Department of Energy
Washington, DC 20585

JUN 30 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.

Carmine J. Macolusso for

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

Enclosures:
(1) EG&G Progress Report, May 1992
(2) Lawrence Livermore National Laboratories Yucca Mountain Project Status Report, May 1992
(3) REECo Yucca Mountain Project Status Report, May 1992
(4) Sandia National Laboratories Monthly Highlights and Status Report, April 1992

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June 4, 1992
LV92-RAG-108
WBS 1.2.5.4.7
NQA

Kathleen F. Grassmeier, Chief
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Yucca Mountain Project Office
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P. O. Box 98518
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PROGRESS REPORT - MAY 1992

Attached is the May 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
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mak

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ENCLOSURE 1

YUCCA MOUNTAIN PROJECT
BIOLOGICAL RESOURCES PROGRAM
MONTHLY PROGRESS REPORT
MAY 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

- Preactivity surveys were conducted for soil test pits PSF1-4, GSF1-12, GSF16-21, GSF25-39, GSF14-15, and GSF22-24 (request #92-008b); soil test pit MWV34-36 (request #92-009); trenches B, 17, and 14d (request #92-008b); radiological monitoring site NF14 (small mammal trapping location) (request #91-006); and Busted Butte pavement study (request #92-007b). Trench MWV-T5a was resurveyed for tortoises prior to the start of construction as required in the land access agreement.

- Preactivity survey reports for 12 of 15 REM/EM sites (Request #92-006) and for neutron borehole N27 (request #91-023b) were completed and submitted to Project Office. Mitigation recommendations and reclamation stipulations were prepared and submitted to Project Office for trenches MWV-T5a, 14d, and MWV-T4 (request #92-009).

- An EG&G/EM biologist met with construction personnel at neutron borehole N53 (survey request #91-023b) and provided guidance on moving drilling equipment to the site to minimize potential impacts to biological resources. Also, an EG&G/EM biologists attended a pre-staking meeting for UZ-14 and NRG-6 to identify any potential environmental concerns.

- EG&G/EM provided a map of tortoise burrows near Exile Hill to RSN (R. Clark) to assist in locating a water line with minimal impact to desert tortoise habitat.

Habitat Reclamation

- The measurement of seedling density was completed at the Forty-Mile Wash reclamation trial plot. Twelve of the trial plots at this site also were irrigated. The data from the automated weather station at the Forty-Mile Wash reclamation site were downloaded into a computer database.

- Seedling density was measured on the reclaimed areas at neutron boreholes 54 and 55.

Site Characterization Effects Program

- The entering of small mammal trapping data from April into computer databases was completed. Small mammal populations were trapped on eight ecological study plots (ESPs) to estimate abundance, survival, and recruitment.

- Traffic count data were recorded each week at eight locations. Counters were rotated each week to new locations. The fugitive dust samples collected in April were weighed. Dust samples were collected at 44 ESPs.

- Vegetation cover was measured on 17 ESPs. Cover measurements now have been completed on 37 of 48 study plots. Perennial and annual plant seedling density was measured on 19 ESPs. Seedling density measurements have been completed on 33 study plots. Twenty-seven staff scientists were trained in methods used for measuring and estimating vegetation production. Seventeen new staff scientists were trained in plant identification.

- Weather and soil moisture and temperature data were recorded weekly at the ecological study plots. As soil moisture decreases to undetectable levels, study plots are switched to a monthly recording schedule. During the first week of May, weather and soil moisture and temperature data were recorded at 43 of 48 ESPs. By the end of May, soil moisture had declined to undetectable levels on 28 study plots.

- Surveys for the spotted bat were conducted in Pagony Wash (northwest of Exile Hill), J-13 Well, and upper portion of Forty-Mile Wash. Surveys were conducted by listening for feeding vocalizations. Digital audio recording equipment is being used to record these vocalizations. However, no vocalizations were heard during the two nights of effort.

Radiological Monitoring Program

- Efforts were made to locate all radiomarked quail once each week. Usually one or two quail could not be located. Four of the radiomarked quail were nesting by the end of May. Two of these nests had hatched by the last week of May. In one nest, 14 of 17 eggs successfully hatched. Fifteen of 16 eggs hatched in the other nest. Two female radiomarked quail still are incubating eggs.

- Two radiomarked male quail were found dead. Both appeared to have been killed by predators. One was found approximately two miles north of where it had been trapped and marked. Cause of death was probably predation by a raptor. The second mortality appeared to be caused by a mammalian predator, possibly a coyote. Three of the 10 radiomarked quail have been lost to predation.

- The entry of small mammal trapping data from April into computer databases was completed for plots NF37 and NF59. These plots will be trapped again in early June to monitor effects of collecting specimens on population abundance and recruitment.

Desert Tortoise Program

- Three tortoises were found dead during May. A hatchling tortoise (# 513) was found dead at the entrance to a burrow near Exile Hill. The radio transmitter was found in the burrow. This tortoise had been marked in January. A second marked tortoise (# 281) also was found dead near Exile Hill. The apparent cause of death was predation. An unmarked tortoise hatchling was found dead on an unpaved road near the Tortoise Control Study Area southwest of Calico Hills. This tortoise was killed by a vehicle and was the second incidental take reported for the Yucca Mountain Site Characterization Project. An incident report and a draft letter from the Project Office (W. Dixon) to the U. S. Fish and Wildlife Service (FWS) (D. Harlow) were written and submitted to Project Office. As requested by Project Office, EG&G/EM (T. O'Farrell) notified the FWS of the incidental take within three days as required by the Biological Opinion.

- Sixteen new tortoises were found and marked in the Yucca Mountain area this month. Fourteen of these tortoises were fitted with radio transmitters. Four other tortoises were sighted by other YMP contractors and reported to EG&G/EM biologists. These four were not marked. At the end of May, 155 tortoises had been marked for the Yucca Mountain Project. Of these, 108 are fitted with radio transmitters. Most of the radiomarked tortoises were located twice each week.

- The relocated tortoise (# 423) continued to be monitored. Because of the extended movements of this tortoise, it was located 4-7 days each week. A more powerful radio transmitter was put on the tortoise to assist in locating it. This

tortoise was relocated from the site of the North Portal Facilities in February to a site southwest of the Calico Hills. The tortoise emerged from its new burrow in late March. During April, the tortoise moved about 3.6 km south of its release site. It crossed H-Road just west of the Canyon Substation. In May it continued south then moved east near the E-Mad Facility. During the last two weeks of May, the tortoise moved south and now is just north of Area 25 Camp near the old landfill. It has moved approximately 10 km this month and is about 8 km from its relocation burrow.

- Ten female tortoises were weighed weekly during the month to monitor egg laying. A weight loss exceeding 100 g over a short interval (i.e., one to two weeks) is being used as an indicator that eggs have been laid. Three nests have been located. The nests were found in the middle of burrow floors under about 10 cm of loose dirt. Weight loss in two other tortoises indicates they too have laid eggs. Using the palpation technique (feeling the body tissue in front of the hind leg), eggs were felt in three other tortoises.

- EG&G/EM biologists (K. Rautenstrauch and J. Mueller) met with Nevada Test Site Operation Control Center staff (G. Hoover and L. Draper) to discuss additional tortoise relocation sites. There were no conflicts with the sites currently being considered. Also, sites near Saddle Mountain that were denied for use last year may be available for use. The denial resulted from a misunderstanding on the location of a future activity that would have prevented use of the area.

Support Items

- The April 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 met with Project Office and EG&G/EM quality assurance personnel to discuss EG&G/EM's Quality Plan Description and Software Quality Assurance Plan and the Office of Civilian Radioactive Waste Management's Quality Assurance Records Description. EG&G/EM also participated in a meeting on space requirements for a field laboratory and offices facility in Area 25.

- Comments by FWS on the Bureau of Land Management's Environmental Assessment for the proposed gravel pit in Forty-Mile Wash were reviewed at the request of Project Office. EG&G/EM provided additional comments to Project Office (K. Grassmeier) on the response letter to the State of Nevada (B. Loux) regarding their review of the Reclamation Implementation Plan.

- EG&G/EM scientists provided biological expertise in support of several tours. These included the Public Outreach tours, tours for junior and senior high school classes, and the Native American tour.

Lawrence Livermore National Laboratory

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June 10, 1992

WBS 1.2.9
"QA: N/A"

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

SUBJECT: Yucca Mountain Project Status Report - May 1992

Attached is the May 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,

W. L. Clarke
LLNL Technical Project Officer
for YMP

Lori
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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

MAY 1992 TECHNICAL HIGHLIGHTS AND STATUS REPORT

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

MAY 1992

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

1) **WBS 1.2.2.2.2** Calculations were performed to evaluate retardation under different fracture-matrix flow conditions. For matrix dominated flow, retardation is essentially the result of chemical processes (e.g., sorption). For fracture dominated flow conditions, retardation would be a result of either advection into the matrix by imbibition processes or from molecular diffusion into the matrix. Molecular diffusion is a relatively slow process, and therefore would dominate only under limited conditions. However, diffusion is the only process for transporting radionuclides from the matrix into a "clean" pulse of water in fracture dominated flow.

The retardation processes can be effectively utilized in design options which will enhance the isolation of waste and prevent any migration out of the EBS area.

1.2.1 SYSTEMS

1.2.1.1 Management and Integration

PACS network were updated for the Mission 2001 Exercise.

J. Blink met with S. Bodnar (M&O) to discuss the FY93 LLNL budget for WBS elements 1.2.1.1 and 1.2.1.2.

1.2.1.2 Systems Engineering

1.2.1.2.4 Systems Engineering Implementation

J. Blink met with P. Gottlieb (M&O) on May 12 in Las Vegas to discuss the progress of the M&O-led Thermal Loading System Study.

D. Ruffner attended the MGDS System Requirements Document meeting in Las Vegas, May 11-13.

1.2.1.2.5 Configuration Management and Plans and Procedures Control

Two Affected Document Notices were completed, and two LLNL-YMP Quality Procedures were changed to comply with the YMPO control documents.

Text was proposed to T. Stanton (M&O) for a new WBS element, 1.2.9.3, Altered Zone Characterization.

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 began on reviewing/revising the set of GEMBOCHS "parameter screens" that were drafted and forwarded by G. Heitand (SAIC). The revised screens will be included in the YMP-TDB Parameter Dictionary.

1.2.1.4 Performance Assessment

1.2.1.4.2 Waste Package Performance Assessment

A test controller was developed and implemented as a UNIX C shell script. The test controller executes the prescribed test runs and checks the performance of the PANDORA code against established code performance specifications. The test controller allows a large number of test cases to be catalogued and run while maintaining a record of any deviation from expected performance.

A Flow and Transport Workshop was held in Las Vegas on May 5-6. LLNL attendees were W. Halsey, W. Clarke, D. Wilder, J. Blink, L. Younker, D. Chesnut, J. Nitao and T. Buscheck. T. Buscheck gave the presentation "The Impact of Repository-Heat-Generated Hydrothermal Flow on Repository Performance" and J. Nitao gave the presentation "The Impact of Physical and Chemical Retardation on Radionuclide Transport in Fractures".

W. O'Connell, W. Halsey and T. Buscheck participated in the Source Term/Near Source Effects meeting held at Berkeley, CA on May 27. Discussions were held on source term, waste package, temperature effects and hydrological flow.

1.2.1.4.5 Geochemical Modeling and Data Base Development

The restructuring of the sets of basis and auxiliary basis aqueous species used in EQ3/6 calculations was completed. This resulted in significantly improved flexibility with regard to the range of geochemical problems that can be addressed using the EQ3/6 package.

Work has begun on the development of Version 8.0 of EQ3/6. The first task is to complete major architectural changes needed to accommodate desired new capabilities. The basic architecture of Version 7.0 was designed to solve a limited range of problems. It was also very limited by the small memories of an older generation of computers. The first new major capabilities to be added will address redox disequilibrium and redox kinetics. When those capabilities are complete, attention will shift to incorporation of surface chemistry models and development of more models for solid solutions.

Version 7.0 of EQ3/6 was submitted to the Energy Science and Technology Software Center (ESTSC) at Oak Ridge, TN. As part of the submittal, an abstract was prepared in the ESTSC-required format. This abstract will replace the old FIPS abstract. This software transmittal to the ESTSC fulfills a requirement under DOE Order 1360.4B.

New data files were run through the EQ3/6 test case library to catch any errors associated with the recent rewrite of a significant subset of reactions. This testing was necessary to facilitate proper use of the software. A few problems were detected and are being addressed.

EQ3/6 was ported to a workstation and test cases were run.

The following two manuals of the four volume set of basic documentation for EQ3/6 completed in December 1991, have completed the first technical review. They have been returned to the author for suggested changes.

1) The EQ3/6 Package Overview and Installation Guide, and
2) The EQ3NR Theoretical Manual and User Guide.

The other two documents have just started technical review.

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

J. Johnson and S. Lundeen attended the Ingres World '92 Conference held in Tarpon Spring, FL on May 17-21. S. Lundeen gave a presentation entitled "Reverse/Re-Engineering an Existing Database".

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

PACS networks were updated for the Mission 2001 Exercise. A prototype test facility workaround to provide heater test data prior to license application was included in the field test network.

1.2.2.2 Waste Package Environment

1.2.2.2.1 Chemical and Mineralogical Properties of the Waste Package Environment

The draft work statement was completed for the New Zealand natural analog contract.

Planning continues for model validation activities.

1.2.2.2.2 Hydrologic Properties of the Waste Package Environment

The determination of the characteristic curves of the eight disc-type Topopah Spring Tuff samples from U3hg-1 hole, at a depth of 1312 feet, continued. The saturated samples were put in a constant humidity chamber which is set at a constant temperature and various relative humidity levels. One measurement at 50°C and 98% relative humidity has been completed. The measurement was discontinued because the humidity chamber must be repaired.

Determination of the characteristic curves of five samples of the Grouse Canyon tuff from G-Tunnel, NTS, also was performed in the humidity chamber. These samples are 1" diameter and 1" length plugs sub-cored from core sections which were recovered from G-Tunnel during the over-coring activity at the end of the Prototype Engineered Barrier System Field Test.

The feasibility study of using a resonant cavity to measure relative humidity in laboratory rock samples continued. Work has begun to improve the design of the resonant cavity.

A suite of fracture-matrix flow calculations was conducted by J. Nitao to compare primary retardation mechanisms affecting radionuclide transport in fractures. Transport of radionuclides can occur under locally fracture-dominated or matrix-dominated flow conditions. The type of flow has a major impact on the relative amount of hydrological and geochemical interaction between the infiltration pulse and the mineralogy of the fractures and matrix. In general, three primary categories of retardation have been identified which retard aqueous species transport in fracture-matrix systems, two of them involving physical retardation of the wetting front and one involving chemical retardation.

Radionuclide transport under matrix-dominated flow conditions is retarded by the chemical sorption properties of the matrix. Transport under fracture-dominated flow conditions, on the other hand, is retarded by chemsorption onto fracture surfaces, which because of geochemical alteration from previous episodic events (or from repository-heat-generated condensate drainage), could be considerably different from the matrix. Additional retarding mechanisms for fracture-dominated transport are liquid advection and diffusion, resulting in transport of the species from the fracture into the matrix.

Radionuclides moving through fractures will be advected into the matrix by matrix imbibition. The concentration of radionuclides in the fracture is not reduced by matrix imbibition, but the movement of the advective liquid front down the fracture is itself retarded. This type of retardation could be termed "physical-advective retardation" as opposed to "chemical retardation".

Molecular diffusion from the fracture to the matrix is an important retarding process only when it is comparable to or stronger than the imbibition flux. Diffusion into the matrix dominates if the matrix imbibition diffusivity constant, D_m, is much smaller than the apparent molecular diffusivity constant of the solute. Because of the small storativity of the fracture, molecular diffusion from fracture to matrix may be an important retarding mechanism for fracture-dominated transport,

even though it is a relatively slow process. Diffusion, unlike advection, retards transport by reducing the solute concentration in the fracture stream. This type of retardation could be termed "physical-diffusive retardation".

"Back-diffusion" occurs when a clean pulse of water flowing down a fracture is contaminated by radionuclides diffusing out of the matrix. This process occurs if the apparent molecular diffusivity constant of the solute is comparable to or larger than the matrix imbibition diffusivity constant, D_m. On the other hand, if D_m is large relative to the apparent molecular diffusivity constant, advection by imbibition from fracture to matrix will dominate molecular diffusion from matrix to fracture, limiting the entrainment of radionuclides in the fracture pulse.

An important release and transport scenario pertains to the situation in which the emplacement drift is backfilled with a high-k_m (matrix permeability) material. For high k_m backfill, flow conditions in the emplacement drift (surrounding the waste package) are matrix-dominated which will attenuate any potential fracture-dominated pulse of water reaching the emplacement drift. Consequently, any release and transport of radionuclides is controlled by molecular diffusion, resulting in a slowly expanding plume of radionuclides through the backfill and into the surrounding TSw2 host rock. Radionuclides will diffuse from the contaminated matrix into any flowing fractures each time a liquid fracture pulse passes through the contaminated plume domain. Depending on the relative magnitude of D_m and the molecular diffusivity constant, the mass of entrained radionuclides may be quite limited.

A suite of hydrothermal calculations over a wide range of repository thermal loads and hydrologic conditions were performed.

T. Buscheck and J. Nitao met with W. Nelson of the M&O on May 1 to discuss long-term technical issues which are critical to hydrologic performance assessment. The meeting focused on a methodology for hypothesis testing to establish the level of detail required of hydrologic process models.

1.2.2.2.3 Mechanical Attributes of the Waste Package Environment

S. Daveler continues to assist S. Blair in developing a prototype version of the ASTOOL geomechanical code which is a statistical model for predicting crack growth behavior in fractured rock. This modeling capability will eventually be combined with the hydrothermal models to investigate repository-heat-driven alteration of the fracture properties of the altered zone. Postscript capability was added to ASTOOL's graphics postprocessor.

1.2.2.2.4 Engineered Barrier System (EBS) Field Tests

W. Lin attended the Sample Overview Committee (SOC) meeting on May 12 in Las Vegas.

J. Blink attended the ESFTC meeting in Las Vegas on May 12.

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

No significant activities.

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

The repeat runs of the room-temperature and 20% oxygen experiments were completed. The dissolution rates were much higher than the first series reported last fall. The explanation for this difference is being sought. The only planned difference was the higher dissolved oxygen levels of the recently finished runs, which was the reason for the repeated runs. The oxygen content is not likely to be a significant factor here. The buffer compositions are the same as before and have no measurable impurities. One cell from the last series was disassembled so that the surface of the pellet could be examined with X-ray Photoelectron Spectroscopy (XPS) to look for impurities or other anomalies that might explain the higher dissolution rates. No unexpected chemical species were seen. However, the cell interior and filters contained dark powder that is presumably UO_2. The origin of this irregularity is being pursued. The consequent high surface area could account for the high dissolution rate.

At PNL, flow through testing of spent fuel specimens at reduced oxygen fugacities is in progress according to the approved test matrix.

An abstract by W. Gray, L. Thomas and R. Einziger (all of PNL) entitled "Effects of Air Oxidation on the Dissolution Rate of Spent LWR 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 drybath tests at PNL continue to run without incident. The next interim examination is scheduled for August.

Materials Characterization Center (MCC) Hot Cell Activities

PNL will be recommending closeout of the MCC Hot Cell Activities in FY93. Spent Fuel assemblies and samples acquired by the Materials Characterization Center for use within the Office of Civilian Radioactive Waste Management (OCWRM) Program are now stored in the Bldg. 324 B and D cells. Currently, OCRWM is providing about 2% of the building costs while the fuel occupies this hot cell space. The funds provided by OCWRM only support ES&H activities. There have been no funds allocated for performing OCRWM research activities in these hot cells since FY88.

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 324 weeks. The N3 tests (ATM-10, a West Valley actinide-doped glass) continue and have been in progress for 242 weeks.

1.2.2.3.2 Metal Barriers

No significant activities. This WBS element has received limited funding in FY92.

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

B. Viani participated in the geochemistry core-team teleconference on May 18. The agenda and working groups for the geochemistry integration meeting focusing on hydrology and geochemistry to be held June 9-11 was finalized.

Internal QA grading of Activities G-20-4 and G-20-5 was completed.

<u>G-20-2 Determination of Elemental Profiles in Rocks, Minerals, and Glasses using the Ion Microscope</u>

Microscopic examination of autoradiography film that was exposed to tuff core wafers and a sample of Climax Stock granite revealed the presence of alpha tracks. Samples had been exposed for 11 days to three weeks.

<u>G-20-3 Interactions of Actinide-bearing Solutions with Rock Core Samples</u>

The flow-through system, which is designed to study the adsorption and hydrology of pore fluid with radionuclide tracers, has been moved to Bldg. 281 where the flow-through experiments will be conducted. When the system is assembled, the flow-through experiments will begin.

Further TEM and optical microscopic analysis of colloids separated from UO_2 leach solutions was conducted. Colloidal carbon particles were identified from the holey carbon film used to coat the TEM sample support grids. These particles were the major source of the contamination noted previously. The potential for contamination of fluids by particles used in the "finishing" of plastic sample bottles is also being investigated.

The adsorption of uranyl ion onto goethite at 70°C has been completed over the pH range of 4 to 9. Preliminary analysis of the data suggests that adsorption is enhanced relative to adsorption at 25°C.

1.2.2.3.4.2 Thermodynamic Data Determination

An abstract by J. D. Rudnicki and R. E. Russo (both of 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

A meeting was held with M&O and SNL to discuss thermal loading on May 14 in Las Vegas with the M&O. LLNL participants were W. Clarke, D. Wilder, D. Ruffner, T. Buscheck and J. Blink.

Repository scale thermal calculations have been started to address the temperature profiles throughout the repository as a function of time out 10,000 years. The TOPAZ calculations are done using two different models, a 3D model for the free field, and a 2D model to evaluate temperature profiles in the waste package. The first series of runs have given enough data to derive parametrics for quantifying additional mass loading scenerios.

1.2.5 REGULATORY AND INSTITUTIONAL

1.2.5.2 Licensing

1.2.5.2.1 NRC Interaction Support

The Nuclear Waste Technical Review Board (NWTRB) tours of the oxidation tests at PNL in the Bldg. 327 I-cell generated a lot of interest. Dr. R. Luce requested reprints of several publications.

1.2.5.2.2 Site Characterization Program

LLNL staff members reviewed 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". Their comments are being consolidated by J. Blink prior to submission to A. Simmons at YMPO.

M. Revelli participated in the three Integrated Test Evaluation (ITE) meetings during the month of May. As part of this task's effort, LLNL Study Plans were reviewed and the group evaluated the entire suite of Project Study Plans for their contribution toward addressing technical issues identified in the Early Site Suitability Evaluation report.

1.2.5.2.4 Technical Support Documentation

No significant activities.

1.2.5.2.5 Study Plan Coordination

J. Nitao re-reviewed USGS Study Plan 8.3.1.2.2.2, Rev. 1, "Water Movement Test". His earlier review was of a preliminary draft.

D. Carpenter reviewed USGS Study Plan 8.3.1.17.4.3 "Quarternary Faulting Within 100 km of Yucca Mountain".

J. Shinn reviewed Study Plan 8.3.1.12.2.2 "Meteorological Data Collection at the Yucca Mountain Site".

1.2.5.2.6 Semi-Annual Progress Reports

Questions were received in early May and quickly resolved on LLNL's input to the 6th Progress Report (PR). A draft report was received on May 15. It was reviewed and found to be acceptable as drafted.

1.2.9 PROJECT MANAGEMENT

1.2.9.1 Management and Integration

1.2.9.1.1 Management

J. Blink attended the Software Advisory Group meeting on May 28-29 in Las Vegas. He also attended the Quality Integration Group meeting in Las Vegas on May 21.

D. Helton (YMPO) and J. Blink met on May 29 to discuss Telecommunications and Information Resource (IRM) management.

C. Gertz and A. Robison (YMPO) were briefed by J. Blink on the LESSON Program. This two week program trains K-8 teachers to present science in a hands-on inspirational manner. J. Blink and R. Knipes (LLNL-NTS) are the southern Nevada

coordinators for LESSON. LLNL staff presented a "Train the Trainer" session in Las Vegas on May 20.

J. Blink served as a YMP tour guide for several university of Colorado facility and students on May 1. He was the speaker at the Yucca Mountain lecture series in Beatty on May 21 and Las Vegas on May 26. He also presented an educational program to six classes in Tonopah on May 22.

1.2.9.1.4 Records Management

Document Control issued five Change Notices and four new documents under controlled distribution. Routine follow-up for receipt acknowledgments continues.

A total of 139 items were logged into the LLNL-YMP tracking system. This includes 15 records/records packages that were processed through to the CRF. Nine action items were closed.

T. Holmes is the new Records Manager replacing Darleen Good.

1.2.9.2 Project Control

The April FTE report was submitted to YMPO. The PACS actual cost and schedule data for the period ending April 30 were submitted to YMPO. The May cost plan was prepared.

A PACS workstation was installed and is being tested.

A Mission 2001 Planning kickoff meeting was held in Las Vegas on May 7th with the M&O to discuss future LLNL workscope. Attendees were B. Clarke, D. Wilder, R. Stout, D. Ruffner, B. Halsey, J. Podobnik, D. Rainey and J. Blink. Efforts continue to complete LLNL's submissions for the 2001 exercise.

Work began to prepare data input for the FY94 IRM Short Range Plan. Tabulations of computing resources and telecommunications planning were compiled and are being reviewed for submission to YMPO.

J. Podobnik attended a Project Steering Committee meeting in Denver on May 29. Discussions were held on the FY94 IRB and potential changes in overall program strategy that may result from funding deficits. The Committee was also informed that the 93 budget process was close to meeting targets. The new WBS structure was discussed. Participants were aware of title changes and conversion routes from the previous version, but no one had seen the workscopes for the new structure. A PACS training/orientation film produced by Sandia was reviewed and a few minor changes were recommended. Copies will soon be available for all participants. Final reports were provided by the procedures and training subcommittees. The committee also reviewed a USGS PACS problem and provided recommendations. The meeting was the last for current steering committee members. A letter will be transmitted from YMPO requesting the participant TPOs appoint representatives for the next 12 month period. In addition, the TPOs will be asked to appoint a technical representative to interact with PACS and the steering committee.

1.2.9.3 Quality Assurance

Internal Audit 92-05, "Training and Qualifications of Personnel/Review of Technical Publications" was conducted April 27 - May 13.

Audit Report 92-11 "LLNL Mechanical Engineering/ Engineering Measurements & Analysis Calibration Laboratory" was distributed. No Corrective Action Reports were issued, but EM&A has been dropped from the Approved Suppliers List of LLNL-YMP.

Closure notifications of Adverse Finding Report AFR-LLNL-019 and Corrective Action Report CAR-LLNL-004 were transmitted to YMPO. Corrective action for these reports has now been completed and verified.

Documentation was transmitted to YMPO to close the "storage facilities" action of CAR YM92-056 resulting from Audit YMP-91-01. All corrective actions (remedial and preventive) have been completed with the exception of the action relating to the issue of matrixing of QARD requirements; this action cannot be completed until the formal publishing of the QARD.

Quality Assurance Program Plan revisions 033-YMP-R 17, Rev. 1 "Quality Assurance Records" and 033-YMP-R 3, Rev. 1 "Scientific Investigation Control and Design Control" were completed and submitted to YMPO. Quality Procedure Change Notices 1.0-2-2 "Organization"; 3.1-0-3 ,"Design Control"; and 3.0-2-2, "Scientific Investigation Control" were completed and distributed. Quality Procedures revisions 033-YMP-17.0, Rev. 4 "Quality Assurance Records" and 033-YMP-4.0, Rev. 3 "Procurement Document Control" were completed and distributed.

TIP-YM-12 "Electronic Record Keeping" was finalized and distributed.

LLNL-YMP FY 92 Quality Assurance Audit and Surveillance Schedules, Rev. 1 was transmitted to YMPO. This revision to the schedules represents a change in QA program oversight and intensity with one annual audit and many "performance based" surveillances during the year.

Review of the Quality Assurance Requirements Document draft is continuing.

D. Wolfe attended the QA Managers Meeting in Las Vegas on May 12.

Reynolds Electrical & Engineering Co., Inc.
Post Office Box 98521 • Las Vegas, NV 89193-852'

:-328285 LH

IN REPLY REFER TO

580-01-463

WBS 1.2.9.1
QA: N/A

June 10, 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 May 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.

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RF Pritchett

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

RFP:SLH:mab

Enclosure
Status Report (3 pages)

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U. 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
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, W, M/S 517/T-24

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

YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT (YMP)

MAY 1992 - STATUS REPORT

SITE (1.2.3)
WBS 1.2.3.5
Task: Capital Equipment to Support Drilling Programs

The air processing and metering system manufactured by Perry Equipment Corporation (PECO) was delivered to the Nevada Test Site on May 12, 1992, ten days prior to the anticipated delivery date. PECO's factory representative has been requested to be available during the week of June 2, 1992 to supervise the startup. The equipment has been delivered to the UZ-16 drill site. The system will be put into operation when drilling/coring under the surface casing.

The CME-850 drill rig was delivered and accepted.

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

Completed UZ-N27; total depth was 202 feet. Rigged up the new CME-850 drill rig on UZ-N53. Presently coring at 70 feet. Estimated total depth to be drilled/cored is 225 feet.

Task: JF-3 Water Monitoring Well (Job Package 92-1)

Completed placement of concrete pad and performed site cleanup.

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

Commenced operations with the LM-300 drill rig at UZ-16 on May 27, 1992. Presently coring at 30 feet. The hole will be cored to 50 feet plus, opened to 22 inches in diameter, and a 16-inch surface casing set at this depth prior to beginning the dual-wall reverse air drilling/coring operation.

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

Excavated Trench MV-T5A; removed shoring and trench covering.

Prepared Requests for Matrix Support Services as required for site investigations job packages and field activities.

EXPLORATORY STUDIES (1.2.6)
WBS 1.2.6.1
Task: Exploratory Studies Facility (ESF)

Amendment 1 to the Request for Proposal 1-DH-92, for the Technical and Underground Excavation for Exploratory Studies Facility, was mailed to all prospective offerers on May 15, 1992.

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 the 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. 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 and conferences; staffed and supported the Public Reading Room of the Research and Study Center.

Completed drafting the FY 1991 Project History.

Escorted approximately 40 seniors from Las Vegas High School on a tour of Yucca Mountain and surrounding facilities.

Task: Site Characterization Plan (SCP) Distribution

There were no SCP sets delivered during this period.

Task: Hazardous Materials Coordination

The Hazardous Materials Coordinator submitted the Materials Reporting and Handling Plan (MRHP), Revision 3, to the Division Office for signature; prepared and submitted to DOE several Material Safety Data Sheets and Administrative Procedure 6.13, Request for Submission to the DOE Project Office; continued making training class outlines and notes for classes as required by the MRHP; issued Request for Matrix Support Services No. CND-RMSS-034 for cleanup of dried, nonhazardous epoxy waste at the Sample Management Facility; and discussed with the TPO the Interim Procedure for the Accumulation and Disposal of Aerosol Cans on the NTS.

Task: Long Range Planning (LRP)

Continued support of LRP, Planning and Control System, Fiscal Year 2001 budget exercise, and Performance Measurement Baseline activities. Completed cost estimates and schedules as requested.

WBS 1.2.9.3
Task: Quality Assurance (QA)

Worked on, reviewed, received and/or resolved comments on 18 Management Control (MC) procedures.

Conducted Audit No. REECo-006-92 and issued the Audit Report to the YMP Division Office with no findings identified.

Closed Deficiency Notice DN-92-006, issued to Human Resources, DN-92-008, issued to Operations Equipment, and DN-92-009, issued to Quality Systems, after reviewing their responses and determining them to be acceptable.

Conducted Surveillance No. SR-0078-92 on the YMP Division's Records Management Plan.

Reviewed and accepted the response and action plan to the Corrective Action Report CA-92-001 from the YMP Division.

Initiated the review of the preliminary revised OCRWM Quality Assurance Requirements and Description document.

Scheduled Audit No. REECo-007-92 with the Human Resources Department for June 26, 1992, and issued the YMP QA Audit/Survey Plan.

Conducted and issued Surveillance No. SR-008-92 with one Deficiency Notice, DN-92-010, identified and issued to the YMP Division Office. Closed DN-92-010 after verifying that all actions were satisfactorily completed.

Closed both the Audit Finding Report #3 and the Audit No. REECo-005-91 via SR-008-92 after verifying all corrective actions were performed and satisfactorily completed.

General

REECo has no reportable Level I or Level II milestone activities at this time.

I-327688

Sandia National Laboratories

Albuquerque, New Mexico 87185

MAY 19 1992

WBS: 1.2.9
QA: NA

Carl P. Gertz, Project Manager
Yucca Mountain Site Characterization
Project Office
Nevada Operations Office
101 Convention Center Drive
Phase 2, Suite 200
Las Vegas, NV 89193-8518

Attention: V. F. Iorii

Dear Carl:

Subject: April 1992 Monthly Highlights and Status Report

Enclosed is the Monthly Highlights and Status Report for the month of April 1992. If you have any questions, please call Fran Cheek-Martin at FTS 844-7810.

Sincerely,

Thomas E. Blejwas

Thomas E. Blejwas, Manager
YMP Management Department 6302

FCM:6318:jd
Enclosure

DIVISION 10M1
cc: Clanton
cc: Harrison - Giesler
cc: Dyer
cc: Simecka
cc: Brodsky
cc: S. Jones
cc: Stucker - RW-22
cc: Gertz - O/O

REC'D IN YMP
5/26/92

ENCLOSURE 4

MAY 27 9 05 AM '00

Copy to:

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YMPO	M. Cloninger
YMPO	D. Dobson
YMPO	J. Robson
YMPO	W. B. Simecka
YMPO	V. F. Iorii
NRC	P. T. Prestholt
SAIC	M. Brodeur
TESS	S. J. Bodnar (2)
TESS	E. M. Fortsch (2)
TESS	R. K. St. Clair (2)
USGS	B. Raup
ORNL	R. B. Pope
CCS	S. O'Connor
6300	D. E. Miller
6302	T. E. Blejwas
6312	F. W. Bingham
6313	L. S. Costin
6316	R. P. Sandoval
6316	J. W. Teak, SAIC
6318	S. E. Sharpton
6318	F. Cheek-Martin
6318	B. J. Mathis
6319	R. R. Richards
6115	P. J. Hommert, Acting
7111	J. S. Phillips
6302	Library
6318	31/12911/1.3/NQ
6318	YMP CRF