Sandia National Laboratories

U.S. DEPARTMENT OF ENERGY

YUCCA MOUNTAIN

YUCCA MOUNTAIN PROJECT

Yucca Mountain Site Characterization Project

MONTHLY HIGHLIGHTS AND STATUS REPORT

January 1992

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ENCLOSURE

DISCLAIMER

Quality assurance checks on data contained in this report have been performed only to determine that the data have been obtained and documented properly. The SNL Project Department 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. Milestones have not been baselined and are included only to show status.

TABLE OF CONTENTS

WBS 1.2.1	Systems	1
WBS 1.2.1.1	Management and Integration (Klamerus)	1
WBS 1.2.1.2.1	System Requirements and Description (Klamerus)	1
WBS 1.2.1.2.2	System Studies (Klamerus)	1
WBS 1.2.1.2.4	Systems Engineering Implementation (Klamerus)	1
WBS 1.2.1.2.5	Configuration Management Plans and Procedures Control (Schelling)	1
WBS 1.2.1.2.6	Yucca Mountain Site Characterization Project (YMP) Support to the Management Systems Improvement Strategy (MSIS) (Schelling)	1
WBS 1.2.1.3.1	Site and Engineering Properties Data Base (Orzel).	2
WBS 1.2.1.3.2	Interactive Graphics Information System (Jones)	2
WBS 1.2.1.3.3	Reference Information Base (Schelling)	3
WBS 1.2.1.3.4	Technical Data Base Management Computer Support (Romero)	3
WBS 1.2.1.3.5	Technical Data Base Input (Schelling)	3
WBS 1.2.1.4.1	Total System Performance Assessment (Dockery)	4
WBS 1.2.1.4.3.1	Postclosure Repository Design Analysis (Ryder)	4
WBS 1.2.1.4.3.2	Preclosure Radiological Safety Analyses (Klamerus)	5
WBS 1.2.1.4.3.4	Seal Performance Requirements and Analyses (Fernandez)	5
WBS 1.2.1.4.4.1	Pre-Waste-Emplacement Ground-Water Travel Time (Dockery)	5
WBS 1.2.1.4.6	Development and Validation of Flow and Transport Models (Nimick)	6
WBS 1.2.1.4.7	Supporting Calculations for Postclosure Performance Analyses (Fewell)	8
WBS 1.2.1.4.9	Development and Verification of Flow and Transport Codes (Dockery)	9
WBS 1.2.3	Site Investigations	11
WBS 1.2.3.1	Site Management and Integration (Nimick)	11
WBS 1.2.3.2.2.2.1	Systematic Acquisition of Site-Specific Subsurface Information (Rautman)	12
WBS 1.2.3.2.2.2.2	Three-Dimensional Rock Characteristics Models (Rautman)	12
WBS 1.2.3.2.7.1.1	Laboratory Thermal Properties (Nimick)	13
WBS 1.2.3.2.7.1.2	Laboratory Thermal Expansion Testing (Nimick)	13
WBS 1.2.3.2.7.1.3	Laboratory Determination of Mechanical Properties of Intact Rock (Price)	13
WBS 1.2.3.2.7.1.4	Laboratory Determination of the Mechanical Properties of Fractures (Price)	14
WBS 1.2.3.2.8.3.3	Ground Motion from Regional Earthquakes and Underground Nuclear Explosions (Nimick)	14
WBS 1.2.3.6.2.1.6	Future Regional Climate/Environments (Behl)	15
WBS 1.2.4	Repository Investigations	17
WBS 1.2.4.1.1	Repository Management and Integration (Costin)	17
WBS 1.2.4.2.1.1.1	Excavation Investigations (Pott)	17
WBS 1.2.4.2.1.1.2	In Situ Thermomechanical Properties (Pott)	17
WBS 1.2.4.2.1.1.3	In Situ Mechanical Properties (Pott)	17
WBS 1.2.4.2.1.1.4	In Situ Design Verification (Pott)	18
WBS 1.2.4.2.1.2	Rock Mass Analysis (Bauer)	18
WBS 1.2.4.2.3.1	Certification of Design Methods (Bauer)	18
WBS 1.2.4.2.3.2	Design Analysis (Ryder)	19
WBS 1.2.4.6.1	Seal Design and Design Requirements (Fernandez)	19
WBS 1.2.4.6.2	Sealing Testing (Fernandez)	19

TABLE OF CONTENTS

WBS 1.2.5	Regulatory and Institutional	20
WBS 1.2.5.1	Management and Integration (Dennis)	20
WBS 1.2.5.2.1	NRC and NWTRB Interaction Support (Dennis)	20
WBS 1.2.5.2.2	Site Characterization Program (Dennis)	20
WBS 1.2.5.2.3	Regulatory Review (Dennis)	20
WBS 1.2.5.2.5	Study Plan Coordination (Price)	21
WBS 1.2.5.2.6	Semi-Annual Progress Reports (Cheek-Martin)	21
WBS 1.2.6	Exploratory Shaft Investigations	22
WBS 1.2.6.1.1	Exploratory Shaft Management, Planning, and Technical Assessment (Pott)	22
WBS 1.2.9	Project Management	23
WBS 1.2.9.1.1	Management (Sharpton)	23
WBS 1.2.9.1.4	Records Management (Hotchkiss)	23
WBS 1.2.9.1.5	Yucca Mountain Site Characterization Project (YMP) Support for the Training Mission (Cheek-Martin)	23
WBS 1.2.9.2	Project Control (Sharpton)	24
WBS 1.2.9.3	Quality Assurance Program (Richards)	24
APPENDIX A:	Technical Data Base Input (Orzel)	26
APPENDIX B:	Reference Information Base (Schelling)	27

1.2.1 SYSTEMS

The objective of the Systems element is to provide the focal point for the Yucca Mountain Site Characterization Project (YMP) activities concerned with the integrated perspective of the entire radioactive waste disposal system. The Systems element is comprised of four individual tasks: Systems Management and Integration (1.2.1.1), Systems Engineering (1.2.1.2), Technical Data Base Management (1.2.1.3), and Total System Performance Assessment (1.2.1.4).

1.2.1.1 MANAGEMENT AND INTEGRATION

Status Report on Ongoing Activities

Scopes of work were realigned in the Planning and Control System (PACS) to address changes in technical requirements necessitated by the Project Office's reallocation of FY91 carryover funds.

1.2.1.2.1 SYSTEM REQUIREMENTS AND DESCRIPTION

No activity to report this period.

1.2.1.2.2 SYSTEM STUDIES

No activity to report this period.

1.2.1.2.4 SYSTEMS ENGINEERING IMPLEMENTATION

No activity to report this period.

1.2.1.2.5 CONFIGURATION MANAGEMENT PLANS AND PROCEDURES CONTROL

Status Report on Ongoing Activities

Internal Memo of Understanding (IMOU) 330020, Rev. B was developed, reviewed, and accepted. This IMOU describes Sandia National Laboratories (SNL) staff participation in the "Determination of Importance and Grading Enhancement (DIGE)" activity.

1.2.1.2.6 YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT (YMP) SUPPORT TO THE MANAGEMENT SYSTEMS IMPROVEMENT STRATEGY (MSIS)

No activity to report this period.

1.2.1.3.1 SITE AND ENGINEERING PROPERTIES DATA BASE

Significant Meetings Attended

P. Adams and R. Orzel attended a meeting of the Technical Data Base (TDB) Administrators Technical Working Group (TWG) on January 28, 1992. The primary objectives of this initial TWG meeting were to discuss the group's charter, organization, and principal areas of focus for 1992, and to assign tasks/actions.

Status Report on Ongoing Activities

The Site and Engineering Properties Data Base (SEPDB) staff continued its effort to enter, verify, and prepare return packages for all data submitted prior to FY91 that either have not yet been entered into the database or have not had records completed. The data submittals processed in November and December were found to have data base structural problems and are being redone.

Major Activities Upcoming Next Three Months

Data entry for outstanding data submittals will continue.

Investigation of the merger of the SEPDB and GENESIS data bases will continue.

The existing tables in the data base will be restructured for better compatibility. This will also make the tables more compatible with pending mergers.

1.2.1.3.2 INTERACTIVE GRAPHICS INFORMATION SYSTEM

Status Report on Ongoing Activities

Data files for development of the mapping resource have been received from the Project Graphics Information System (GIS) data base .

The Stardent replacement computer has been received and is being set up. Development of solid models will resume when the Application Visualization System (AVS) is running on the Stardent.

Drillhole survey data has been input into the Lynx format, a three-dimensional geological imaging program, and successfully read by the Lynx software.

Development continued on using Lynx to produce geologic models of Yucca Mountain.

The following jobs have been completed:

Job	Requestor	Description	Status/Comments
373	L. Costin	GTM intersections	Cancelled
376	M. Fewell	NRG/SRG Drillholes	Complete
377	L. Shephard	Yucca Mountain Isometric	Complete
380	S. Sobolik	UZ-16 Location	Complete

Major Activities Upcoming Next Three Months

The mapping capabilities for Performance Assessment will be developed on ARC/INFO, using data from the Project data base. Solid models of thermal/mechanical units will be developed, using AVS software.

The following jobs are in progress:

Job	Requestor	Description	Status/Comments
369	K. Anderson	New PTn data models	Continuing
379	M. Esp	TS Main Drift	Continuing

1.2.1.3.3 REFERENCE INFORMATION BASE

Status Report on Ongoing Activities

Substantial progress was made in processing proposed Reference Information Base (RIB) changes. (Current status is shown in Appendix B). Submittal of a package of three to seven RIB items for Change Control Board (CCB) approval is expected shortly.

Major Activities Upcoming Next Three Months

The initial meeting of the RIB Development Team, which succeeds the Technical Data Advisory Group for RIB concerns, will be held in Las Vegas, NV on February 4, 1992.

1.2.1.3.4 TECHNICAL DATA BASE MANAGEMENT COMPUTER SUPPORT

Status Report on Ongoing Activities

The local area network (LAN) machine and users registration forms were completed and most information entered into the data base. In addition, the new LAN (18) was tested and performed adequately. Design Change Requests (DCRs) on all secretary and supervisor LAN changes were completed and submitted to SNL Organization 1935. All hardware is in place and when the LAN connection in the PBX is made, the system will be operational.

When the Legato LAN backup system was tested, a problem was uncovered in the Exabyte tape drive firmware. The drive was returned to the vendor for replacement; final testing will begin when the replacement is received.

The Sun Computer Server was upgraded to a multiple processor 670 in January. Testing has commenced and will continue through February.

The read/write optical disk drive added to the Sun SparcStation is performing as expected. Each side of an optical disk will provide 235 mb of disk space.

Major Activities Upcoming Next Three Months

Full network connectivity is a high priority.

The Legato backup system will be tested and on line as soon as possible. The target date is the end of February.

Training will be established for E-Mail and File Transfer Protocol (FTP) services on the network and users will be trained.

1.2.1.3.5 TECHNICAL DATA BASE INPUT

No activity to report this period.

1.2.1.4.1 TOTAL SYSTEM PERFORMANCE ASSESSMENT

Major Accomplishments

An article entitled "Potential for Water-Table Excursions Induced by Seismic Events at Yucca Mountain, Nevada," by C. Carrigan, G. King, G. Barr, and N. Bixler was published in Geology, v. 19, pp. 1157-1160. This work was initiated at SNL and completed by C. Carrigan at Lawrence Livermore National Laboratory (LLNL), under funds supplied by SNL. The paper reports the results of numerical simulations of tectonohydrologic coupling resulting from typical basin and range earthquakes. The simulations show that only very small water table excursions, on the order of 2 to 3 m, are likely to occur in response to pore-pressure fields induced by earthquakes of this magnitude.

SAND91-2499C, "Preclosure Seismic Hazards and Their Impact on Site Suitability of Yucca Mountain: An Update," by D. Gibson, completed the Yucca Mountain Site Characterization Project (YMP) review and was submitted to the Proceedings of the International High-Level Radioactive Waste Management Conference, April 1992, Las Vegas, NV.

Status Report on Ongoing Activities

Revising and rewriting SAND91-2795, "TSPA-1991: An Initial Total-System Performance Assessment for Yucca Mountain" continued. The document is expected to complete internal technical and management review by March 31, 1992.

Two summaries solicited for the American Nuclear Society (ANS) Spring Meeting, June 7-12, 1992 in Boston, MA, were submitted to YMP for policy review. "Total-System Performance Assessment for the Yucca Mountain Project," by M. L. Wilson (SAND92-0208A), was submitted for a special session on "System Modeling for the High-Level Waste Program." "Six-Step Method for Systematic Performance Assessment," by R. W. Barnard, was submitted for a special session on "Risk Associated with High-Level Nuclear Waste Repositories."

The first rough draft of the SAND report on scenario selection for nominal-flow processes has been completed. The rough draft of the SAND report on the selection of scenarios describing basaltic volcanism is being illustrated and will be ready for internal technical review when illustrations are complete. The tectonism event-tree report is being prepared for review.

SAND91-7034, "Numerical Studies of Rock Gas Flow in Yucca Mountain," by B. Ross, S. Amter, and N. Lu completed resolution of YMP comments and is currently awaiting YMP acceptance of these resolutions.

1.2.1.4.3.1 POSTCLOSURE REPOSITORY DESIGN ANALYSIS

Significant Meetings Attended

E. Ryder participated in the Interface Meeting on Temperature, Hydrology and Design in Las Vegas, NV on December 12, 1991. The meeting focused on the interaction between the thermal and hydrologic environments at Yucca Mountain. Specific discussions centered on the potential for using the induced thermal environment to create hydrologic shedding zones and regions of long-term dryout around the waste packages.

Status Report on Ongoing Activities

SAND91-1493, "Equivalent Energy Density: A Preliminary Reexamination of a Technique for Equating Thermal Loads," by E. Ryder has completed SNL technical review and been submitted for management review. SAND91-1493 documents the results of a study that addresses the thermal design problem of bounding induced thermomechanical responses over expected ranges of waste stream characteristics (age and burnup). Results are presented for baseline thermal loadings of 57 and 80 kW/acre (based on the layout described in the Site Characterization Plan-Conceptual Design Report [SCP-CDR]) in both the near- and far-fields.

Preliminary investigations of waste stream characteristics for proposed drift emplacement container configurations has been initiated. Emphasis to date has been on establishing initial power outputs and average ages of waste containers for an oldest-fuel-first receipt scenario. This work will help support the Management and Operations (M&O) staff evaluation of the concept of horizontal, in-drift emplacement at the potential repository.

1.2.1.4.3.2 PRECLOSURE RADIOLOGICAL SAFETY ANALYSES

Status Report on Ongoing Activities

Comments on definitions of scope of work for the development of a process for determining "Items Important To Waste Isolation" were received, resolved, and incorporated. A preliminary review was performed of the process and requirements to evaluate alluvium as an item important to waste isolation.

1.2.1.4.3.4 SEAL PERFORMANCE REQUIREMENTS AND ANALYSES

Status Report on Ongoing Activities

The task associated with development of seismic requirements for sealing components was initiated this month. Sealing personnel staff attended the Nuclear Waste Technical Review Board (NWTRB) presentation on seismic vulnerability in Orange Co., CA on January 22 and 23, 1992. Participants gained an understanding of the seismic issues perceived by various groups.

Thermomechanical calculations were performed to determine the strength requirements for grouted fractures either intersecting or adjacent to shaft seals and borehole plugs. The analyses considered different cases including intersecting and nonintersecting fractures under in situ stress and thermal loadings. The effects of seals, which provide positive interface stress on borehole walls, also were considered.

Other Items to Report

Sealing personnel and SNL contractors participated in a performance assessment of proposed borehole UZ-16. Evaluations prepared to evaluate the performance of UZ-16 included:

- flood-water hydrology,
- flow from a flooded drift,
- advection-dispersion of gaseous flow above a repository, and
- preliminary sealing performance requirements and tentative sealing locations.

Results from these evaluations will be documented in a SAND report entitled, "A Strategy for Sealing Exploratory Boreholes for the Yucca Mountain Site Characterization Project," by J. A. Fernandez et al.

1.2.1.4.4.1 PRE-WASTE-EMPLACEMENT GROUND-WATER TRAVEL TIME

Major Accomplishments

SAND91-1788C, "Uncertainty and Sensitivity Results for Pre-Emplacement Groundwater Travel Time," by P. Kaplan, was submitted to the Proceedings of the International High-Level Radioactive Waste Management Conference, April 1992, Las Vegas, NV.

Status Report on Ongoing Activities

Uncertainty and sensitivity analyses of pre-waste-emplacement groundwater travel time were started this month; they use geohydrologic data that were prepared at each of four drillholes for the 1991

Total System Performance Assessment (TSPA-1991). A SAND document describing the results of the analyses is in preparation and should enter internal review in late February or early March. The document will include specific recommendations for data needs from the field investigations being planned for the site.

A document describing the preparation of the geohydrologic parameters and data distributions used to support TSPA-1991 and current groundwater travel time analyses is in the final stages of preparation prior to submission for internal technical review.

Plans to follow the hydrologic data document with a natural analog study were formalized this month. Emphasis will be placed on compiling and interpreting fracture data and transport parameters from currently available site data, as well as from reports on known analog materials, such as the Apache Leap, the Bandelier, and Nevada Test Site (NTS) tuffs. The intent of the analysis is to provide an updated data base for future performance-assessment modeling.

SAND89-7018, "Conceptual, Experimental, and Computational Approaches to Support Performance Assessment of Hydrology and Chemical Transport at Yucca Mountain," by T. Narasimhan and J. Wang, has completed SNL management review and is currently undergoing comment resolution.

1.2.1.4.6 DEVELOPMENT AND VALIDATION OF FLOW AND TRANSPORT MODELS

Status Report on Ongoing Activities

NOTE THAT ALL ITEMS REPORTED SUPPORT SCP ACTIVITIES:

Subactivity 1.6.2.1.1 , SCP Section 8.3.5.12.2.1.1 and
Subactivity 1.6.2.2.2, SCP Section 8.3.5.12.2.2.2

Unsaturated flow through single fractures

No experiments due to laboratory reorganization.

Fracture-matrix interaction

No experiments due to laboratory reorganization.

Field, lab, and numerical experimentation to determine scaling laws for effective media properties in heterogeneous media

The validity of models for unsaturated flow and transport through porous media is dependent in part on the accurate estimation of effective media properties. For problems where the scale of application is different than the scale of measurement, intermediate conceptual models, or scaling laws, must be used to define effective properties at the scale of interest. Although significant efforts have been made in the development of scaling laws, relatively little physical experimentation focusing on model validation has accompanied this process.

We built a gas permeameter last fall that allows rapid, precise measurement of rock permeability at scales spanning four orders of magnitude on a per-volume basis. Following a review of data collected in the past months using the gas permeameter in the laboratory, a need for improved measurement precision was noted. To address this need, improvements to the gas-pressure measurement system were made as well as improvements to the permeameter/rock seal positioning system. A preliminary design for an improved permeameter/rock seal, based on a double-ring injection principle, has been developed as well. Finally, tests in the laboratory have been performed to evaluate the performance of the permeameter/rock seal on rough rock surfaces such as are found in the field. Results of the tests suggest that repeatable measurements with minimal leakage can be performed. The next step will involve taking the permeameter to the field.

Experiments to develop scaling laws for saturated and unsaturated systems containing micro-layering and cross-bedding heterogeneities are being designed. Such heterogeneities are found in all the alluvial sediments at and around Yucca Mountain and in the bedded tuffs units within Yucca Mountain. Our first phase in this work is being conducted in the laboratory in conjunction with the LANL intermediate-scale caisson experiment. We are creating micro-layering and cross-bedding heterogeneities in thin slabs of sand that will compose the LANL caisson. Using our full-field moisture-content technique based on light transmission, we will follow a sequence of infiltration and drainage experiments. The experimental sequence allows the measurement of chamber-scale hysteretic moisture characteristic curves, saturated and relative permeabilities, and solute dispersion coefficients. These effective chamber-scale properties will be measured in a series of experiments with the type and intensity of the heterogeneity varied systematically. In addition, measured transient moisture content and solute concentration fields will be compared with numerical simulations.

This month we built a slab chamber for use in the heterogeneous sand experiments that incorporates a grid of tensiometers so that transient pressure fields also can be measured. Special rapid-response wall-mounting tensiometers were developed and fabricated. Design of a flow-through solute (dye) concentration sensor was begun. The solute sensor will be fabricated and tested in February. A data acquisition system for the array of tensiometers/pressure transducers and solute sensors will be developed in February and March.

Development of Experimental Capabilities

We have continued our evaluation of x-ray absorption and light transmission as effective means of monitoring transient moisture-content fields in thin two-dimensional slabs of porous material. This month's activities have focused on evaluating measurement precision and conducting a systematic error analysis on the ensuing data. A journal article describing the x-ray and light techniques as well as the comparison studies is being prepared for submission to Water Resources Research.

Gravity driven fingering in porous media

No activity.

Caisson Experiment

Collaboration with Los Alamos National Laboratory (LANL) YMP staff (E. Springer) in an intermediate-scale (caisson) flow and transport validation experiment continued. The LEHGC code was used to carry out a series of design calculations to estimate the combinations of water flux, tracer feed rate and location of the sorbing layer that would result in reactive tracer breakthrough within approximately 150 to 200 days after the start of the experiment. Retardation of the reactive tracer (Ni) was estimated from data (K_d) obtained in batch sorption experiments using quartz or goethite. A linear mixing model was used to estimate the K_d for each mixtures of the two minerals. These calculations suggest that a layer of sand doped with 3 to 5% goethite that is placed 1 m below the top of the caisson could be detected from the Ni breakthrough curve ~150 days after the start of the experiment. These calculations indicated that a meaningful validation experiment will be possible at the LANL facility using an unsaturated sand/goethite porous medium. The material for the experiment was ordered.

Experimental studies to produce data for a second round of design calculations were initiated. These include batch sorption studies to determine apparent K_d's for a range of goethite/sand mixtures at near-neutral pH; the goal of these studies is to test the linear mixing model used in the scoping design calculations. The analytical protocol for Ni by Graphite-Furnace Atomic Absorption was further optimized and a draft SOP has been written. Standard operating conditions yield maximum precision for Ni concentrations between 20 and 55 ppb, with a limit of detection of <0.25 ppb. Precision (1σ) is ±3% or ±0.6 ppb, whichever is greater. By altering the volume of sample injected into the furnace, the optimum range may be extended, encompassing 5 to 100 ppb with a limit of detection of <0.10 ppb. The laboratory technician has become proficient with the routine aspects of data collection. Further work will involve development of a method to correct for apparent nonlinearity; the degree of nonlinearity appears to amount to ~+1 ppb for concentrations near 10 ppb.

B sorption experiments using sand and goethite also were carried out during January. These experiments will provide an initial estimate of the degree of B sorption by the two minerals and will allow evaluation of the precision of the analytical technique (d.c. plasma spectroscopy) used for B analysis.

Scoping Sorption Studies

Fabrication of a computer-driven titrimeter for acidimetric and alkalimetric determination of mineral-surface hydrolysis constants is nearly complete.

General

The first three weeks of the new year were spent reorganizing the Subsurface Flow and Transport Laboratory. The reorganization incorporates an additional light transmission experimental system (to be built over the next three months) for use in sand experiments in support of the LANL caisson project. Additional work areas for undergraduate and graduate students in our laboratory were also created to accommodate two PhD students (M. Nicholl of the University of Nevada and D. Norton of the University of Arizona) and two MS students (D. Burns of the University of Texas and J. Brainard of the University of New Mexico).

Major Activities Upcoming Next Three Months

A manuscript for the proceedings of the Seventh International Water-Rock Interaction Symposium (Park City, Utah; July 13-22, 1992) will be completed. Drafts of two papers for the special issue of "Radioactive Waste Management and Nuclear Fuel Cycle" will be written. Detailed studies of sorption of B and Ni by mixtures of sand and goethite and by materials (samplers, plastic laboratory ware) to be used in caisson or in supporting laboratory studies will continue, as will design calculations for the caisson experiment. The caisson will be filled and instrumented. Surface potentiometric titration of sand, geothite, and zeolite will begin.

The laboratory activities related to flow investigations will continue.

1.2.1.4.7 SUPPORTING CALCULATIONS FOR POSTCLOSURE PERFORMANCE ANALYSES

Status Report on Ongoing Activities

SAND91-0791, "Movement of Shaft and Drift Construction Water in Yucca Mountain, Nevada - An Extended Study," is in publication, as is SAND91-0790, "Estimation of the Performance Assessment Limitations for Surficial Water Addition Above a Potential High Level Radioactive Waste Repository at Yucca Mountain, NV."

SAND91-0792, "Estimation of the Impact of Water Movement from Sewage and Settling Ponds Near a Potential High-Level Radioactive Waste Repository at Yucca Mountain, NV," is in YMP review.

Preliminary efforts for a model validation exercise in collaboration with WBS 1.2.1.4.6 have been initiated. Preliminary calculations are being performed and a Problem Definition Memo (PDM) describing calculations to be made in conjunction with the caisson sand experiments is being written. A revised performance assessment of the impacts on waste isolation of extending the neutron boreholes into the Topopah Springs unit was completed.

Performance assessment evaluations of the impacts of drillhole NRG-1 and nearby test pits at the north Exploratory Studies Facility (ESF) ramp portal on waste isolation were finalized, and an assessment was transmitted to the YMP.

The water control and allocation process working group continued its efforts to identify YMP water requirements. An effective process that allocates water to specific tasks, provides an efficient mechanism to document the water used for these tasks, and identifies an approach to determine potential impacts on waste isolation is under development. Working group members represent the U.S. Department of Energy (DOE), LANL, M&O, REECo, Raytheon Services of Nevada (RSN), Science Applications International Corp. (SAIC), and SNL.

SAND91-2217C, "Applications of Performance Assessment in Support of the Exploratory Studies Facility (ESF) Design," was accepted for presentation at the International High-Level Radioactive Waste Management Conference scheduled for April 1992 in Las Vegas, NV.

"General Concerns in Evaluations of the Impacts of Surface Drillholes on Waste Isolation" was developed to list generic performance assessment concerns that must be considered in evaluating the impacts of surface-based drillholes on waste isolation. This list will serve as a checklist for performing performance assessment evaluations of the impacts of surface-based drillholes on waste isolation. This list was transmitted to the YMP and is being used in the assessment of UZ-16 on waste isolation.

"Information Necessary for Evaluating the Impacts of Surface Drillholes on Waste Isolation" was developed to list the types of information necessary for conducting performance assessment evaluations of the impacts of surface-based drillholes on waste isolation. This list will serve as a checklist for obtaining the information necessary for conducting performance assessment evaluations of the impacts of surface-based drillholes on waste isolation. This list was transmitted to the YMP and used to obtain information for the performance assessment of UZ-16.

The performance assessment evaluations of UZ-16 were divided into two assessments--pad construction and borehole construction and operation. All information listed in the "Information Necessary for Evaluating the Impacts of Surface Boreholes on Waste Isolation" checklist has been gathered and a draft of the pad assessment has been written.

Major Activities Upcoming Next Three Months

The documents describing the performance assessment plan for ESF Title II design support will be completed. The plan described in the document will be further developed and will be implemented.

Completion of the water control and allocation working group effort is expected in February 1992. LANL will then assume management of the site fluids and materials data base.

Performance assessment evaluations of test planning packages for drillhole UZ-16 surfaced-based testing will be completed.

1.2.1.4.9 DEVELOPMENT AND VERIFICATION OF FLOW AND TRANSPORT CODES

Major Accomplishments

SAND90-3165, "PACE-90 Water and Solute Transport Calculation for 0.01, 0.1, and 0.5 mm/yr Infiltration into Yucca Mountain," by R. C. Dykhuizen, R. R. Eaton, P. L Hopkins, and M. J. Martinez, was printed and released. SAND90-2542, "NORIA-SP - A Finite Element Computer Program for Analyzing Liquid Water Transport for Porous Media," by P. L. Hopkins, R. R. Eaton, and N. E. Bixler, was also printed and released.

Status Report on Ongoing Activities

Code Development (Subactivity 1.6.2.1.2)

A preliminary summary of issues and recommendations of the code development Quality Action Team (QAT) subteam for numerical methods was prepared and distributed for comment. The summary will be presented at the next meeting of the full code development QAT.

A first draft of the user's manual for the method-of-lines code, LLUVIA-II, has been completed. It has been reviewed by A. Treadway in Organization 6313.

LLUVIA-II is being used to aid in the determination of infiltration limits that may cause significant lateral diversion of water in Yucca Mountain. Results have been calculated for infiltration rates between 0.01 and 1.0 mm/yr for a five-layer model with a downdip of 6.25 degrees. Material

properties given in the memo from Kaplan et al. dated June 25, 1991, are being used. The results show that the relative amount of lateral diversion decreased with increased infiltration. These results, which show a different behavior from those calculated in the PACE exercise, are due to the changes in the relative magnitudes of the hydraulic conductivities as the in situ moisture content increases with increasing infiltration rate.

A unit pressure-gradient boundary condition option has been added to the LLUVIA-II code. The use of this boundary condition at the extreme downdip side of a geologic unit will relax the no-flow condition that is generally applied at this location. The infiltration computations discussed above will be repeated with this new boundary condition to help determine the impact of numerical boundary conditions on the calculated results.

Development using PV-wave graphical software is proceeding on a workstation-based post-processing capability for the NORIA-SP code.

Software Quality Assurance (QA) (No SCP Activity)

The joint effort of divisions across the Department to develop software configuration-management tools and the software procedures to control their use is continuing.

A revision for clarification of Quality Assurance Implementing Procedure (QAIP) 3-2 is under consideration. The revision may include dividing the procedure into several different procedures.

The quarterly status report on the modification-or-discrepancy system (MODS) was issued.

Software QA procedures implemented by other users, such as the Waste Isolation Pilot Plant, were reviewed for ideas to be used in revising our QA procedures.

Staff is investigating hardware resources for setting up the configuration-management system for software under the Source Code Control System (SCCS). LLUVIA 2D has been suggested for use as the prototype code for setting up the SCCS procedures.

Software QA documents are being developed for the codes FASTQ, COYOTE II, and BLOT. FASTQ reports have been reviewed and approved. The QA records package should be completed by February 1, 1992. COYOTE II and BLOT requirements memos have been received, and the COYOTE II evaluation report is ready for first draft review. The checkout report for COYOTE II will be completed soon.

1.2.3 SITE INVESTIGATIONS

The objective of the Site Investigation element is to determine repository site suitability in terms of DOE siting guidelines (10 CFR 960), Nuclear Regulatory Commission (NRC) criteria (10 CFR 60), and Environmental Protection Agency (EPA) standards (40 CFR 191).

1.2.3.1 SITE MANAGEMENT AND INTEGRATION

Significant Meetings Attended

F. Nimick attended the Nuclear Waste Technical Review Board meeting on seismic vulnerabilities on January 22 and 23, 1992. The meeting included presentations by Project personnel working under several work breakdown structure (WBS) elements within 123, including the Weapons Test Seismic Investigation for which SNL is responsible.

C. Rautman participated in the Sample Overview Committee (SOC) meeting at the Sample Management Facility in Area 25 on January 23, 1992. One request by SAIC for cutting samples from new drillhole JF-3, a water-level monitoring well south of hole J-12, was approved. A second request by a U.S. Geological Survey (USGS) Principal Investigator (PI) was rejected because the request was sent directly to the SOC and did not come through the USGS SOC representative as required by procedures. The request will be resubmitted next month.

Most discussion focused on drillhole scheduling and prioritization. SOC representatives viewed presentations of the Early Site Suitability Evaluation (ESSE) report recently completed by the Project Office, Exploratory Studies Facility (ESF) design requirements, status and capabilities of the LM-300 drill rig, and various budget scenarios for the next two fiscal years. Discussion concerning the ESSE report focused on implications of the report's findings for hole prioritization. However, it was unclear exactly how the findings could be applied, other than to confirm that additional confidence is required in both the geologic framework of the site and in the material properties of various geologic units. Concerns expressed by ESSE reviewers regarding the Project's natural resource evaluation may indicate that drilling procedures be modified to include monitoring for gaseous hydrocarbons as an indicator of petroleum resources.

Indications are that the deeper ramp exploration drillholes proposed to support ESF design will be integrated into the overall Project drilling program. Some discussion centered on combining the repository-entry ramp holes, NRG-5 and SRG-5, with equivalent holes originally proposed as part of the Systematic Drilling Program. The holes would be drilled using the more stringent requirements of the SD program; core would be allocated through the usual SOC process.

Budget discussions indicate that the Project will be constrained to one LM-300 drill rig through at least FY93. Incorporation of the ramp drillholes into the systematic drilling program ostensibly would require use of the LM-300 in the immediate future, given the high profile of these ESF design-related boreholes. The limitation to one drill rig then would cause unacceptable delay in the USGS hydrologic (deep unsaturated zone) testing program. No resolution was possible, but a number of alternatives were proposed. The drillhole prioritization activity will resume on March 3-4, 1992. SOC representatives were requested to obtain input from PIs in their organizations regarding the implications of the "new" ramp hole strategy and specific priorities for sequencing the various holes through at least FY93.

Status Report on Ongoing Activities

M. Siegel participated in the January monthly teleconference for the Geochemistry Integration Team. A set of recommendations for improved coordination between geochemical activities and performance assessment activities, based on the discussions held at the December quarterly meeting, was presented to the team members for review. After revision, these recommendations will be presented to C. Gertz.

1.2.3.2.2.2.1 SYSTEMATIC ACQUISITION OF SITE-SPECIFIC SUBSURFACE INFORMATION

Significant Meetings Attended

SNL staff for the Systematic Drilling Program Study participated in a Project Office review of activities falling under the 1.2.3.2.2 Rock Characteristics fifth-level WBS element. The meeting brought together investigators from SNL and the USGS. Areas of common interest were discovered, and the investigators involved are preventing gaps and overlaps in their activities. (SCP Activity 8.3.1.4.3.1.1)

The SOC met on January 23, 1992 in Area 25 at the NTS to discuss drillhole scheduling and prioritization. The group tentatively proposed to drill the high-priority, ESF design-related "ramp" boreholes as part of the more broadly based Systematic Drilling Program. Such an approach would provide an entire spectrum of testing activities with samples from the repository block at a much earlier date than would otherwise be possible. A more detailed report on the SOC meeting is provided under WBS 1.2.3.1, Site Management and Integration. (SCP Activity 8.3.1.4.3.1.1)

Status Report on Ongoing Activities

Determination of hydrologic properties for 82 samples of existing core and cuttings from the Sample Management Facility is in process at the USGS Hydrologic Research Facility. The work is being sandwiched between higher priority samples related to the ongoing neutron-hole drilling activities at the site. One or two additional outcrop transects will be sampled in February, 1992. (SCP Activity 8.3.1.4.3.1.1 and 8.3.1.2.2.3.1)

Major Activities Upcoming Next Three Months

Comment resolution for the Study Plan for this activity has resumed with the goal of submitting a revised draft in March or April. Some proposed resolutions were unsatisfactory to SNL management, which necessitates additional rewriting and new proposed resolutions. (SCP Activity 8.3.1.4.3.1.1)

1.2.3.2.2.2.2 THREE-DIMENSIONAL ROCK CHARACTERISTICS MODELS

Significant Meetings Attended

SNL staff for the Systematic Drilling Program Study participated in a Project Office review of activities falling under the 1.2.3.2.2 Rock Characteristics fifth-level WBS element. The meeting brought together investigators from SNL and the USGS. Areas of common interest were discovered, and the investigators involved are preventing gaps and overlaps in their activities. (SCP Activity 8.3.1.4.3.2.1)

Status Report on Ongoing Activities

Drillhole deviation survey information for "old" holes at Yucca Mountain has been prepared in the required format for input into the Lynx Geotechnical Modeling System. Publication of USGS Map GP-1001, which is actually a set of compiled and edited geophysical logs for selected old holes at the site, has raised the possibility of obtaining the digital well log data and incorporating this information directly into the Lynx system. Such an accomplishment would allow modelers to view the well logs at the proper spatial location and in the proper deviated position as they interpret geology and construct models of the site. This approach will be investigated further and implemented if feasible and if time permits. (SCP Activity 8.3.1.4.3.2.1)

Major Activities Upcoming Next Three Months

Modeling activities using the Lynx Geotechnical Modeling System will continue.

1.2.3.2.7.1.1 LABORATORY THERMAL PROPERTIES

Status Report on Ongoing Activities

Calibration of mechanical and electronic measuring equipment and thermal sensors, including verification of supporting documentation, is in process. System verification tests and calibration runs of the comparative instrument have been made. (SCP Activity 8.3.1.15.1.1.3)

Major Activities Upcoming Next Three Months

Thermocouple transfer standards will be developed and system verification and calibration of the Thermal Conductivity Analyzer (TCA) will be conducted. After testing prerequisites are met, the scoping study on the effects of saturation on thermal conductivity will begin. (SCP Activity 8.3.1.15.1.1.3)

1.2.3.2.7.1.2 LABORATORY THERMAL EXPANSION TESTING

Status Report on Ongoing Activities

Tests to determine the stability of the calibration of the modified dilatometer system indicate that a consistent calibration correction can be made to the data from 25 to 100°C if the sample is saturated. However, there is a drift in the LVDT output during the soak time if the sample is allowed to dehydrate. The lack of consistency in the drift for different runs precludes making a meaningful calibration correction to the data above 100°C. Methods to control the drift in the LVDT output are being investigated. (SCP Activity 8.3.1.15.1.2.1)

Major Activities Upcoming Next Three Months

Once the accuracy and reproducibility of test data is established and the relevant procedures approved, a scoping study on the effects of sample size on thermal expansion will be initiated. (SCP Activity 8.3.1.15.1.2.1)

1.2.3.2.7.1.3 LABORATORY DETERMINATION OF MECHANICAL PROPERTIES OF INTACT ROCK

Major Accomplishments

Two data reports, SAND91-7031, "Mineralogy, Petrology, and Whole-Rock Chemistry Data Compilation for Selected Samples of Yucca Mountain Tuffs," and SAND90-7058, "Mineralogy, Petrology, and Whole-Rock Chemistry of Selected Mechanical Test Samples of Yucca Mountain Tuffs," both by J. R. Connolly (UNM), were printed during January. (SCP Activity 8.3.1.15.1.3.1)

Significant Meetings Attended

R. H. Price, a member of the American Society for Testing and Materials/Institute for Standards Research (ASTM/ISR) Steering Committee for the Interlaboratory Testing Program for Rock Properties, attended a meeting of the committee on January 29, 1992 during the ASTM national conference in New Orleans, LA. At least six government, private, and academic laboratories have completed the experiments in Phase I. The results from Phase I and the final plans for Phase II testing were discussed. (No SCP Activity)

Status Report on Ongoing Activities

A study involving high temperature experiments at creep and low strain rate conditions is being conducted at New England Research, Inc. (NER). The sixth and final experiment run at a nominal strain rate of $10^{-9}s^{-1}$ has been initiated. (SCP Activity 8.3.1.15.1.3.2)

SAND92-0223A, "The Influence of Strain Rate and Sample Inhomogeneity on the Moduli and Strength of Topopah Spring Member Tuff," by R. Price (SNL), R. Martin (NER), P. Boyd (NER), and J. Noel (NER), is being submitted for presentation at the American Geophysical Union (AGU) Spring 1992 meeting. (SCP Activity 8.3.1.15.1.3.2)

Major Activities Upcoming Next Three Months

During February, R. Price will be meeting with R. J. Martin and P. J. Boyd of NER concerning progress on a contract for running high temperature experiments at creep and low strain rate conditions. (SCP Activities 8.3.1.15.1.1.1 and 8.3.1.15.1.3.2)

1.2.3.2.7.1.4 LABORATORY DETERMINATION OF THE MECHANICAL PROPERTIES OF FRACTURES

Status Report on Ongoing Activities

Profiles from three fracture surfaces in samples of tuff from Yucca Mountain are being analyzed and compared with fracture profiles from other rock types. This work supports the analyses of mechanical property measurements on the fractures. (SCP Activities 8.3.1.15.1.4.1 and 8.3.1.15.1.4.2)

The development of a technique for testing rough fracture surfaces is continuing and a fracture should be ready within the next few weeks. This technique will allow for the holding of a sample of any external shape while a circular test area (an annulus) is tested in rotary shear. (SCP Activity 8.3.1.15.1.4.2)

The time-dependent behavior of fractures is being studied in a series of scoping experiments. In the initial experiment, no creep deformation was observed for a relatively smooth fracture loaded to shear stresses less than that necessary for sliding. Future work will include similar testing of rough fractures. (SCP Activity 8.3.1.15.1.4.2)

1.2.3.2.8.3.3 GROUND MOTION FROM REGIONAL EARTHQUAKES AND UNDERGROUND NUCLEAR EXPLOSIONS

Significant Meetings Attended

J. Phillips made a presentation on the tunnel dynamics experiment to the NWTRB on January 22, 1992. The meeting topic was seismic vulnerability of engineered facilities; Phillips' presentation covered observations of tunnel response to an underground nuclear explosion.

Status Report on Ongoing Activities

The software to be used in statistical analysis of UNE-generated ground motions has been approved for use via the software QA process. Final calculations now can be run comparing older data (obtained before implementation of the YMP QA system) with data gathered under rigorous QA controls. Preliminary calculations suggested minor differences between the two data sets; these differences will be evaluated before completion of the analyses.

For the software QA process for analysis of travel-path effects, tests have been conducted with the layer-over-halfspace model of Vidale et al. (1985) to further verify code performance. Results are being compared with those given by Vidale et al.

Test runs using a simple half-space velocity model were used to investigate the proper model configuration. The effects of model grid spacing and vertical and horizontal size on the waveforms were examined, focusing on timing of reflected phases from the bottom and sides of the model. Runs with different source locations were used to identify the reflections and to assess the minimum allowable distance for the source from the model edge. Preliminary results indicate that a model grid of about 1400 by 450 points (70 by 22.5 km) with a source 50 points (2.5 km) from the model edge is adequate for avoiding reflected phases in the synthetic seismograms for the first two seconds.

Major Activities Upcoming Next Three Months

A draft report on the statistical analysis of ground-motion data should be completed in the next three months. Analysis of travel-path effects will continue.

1.2.3.6.2.1.6 FUTURE REGIONAL CLIMATE/ENVIRONMENTS

Significant Meetings Attended

F. Giorgi and G. Bates of National Center for Atmospheric Research (NCAR) attended the Annual Fall Meeting of the American Meteorological Society in Atlanta, GA on January 5-10, 1992 and presented papers on regional climate modeling using MM4.

Status Report on Ongoing Activities

An overview paper for the 1992 High-Level Radioactive Waste Management Conference to be held in Las Vegas, NV on April 12-16, 1992 has been completed and submitted to the American Nuclear Society (ANS); the paper is authored by R. P. Sandoval, Y. K. Behl, and S. L. Thompson.

The analysis of the output from a three-and-a-half year present day climate simulation with the MM4 driven by boundary conditions from a modified version of the CCM is being continued. Averages and higher-order statistics of surface temperature and precipitation fields are being compared with observations as part of this analysis.

Test simulations have been conducted utilizing the split-explicit time integration option in MM4. The use of this time integration scheme will permit a 40 to 50 percent savings in computer time and thus will allow longer climate simulations with MM4. Initial problems in the implementation of this scheme have been alleviated by reducing the vertical diffusion coefficient. This scheme will be used in Phase II of the present day climate simulations and in the paleoclimate simulations.

The technical editing of the paper summarizing the results of the Phase I validation analysis has been completed; the paper is being returned to the authors for their responses.

The NCAR contract has been revised and is currently undergoing management review.

Major Activities Upcoming Next Three Months

The review of the Phase I, "Toward the Simulation of Possible Future Climate Scenarios Over the Southern Great Basin," will be completed.

A multi-year regional climate run for the Western U.S., using boundary conditions provided by CCM1, will be completed.

The NCAR contract will be revised in response to DRs 92-02 and 92-03.

Issues/Potential Problems Needing Resolution and Potential Impacts

The MM4 simulations require QA-certified inputs from a global circulation model. These inputs are to be provided by Pacific Northwest Laboratories (PNL). This issue has been brought to the attention of the YMP QA Office. If the above-mentioned inputs are delayed for any reason, the schedule for the RCM simulations would slip as well, resulting in wasted resources.

Other Items to Report

The PDM77-01, Regional Climate Modeling, has been transmitted to NCAR for response.

1.2.4 REPOSITORY INVESTIGATIONS

The objectives of the Repository element are to design a repository compatible with the host rock that meets the engineered barrier performance objectives of 10 CFR 60 and 40 CFR 191; to develop the required instrumentation and equipment for the repository; to obtain the necessary geoengineering data through laboratory and field tests; and to identify repository operation, closure, and decommissioning requirements.

1.2.4.1.1 REPOSITORY MANAGEMENT AND INTEGRATION

Status Report on Ongoing Activities

Work continued with the M&O to support efforts in repository design. A meeting is being arranged to discuss SNL repository design activities with M&O personnel to familiarize them with past design activities and assist them in developing plans for future design activities. Arrangements are in place for staff who no longer work on the YMP to support this meeting. In addition, SNL staff provided an informal review of the M&O plans for a system study of thermal loading of the repository.

SAND91-1958C, "Summary of the Exploratory Studies Facility Alternatives Study," completed Project Office review and was sent for inclusion in the proceedings of the 1992 International High-Level Radioactive Waste Management Conference in Las Vegas, NV.

Efforts to integrate the planned ESF analyses into the Project schedule continued. Two analyses are planned this year: (1) far-field thermal analyses of the repository to examine thermal-structure effects on key parts of the ESF, and (2) rock mass properties analyses to determine rock mass properties for ESF Design. These will be incorporated into the RIB.

Major Activities Upcoming Next Three Months

A meeting with M&O representatives on repository design is planned.

1.2.4.2.1.1.1 EXCAVATION INVESTIGATIONS

Status Report on Ongoing Activities

Editorial changes to the ESF DR–Appendix B have been approved.

1.2.4.2.1.1.2 IN SITU THERMOMECHANICAL PROPERTIES

Status Report on Ongoing Activities

Background material was researched as a first step in the design of test instrumentation that will operate in the hot thermal environment proposed for the in situ thermomechanical experiments.

Major Activities Upcoming Next Three Months

An SNL/AECL Experimental Rock Mechanics meeting is scheduled for March 11 and 12, 1992.

1.2.4.2.1.1.3 IN SITU MECHANICAL PROPERTIES

No activity to report this month.

1.2.4.2.1.1.4 IN SITU DESIGN VERIFICATION

Status Report on Ongoing Activities

Comments on Study Plan 8.3.1.15.1.8, In Situ Design Verification are being reviewed and resolved.

1.2.4.2.1.2 ROCK MASS ANALYSIS

Status Report on Ongoing Activities

SAND91-1982C, "Fault Stress Analysis for the Yucca Mountain Site Characterization Project," by S. J. Bauer (SNL) and M. P. Hardy, R. Goodrich, and M. Lin (Agapito and Associates), completed Project Office review and was submitted to the ANS. The paper will be presented at the International High-Level Radioactive Waste Management Conference in April 1992 in Las Vegas, NV. (SCP Activity 8.3.2.4.1.4)

Work on Design Investigation Memo (DIM) 260, "Rock Mass Property Assessment-I, Fracture Analysis," and DIM 261, "Rock Mass Property Assessment-II, Rock Mass Strength, Modulus, Etc.," continued. Preliminary results on the work are anticipated shortly; a meeting is being planned with ESF designers to provide them with results.

Work continued on analyses of the heated room experiment in support of the ESF design effort. The analysis work has been slowed in order to complete software QA requirements.

Major Activities Upcoming Next Three Months

Work has begun on a series of laboratory experiments with results to be used to evaluate and validate the joint models. The initial experiments will use a stack of plates of Lexan with a centrally located hole. The plates will be loaded perpendicular to the stacking and displacements will be tracked and measured using Moire grid techniques. Experimental methods and details are being planned. Plans to use experimental results as input to analyses being performed in WBS 124231 have been completed.

1.2.4.2.3.1 CERTIFICATION OF DESIGN METHODS

Status Report on Ongoing Activities

An important component of the Project involves the development of constitutive models capable of analyzing the responses of jointed rock masses, which is a representative geologic feature of the potential waste repository site at Yucca Mountain, NV. Current compliant joint models represent state-of-the-art analysis capabilities. These models were incorporated into computationally efficient computer codes providing a unique capability for simulation of large-scale field problems. Efforts to improve both the capability and efficiency of the models and codes is ongoing.

Work has begun on numerical analysis of a series of laboratory experiments being performed (WBS 124212). The analyses will be used to help evaluate and validate the joint models. First order pretest discrete element analyses of the layered model have been completed. In the analysis the model was loaded to approximately 1000 psi and obtained joint slips in the range of 4.0 e-2 mm. Continuum models (finite element) have been prepared. Now that detailed material properties have been obtained (WBS 124212), the analyses will be run.

Work continued at SNL and GeoLogic Inc. to begin preliminary work to develop a linked boundary element-finite element computer model for analyzing thermomechanical problems associated with

design and performance of a potential nuclear waste repository. The linkage with an infinite boundary element domain will allow for the finite element portion of the analysis to focus on the near-field (detailed) aspects of a given problem, while ensuring that more realistic far-field effects are properly accounted for using the boundary element code. JAC will be used as the mechanical finite element code.

1.2.4.2.3.2 DESIGN ANALYSIS

Status Report on Ongoing Activities

SNL staff met with Agapito and Associates personnel for a status update on the contract, including QA concerns. Instrumentation concepts for planned ESF experiments and the new far-field thermomechanicals analysis to support ESF design were discussed. The new repository design will be used in the analysis, with thermal loadings of 57 and 80 kW/acre.

SAND91-2853C, "Drift Design Methodology and Preliminary Application for the Yucca Mountain Project," by S. J. Bauer (SNL) and M. P. Hardy (Agapito and Associates), was drafted and submitted for peer review. The paper will be presented at the 33rd U.S. Rock Mechanics Symposium in Santa Fe, NM in June 1992 at a workshop entitled "Geotechnical Design." SAND91-2853C, "Rock Mechanics Aspects of Design of a Licensed Nuclear Waste Repository in Hard Rock," by S. J. Bauer (SNL) and M. P. Hardy (Agapito and Associates), completed all reviews and was submitted to the meeting organizers. The paper will also be presented at the workshop entitled "Geotechnical Design."

PDM 75-25, "New Three-Dimensional Far-Field Repository Thermomechanical Calculations," was drafted, reviewed, and submitted for distribution. The analyses are intended to determine the temperatures, stresses, and strains expected in the vicinity of ESF openings that may become part of the repository. The new repository design will be used in the analysis, with thermal loadings of 57 and 80 kW/acre. The work is expected to take about eight months to complete.

1.2.4.6.1 SEAL DESIGN AND DESIGN REQUIREMENTS

No activity to report this period.

1.2.4.6.2 SEALING TESTING

Status Report on Ongoing Activities

Work continued in the development of the sealing field-test definitions report. Work included preparation of the fracture grouting portion of the report. Additional sections were prepared on the material selection and emplacement aspects.

1.2.5 REGULATORY AND INSTITUTIONAL

The objective of the Regulatory and Institutional element is to (1) conduct all activities involving licensing, environmental compliance, communication, and liaison with the State of Nevada, affected Indian tribes, and the public and (2) administer the grants mandated by the Nuclear Waste Policy Act (NWPA) of 1982.

1.2.5.1 MANAGEMENT AND INTEGRATION

Major Accomplishments

R. Orzel (6316) and J. Letz (6319) represented SNL on the YMP public tour conducted on January 22, 1992. The tours are an ongoing monthly activity under DOE's public outreach program.

Status Report on Ongoing Activities

The 1992 PACS budget allocations were revised to meet the Performance Measurement Baseline deadline of January 31, 1992.

The Contractor WBS dictionary was reviewed and revised for consistency with the revised PACS scope of work descriptions.

1.2.5.2.1 NRC and NWTRB INTERACTION SUPPORT

Significant Meetings Attended

An NWTRB meeting to address seismic vulnerabilities was held January 22 and 23, 1992. SNL personnel supported this interaction with presentations on weapons test seismic considerations and seismic concerns relative to underground stability.

Major Activities Upcoming Next Three Months

A two-day technical exchange meeting with Nuclear Regulatory Commission (NRC) representatives will be held in Albuquerque, NM on March 17 and 18, 1992. SNL will support discussions on the NRC draft "Technical Position on Geologic Repository Operations Area Underground Facility Design-Thermal Loads" report and on technical and regulatory issues related to repository-induced thermal gradients at Yucca Mountain.

1.2.5.2.2 SITE CHARACTERIZATION PROGRAM

No activity to report this period.

1.2.5.2.3 REGULATORY REVIEW

No activity to report this period.

1.2.5.2.5 STUDY PLAN COORDINATION

Status Report on Ongoing Activities

The responses to SNL review comments on Study Plan 8.3.1.2.2.8, "Characterization of Fluid Flow in Unsaturated, Fractured Rock," written by USGS staff, were accepted by R. J. Glass. The completed Study Plan Review Checklist was returned to the Project Office on January 6, 1992. (No SCP Activity)

The responses to SNL review comments on Study Plan 8.3.1.2.3.2, "Characterization of the Yucca Mountain Saturated Zone Hydrochemistry," written by USGS staff, were accepted by V. C. Tidwell. The completed Study Plan Review Checklist was returned to the Project Office on January 6, 1992. (No SCP Activity)

The target dates for submittal of drafts and/or revisions of SNL study plans was provided to Project Office personnel on January 10, 1992.

Major Activities Upcoming Next Three Months

Study Plan 8.3.1.4.3.1.1, "Systematic Acquisition of Site-Specific Subsurface Information - Systematic Drilling Program," by C. A. Rautman, has been reviewed by other Project participants, YMPO, and HQ personnel. The review comments were received on October 3, 1990 and will be responded to by the end of March 1992. (SCP Activity 8.3.1.4.3.1.1)

1.2.5.2.6 SEMI-ANNUAL PROGRESS REPORTS

No activity to report this period.

1.2.6 EXPLORATORY SHAFT INVESTIGATIONS

The objective of the Exploratory Shaft element is to develop, design, construct, operate, maintain, and decommission the exploratory shafts required for site characterization and to plan and implement the in situ testing program.

1.2.6.1.1 EXPLORATORY SHAFT MANAGEMENT, PLANNING, AND TECHNICAL ASSESSMENT

No activity to report this period.

1.2.9 PROJECT MANAGEMENT

The objective of the Project Management element is to schedule, budget, perform, control, coordinate, and report Project management, Project control, and quality assurance work. This includes identifying and defining interfaces among Project elements and integrating those elements.

1.2.9.1.1 MANAGEMENT

Major Accomplishments

Of SNL's 22 conference papers for the 1992 International High-Level Radioactive Waste Management Conference, 16 have completed all signoffs and record packages are being readied for submittal to the Local Records Center (LRC). The remaining 6 papers have completed all signoffs and are awaiting arrival of YMPO approval letters so that record packages can be prepared.

Twelve new SAND documents were added to the tracking system; twelve SAND documents were transmitted to YMPO for programmatic review; and four SAND reports were printed and distributed.

1.2.9.1.4 RECORDS MANAGEMENT

Status Report on Ongoing Activities

Development of training programs for records sources continued. Development of supplemental modules for the OJT program for LRC staff also continued. A draft of QAIP 17-1, "Preparation and Submittal of Records," was completed, as well as a draft of QAIP 17-3, "Processing Records." Two replacement record technicians were hired and trained. A large collection of backlog photos supporting past work in G-Tunnel were received, indexed, and stored. Mylars of Bechtel drawings published in the SCP-CDR were reproduced and forwarded to RSN at its request. Submission of System 80 records to the CRF continues.

Major Activities Upcoming Next Three Months

Record source training will be implemented on a regular basis. QAIPs 17-1 and 17-3 will be issued. Sorting of backlog records will be initiated.

All backlogged System 80 records will be submitted to the CRF by March 1, 1992.

1.2.9.1.5 YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT (YMP) SUPPORT FOR THE TRAINING MISSION

Significant Meetings Attended

On January 15-16, 1992, training staff attended the Training Coordinators' Workshop held at SAIC in San Diego, California. This meeting focused on introducing the concept of performance-based training and its implementation to date within the Project.

Status Report on Ongoing Activities

Development of an Orientation Manual for SNL/YMP staff and training support for the PACS video continued. Preparation and submittal of backlog training records, both for individual and classroom training is ongoing. Training on how to collect and report costs at the summary account level was provided to department staff.

Major Activities Upcoming Next Three Months

Training staff will attend the YMP "Train the Trainer" course as well as the YMP workshop designed to train participants in the implementation of performance-based training. The YMP training staff will be offering a three-day "Initial Instructor Training" course at SNL, targeted for subject matter experts who conduct training.

DOP 2-5 will be revised and issued.

A redesign of the SNL Training Program that addresses orientation, interdisciplinary technical training, and performance-based training will be developed and proposed.

1.2.9.2 PROJECT CONTROL

Significant Meetings Attended

SNL staff met in Las Vegas, NV with D. Helton and a member of the IRM group on January 8, 1992 to improve electronic networking between Project participants.

Status Report on Ongoing Activities

Troubleshooting existing problems with the administrative LAN software and hardware continued, including direct interaction with technical personnel at SNL's external suppliers facility. A number of technical issues regarding the integration of the administrative and technical LAN have been resolved. Ample programming was completed on the newest component of the administrative support system, the QA deficiencies database, to bring up a test version on the administrative LAN. Supervisors and secretaries are beginning to shift over to the new LAN. The rest of the technical and administrative staff will follow. Carryover budget funds have been distributed in PACS; networks and scopes of work were changed to reflect the budget. All information has been transmitted to YMPO. Cleanup on PACS has started and statusing will begin in February.

1.2.9.3 QUALITY ASSURANCE

Significant Meetings Attended

R. R. Richards attended the periodic Office of Civilian Radioactive Waste Management (OCRWM) Program QA Managers' meeting held in Las Vegas, NV on January 22, 1992.

Status Report on Ongoing Activities

SNL QA staff members continued to work with Project Office staff on development of a Project-wide, computer-based requirements tracking network. This network is intended to fulfill the purpose of the QA requirements "matrix" referred to in the QARD.

The restructuring at SNL will impact the SNL YMP QA Program; work has begun to identify those impacts and to prepare QAPD and procedure revisions to become effective with the organizational restructuring on April 2, 1992.

Work continued to simplify existing QA implementing procedures. Prototyping of a draft procedure for interface control and work direction began. This new procedure is expected to replace the existing procedures for Task Definition Statements, Interface Task Memos, Problem Definition Memos, and Design Investigation Memos. Prototyping efforts are directed at using the new procedure to create "Work Agreements" that fulfill the functions of Task Definition Statements and Problem Definition Memos.

An internal surveillance of QA Program elements 1, 2, 15, 16, and 18 was completed.

An unscheduled surveillance of procurement and audit scheduling processes was completed. Although the report will be issued in February, four Deviation Reports and a number of recommendations are expected to result. They will focus on the concept of revising contractor QA specifications to cite the QARD, rather than its predecessors, and on better definition of contractor work with respect to being "quality-affecting" or not.

The bimonthly "QA Program Report," which includes trend evaluation, was issued for November and December, 1991.

Major Activities Upcoming Next Three Months

QA Program changes necessitated by SNL restructuring will be implemented.

QA Implementing Procedure improvement and simplification will continue.

Audit, surveillance, and QA Program status evaluation activities will continue.

Efforts to develop the computer-based QA requirements "matrix" referred to above will continue.

APPENDIX A: TECHNICAL DATA BASE INPUT

1. CANDIDATE DATA FOR THE TECHNICAL DATA BASE

Participant	Description of Data
None.	

2. DATA FORMALLY SUBMITTED TO THE TECHNICAL DATA BASE

Participant	Description of Data	SNL Data Auth. No.
None.		

3. DATA FORMALLY ENTERED INTO THE TECHNICAL DATA BASE

Participant	Description of Data	SNL Data Auth. No.
None.		

Precipitation measurement and test conditions data from USGS citation number OFR 87-463 titled "Isotopic Content and Temperature of Precipitation in Southern Nevada." This data was submitted under SEPDB DA0031.

APPENDIX B: REFERENCE INFORMATION BASE

1. REFERENCE INFORMATION BASE (RIB) CHANGE REQUESTS SUBMITTED*

RIBCR	Subject	Participant	Status
None.			

2. INFORMATION BEING PROCESSED AS RIB CHANGE DEVELOPMENT FILES FOR CONSIDERATION AS INPUT TO THE RIB*

RIBCR	Subject	Status
CR57	Calcite-Silica Vein Deposits	CCB Ready
CR58	Volcanic Features	Review
CR60	Spent Fuel Vertical Emplacement	Under Development
CR61	Spent Fuel Horizontal Emplacement	Under Development
CR62	Geomorphic Processes	Review
CR63	Estimated Water Usage	Review Complete
CR64	Physiographic Divisions	Review
CR65	Tectonic Geomorphology	Review
CR66	Mechanical Excavation	Review
CR67	Thermal/Mechanical Cross Sections	Review
CR68	Existing Roads	Under Development
CR70	Hydrogeologic Zones	Review Complete
CR71	Potential Transportation Routes	Review
CR72	Material Specifications - Surface	Review Complete
CR73	Paleoclimatic Change	Cancelled
CR74	Paleohydrologic Evidence	Cancelled
CR75	Regional Seismic History	CCB Ready
CR76	UNE Seismicity	CCB Ready
CR77	Rock Mass and Q Ratings	Review
CR78	Future Seismicity	Cancelled
CR80	Water Application Movement	Under Development
CR81	Thermal/Mechanical Surfaces	Review
CR82	Topographic Maps	Review Complete

3. INFORMATION ENTERED INTO THE RIB

None.

*Candidate information is identified by RIB Change Requests, which are prepared in accordance with Revision 0 of Yucca Mountain Project Administrative Procedure AP-5.3Q, "Information Flow Into the Reference Information Base," which is implemented at SNL as Department Operating Procedure (DOP) DOP 3-8.

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

WBS: 1.2.7.4
QA: N/A

FEB 24 1992

FIELD CONTROLLED COPY NO 3 THIS IS A RED STAMP

YUCCA MOUNTAIN SITE OFFICE
FIELD OPERATIONS CENTER

Field change has been made as of 3-3-92
- required field verification plan
- " as-built drawing
- minor editorial changes

Job Package: 92-5
Date: February 24, 1992
Job Title: Midway Valley Excavations Phases I and II

Robert F. Pritchett, REECo, Las Vegas, NV
Richard L. Bullock, RSN, Las Vegas, NV
Larry R. Hayes, USGS, Las Vegas, NV

JOB PACKAGE (JP) AUTHORIZATION

This is your authorization to proceed with JP 92-5 in accordance with the enclosed Job Package, Test Planning Package and the following requirements:

1. This JP is to provide a two-week Phase I for excavations of a series of closely spaced test pits along the proposed alignment of a "long trench" and other test pits in Midway Valley. Phase II, a four week phase will include excavation of a "long trench" adjacent to the proposed repository surface facilities and other excavations on the west side of Fran Ridge and at the south end of Midway Valley.

2. The participants involved in the excavations are Reynolds Electrical and Engineering Co., Inc. (REECo) and Raytheon Services Nevada (RSN).

3. REECo will provide labor, materials and equipment to perform the required excavation work for the trenches and soil test pits and has the responsibility of ensuring a safe work site.

4. The equipment that REECo will use for the excavation work has been made available from the resources of the Area 3, Field Operations Department.

5. RSN will provide engineering design, inspection and testing services, reporting, engineering support and surveying.

6. United States Geological Survey (USGS) or Geomatrix accomplishing ongoing non-surface disturbing geologic mapping of the trenches and descriptions of soil test pits; identification of locations and size for all exploratory trenches and soil test pits required for the Midway Valley study and field work related to the preparations of a surface geological map of the Midway Valley study area.

7. The field change control threshold for costs is ten percent of the planned budget and schedule.

8. All field personnel must be aware and knowledgeable of the Field Operating Instructions (FOI) systems and must comply with applicable FOIs for those activities performed.

9. All required safety training must be completed by all YMP personnel before performing field work under this JP. Personnel wishing to visit the job site must be escorted by an individual who has completed the training.

10. Field personnel head counts and daily progress reports will be provided to the Field Operations Center by 8:30 a.m. each day.

11. The Site Manager will contact the Operations Control Branch (OCB) five days prior to field activities at the site in order for EG&G/EM to perform a biological resources preactivity survey prior to excavation work commencing.

12. A YMP Field Operations Permit #92-005 is being prepared and will be submitted under separate cover. A copy of the permit must be posted in a conspicuous place at the work site as well as a copy of the JP being made available.

13. Raytheon Services Nevada (RSN) will provide a soils engineer at the site during the excavation work.

If you have any questions pertaining to the JP Authorization Letter or the JP itself, please contact me at 295-5914.

Winfred A. Wilson

Winfred A. Wilson
Site Manager

YMP:WAW-231

Enclosure:
Notice to Proceed
and JP 92-5

cc w/encls:
J. A. Catozzi, REECo, Las Vegas, NV
T. M. Leonard, REECo, Las Vegas, NV
J. E. McNeely, RSN/YMSO, M/S 726
Eddie Wright, RSN, Las Vegas, NV
U. S. Clanton, YMP, NV
R. R. Schneider, SAIC/YMSO, M/S 717
R. T. Simms, SAIC/YMSO, M/S 717
L. K. Camp, SAIC/YMSO, M/S 717
Joy Mukherjee, YMP, NV

cc w/o encls:
I. R. Cottle, SAIC, Las Vegas, NV M/S T-17
G. D. Milligan, SAIC/YMSO, M/S T-01
R. B. Baumeister, YMP/YMSO, M/S 717
R. J. White, YMP/YMSO, M/S 717
W. R. Tunnell, YMP/YMSO, M/S 717
J. T. Sullivan, YMP, NV
V. F. Iorii, YMP, NV

bcc:
C. P. Gertz, YMP, NV
M. B. Blanchard, YMP, NV
J. R. Dyer, YMP, NV
W. R. Dixon, YMP, NV
W. B. Simecka, YMP, NV
R. E. Spence, YMP, NV
R. V. Barton, YMP, NV

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

WBS 1.2.9
QA: N/A

Winfred A. Wilson, Site Manager, YMP, Mercury, NV, M/S 717

NOTICE TO PROCEED ON JOB PACKAGE 92-05, MIDWAY VALLEY EXCAVATIONS PHASES I AND II

This notice to proceed, and the controlled copies of the Test Planning Package (92-03) and Job Package issued by the Document Control Center, are your authorization to commence field work in accordance with the documents contained therein. You may not exceed your assigned thresholds in this area.

Direct correspondence or questions concerning this Job Package to J. Russell Dyer, Director, Regulatory and Site Evaluation Division at 794-7586, or Jay Mukherjee at 794-7894.

for Maxwell Blanchard
Carl P. Gertz
Project Manager

PCB:JM-2115

Enclosure:
Job Package 92-05

cc w/o encl:
I. R. Cottle, SAIC, Las Vegas, NV
K. R. Harbert, SAIC, Las Vegas, NV
J. S. Stuckless, USGS, Denver, CO
R. L. Bullock, RSN, Las Vegas, NV
Tony Buono, USGS, Las Vegas, NV
R. F. Pritchett, REECo, Las Vegas, NV
L. R. Hayes, USGS, Las Vegas, NV
R. P. Nance, SAIC, Las Vegas, NV
J. T. Sullivan, YMP, NV
Jay Mukherjee, YMP, NV
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R. V. Barton, YMP, NV
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