DC 20024



EG&G ENERGY MEASUREMENTS

Santa Barbara Operations

EG&G ENERGY MEASUREMENTS, INC., 101 CONVENTION CENTER DRIVE, LAS VEGAS, NEVADA 89109

TEL: (702)794-7463

AUG 11 9 05 AM '00

I-330557 37

August 9, 1992
LV92-RAG-129
WBS 1.2.5.4.7
NQA

Kathleen F. Grassmeier, Chief
Project and Operations Control Division
Yucca Mountain Project Office
DOE Field Office, Nevada
P. O. Box 98518
Las Vegas, NV 89193-8518

PROGRESS REPORT - JULY 1992

Attached is the July 1992 progress report on biological studies and support activities conducted by EG&G/EM for the Yucca Mountain Project. Please contact me (293-7762) or Kent Ostler (794-7474) if you have questions regarding this report.

EG&G Energy Measurements, Inc.

Thomas P. O'Farrell, Manager
Environmental Studies Project
611 Avenue H
Boulder City, NV 89005

mak

Enclosure

cc: W. Dixon, DOE/YMP
D. Sorensen, SAIC
P. Niles, SAIC

DIVISION DIXON
CC: LOPUE
CC: Dyer/Schrick
CC: Kubler/Cest
CC: McCann/SAIC
CC: Prodsky
CC: Grandi
CC: HUMPS
CC: S. Jones/Gert -a/o

REC'D IN YMP
8/11/92

ENCLOSURE 3

**YUCCA MOUNTAIN PROJECT
BIOLOGICAL RESOURCES PROGRAM
MONTHLY PROGRESS REPORT
JULY 1992**

Summary of Work Accomplished During Report Period

EG&G Energy Measurements (EG&G/EM) conducted work for the Biological Resources task (WBS 1.2.5.4.7) for the Project Office. Activities included conducting preactivity surveys; continuing site characterization effects studies, support studies for the radiological monitoring program, desert tortoise studies, and habitat reclamation studies; development of work instructions and study designs for new studies; and responding to requests for biological support by Project Office.

Monitoring and Mitigation

- Six preactivity surveys were conducted during July:
 - 1) UNLV groundwater fingerprinting stations (#92-017b).
 - 2) Alice Hill trenches A-1, A-2, and MWV-T3 (#92-009b).
 - 3) North Portal Rock (ESF Port 1a, #92-015b).
 - 4) Road leading to proposed powder magazine site (#92-015b).
 - 5) Hazardous waste accumulation area (#92-021b).
 - 6) Neutron boreholes N57, 58, 59, and 61 (#92-018b).

- Seven preactivity survey reports were submitted to Project Office:
 - 1) Nine rock and soil test pits; PSF 5-10 and GSF 21, 25, and 26 (#92-008b).
 - 2) Neutron boreholes N63 (#92-018b).
 - 3) RSN radio tower site (#92-013b).
 - 4) UNLV groundwater fingerprinting stations (#92-017b).
 - 5) North Portal Road (part of ESF Port 1a, #92-015b).
 - 6) Rock collection for bit test programs (#92-010b).
 - 7) Quaternary fault study (#92-010b).

- A resurvey was completed of neutron borehole N63 (#92-018b). Tortoise burrows which REECO personnel thought would be destroyed by construction were collapsed.

- Site-specific reclamation stipulations were submitted to the Project Office for the Quaternary fault study (#92-010b).

- Soil samples were collected from five Midway Valley pits (#91-028d). A reclamation inventory was completed for the North Portal access road (#92-015b).

- EG&G/EM provided a biologist for real-time surveys at three seismic instrument stations, and to assist with siting recommendations at the proposed NRG-6 drill pad. An EG&G/EM reclamation scientist met with YMP, REECo, and USGS personnel to discuss alternative access routes for the Busted Butte pavement study (#92-007b).

Habitat Reclamation

- The depth of soil to bedrock was measured at the reclamation study plot on the north end of Yucca Mountain. The study design for this plot is being revised to accommodate the spatial variability in soil depths.
- Twelve plant succession study plots were established. Plant cover and density and seedling density were measured on each plot.
- Existing topsoil stockpiles were inventoried. A chemical stabilizer was applied to about three-quarters of the stockpiles at Trench MWVT-5a. Equipment problems prevented completion of this task. This work will be completed in August.

Site Characterization Effects Program

- Vegetation production samples were collected on 14 ecological study plots (ESFs). Twenty-two of forty-eight ESPs have been sampled.
- Traffic counts were recorded each week at 12 locations. Eight of the counters were rotated to different locations each week. Four counters are left at permanent locations.
- Soil moisture and temperature and weather data were collected once at the 48 ESPs. Mesh screen was placed on the precipitation gauges to keep out insects.
- Fugitive dust samples were collected from the 48 ESPs and weighed.

Radiological Monitoring Program

- The radiomarked quail were located each week. Six marked quail were alive at the beginning of July. Three birds were confirmed dead during the month. The transmitter from a fourth bird was found in the subdock area. This quail had been nesting nearby and never returned to the nest. It is presumed dead. Eight of ten radiomarked quail now have died. One radiomarked quail from Forty-Mile Wash near H-Road moved to the subdock area. This quail remained there for two weeks and then moved back to Forty-Mile Wash. This is the only evidence that suggests quail may move between Forty-Mile Wash and the area near the subdock were much of the site characterization activity will occur. The two nests that were being tended in early July were found abandoned; one was destroyed, probably by a predator.

- Small mammals were captured and released at NF37 and NF59 to monitor effects of radiological collections on population abundance and recruitment. Large numbers of juveniles were caught indicating successful reproduction. A second collection in October will likely be made.
- Thirty-two deer forage samples were collected from twenty-five locations. Collections have been completed for FY92.
- Spotlight surveys were conducted at Yucca Mountain and in Crater Flats to monitor the abundance of *lagomorphs* (i.e., jackrabbits and cottontails) and mammalian predators. Surveys were conducted for three consecutive nights in each area. An average of 22 and 39 *lagomorphs* per night were observed in Crater Flats and at Yucca Mountain, respectively. In FY91, an average of only 1.3 *lagomorphs* were observed per night. At Yucca Mountain three or four mule deer were seen each night. Kit fox were seen during two of three nights.

Desert Tortoise Program

- Most of the radiomarked tortoises (84-88) were located twice each week. The four tortoises scheduled to be located once each week were located. Eleven new tortoises were observed in the Yucca Mountain area. Five were marked with numbers, and one (a hatchling) was radiomarked. Five were not marked; three were in deep burrows and could not be removed. The locations of two were reported by YMP contractors to the Field Operation Center. These two were not marked because no one was immediately available, and neither tortoise was in danger.
- Tortoise # 423 (relocated from Midway Valley) was located 3-4 times each week. It moved about 3-4 km this month but remained in an area approximately 2.5 km east of its original release site.
- One new tortoise nest was found. The nest is on the south end of Yucca Mountain. One egg was outside the nest, and two others were uncovered. This nest is being monitored. Female tortoises included in the reproduction study were weighed twice. String attached to these tortoises to follow movements was removed because no significant weight loss occurred and courtship activity has started. Seven of the eleven nests previously found were excavated to determine clutch-size. Nine nests now have been excavated. Clutch-size has ranged from 3 to 10 eggs.
- Tortoise scat samples from FY91 were sent to Colorado State University for analysis to estimate diet composition.

Support Items

- **The June monthly report of Yucca Mountain Site Characterization Project activities and accomplishments was sent to the Project Office. Weekly reports of activities also were submitted to Project Office and SAIC.**
- **EG&G/EM provided SAIC (T. Pysto) with information and recommendations on the best available technology for deterring raven-use of power poles for roosting and nesting.**
- **Budget status and PACS information were prepared for the Project Office at their request. These estimates were based on estimated costs to end of FY92. Preparation of scopes of work and budgets for FY93 was started. Baseline budget requirements were prepared to justify FY93 funding.**
- **Two EG&G/EM biologists assisted with a YMP Public Outreach tour. EG&G/EM also met with SAIC (K. Rohrer) to discuss plans and needs for a tortoise habitat display and poster at the YMP Field Operations Center. A brief description of the desert tortoise studies was presented at a YMP Site Office staff meeting.**
- **EG&G/EM facilities personnel met with TRW to discuss office space requirements and the proposed move.**



Reynolds Electrical & Engineering Co., Inc.

Post Office Box 98521 • Las Vegas, NV 89193-8521

AUG 12 3 25 PM '00

I-330671 87

IN REPLY REFER TO:
580-01-599

WBS 1.2.9.1
QA: N/A

August 11, 1992

Carl P. Gertz, Project Manager
Yucca Mountain Site Characterization
Project Office
U.S. Department of Energy
Post Office Box, 98608
Las Vegas, NV 89193-8608

YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT (YMP) STATUS REPORT

Attached is the July YMP Status Report for Reynolds Electrical & Engineering Co., Inc.'s participation in the YMP.

If further information is required, please contact Sandra L. Hughes at 794-7192.

RFP Pritchett

R. F. Pritchett, Manager
Yucca Mountain Project Division
YMP Technical Project Officer

RFP:SLH:mab

Enclosure
Status Report (3 pages)

cy: See page 2

*Gertz (2)
See Distribution
List (YMP)
Berkop
Grodsky
Jones S
Waters
Stecker-ew22*

8/12/92

TOTAL QUALITY IS OUR BUSINESS

REECO

AN EG&G COMPANY

ENCLOSURE 4

Carl P. Gertz
580-01-599
Page 2
August 11, 1992

cy w/encl.

Central Files, M/S 530 THRU
Executive Office, M/S 555

✓ C. E. Hampton, DOE/NV, M/S 505
L. M. Smith, DOE/NV, M/S 505
✓ M. B. Blanchard, DOE/YMP, M/S 523
✓ S. Clanton, DOE/YMP, M/S 523
✓ M. O. Cloninger, DOE/YMP, M/S 523
✓ W. R. Dixon, DOE/YMP, M/S 523
✓ J. R. Dyer, DOE/YMP, M/S 523
✓ B. D. Hutchinson, DOE/YMP, M/S 523
✓ V. F. Iorii, DOE/YMP, M/S 523
✓ E. H. Petrie, DOE/YMP, M/S 523
✓ W. B. Simecka, DOE/YMP, M/S 523
✓ W. A. Wilson, DOE/YMP, M/S 717
L. D. Foust, M&O, M/S 423
M. M. Martin, M&O, M/S 423
R. L. Robertson, M&O/Fairfax, VA
P. Prestholt, NRC/Las Vegas, NV
R. C. Furtek, REECO, M/S 235
B. R. Gardella, REECO, M/S 408
W. J. Glasser, REECO, M/S 408
J. L. Henze, REECO, M/S 751
R. B. Land, REECO, M/S 585
T. M. Leonard, REECO, M/S 408
K. L. Limon, REECO, M/S 408
C. J. Mason, REECO, M/S 751
S. O. Straub, REECO, M/S 408
J. R. Trujillo, REECO, M/S 590
R. A. Adams, SAIC, M/S 517
M. Brodeur, SAIC, M/S 517/T-23
R. D. Hutton, SAIC, M/S 517
S. C. Smith, SAIC, M/S 517/T-10
J. W. Teak, SAIC, M/S 517
J. E. Therien, SAIC, M/S 517
R. S. Saunders, SAIC, M/S 517/T-24

REYNOLDS ELECTRICAL & ENGINEERING CO., INC.
(REECO)

YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT (YMP)

JULY 1992 - STATUS REPORT

REECO has no reportable Level 0 or Level 1 Milestones.

SITE (1.2.3)

WBS 1.2.3.5

Task: Capital Equipment to support Drilling Programs

Procurement is in process for the following drilling support equipment:
Sutorbilt blower, drill rig to replace the Joy 1, cuttings/handling system.

Task: Neutron Access Holes (Job Package 91-9)

Received Job Package 91-9, Revision 3, for drilling and coring of the second 12 neutron access boreholes (Phase 2). Expected start date is July 31, 1992.

Task: North Portal Drill Hole and Surface Facility Test Pits (Job Package 92-2)

No field activity during this period.

Task: UZ-16 Drilling and Testing (Job Package 92-3)

Replaced "wet" dust suppression system with Haz-Vac Industrial Vacuum Loader, and resumed drilling operations with approval of YMPO on July 8, 1992. Core hole depth is 408.67 feet; 12 1/4-inch reamed hole depth is 382.20 feet. During tripping, drill pipe joints, stabilizer and bit were dropped from the surface and fell to the bottom. Seventeen drill pipe joints were recovered, leaving .8 feet of drill pipe, the stabilizer and bit in the hole. Remainder of fish was recovered. Presently preparing to non-destructive test the dropped tools at the Area 25 Subdock in preparation to resume drilling.

Task: Midway Valley Trenching (Job Package 92-5)

Returned twenty pieces of shoring to vendor.

Task: General Support

Completed certification of the Failing Stratmaster drill rig.

EXPLORATORY STUDIES (1.2.6)

WBS 1.2.6.1

Task: Exploratory Studies Facility (ESF)

Continued to provide constructability support to activities to begin Tunnel Boring Machine (TBM) operations and ESF Title II design. Participated in 90% Title II reviews. Request for Proposal (RFP) 1-DH-92 for the Technical Support and Underground Excavation for the ESF closed at 4 p.m. on July 29, 1992. The Source Evaluation Board convened on July 30, 1992 to begin evaluation of proposals.

FIELD OPERATIONS (1.2.7.4)

Task: Administrative & Maintenance Support

Continued support to W. A. Wilson, Yucca Mountain Site Manager, to include: processing of purchase requisitions for Field Operations Center (FOC) Site Office requirements; providing support services to participants and maintenance on YMP utilized facilities, equipment and roads in Area 25; and providing logistical and support services to management contractor.

Provided support for the Yucca Mountain Site Office open house and public tours. Seven tours were held during this period with 145 people attending. Support included but was not limited to arrangements for buses, registration of guests, coordination of lunches/beverages, medical service, furniture, mechanical service and grading of access road. Continued preparations for upcoming tours.

PROJECT MANAGEMENT (1.2.9)

WBS 1.2.9.1

Task: Management and Administrative Support

Continued coordination and staffing of YMP displays at meetings, exhibits, conferences and tours; staffed and supported the Public Reading Room of the Research and Study Center.

Task: Site Characterization Plan (SCP) Distribution

Received 4,350 copies of Progress Report No. 5. Distributed 2,769 copies for a balance of 1,671. There were no SCP's distributed during this period.

Task: Long Range Planning (LRP)

Completed initial estimate review of Mission 2001 Planning and Control Systems output and began compiling cost data for August 1992 status. Continued revising Contractor Work Breakdown Structure (WBS) to reflect revised WBS for Fiscal Year 1993, and provided input to Implementation Plan for WBS conversion.

WBS 1.2.9.3

Task: Quality Assurance (QA)

Continued review, comment, approval, and controlled distribution of various REECo Management Control procedures.

Performed surveillance SR-009-92 (YMP Drilling Department's calibration activities) and SR-010-92 (YMP Division document control activities). Issued audit reports REECo-007-92 (Human Resources Department) and REECo-009-92 (Communications & Electronics Department) without any findings. Scheduled and issued audit plans for REECo-009-92 (Logistical Support Department) and REECo-010-92 (Supply & Property Management Department).

Issued Corrective Action Report CA-92-002 and Surveillance Report SR-010-92 to the Division Office on document control deficiencies.

Provided comments on the draft memorandum for performance of quality control inspections to Science Applications International Corporation.

Reviewed Nevada Test Site Calibration Lab purchase requests and Quality Systems' methods of approving calibration sources to determine what actions must be initiated to place existing and potential calibration sources on a YMP Approved Vendor List.

Issued the 1992 Second Quarter Trend Evaluation Report.