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October 22, 1992

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QA: N/A

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SUBJECT: U.S. Geological Survey (USGS) Detailed Monthly Status Report for August, 1992

Dear Carl:

Enclosed is the USGS detailed monthly status report for August, 1992. If you have any questions or comments, please contact Raye Ritchey at FTS 776-0517.

Sincerely,

Larry R. Hayes
Technical Project Officer
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**LRH/RER/mt
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Department of the Interior
United States Geological Survey
YUCCA MOUNTAIN PROJECT
Monthly Highlights and Status Report
AUGUST 1992

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. Any information is preliminary and subject to change as further analyses are performed. This report has not been reviewed for conformity with U.S. Geological Survey technical and editorial standards and stratigraphic nomenclature. Company names are for descriptive purposes only and do not constitute endorsement by the U.S. Geological Survey.

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ACRONYM LIST

A&E	architectural and engineering
ABC	American Borate Corporation
ACD	advanced conceptual design
ACM	alternative conceptual model
ACNW	Advisory Committee on Nuclear Waste
ACP	Area Characterization Plan
ACSR	Activity Control Specification Report
ACS	American Chemical Society
ACWP	actual cost of work performed
ADN	Affected Document Notice
ADP	automated data processing
ADTS	Automated Data Tracking System
AEC	Atomic Energy Commission
AECB	Atomic Energy Control Board
AECL	Atomic Energy of Canada, Ltd.
AEG	Association of Engineering Geologists
AFOS	Automated Field Operating System
AFR	Audit Finding Report
AGU	American Geophysical Union
AIH	American Institute of Hydrology
ALARA	as low as reasonably possible
ALTS	Apache Leap Tuff Site
AMA	Assistant Manager for Administration
AMFM	alternative means of financing and managing
AML	Arc Macro Language
AMP	Administrative Management Procedure
AMD	Administrative Management Section
ANS	American Nuclear Society
ANSI	American National Standards Institute
ANSTO	Australian Nuclear Science and Technical Organization
AO	Administrative Officer
AP	Administrative Procedure
APQ	Administrative Procedure Quality
ARR	Area Recommendation Report
ARS	Automated Records System
ASA	American Statistical Association
ASME	American Society of Mechanical Engineers
ASQC	American Society for Quality Control
ASR	Annual Status Report
ASTM	American Society for Testing and Materials
AT	acoustic televiewer
ATC	Asynchronous Terminal Concentrator
ATLAS	Alternatives to License Application Strategies
ATS	Activity Tracking System
AVL	Approved Vendors List
AVS	Application Visual System
BA	Biological Assessment

BAC	budgets at completion
BAMG	Branch of Atlantic Marine Geology
BBC	British Broadcasting Company
BBS	Bulletin Board System
BCWP	budgeted cost for work performed
BCWS	budgeted cost for work scheduled
BDR	Basic Data Recorder
BFD	Basis for Design
BG&H	Bond Gold and Hydrosearch
BGRA	Branch of Geologic Risk Assessment
BIG	Branch of Isotope Geology
BLM	Bureau of Land Management
BP	before present
BPA	blanket purchase agreement
BPO	blanket purchase order
BQA	Branch of Quality Assurance
BRC	below regulatory concern
BRG	Branch of Central Regional Geology
BSP	balanced cross section modeling program
BSR	Bi-annual Status Report
BWIP	Basalt Waste Isolation Project
C/SCR	Cost and Schedule Change Report
C&C	consultation and cooperation
CA	Construction Authorization
CADD	Computer-Aided Drafting and Design
CAE	Computer-Aided Engineering
CAM	Cost Account Manager
CAP	cost account plan
CAR	Corrective Action Report
CASY	Committee for the Advancement of Science in the YMP
CATS	Corrective Action Tracking System
CBI	Controlled Blasting Investigation
CCB	Change Control Board
CCC	Configuration Control Committee
CD	Consultative Draft
CDP	Career Document Profile
CDR	Conceptual Design for the Repository
CFR	Code of Federal Regulations
CFS	cubic feet per second
CGC	Center for Geoscience Computing
ChemTrec	Chemical Transportation Emergency Center
CHLW	commercial high-level waste
CIRF	Configuration Identification Request Form
CMR	Branch of Central Mineral Resources
COB	close of business
COCORP	Consortium for Continental Reflection Profiling
CODMU	Computer Operations and Data Management Unit
COGS	Computer-Oriented Geological Society
COSIM	conditional simulation
CPR	Cost Performance Report
CR	Central Region

CRF	Central Records Facility
CRF	Comment Response Form
CRG	Central Regional Geology
CRGB	Central Regional Geology Branch
CRW	comment resolution workshop
CSCS	Cost Schedule Control System
CSI	Campbell Scientific, Inc.
CSM	Colorado School of Mines
CVO	Cascade Volcanoes Observatory
CWP	Center for Wave Phenomena
CY	calendar year
D&E	development and evaluation
DAA	Design Acceptability Analysis
DAS	data acquisition system
DCP	data collection platform
DDP	Director's Decision Plan
DEC	Digital Equipment Corporation
DECUS	Digital Equipment Corp Users Group
DEIS	Draft Environmental Impact Statement
DFC	Denver Federal Center
DHLW	defense high-level waste
DISA	Downhole Instrument Station Apparatus
DMS	Desktop Mapping System
DOE	Department of Energy
DOE/HQ	Department of Energy Headquarters
DOE/NV	Department of Energy/Nevada Operations Office
DOE/NVO	Department of Energy/Nevada Operations Office
DOP	Department Operating Procedures
DOT	Department of Transportation
DR3M	Distributed Routing Rainfall-Runoff Model
DRC	Document and Records Center
DRI	Desert Research Institute
DRMS	Data Records Management System
DRS	document review sheet
DTN	document transmittal notice
DTP	Detailed Test Plan
DWMD	Defense Waste Management Department (REECo)
DWPF	Defense Waste Processing Facility
DVNM	Death Valley National Monument
EA	Environmental Assessment
EAC	estimate at completion
EAEG	European Association of Exploration Geophysicists
EBS	engineered barrier system
ECD	electron capture detector
ECR	Engineering Change Report
EDBH	engineered design borehole
EDF	Environmental Defense Fund
EDM	Equivalent Discontinuum Model
EDXRF	energy-dispersive x-ray fluorescence
EEI	Edison Electric Institute
EEP	Emergency Evaluation Plan
EFAP	Environmental Field Assessment Plan

EIA	Emergency Information Administration
EIS	Environmental Impact Statement
EKES	Electronic Keyed-Entry System
EM	electromagnetic
EMP	electron-microprobe
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
ERC	Engineering Request Change
ERDA	Energy Research and Development Administration
EROS	Earth Resource Observatory System
ERTP	Environment Requirements Training Program
ES	exploratory shaft
ESF	Exploratory Studies Facility
ESF/DRD	Exploratory Shaft Facility Design Requirements Document
ESQAT	Earth Science Quality Assurance Team
ESR	electron spin resonance
ESSE	Early Site Suitability Evaluation
ESTC	Exploratory Shaft Test Coordination
ESTP	Exploratory Shaft Test Plan
ESTP-C	Exploratory Shaft Test Plan Committee
ET	evapotranspiration
EV	earned value
FEHMS	Finite Element Heat Mass and Stress
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FFS	Federal Financial System
FFS	Federal financial system
FFT	Fast-Fourier Transform
FID	Flame Ionization Detector
FIS	Federal interim storage
FITS	Facilities Important to Safety
FMMG	Fracture Matrix Mesh Generator
FMN	Fortymile neutron
FOLD	Federally Owned Landsat Data
FP	final procedures
FPC	final procurement and construction
FOI	Federal Quality Institute
FR	Federal Register
FRD	Functional Requirement Document
FRHP	Fractured Rock Hydrology Program
FSN	Fenix and Scisson, Nevada
FSU	Florida State University
FTE	full-time equivalent
FWP	field work proposal
FY	fiscal year
G&A	Goodson and Associates
GAO	Government Accounting Office
GAP	Geostatistical Analysis Package
GC	gas chromatograph
GCM	Global Climate Model
GCP	Geochronological Procedure
GD	Geologic Division

GEMLink	General Electric Microwave (communications) Link
GEOEAS	Geostatistical Environmental Software
GET	General Employee Training
GETT	grants equal to taxes
GID	Ground Water Site Investigation
GIS	Geologic Information System
GIS	Graphic Information System
GIT	Geochemistry Integration Team
GMP	Geologic Modeling Program
GMT	Greenwich Mean Time
GOCO	government-owned contractor-operated
GOES	Geostatistical Environmental Operational Satellite
GP	Geologic Procedure
GPO	Government Printing Office
GPP	Geophysical Procedure
GPR	ground-penetrating radar
GPS	global positioning satellite
GQA	Graded Quality Assurance
GRESS	Gradient Enhanced Software System
GSA	Geological Society of America
GSA	General Services Administration
GSIS	Geoscientific Information System
GSP	Geologic Studies Program
GTUF	G-Tunnel Underground Facility
GW	ground water
GWE	Gigawatts Electrical
GWTT	ground water travel time
GXP	Geochemical Procedure
H&N	Holmes and Narver
HIP	Hydrologic Investigations Program (formerly NHP)
HITF	Hydrology Integration Task Force
HLRW	high-level radioactive waste
HLW	high-level waste
HP	Hewlett Packard
HP	Hydrologic Procedure
HQ	Headquarters
HRF	Hydrologic Research Facility
HRMP	Hydrology and Radionuclide Migration Program
HRU	hydrologic-response unit
HSPF	Hydrological Simulation Program
IBM	International Business Machines
IC	ion chromatograph
ICE	Independent Cost Estimate
ICG	International Geologic Congress
ICIAM	International Conference on Industrial and Applied Mathematics
ICN	Interim Change Notice
ICWG	Interface Control Working Group
IDAS	Integrated Data Acquisition System
IDS	Information Data System
IFS	Iterated Function System
IG	Integration Group

IGIS	Interactive Graphics Information System
IGT	Institute of Gas Technology
IHLWM	International High Level Radioactive Waste Management
IMS	Information Management System
INEL	Idaho National Engineering Laboratory
INSTAAR	Institute of Arctic and Alpine Research
INTRAVAL	International Transport Code Validation
IPA	Intergovernmental Personnel Act
IR	infrared
IRG	Interagency Review Group
ISA	Instrument Society of America
ISD	Information Systems Division
ISM	Interactive Surface Modeling
ISO	International Standards Organization
ITR	Information Technology Resources
IVV	Independent Verification and Validation
JGR	<i>Journal of Geologic Research</i>
LA	license application
LACT	laser alignment and centering target
LAN	local area network
LANL	Los Alamos National Laboratory
LBL	Lawrence Berkeley Laboratories
LCS	Liquid Scintillation Counter
LDRP	litigation discovery request procedure
LDS	lightning detection system
LLNL	Lawrence Livermore National Laboratory
LLP	Lightning Location & Protection, Inc.
LLW	low-level waste
LOE	level of effort
LPRS	large plot rainfall simulator
LRC	Local Records Center
LRE	latest revised estimate
LRGS	Local Read-Out Ground Station
LRP	long-range planning
LRP/IPS	Long Range Plan/Integrated Project Schedule
LRS	Litton Resource System
LSC	liquid scintillation counter
LSP	laser safety plan
LSS	Licensing Support System
LWS	Lathrop Wells aeromagnetic survey
LV	Las Vegas
MAs	Management Agreements
MADS	Meteorological Alert Distribution System
MCL	Maximum Contaminant Level
MEDA	Meteorological Data Acquisition Network
MFC	mass flow controller
MGDS	Mined Geologic Disposal System
MIC	Management Information Center
MISIS	Micro Integrated Storm Information System
MLT	materials testing laboratory
MMDS	Martin Marietta Data Systems

MOA	Memorandum of Agreement
MODFE	Modular Finite Element
MOT	Management Overview Team
MOU	Memorandum of Understanding
MPBA	multipurpose borehole activity
MPBH	multipurpose borehole
MPM	Management Procedure Manual
MPU	Manuscript Prep Unit
MRIR	Material Receiving and Inspection Report
MRS	monitored retrievable storage
MSA	major system acquisition
MSHA	Mine Safety and Health Administration
MSIS	Management System Information Strategy
MSL	mean sea level
MSS	Multispectral Scanner
MT	magneto-telluric
M&TE	measuring and test equipment
MTL	main testing level
MTU	metric tons of uranium
MW	mixed waste
NARUC	National Association of Regulatory Utility Commissioners
NBMG	Nevada Bureau of Mines and Geology
NBS	National Bureau of Standards (now NIST)
NCAR	National Center for Atmospheric Research
NCDC	National Climatic Data Center
NCR	Nonconformance Report
NCTM	National Computer Technology Meeting
NEA	Nuclear Energy Agency
NEPA	National Environmental Policy Act
NFS	Nuclear Fuel Services
NGS	National Geodetic Survey
NHP	Nuclear Hydrology Program (now HIP)
NIST	National Institute of Standards and Technology
NLT	no later than
NMD	National Mapping Division
NMIMT	New Mexico Institute of Mining and Technology
NNWSI	Nevada Nuclear Waste Storage Investigation
NOAA	National Oceanic and Atmospheric Administration
NOO	Nevada Operations Office
NPS	National Park Service
NRC	Nuclear Regulatory Commission
NRP	National Research Program
NSTF	near-surface test facility
NTC	National Training Center
NTS	Nevada Test Site
NTSO	Nevada Test Site Office
NVO	Nevada Operations Office
NWF	Nuclear Waste Fund
NWIS	Nevada Water Information System
NWIS	National Water Information System
NWM	Nuclear Waste Management

NWN	Nuclear Waste News
NWPA	Nuclear Waste Policy Act
NWPO	Nuclear Waste Projects Office
NWQL	National Water Quality Laboratory
NWTRB	Nuclear Waste Technical Review Board
OBS	organization breakdown structure
OCRWM	Office of Civilian Radioactive Waste Management
OEVE	Office of Earthquakes, Volcanoes and Engineering
OF	Open file
OFR	open-file report
OGR	Office of Geologic Repositories
OMB	Office of Management and Budget
OMR	Office of Mineral Resources
OPCNM	Organ Pipe Cactus National Monument
OPFM	Office of Project and Facilities Management
OPIO	Office of Policy, Integration, and Outreach
ORM	Office of Resource Management
ORNL	Oak Ridge National Laboratory
OSTS	Office of Storage and Transportation Systems
OWQSU	Ocala Water Quality Services Unit
P&S	planning and scheduling
PA	performance assessment
PAC	planning and control
PACE	Performance Assessment Calculation Exercise
PACS	Planning and Control System
PAGEOPH	<i>Pure and Applied Geophysics</i>
PAGIS	Performance Assessment of Geological Isolation Systems
PAL	Project Acronym List
PAMP	Performance Assessment Management Plan
PAP	Performance Assessment Plan
PASP	Performance Assessment Strategy Plan
PBEI	prototype blast effects on instrumentation
PBQ&D	Parson, Brinkerhoff, Quade, and Douglas
PBS	pyramid beam splitter
PC	personal computer
PCBI	Prototype Controlled Blasting Investigation
PCCB	Program Change Control Board
PCM	pivoting camera mount
PCSB	Program Cost and Schedule Baseline
PC&TS	Program Coordination and Technical Support
PD	Position Description
PDA	Participant Data Archives
PDCR	prototype dry coring of rubble
PDHI	prototype drill hole instrumentation
PDM	Problem Definition Memorandum
PDS	Project Decisions Schedule
PEET	prototype excavation effects test
PI	Principal Investigator
PIP	Prototype Investigation Plan
PIR	Precision Infrared Radiometer
PL	Public Law

PMB	Performance Measurement Baseline
PMF	probable maximum flood
PMI	Phase Measuring Interferometry
PMIS	Program Management Information System
PMP	Program Management Plan
PMR	performance measurement review
PMS	Program Management System
PNL	Pacific Northwest Laboratories
PPWE	prototype pore-water extraction
PQM	Project Quality Management
PRBP	project review briefing package
PRC	Project Records Center
PRDA	Program Research and Development Announcement
PRESS	Project-related Engineering and Scientific Studies
PRMS	Precipitation Runoff Modeling System
PSAR	Preliminary Safety Analysis Report
PSI	pounds per square inch
PTP	Prototype Test Plan
PTS	Petroleum Testing Services
QA/QC	quality assurance/quality control
QA	Quality Assurance
QAG	Quality Assurance Grading
QAGR	Quality Assurance Grading Report
QALA	Quality Assurance Level Assignment
QALAS	Quality Assurance Level Assignment Sheet
QAM	Quality Assurance Manager
QAP	Quality Assurance Program
QAPD	Quality Assurance Program Description
QAPO	Quality Assurance Project Officer
QAPP	Quality Assurance Program Plan
QAR	Quality Assignment Records
QARD	Quality Assurance Requirements Document
QASC	Quality Assurance Support Contractor
QMP	Quality Management Procedure
QMFR	Quality Management Policies and Requirements
QRA	Quality Related Activities
QRB	Quality Review Board
QVC	Quality Verification Check
QWL	quality of work life
R&D	research and development
R&H	receiving and handling
R&LSD	Research and Laboratory Services Division
RALD	right angle laser deflectometer
RAM	responsibility assignment matrix
RASA	Regional Aquifer Study Assessment
RASRA	radial arm strike rail assembly
RCR	Regional Characterization Report
RCRA	Resource Conservation and Recovery Act
REBS	Radiation Energy Balance Systems
REECo	Reynolds Engineering and Electrical Company
RFP	Request for Proposal
RGEG	Research Grade Evaluation Guide

RIB	Reference Information Base
RIDS	Record and Information Disposition Schedule
RIS	Records Information System
RMF	Records Management Facility
RMNMD	Rocky Mountain National Mapping Division
RMP	Records Management Plan
RMS	Records Management System
ROD	Record of Decision
RPC	Report Package Collection
RQPG	right angle prism goniometer
RRL	reference repository location
RSED	Regulatory and Site Evaluation Division
RSN	Raytheon Services Nevada
RTISA	request to initiate site activity
RW	radioactive waste
RWMNFC Cycle	Radioactive Waste Management and the Nuclear Fuel Cycle
RWMS	Radioactive Waste Management Site
s-p	surface-propagated
SA	study activities
SAG	Software Advisory Group
SAGEEP	Symposium on the Application of Geophysics to Engineering and Environmental Problems
SAIC	Science Applications International Corporation
SAR	Safety Analysis Report
SAS	Statistical Analysis System
SBTFRD	Surface-Based Test Facility Requirements Document
SBTP	Surface-Based Test Prioritization
SCA	Site Characterization Analysis
SCC	substantially complete containment
SCI	Software Configuration Items
SCIF	software checklist and indexing form
SCM	Software Configuration Management System
SCP	Site Characterization Plan
SCPB	Site Characterization Program Baseline
SDR	Standard Deficiency Report
SDRD	Subsystems Design Requirement Document
SE	Senior Engineer
SE&D	Systems Engineering and Development
SEG	Society of Exploration Geophysicists
SEM	scanning electron microscopy
SEMP	System Engineering Management Plan
SEPDB	Site and Engineering Properties Data Base
SES	Scientific and Engineering Software
SF	spent fuel
SG	Senior Geologist
SGB	Southern Great Basin
SGBSN	Southern Great Basin Seismic Network
SGR	Seismic Group Recorders
SIP	Scientific Investigation Plan
SIR	Scientific Investigations and Research
SIR	Special Investigative Review

SIT	Site Integration Team
SKB	Swedish Nuclear Fuel and Waste Management Company
SMF	Sample Management Facility
SMS	Sample Management System
SNF	spent nuclear fuel
SNL	Sandia National Laboratories
SNP	Scientific Notebook Plan
SNSN	Southern Nevada Seismic Network
SOBART	Southern Basin and Range Transects
SOC	Sample Overview Committee
SOIR	status of open items report
SOP	Standard Operating Procedure
SP	Seismic Procedure
SP	Study Plan
SPA	Study Plan Assessment
SPE	Society of Petroleum Engineers
SPOC	submersible pressurized outflow cell
SPR	Semi-annual Progress Report
SPR	Software Problem Report
SPRS	small plot rainfall simulator
SQA	Software Quality Assurance
SQAP	Software Quality Assurance Plan
SRD	system requirements and description
SRG	strike rail goniometer
SRM	standard reference material
SRP	Site Recommendation Report
SSF	software summary forms
SSF	specified software forms
SSR	Site Selection Report
SSSA	Soil Science Society of America
STC	Southern Tracer Complex
SWO	stop-work order
SZ	saturated zone
T&MSS	Technical and Management Support Services
T&MSS SP	T&MSS Standard Practice Procedure
TAR	Technical Assessment Review
TBD	to be determined
TBM	Tunnel Boring Method
TC	Technical Contact
TC	Training Coordinator
TCD	thermal conductivity detector
TCP	telescoping camera pedestal
TCPAL	Thermocouple Psychrometer Calibration
TDAG	Technical Data Advisory Group
TDB	Technical Data Base
TDD	Test Descriptions Document
TDF	task definition form
TDIF	Technical Data Information Form
TDR	time domain reflectometry
TDS	total dissolved solids
TEF	Test and Evaluation Facility
TESS	TRW Environmental Safety Systems

TFA	Temporary Field Assistant
TIC	Technical Information Center
TM	thematic mapper
TP	Technical Procedure
TPEC	Technical Proposal Evaluation Committee
TPO	Technical Project Officer
TPP/JPP	Test Planning Package/Job Planning Package
TPT	Testing Prioritization Task
TQM	Total Quality Management
TRIG	Technical Review and Integration Group
TRIMS	Technical and Regulatory Information Management System
TRU	Transuranic
TSR	Technical Status Report
TVA	Tennessee Valley Authority
UARW	Upper Amargosa River Watershed
UNE	Underground Nuclear Explosion
UNLV	University of Nevada at Las Vegas
UNR	University of Nevada, Reno
UNRSL	University of Nevada Reno Seismic Laboratory
UPS	Uninterrupted Power Supply
URL	underground research laboratory
USBLM	U.S. Bureau of Land Management
USBR	U.S. Department of the Interior Bureau of Reclamation
USDI	U.S. Department of the Interior
USFWS	U.S. Fish and Wildlife Service
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
USNSN	U.S. National Seismic Network
UTM	Universal Trans Mercator
UZ	unsaturated zone
UZFRHP	Unsaturated Zone Fractured Rock Hydrology Project
UZIG	Unsaturated Zone Interest Group
UZSBP	Unsaturated Zone Surface-Based Borehole Project
VAR	Variance Analysis Report
VARS	Video Archival Retrieval System
VLF	very low frequency
VOC	Validation Oversight Committee
VOG	Validation Oversight Group
VSP	vertical seismic profiling
WA	Western Atlas
WAC	Waste Acceptance Criteria
WAS	Work Authorization Submission
WAS/FWP	Work Authorization System/Field Work Proposal
WBS	work breakdown structure
WIPP	Waste Isolation Pilot Plant
WIT	Working Integration Team
WMNFC	Waste Management and Nuclear Fuel Cycle
WMSD	Waste Management Systems Description
WNRE	Whiteshell Nuclear Research Establishment
WORM	Write Once Read Many
WP	waste package

WP	Weapons Program
WPDRD	Waste Package Design Requirements Document
WRCC	Western Region Climate Center
WRD	Water Resources Division
WRG	Western Region Geology
WRI	Water Resources Investigations
WRIR	Water Resources Investigations Report
WRR	Water Resources Research
WSA	Wilderness Study Area
WSNSO	Weather Service Nuclear Support Office
WSP	Water Supply Paper
WT	water table
WVDP	West Valley Demonstration Project
WY	water year
XRD	x-ray defraction
XRF	x-ray fluorescence
YM	Yucca Mountain
YMP	Yucca Mountain Project
YMPB	Yucca Mountain Project Branch
YMPO	Yucca Mountain Project Office

1.2.1 SYSTEMS

OBJECTIVE

To integrate systems with the Geologic Repository Program and to describe the YMP Mined Geologic Disposal System (MGDS); and to evaluate the performance of the natural, engineered barrier, and total systems for meeting regulatory standards.

WBS 1.2.1.3 Technical Data Base Management

OBJECTIVE

To manage, maintain, and accumulate technical data and information produced by site characterization, design development, and performance assessment activities for the Project.

WBS 1.2.1.3.5 Technical Data Base Input

Principal Investigator - L. Hayes

OBJECTIVE

To provide the hardware, software, personnel, and procedures needed to provide data to the technical base.

ACTIVITIES AND ACCOMPLISHMENTS

Twenty-seven data submittals were received in the Participant Data Archives. Four data transfers to YMPO were processed. Three data packages were transferred from the USGS Parfet PDA location to USBR.

The ATDT Database Programmer (in LV) responded to this office's request for the capability to print TDIF's at this location with a temporary "fix" that allows a print file to be created.

WBS 1.2.1.4 Performance Assessment

OBJECTIVE

To conduct investigations and develop mathematical models examining the performance of the MGDS in the preclosure and postclosure phases; to verify, validate, benchmark, and document codes for assessing the performance of the overall waste isolation system; and to analyze the performance of the total system and subsystems.

WBS 1.2.1.4.4 Site Performance Assessment

OBJECTIVE

To integrate physical process submodels and data into computational models for prediction of performance of the site (including uncertainties); and assess whether the site will meet requirements for ground-water travel time in 10 CFR 60.113(a) (2). (SCP Sections 8.2.2 and 8.3.5)

WBS 1.2.1.4.4.2 Favorable and Adverse Conditions

Principal Investigator - A. Flint

OBJECTIVE

To assess site performance characteristics under the favorable and adverse conditions listed in 10 CFR 60.122; and assess engineered barrier system (EBS) performance characteristics under the potentially adverse conditions in 10 CFR 60.122, which refers to impacts on EBS performance. (SCP Section 8.3.5.17)

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GPA007 Sensitivity analysis model mesh size to 1-D infiltration

Modification of the TOUGH code to allow for 99 vertical input units has been discussed with LBL. The fix is easy and new meshes will be generated to compare with the results of the ones with 27 units.

3GPA003 Imbibition experiment for input to analysis solution

Core samples that have water characteristic curves have been selected from old SPOC cell and centrifuge analysis to be run through various stages of imbibition. The predicted curves will be compared to the modeled curves both for Brooks and Corey and Van Genuchten curves.

Quality Assurance

Planning and Operations

Variances

WBS 1.2.1.4.6 Development and Validation of Flow and Transport Models

Principal Investigator - A. Flint

OBJECTIVE

To develop and validate the calculational models that (1) are used primarily in assessments of performance for the resolution of Issues 1.1, 1.2, 1.3, 1.6, 1.8, and 1.9; (2) describe fluid flow or the transport of energy/or radionuclides; and (3) are not used exclusively in the resolution of a single issue; and to follow applicable quality-assurance procedures.

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GVF002 Heating experiment lab analyses

Air and water permeabilities are still underway. Some preliminary conclusions have been provided to Sandia for their modeling efforts.

3GVF006 Develop software preliminary analysis of thermal conduct heat capacity

Several probe configurations are being tested for strength, calibration and repeatability of thermal output. Additional software has been written to compensate for the heat conducted up the probe and the heat capacity of the air gap.

3GVF015 Finalize geostatistical software and text
Software and text are still under revision.

Quality Assurance

Planning and Operations

Variances

WBS 1.2.1.4.7 Supporting Calculations for Postclosure Performance Analyses

Principal Investigator - A. Flint

OBJECTIVE

To provide documentation and results of calculations used in analyses of postclosure performance that support design efforts, contribute to the resolution of Issue 1.3, and indirectly support activities carried out under other performance assessment WBS elements.

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GPC002 Develop method to determine moisture retention-CX-2

Several moisture retention curves were determined using the CX-2. Brooks and Corey and Van Genuchten curves were fit between 0 and -2000 bars with r^2 's between .85 and .98.

Quality Assurance

Planning and Operations

Variances

1.2.3 SITE

OBJECTIVE

To characterize Yucca Mountain and vicinity to identify and technically qualify a possible site for the construction and operation of a mined geologic repository for high-level radioactive waste.

WBS 1.2.3.1 Management and Integration

Principal Investigator - L. Hayes

OBJECTIVE

To manage and integrate the work performed within the site WBS elements.

M&I - Geologic Studies Program 0G3192G1

Summary Account Manager - J. Stuckless

ACTIVITIES AND ACCOMPLISHMENTS

Continued work on Trench 14 issue resolution with H. Moomey (SAIC) and D. Vaniman (LANL). All figures and data tables needed for the report were completed and submitted to DOE. Analysis of samples from wells needed to verify older isotopic data for water was started.

J. Stuckless and J. Whitney spent several days designing an accelerated seismic risk project.

Work Performed but not in Direct Support of the Scheduled Tasks

An estimated 16 hours were spent in support of the following tasks:

J. Stuckless attended a one day seminar on the study of colloid transport of radioactive nuclides at which there was an extensive discussion of the work being done by the Germans.

J. Stuckless attended a 1-day training course in public communication.

M&I QA Implementation GSP 0G3192G2
Summary Account Manager - J. Stuckless

ACTIVITIES AND ACCOMPLISHMENTS

The following technical procedures and scientific notebook plans were formatted and returned to GSP/HIP:

GP-42T, R0	Thermobarometric and kinematic studies of metamorphic rocks at Bare Mountain and proximal sites
GPP-15, R1	Magnetic susceptibility borehole logging operations
GPP-17, R1	Magnetometer borehole logging operations
HP-54, R1	Water-flow measurements using 90° V-notch weirs, flumes, and barrels
HP-100, R1	Stream discharge measurement using a type-AA price current meter
HP-166, R1	Stream discharge measurement using a pygmy current meter
HP-212, R0	Method of locating fractures within welded tuff using a miniature packer system
HP-239, R0	Method for removing traced drilling air from unsaturated-zone boreholes
HP-247, R0	Thermistor calibration procedure for pneumatic testing section of unsaturated zone borehole testing program
HP-248T, R0	Extraction of pore-water from welded and non-welded tuff chips using one-dimensional compression methods
HP-250, R0	Intact fracture sampling radial sampling

The TP Status List was updated and forwarded to the YMP-USGS QA Office. All completed record packages were submitted to the LRC.

The GSP QA Support monitored and/or provided input to the following open items: YM-CAR-92-063, CAR-91-01, CAR-91-03, CAR-91-05, CAR-91-07, CAR-92-05, CAR-92-09, NCR-90-37, NCR-91-26, NCR-91-31, NCR-92-02, NCR-92-06, NCR-92-19, NCR-92-26, NCR-92-33, AND NCR-92-36.

Continued to monitor and assist with the transition of the SGBSN from the Branch of Geologic Risk Assessment to the UNRSL. A majority of the work for the reporting period focused on QA records submittal and procurement of items.

Completed assimilating data, figures, photographs, a data quality statement, and glossary to support IRT "Origin of Calcite-Silica Deposits".

Coordinated GSP involvement in DOE Field Surveillance YMP-SR-92-022, USGS Field Surveillance 92-S10, and USGS Audit 92-08. Taught YMP-USGS Orientation at the YMP Training Center, Las Vegas, NV. Completed reviews of various QMPs. Numerous TDIFs were prepared for the GSP.

An MOA Between the GD and the WRD for Mineral and Energy Resources Activities, FY 1992, (8.3.1.9.2.1.5) was distributed and the records package submitted to the LRC.

Requisition requests were prepared in support of calibration service procurements for W. Wendt, USGS/GSP, under SCP 8.3.1.15.2.2. Requisition requests were prepared for H. Oliver, USGS/GSP, for procurement of portable proton magnetometers for work under SCP 8.3.1.4.2.1.

Study Plan 8.3.1.17.4.4, R0, "Quaternary strike-slip faulting proximal to the site within northeast-trending fault zones was transmitted to the DOE RSED for Project approval. A records package was prepared and submitted to the LRC.

ACTIVITIES AND ACCOMPLISHMENTS (CONTINUED)

The monthly report for rock characterization was submitted to PACS.

A summary of TP GP-01, R3, "Geologic mapping", was prepared.

Fifteen TDIFs from 1989 through 1991 were worked on, and assistance was given for developing a process to automatically enter TDIF information into the INGRESS system VAX network, eliminating at least one step of data entry for TDIF transmittal.

M&I - Hydrology Program Management and Administration 0G3192H1

Summary Account Manager - D. Gillies

ACTIVITIES AND ACCOMPLISHMENTS

The status of all 58 USGS and LBL summary-account schedules was completed as of the end of July using schedule-status, progress, and variance information provided by each summary-account manager. Schedule variances for a number of summary accounts were reviewed with project-control staff. Several summary-account-level variances were reduced by canceling or terminating some activities that have been replanned in FY93 as part of the Mission 2001 initiative.

At the request of the YMP-USGS TPO, hydrology-program management staff reviewed FY93 and outyear budgets in the Mission 2001 package and proposed possible reductions. The reductions are intended to reduce work scope in the surface-based, ESF, and climate programs, while attempting to maintain the scientific viability of site-characterization activities.

D. Appel, D. Gillies, and R. Luckey attended a briefing by K. Turner of the Colorado School of Mines GIS facilities. The briefing focussed on how GIS capability is being used to compile, organize, and synthesize data for construction of a new multi-layered, three-dimensional, regional ground-water-flow model of Yucca Mountain and vicinity.

D. Gillies and M. Chornack attended the periodic YMP-USGS unsaturated-zone modeling meeting on August 25-26, 1992, in Nevada. The meeting emphasized the possible hydrologic properties of faults and fault zones and how such features might be represented in the preliminary site-scale UZ model of Yucca Mountain under development at LBL. The meeting included a one-day field trip to Yucca Mountain, led by R. Spengler, to examine fault zones, such as the Ghost Dance.

D. Appel attended the DOE quality-assurance surveillance of instrument-calibration issues at the Las Vegas Subdistrict office and at the HRF Facility as the YMP-USGS hydrology-program management representative.

M&I QA Implementation, Hydrology 0G3192H2

Summary Account Manager - W. Causseaux

ACTIVITIES AND ACCOMPLISHMENTS

Technical Procedure status

S. Frans currently is processing 34 hydrologic procedures and scientific notebook plans, and has submitted six approved technical procedure packages to SAIC.

S. Boucher submitted a field modification to HP-200, R0, to the QA Office, and edited HP-196, R1, based on the QA review.

Quality management procedures

QMP 4.01, R4, entitled "Procurement document control" was reviewed by G. Severson, K. Thomas, G. Abend, J. Woolverton, P. Tucci, and S. Boucher of HIP.

QMP 5.01, R5, entitled "Preparation of technical procedures" was reviewed by A. Yang, J. Kume, G. Abend, J. Woolverton, S. Boucher, M. Ciesnik, and W. Causseaux of HIP.

QMP 7.01, R5, entitled "Acceptance or rejection of purchased items and/or services" was reviewed by G. Severson, K. Thomas, G. Abend, P. Tucci, and S. Boucher of HIP.

QMP 7.04, R0, entitled "Supplier evaluation" was reviewed by G. Severson, K. Thomas, G. Abend, P. Tucci, and S. Boucher of HIP.

M. Ciesnik discussed with L. Linden of the SMF the applicability of AP-6.26Q to the project's borehole samples (Felderhoff wells). As a result of these discussions, an ICN to AP-6.26Q will be issued accommodating borehole cutting samples.

Open items status

M. Pabst submitted a proposed response for USGS-NCR-92-31 (manuscript transmitted and released for publication without full approval).

M. Pabst submitted a proposed response for USGS-NCR-92-35 (procurement activities with Scott Specialty Gases).

J. Woolverton assisted C. Peters in preparing an "Impact on Quality" statement regarding the lack of an MA with the Branch of Petroleum Geology's Organic Geochemistry Laboratory. This was HIP's final required action for AFR-9112-02.

M. Pabst assisted J. Rousseau in preparing an "Impact on Quality" statement regarding the lack of an MA with R. Getzen. This action was required in conjunction with CAR-92-03.

J. Woolverton assisted M. Chornack in the qualification process for UZ 6s surface flow data. This effort is underway to support the resolution of CAR-92-04.

J. Woolverton and G. Severson submitted a proposed response for USGS-NCR-92-32 (manuscript transmitted and released for publication without full approval).

W. Causseaux talked to B. Milam of Licor, about the need for additional information for calibration certifications associated with NCR-92-23.

M. Ciesnik prepared the final amended responses to AFRs 92-03 and 92-04 and submitted them to the QA Office.

S. Boucher initiated a NCR (92-37) for lack of training prior to conducting quality-affecting work for Activity 8.3.1.2.3.1.2.

S. Boucher wrote memos in partial response to CAR-92-03 and AFR-9204-02.

Audit status

M. Pabst participated in the DOE Surveillance YMP-92-20 at the NTS and Las Vegas Subdistrict Office.

M. Ciesnik participated in the audit of Activity 8.3.1.5.2.1.4b (USGS Audit 92-07).

Audit status (CONTINUED)

S. Boucher participated in the QMP-12.01 surveillance conducted by the DOE in Nevada.

Management agreement status

M. Pabst continued coordination of the MA with the Branch of Petroleum Geology Machine Shop. The agreement was sent for Reston signatures.

M. Pabst continued efforts in processing an MA with the Branch of Petroleum Geology's Organic Geochemistry Laboratory. Processing included final distribution of the approved MA.

M. Pabst continued efforts in processing an MA with the National Research Program, WRD, Western Region for R. Getzen. Processing included final distribution of the approved MA.

General

M. Pabst assisted A. Yang in updating the training matrix for the UZ Hydrochemistry Technical Staff.

M. Pabst submitted the calibration form for the UZ hydrochemistry activity.

M. Pabst assisted J. Ferarese and D. Valega in requesting approval for additional calibration gases.

M. Pabst submitted a request for evaluation of John Fluke Manufacturing Inc., for performing calibration services.

J. Woolverton assisted M. Chornack in processing revisions to the gaseous phase circulation study plan.

J. Woolverton assisted the UZ hydrochemistry study in documenting the geochemical model Phreeqe, 1990, Rev. 4, in accordance with QMP 3.03 guidelines.

J. Woolverton submitted a request to the YMP-USGS QA Office to qualify Southern Methodist University as an approved vendor for C¹⁴ analysis.

J. Woolverton performed ad hoc technical reviews of graded QA packages for the UZ hydrochemistry study; 1) exemption for hydrochemical modeling, and 2) displacement data from the load frame.

T. Oliver submitted sample forms per AP-6.26Q for sampling trip conducted July 27-31, 1992, and the user documentation for RADSOL per QMP-3.03, R3.

M. Ciesnik prepared a package of sample^{ry} collection reports for the precipitation water samples collected at two sites in southern Arizona (Oliver Knoll and Organ Pipe National Monument) (Activity 8.3.1.5.2.1.4b) and shipped them to the SMF.

M. Ciesnik prepared a sample tracking system to track precipitation samples collected for Activity 8.3.1.5.2.1.4b, and reviewed Activity 8.3.1.5.2.1.4b for QA compliance in preparation for an internal audit (USGS 92-07).

General (CONTINUED)

M. Ciesnik performed a configuration check on A. Riggs' controlled documents; prepared a package of sample collection reports for 300 rock cutting samples collected from the Felderhoff wells, Amargosa Desert, Nevada (Activity 8.3.1.2.1.3.2); prepared the legal descriptions of the wells within the project's water-level monitoring network in California for pending well access applications filed with the BLM's Office in Barstow, California (Activity 8.3.1.2.1.3.2); and initiated a grading report for Activity 8.3.1.2.1.4.2.

Meetings and travel

M. Pabst met with D. Gockel to discuss software documentation needs for UZ percolation surface-based technical activities, and for G. LeCain's technical activities, and for UZ hydrolochemistry technical activities.

M. Pabst met with M. Mustard and D. Valega to discuss needed investigative actions for responses to USGS-NCR-92-33 (Certified Balance Service) and USGS-NCR-92-34 (Scott Specialty Gases).

D. Appel, M. Chornack, T. Chaney, A. Whiteside, A. Handy, D. Porter, and J. Woolverton met to discuss the status of implementing graded QA (QMP 3.15) within the UZ technical section.

D. Thorstenson, A. Yang, C. Peters, and J. Woolverton met with D. Gockel to discuss documenting the geochemical model "Phreeqe", 1990, Rev. 4, in accordance with QMP 3.03.

J. Woolverton met with G. Severson and F. Thamir to discuss a consistent approach to preparing activity controls specification reports for prototype work regarding intact fracture testing and percolation tests in the ESF.

M. Chornack, E. Weeks, and J. Woolverton met to discuss data qualification efforts for UZ 6s surface flow data.

J. Woolverton met with N. Stuthman, B. Kerans, B. Oatfield, D. Luckey, and D. Burkhardt to discuss NWIS II Data Parameters and YMP-DOE Data Parameter screens.

J. Woolverton met with C. Threlkeld on August 14, 1992, to discuss the MA with the Branch of Petroleum Geology's Organic Geochemistry Laboratory (BPG-OGL). The MA states work by the BPG-OGL will be in accordance with their QA manual. The analytical procedures are a part of the BPG-OGL safety manual. The absence of a "QA Manual" is the subject of AFR No. 9202-01.

J. Woolverton attended the exploratory studies facility test coordination meeting in Las Vegas, the Paintbrush Tuff Stratigraphic field trip at Busted Butte on August 24, 1992, the Geologic-structural Features field trip at Yučca Mountain, and the UZ Modeling meeting

D. Appel, M. Chornack, S. Keller, W. Causseaux, T. Brady, and J. Woolverton met on August 31, 1992, to discuss plans to prepare the study plan for activities supporting the exploratory studies facility.

M. Ciesnik participated in the field trip to the Organ Pipe National Monument area to install weather monitoring equipment for Activity 8.3.1.5.2.1.4b, and to implement relevant QA requirements.

Meetings and travel (CONTINUED)

J. Watson and M. Ciesnik met with D. Porter and D. Gockel to discuss the steps necessary to initiate a grading report for Activity 8.3.1.2.1.4.

J. LaMonaca met with P. Reilly, SAIC, to discuss the publications end of the Lawrence Berkeley Laboratory MA draft.

J. LaMonaca and S. Boucher met with K. Larson, Data Coordinator, to discuss changes in completion of TDIF's and how it affects published report packages.

Records management

Five published HIP report packages were submitted to the LRC.

TDIF's for OFR No. 90-362; and for MA #19 and #24 (Webb and W. Osterkamp) were submitted.

A data package transferred to D. LaCamera; a data package transferred to the State of Nevada (earthquake data); for G. O'Brien's report package (OFR 92-137); for playa and rock sample geochemical results for Activity 8.3.1.5.2.1.3; and records packages for MA with the Branch of Petroleum Geology and the National Research Program, WRD, Western Region were submitted.

The data package for OFR 92-137 was submitted to the LRC.

A memorandum was written documenting the use of "estimated" data and justifying the decision not to write NCRs for any of the estimated data.

Computer Operation & Data Management, Hydrology 0G3192H3
Summary Account Manager - C. Washington

ACTIVITIES AND ACCOMPLISHMENTS

I. Novell System

The Novell File Server was upgraded to a Power Vesa in order to increase the available storage. At the present time, E-mail and home partitions are expanding at an astonishing rate. In October the Novell File Server's disk sub-system will be reconfigured to ensure adequate space for FY93 transition from the Prime minicomputer.

The COU installed at statistics package to monitor the Server's performance and to locate bottlenecks.

II. Unix System

The SUN operating system, in the past, was shipped with additional software packages such as the FORTRAN compiler. This year SUN unbundled their software package therefore, a FORTRAN and "C" compiler had to be purchased. The new compilers will run under the Solaris 2.0 operating system, an upgrade from Berkeley System 3 to AT&T System V.

In addition, the memory was increased in all of the SUN workstations to improve the processing speed.

II. Unix System (CONTINUED)

All of the Data General workstations' operating systems were upgraded to DGUX 5.4.1. All applications were installed on the DG Server including Ingress. Ingress is being tested to ensure proper operation.

III. Miscellaneous

All users are being migrated from the Prime to the Data General File Server. This task is massive and cumbersome. It must be accomplished because of the transition to DIS-II. The users with the largest amount of storage are being migrated first.

The COU assisted the LRC and QA in verifying the data on the 9-track tapes submitted to them.

The HIP Computer Newsletter was completed and distributed.

Scientific Reports and Project Documents, Hydrology 0G3192H4
Summary Account Manager - T. Brady

ACTIVITIES AND ACCOMPLISHMENTS

Scientific reports processing

HIP currently is processing 87 YMP-HIP scientific publications, 57 YMP-GSP scientific publications, 8 YMP-LBL scientific publications, and 28 abstracts.

T. Brady completed the HIP review of the following abstracts and reports:

"Runoff, infiltration and recharge near Yucca Mountain, Nevada" by C. Savard, L. Flint, D. Ambos, and T. Kane (abstract); "Precision and accuracy of water-level measurements in the Yucca Mountain area, Nevada, 1988-90", by M. Boucher, (report); "Assessment of geophysical logs from borehole USW G-2, with recommendations for future logging at Yucca Mountain, Nevada", by P. Nelson, and U. Schimschal, (report); "Tectonic characterization of a potential high-level nuclear waste repository at Yucca Mountain, Nevada", by J. Whitney, and D. O'Leary, (report); and "Implementation and use of an automated projection moire experimental set-up", by J. Cardenas-Garcia, S. Zheng, and F. Shen, (report).

Study Plan status

SP 8.3.1.2.3.3 - Site saturated-zone hydrologic system synthesis and modeling was reviewed by T. Brady and the final HIP version transmitted to YMPO.

Meetings and travel

None

Technical Data Base Management, Hydrology 0G3192H5
Summary Account Manager - N. Stuthmann

ACTIVITIES AND ACCOMPLISHMENTS

Routine jobs were performed throughout the month, including retrieval of QW data from the WRD National Water Laboratory, entry of these data into the HIP NWIS database, and cleanup of Satellite Transmission of data (SATIN) maintenance logs and directories. Backup of the NWIS data base was performed and the backup tape was sent to the LRC for storage in the fire proof vault.

ACTIVITIES AND ACCOMPLISHMENTS (CONTINUED)

The DMU spent a considerable amount of time during the month becoming more acquainted with the design and layout of the NWIS-II database. This included three "brown bag" seminars with J. Paschal. This information will allow continued examination of our constituent requirements and the requirements of our database activities.

B. Oatfield continues to review the various QMPs and APs to reconcile the information with the USGS data policy report.

D. Burkhardt is completing a statistical report on water level trends which will be included in an open-file report. Burkhardt also is working on the task of moving the WRD NWISARC procedure from the Prime computer, to the SUN computer where ARC/INFO software now resides.

A retrieval of selected data from Nevada and California and the update to the HIP reference database has been performed.

WBS 1.2.3.2 Geology

Principal Investigator - J. Stuckless

OBJECTIVE

To conduct geologic investigations to evaluate the suitability of the surface and subsurface environment for siting a nuclear waste repository.

WBS 1.2.3.2.2 Rock Characteristics

OBJECTIVE

To describe present and expected rock characteristics of the Yucca Mountain site and to develop a three-dimensional model of rock characteristics. (SCP Section 8.3.1.4)

WBS 1.2.3.2.2.1 Geologic Framework of the Yucca Mountain Site

OBJECTIVE

To conduct field studies, including surface and subsurface geophysical surveys and geologic mapping on the surface and in the exploratory shaft facility to characterize the geologic framework of the Yucca Mountain site. (SCP Investigation 8.3.1.4.2)

WBS 1.2.3.2.2.1.1 Vertical and Lateral Distribution of Stratigraphic Units within the Site Area

Principal Investigator - R. Spengler

OBJECTIVE

To determine the vertical and lateral variability and emplacement history of stratigraphic units and lithostratigraphic subunits within the Yucca Mountain site area. (SCP Study 8.3.1.4.2.1)

SCP 8.3.1.4.2.1.1 Surface and subsurface stratigraphic studies of the host rock and surrounding units

OG3221A2

Summary Account Manager - C. Hunter

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GG0U11A Synthesize existing borehole data

This activity is underway with compilation of borehole subsurface data for inclusion into digital ASCII databases for eventual incorporation into LYNX 3-D model packages. The LYNX software develops multiple stacked cross sections using the subsurface data.

3GG0U31A Write report on findings, existing boreholes

This effort is complete, constituting informal direction to the 3-D modeling group. Lithostratigraphic information from WT holes has been incorporated into digitized ASCII databases for the LYNX Geoscience Modeling System software package.

Quality Assurance

Planning and Operations

Variances

3GGU002A Geochemical isotopic sampling and analysis, phase 1

This activity is being continued pending resolution of reporting protocols. Similar work was planned under 3GGU021A (Geochemical isotopic sampling/analysis G-5, UZ, WT), but G-5 has been delayed until FY94. As on-going analytical work, there is no long- or short-term impact.

3GGU003A Review samples from prototype (YM) hole, UZ holes

No start to this activity due to the slow progress of drilling. No impact is anticipated, long- or short-term. Staffing is in place and adequate to respond to HIP needs for logging and sampling. Significant core has been recovered, and logging operations will commence in September.

Work Performed but not in Direct Support of the Scheduled Tasks

R. Spengler and C. Hunter attended a GSP meeting to evaluate ways to emphasize the importance of surface-based studies in the face of fiscal restraints related to driving the ESF ramps.

SCP 8.3.1.4.2.1.2 Surface-based geophysical surveys 0G3221B2

Summary Account Manager - C. Hunter

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GGU220 QA documentation of software

In August 1992, D. Plouff spent a tremendous amount of time programming to get product GVDAYRED, as well as User Documentation (13 pages), ready for transmittal, and preparing test data sets for validation. Problems found and resolved, include deleting options, wrong gravity meter constraints (laboriously recalculated and typed from a scratch original), correcting other errors, adding gravity meter D-26, simplifying the presentation, etc. Plouff believes that everything is in hand for the "validation," except typing the form and explaining the proposed procedure. Things should be ultra-smooth for the HANDTC (program for making inner terrain corrections to gravity) next, because Plouff has the test in hand, but not the write-up.

Technical Activities (CONTINUED)

3GGU222 Submit status of regional geophysical for review

In consultation with R. Spengler, H. Oliver agreed to revamp the material on geology for inclusion in Oliver's Chapter 1, "Introduction", of the proposed USGS bulletin entitled "Status of regional geophysical studies at Yucca Mountain and vicinity, Nevada and California." Oliver and colleagues are working on the magnetics chapter and will have the revised manuscript submitted for Branch approval by October 1, 1992.

3GTQ005J Write seismic contract

This task is 100% complete. Follow-up activity in August included extension of the bidding period to September 8, 1992 to accommodate some of the uncertainties related to funding constraints on pre-activity surveys. Technical evaluation of bids will proceed shortly thereafter. Modifications to the RFP clarifying concerns and questions by potential bidders were addressed.

Staff worked with the Contracts Section to develop and release the necessary modifications. Yucca Mountain-area maps were revised several times to reflect proposed shot hole locations. The location maps were made available to bidders.

3GTQ006J Oversee field operations

No field analytical activity reported during this period. The study plan is in review at the NRC, with the 90-day comment period scheduled to end in late September. Additional delays have resulted from funding constraints on pre-activity surveys (including environmental/biological and soil radiation). The Sandia Performance Assessment Team review of possible impacts was completed with no identification of significant problems.

T. Brocher and M. Moses discussed staking large shot holes for lines 2 and 3 on the Nevada Test Site east of Yucca Mountain for facilitating radiological surveys of the shot holes by DOE. M. Moses assisted DOE/NTS participants in staking shot hole locations in late August.

C. Hunter provided responses to W. Chambers, SNL, clarifying design intent and addressing concerns of the test interference/performance assessment group at SNL. These efforts culminated in the release of the performance assessment evaluation of impacts from seismic reflection surveys. This evaluation found no significant concerns related to the seismic profiling detailed under TPP 92-08.

3GGU250 Collect and reduce magnetic/gravity in Yucca Wash

This activity was subdivided into two parts by R. Spengler in late July, 1992. The first part, consists of obtaining five E-W detailed gravity and magnetic profiles across the Midway Valley area, to help locate the surface of the buried Paintbrush and/or other faults on the east side of Yucca Mountain. Four of these five profiles were obtained from July 24 to August 3, 1992, but further work was held up by the lack of the additional elevation surveys required. Apparently, these are now being conducted by Raytheon, and it is planned to return to the field on September 14, 1992 to survey the fifth line.

3GGU250 Collect and reduce magnetic/gravity in Yucca Wash (CONTINUED)

The other part of this activity, is to obtain gravity/magnetic data along five E-W and one N-S line in Yucca Wash, to the north of Midway Valley. The southernmost of these lines was completed during the first field session, leaving four more E-W lines as well as the one N-S line to survey in September. The proposed lines in Yucca Wash are generally shorter, but the topography is rougher, ranging up to 500 feet along individual lines. DOE has contracted with Raytheon to survey the elevations at 50-meter spacings along the five lines in Yucca Wash. The deeper seismic reflections are anticipated to be helpful in describing the Tertiary/Paleozoic contact and the nature of deep faults below Yucca Mountain.

3GGU251 Complete local gravity map of Yucca Wash

This activity has not been started because there is only one station in Yucca Wash for which data gathering is complete. After the September field work has been completed and the data reduced, compilation of the gravity map will begin October 15, 1992.

Quality Assurance

Planning and Operations

3GGF223 Study plan approval

No activity reported during this period. The study plan has been approved by DOE headquarters and is in the review period at NRC. The 90-day comment period concludes in mid-September.

Variations

3GGU220 QA documentation

QA documentation of gravity and magnetic field measurements, data processing and computer modeling is much more extensive than originally envisioned. This effort is ongoing, and impacts are expected to be minimal.

3GGU222 Submit status of regional geophysical for review

Small delays have resulted in changes in authorship; complete manuscripts are scheduled to go to Branch review by October 1, 1992.

Work Performed but not in Direct Support of the Scheduled Tasks

Brocher reviewed the galley proofs of the GSA Bulletin manuscript entitled "Seismic reflection profiling across Tertiary extensional structures in the eastern Amargosa Desert, southern Nevada, Basin and Range Province, United States", by T. Brocher, M. Carr, K. Fox and P. Hart.

SCP 8.3.1.4.2.1.3 Borehole geophysical surveys 0G3221C2

Summary Account Manager - P. Nelson

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GGU332 Evaluate logs from G-2

Modifications in response to WRD's editorial comments to the open-file report, tentatively entitled "Assessment of geophysical logs from borehole USW G-2, with recommendations for future logging at Yucca Mountain, Nevada", by P. Nelson and R. Schimschal, are complete. Final drafting of figures also is complete.

Technical Activities (CONTINUED)

3GGU362 Specify logging tools for future YMP work

Recommendations on selection of logging tools for future YMP work have been completed. These recommendations have been incorporated into the open-file report "Assessment of geophysical logs from borehole USW G-2, with recommendations for future logging at Yucca Mountain, Nevada", by P. Nelson and R. Schimschal.

Quality Assurance

3GGU364 Write procedure for magnetometer logging

The completed technical procedure for operating the magnetic susceptibility tool (GPP-15) was reviewed by USGS-QA, and suggestions were incorporated into the document. The technical procedure for magnetometer logging (GPP-17) was revised and reviewed by USGS-QA.

Planning and Operations

Variances

3GGU392 Compute algorithms to density and resistivity logs

Replotting of the borehole data on large-format plots is underway. Six of the 40 boreholes have been plotted. There was no activity this month on this effort, but work will resume in September. Completion of this task has been delayed by PI involvement (at Project request) in data development and submission to the unsaturated-zone modelers at LBL. These reduction algorithms represent an on-going effort, and no near-term or long-term impact is anticipated.

3GGU365 Run magnetometer log

This task was intended to provide magnetometer logging in drill hole USW G-5 in Yucca Wash. Drilling of G-5 has been delayed until at least FY94. The PACS schedule will be modified to reflect this change.

WBS 1.2.3.2.2.1.2 Structural Features within the Site Area

Principal Investigator - R. Spengler

OBJECTIVE

To determine the frequency, distribution, characteristics, and relative chronology of structural features within the Yucca Mountain site area. (SCP Study 8.3.1.4.2.2)

SCP 8.3.1.4.2.2.1 Geologic mapping of zonal features in the Paintbrush Tuff 0G3221G2

Summary Account Manager - C. Hunter

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GGF182A Analysis of samples

K. Futa processed a series of twelve whole rock samples for Sr isotopic analysis. Samples consisted of unaltered welded and non-welded units collected in outcrop from the geochemical reference section, in Raven Canyon at the south end of Yucca Mountain near Highway 95. Analysis of these units will be compared to compositions of the same units collected from drill core beneath Yucca Mountain, to help assess the chemical variations induced by water/rock interactions occurring beneath the paleo water table.

Technical Activities (CONTINUED)

3GGF184A Structural analysis of exposed fault zones

An on-site quality check was performed of maps by A. Braun and L. Martin that describe the 61 gridded areas along the Ghost Dance Fault at Yucca Mountain. The maps were found to be detailed and accurate.

R. Dickerson and J. Nelson attended a week-long software class for the LYNX Geoscience Modeling Systems (GMS) 3-D geologic modeling software package. Upon completion of the class, Nelson and Dickerson compiled, verified, and entered data into a digitized database for incorporation into the LYNX GMS. This database includes borehole lithology (from the surface to the base of the Bullfrog Member) for holes within the designated site area (bounded by the Solitario Canyon Fault and the Bow Ridge Fault, on the west and east, respectively, the Yucca Wash Fault on the north, and a east-west line intersecting USW G-3 on the south); downhole survey data; an assumed water table elevation of 2395 feet (730 meters) throughout the site; fence sections (based both on those of Scott and Bonk, 1983, and additional sections through selected boreholes); topographic data; and a structural (fault) data file. Once the data were input to the system, they were verified against the primary sources to insure accuracy. Refining of cross sections from Scott and Bonk (1984), was begun for incorporation into the 3-D model, and in creating new cross sections for same. Also, work began on a conceptual approach to a 3-D confidence model for the 3-D geologic model. This eventually, will include a graphical representation of a statistically valid confidence map for geologic interpretation of the regions between drill holes, at a fixed depth below outcrop surfaces.

S. Houlding of LYNX Geosystems was present on August 28, 1992 to answer questions concerning the LYNX GMS software and give advice on how modeling should proceed.

3GGF125 Geologic Mapping of Northeast Corner of Site Area

No new progress to report this month. The mapping accomplished in May and June identified specific targets in the upper Paintbrush and Black Glass Canyons which will be investigated during the scheduled September mapping trips.

3GGF131A Field check southern and western YM mapping

The abstract, "Tectonic framework of Crater Flat Basin, adjacent to Yucca Mountain, Nevada: a preliminary report", submitted to the Geological Society of America, continues to be in DOE/YMPO review. Sample preparation is underway for geochemical and petrographic investigations, to verify conclusions expressed in the preliminary map of northern Crater Flat, completed by C. Fridrich in June.

3GGF101 Review, revise outcrop sections of Tpt

D. Buesch continued assembling outcrop and structural section data, with actual field checking anticipated late in the fiscal year.

3GGF185A Write report on exposed fault zones

A. Braun prepared and submitted this report to R. Spengler for review and additions on schedule. The final document will be larger in scope than originally intended and will contain interpretations along with the acquired data. Mapping completed to date suggests the value of additional detailed mapping along the Ghost Dance Fault as the fractures occur across a wider zone than previously recognized.

Technical Activities (CONTINUED)

3GGF160 Revise tech procedure on analysis of volcanic rocks

D. Buesch conducted discussions of technical procedures with the USGS QA implementation group. His particular focus was on earlier versions of the TPs by D. Nealy and R. Spengler, with emphasis on revisions to include any necessary improvements and additions.

Quality Assurance

3GGF184A Structural analysis of exposed fault zones

The LYNX GMS software package is in use for development of the 3-D geologic model of the site area. Compilation of structural data is underway. TECTONICS software ordered from Midland Valley Associates was delivered on August 26, 1992. This software package will allow paleoreconstruction along structural cross sections. Delivery of supporting hardware is anticipated by the end of September.

Planning and Operations

Variances

Work Performed but not in Direct Support of the Scheduled Tasks

C. Hunter participated as the GSP member in the QA Grading Acceptance Committee (GAC) meeting. The committee began review of several submittals from HIP participants during the meeting. Additional work clarified procedures and formats to be used in the GAC process. The next meeting is scheduled for September 25, 1992.

R. Spengler, C. Hunter, and D. Buesch attended an UZ modeling workshop in Las Vegas on August 25-26, 1992. Spengler led a field excursion to several areas at NTS to illustrate important components of the geologic picture of Yucca Mountain, including examination of recently mapped areas along the Ghost Dance Fault. A second day of the workshop involved presentations by participants in the UZ modeling effort.

R. Spengler, D. Buesch, and C. Hunter viewed core from drill hole NRG-1 (in Denver) and compiled a preliminary geological log of the core.

D. Buesch conferred with workers in Denver on the 3-D modeling effort (with SAIC-Golden) and the definition of lithostratigraphic units to be used in development of the confidence map for the 3-D geologic model. Discussions in part centered on applications of image analysis and petrographic correlation of tephra units.

D. Buesch attended the Society of Economic Paleontologists and Mineralogists (SEPM) meeting in Fort Collins, Colorado, where he presented an abstract entitled "Volcanological controls on tephra supply to distal depositional environments".

SCP 8.3.1.4.2.2.2 Surface-fracture network studies 0G3221H2

Summary Account Manager - M. Fahy

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GGF100 Map & analyze fractures in Tiva Canyon Member

Three data stations (tracelines) were collected in Solitario Canyon in the bedded tuffs immediately above Topopah rounded-step outcrops and topographically south of the UZ-6 bore. Analysis is in progress and is 20% complete. The analysis of Pavement 500 traceline surveys is 70% complete and will be included in the Tiva report. Map construction is 70% complete for the Tiva fracture sets. An additional traceline was collected across the location of the minor fault at NRG-1, on the east side of Exile Hill. These data will be incorporated into the local 3-D fracture model composed of the NRG-1 core, surface data stations and the cleared pavement topographically above the NRG-1 corehole. Clearing of this pavement started the week of August 24, 1992.

3GGF150A Develop Tiva fracture model phase 1

Modeling efforts are statistical in nature and will be the substance of the report. Completion of the Phase I model and report has been delayed pending compliance to USGS QMP 3.03 (Software Quality Assurance).

3GGF151A Collect vertical continuity data Prow Pass Solitario

This task started on July 27, 1992 with data collection in Solitario Canyon. To date, thirteen data stations have been collected in Solitario Canyon in vertical sections near H-5 and UZ-6. Three data stations were collected at Prow Pass in the Topopah section. Analysis is 10% complete, and data will be transmitted at the close of this activity.

3GGF10AA Preliminary fracture map and report (TIVA)

The report is progressing; however, the restrictions imposed by the USGS QA CAR board will impact completion. The map and interpretation will be derived from existing data.

3GGF080 Clear pavement at Fran Ridge

This task started the week of August 24, 1992 after a prerequisite review by the USGS CAR board and internal USBR surveillance for readiness. Logistically, the deepening of the test pit will occur first, followed by the final clearing of the pavement. The planned time frame for completion is approximately three weeks.

Quality Assurance

3GGF100M Map Tiva Canyon for review

Discussion of review and procedures for the qualification of the map as official data continues. The map is tied to deadline for 3GGF10AA (Preliminary fracture map & report (Tiva)) and USGS QA CAR board restrictions for review.

Planning and Operations

Variances

3GGF10AA Preliminary fracture map and report (TIVA)

3GGF100M Map Tiva Canyon for review

The expected delivery date is indeterminate at this time. Analytical software, which was 90% through the USBR QMP 3.03b process, will now have to re-enter the USGS QMP 3.03 process from the start per USGS CAR board decision dated August 21, 1992 with concurrence by J. Stuckless. USBR QA has been "hired" to expedite this matter. Discussions are on-going with the software QA experts.

Variances (CONTINUED)

3GGF150A Develop Tiva Fracture Model Phase I

Restrictions by USGS QA CAR board will impact the completion of this activity. The analytical software used will have to be processed through appropriate validation channels. This effort is underway by USBR QA.

SCP 8.3.1.4.2.2.3 Borehole evaluation of faults and fractures 0G3221I2

Summary Account Manager - J. Wright

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GGU004F Review vendor's techniques; acquisition

J. Wright received data packs from the following vendors: Western Atlas International, Restech Inc., and Halliburton Logging Services. Wright continues to wait for information from BPB and Schlumberger.

3GGU006F Edit, review existing data; data login

LOTUS files for drill holes UE-25B #1, UE-25C #1, UE-25C #2, UE-25C #3, UE-25P #1, USW G-1, USW G-2, USW G-4, USW H-3, USW H-4, USW H-5, USW H-6, USW WT-1, USW WT-2, UE-25 WT #3, UE-25 WT #4, UE-25 WT #6, USW WT-7, USW WT-10, USW WT-11, UE-25 WT #12, UE-25 WT #14, UE-25 WT #15, UE-25 WT #16, UE-25 WT #17, UE-25 WT #18, UE-25 UZ-4, UE-25 UZ-5, and USW UZ #6 were converted into edited, ASCII files. Ten percent of borehole deviation surveys were scanned in.

Quality Assurance

Planning and Operations

Variances

SCP 8.3.1.4.2.2.4 Geologic mapping of the exploratory shaft and drifts 0G3221J2

Summary Account Manager - S. Beason

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GGF006B Excavate test pit

Work on Fran Ridge pit deepening and clearing of pavement started on August 24, 1992. The start of work was delayed approximately two weeks by QA concerns at the Project office. REECo spent two days mobilizing the work, and two days cleaning the bottom of the northern pit and installing rock bolts in the walls of the existing pit. Drilling for the first blast round began on August 28, 1992. Another small delay is expected in the blasting due to permitting problems between REECo and the FOC (Field Operations Center).

3GGF008B Conduct control pt. configuration test

Activity is expected to start September 9, 1992; the planned finish date is still September 30, 1992.

Technical Activities (CONTINUED)

3GGFO22B Upgrade computer equipment

Plans for upgrading the existing computer equipment and the purchase of a new analytical plotter have been postponed indefinitely due to projected funding constraints and uncertainties in future needs for plotting capability. Funds for this upgrade have been reallocated at DOE request to other activities under study 8.3.1.4.2.2 (Geologic Mapping of Zonal Features) and study 8.3.1.14.2.2 (Soil and Rock Properties of Potential Locations of Surface Facilities).

Quality Assurance

3GGF006B Excavate Test Pit

S. Beason continued meetings with A. Handy (USGS QA) regarding invoking USGS QMP-3.15 for the upcoming Fran Ridge work. The QA manager has determined that the Fran Ridge work should be graded out under QMP-3.15 rather than handled through the SN procedure. A YMP-USGS ACSR was completed and signed for submittal to the GAC (Grading Acceptance Committee).

Planning and Operations

Variances

3GGF006B Excavate test pit

The start of work was delayed while QA concerns were being addressed. Another small delay is expected in the blasting because of permitting problems between REECo and the FOC (Field Operations Center). The planned finish date is September 11, 1992.

3GGF008B Conduct control pt. configuration test

This testing has been delayed due to delays in excavation of the Fran Ridge test pit. Activity is expected to start September 9, 1992; the planned finish date is still September 30, 1992.

3GGF009B Reduce test pit data

This activity is directly tied to 3GGF006B (Excavate test pit). The August deadline set by the Project office was missed by two weeks, but work began on the Fran Ridge Pit August 24, 1992. Excavation and pavement clearing are underway and are expected to be completed by September 11, 1992. The PI reports, that reduction of data is scheduled to begin October 15, 1992 and be complete by November 30, 1992.

3GGFO22 Upgrade computer equipment

Plans for upgrading the existing computer equipment and the purchase of a new analytical plotter have been postponed indefinitely. This task will be deleted from the PACS schedule.

3GGF044B Modify study plan

This activity has been slipped into FY93 until ESF design and configuration are established. Geologic mapping is tied to the size, layout, and schedule of the ESF excavation, and rewriting of the study plan is not expedient until plans for the ESF are firm. The PACS schedule will be modified to reflect delays in ESF design.

SCP 8.3.1.4.2.2.5 Seismic tomography/vertical seismic profiling 0B3221A2

Summary Account Manager - E. Majer

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GGF030B Validate interpretational codes AN190 and BEAM87

Validation activities using borehole data from the C-holes, revealed that the codes AN190 and BEAM87 will model mean arrivals. Due to the complexity of the subsurface being encountered in the region, further work will be necessary to adequately account for the effects of fracture on the six primary waves (P and S) and the complex wave fields produced by the fracturing.

3GGF035M Report: Progress VSP

Initial modeling of the field offsets, using data from the C-holes, revealed that optimal offsets for mapping the fractures are dependent upon the number and orientation of fractures, as expected. Pending the results of the processing of data from the C-hole tomography work, the VSP will be designed accordingly. Drilling continues in UZ-16, and plans are in place for conducting VSP work in that location.

Quality Assurance

Planning and Operations

Variances

3GGF031B Update ESF planning documents

Start of this activity is tied to DOE finalizing the ESF structural design. No impact is expected given the timeframe and scale of the ESF construction project.

WBS 1.2.3.2.3 Erosion

OBJECTIVE

To identify the site-specific geomorphic parameters and data that are needed to satisfy the design and performance issues and to ensure that the 200-meter disqualifying condition is not exceeded. (SCP Section 8.3.1.6)

WBS 1.2.3.2.3.1 Present Location and Rates of Surface Erosion

Principal Investigator - J. Whitney

OBJECTIVE

To identify the erosional processes in the Yucca Mountain area during the Quaternary; quantify the rates of the different processes and assess their relative importance; and identify the specific locations of past erosion. (SCP Investigation 8.3.1.6.1)

SCP 8.3.1.6.1.1.1 Development of geomorphic map of Yucca Mountain 0G3231A2

Summary Account Manager - J. Coe

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GER01AM Report: Short term erosion rate on Yucca Mountain

J. Coe, P. Glancy, and J. Whitney submitted a report titled "Volumetric analysis of debris eroded off a hillslope near Yucca Mountain, during a single rainstorm" for USGS technical review. This manuscript characterizes modern hillslope erosion at Yucca Mountain.

Quality Assurance

Planning and Operations

Variances

3GER001A Scoping study - photogrammetric analysis

The planned finish date was pushed back to September 30, 1992 because personnel were needed to complete the report for 3GER01AM and for field work related to excavation of the Paintbrush fault exposures at Busted Butte.

3GER002A Write report on erosion rate for existing data

At the request of the DOE, this report is being delayed in order to complete the topical report on erosion for the NRC by late September.

WBS 1.2.3.2.5 Postclosure Tectonics

OBJECTIVE

To supply data on the probability and effects of tectonic initiating events that may alter existing conditions at Yucca Mountain and adversely affect repository performance. (SCP Section 8.3.1.8)

WBS 1.2.3.2.5.3 Changes in Hydrology Due to Tectonic Events

OBJECTIVE

To assess or analyze the possibility that tectonic events could cause changes in existing hydrologic conditions at the Yucca Mountain site. (SCP Investigation 8.3.1.8.3)

WBS 1.2.3.2.5.3.2 Effect of Tectonic Processes and Events on Changes in Water-Table Elevation

Principal Investigator - J. Whitney

OBJECTIVE

To analyze and assess the probability that tectonic initiating events could result in significant changes in the elevation of the water table or potentiometric surface, changes in the hydraulic gradient, the creation of discharge points in the controlled area, or the creation of perched aquifers in the controlled area. (SCP Study 8.3.1.8.3.2)

SCP 8.3.1.8.3.2.5 Effects of faulting on water-table elevation 0G3253L2

Summary Account Manager - C. Fridrich

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GTW021 Interpretive report large hydraulic gradient YM

The second task is a follow-up on completed milestone 3GTW021M: Report on the large hydraulic gradient. The report was submitted for USGS review on March 18, 1992 to complete the milestone requirement. USGS' reviews were completed and comments returned to the first author in early August. Revision of the report is underway for final submittal to DOE and for publication in the Journal of Hydrology. The anticipated submittal date is September 30, 1992.

Quality Assurance

Planning and Operations

3GTW020 Compile existing information - water table elevation

A letter was drafted and sent from L. Hayes to J. R. Dyer requesting that DOE consider formally assigning responsibility of investigations 8.3.1.8.2, 8.3.1.8.3, and 8.3.1.8.4 to the USGS. The formal assignment of responsibility is required before the next two scheduled steps in the planned work can be done: 1) writing a proposed change to the SCPB for investigations 8.3.1.8.3 and 8.3.1.8.4, for DOE approval, and 2), writing the study plans for these investigations.

Variances

WBS 1.2.3.2.5.5 Information Required by the Analysis and Assessment Investigations of the Tectonics Program

OBJECTIVE

To collect field data called for by analysis and assessment activities in other tectonics investigations to support analyses of volcanic, igneous intrusion, and folding processes. (SCP Investigation 8.3.1.8.5)

WBS 1.2.3.2.5.5.2 Characterization of Igneous Intrusive Features

Principal Investigator - J. Sass

OBJECTIVE

To gather data concerning the presence of thermal anomalies in the area and data on the geochemical and physical effects of intrusions on the surrounding rock. (SCP Study 8.3.1.8.5.2)

SCP 8.3.1.8.5.2.3 Heat flow at Yucca Mountain and evaluation of regional ambient heat flow and local heat flow anomalies 0G3255B2

Summary Account Manager - J. Sass

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GAT006 Revise study plan

The main portions of the study plan have been written and are being compiled into a format suitable for USGS review.

3GAT011 Collect field measurements

The field trip to collect temperature data was delayed as the principal investigator was called away to perform tests related to the California earthquakes at Long Valley.

Plans were made to collect temperature data from drillholes on Yucca Mountain. Schedules were coordinated to remove instrumentation from the drillholes so that temperature data could be collected.

Quality Assurance

Planning and Operations

Variances

3GAT006 and 3GAT006M Revise and submit study plan

Staff working on the study plan were assigned higher priority tasks and were unable to complete compilation of the study plan and submit it for USGS review. Work on the study plan is to be rescheduled so that it is completed as soon as possible. No significant effect on the schedule is anticipated.

WBS 1.2.3.2.6 Surface Characteristics

OBJECTIVE

To collect information on surface characteristics to determine location and design of repository surface facilities. (SCP Section 8.3.1.14)

WBS 1.2.3.2.6.2 Soil and Rock Properties of Potential Locations of Surface Facilities

OBJECTIVE

To characterize the soil and rock at and near the surface to provide design issues with the necessary geotechnical information to help locate the surface facilities, conduct foundation design analyses, evaluate soil-structure interactions, and evaluate potentially unstable slopes; and provide design issues with hydraulic-related soil information for evaluating erosion potential and infiltration-runoff characteristics. (SCP Investigation 8.3.1.14.2)

WBS 1.2.3.2.6.2.2 Surface Facilities Laboratory Tests and Material Property Measurements

Principal Investigator - M. McKeown

OBJECTIVE

To conduct laboratory tests and material property measurements on representative samples of soil and rock. (SCP Study 8.3.1.14.2.2)

SCP 8.3.1.14.2.2 Laboratory test and material property measurements 0G3262A2

Summary Account Manager - M. McKeown

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GSR005 Field exploration-mapping, drilling, excavation

Geophysical logging of the hole, tentatively set for August, has been moved to September 1992. The work to clear a pavement adjacent to NRG-1 is scheduled for August 26, 1992. NRG-1 drill core has been held in Denver but has not been analyzed.

3GSR006 Materials testing

Testing is on hold. The USGS QA manager has determined that USBR work must be done to the USGS QA program. Revision of procedures is underway.

3GSR007 Design data submittal of north ramp

Logs and test results for seven representative test pits were completed and have been submitted to RSN.

Technical Activities (CONTINUED)

3GSR009 Final report on physical properties lab north ramp

3GSR011 Final report mechanical properties lab north ramp

3GSR013 Final report physical properties field North ramp

3GSR015 Final report mechanical properties field North ramp

These reports essentially are on hold until compliance to the YMP-USGS QA program is accomplished. This will require some adjustment of USBR procedures.

3GSR017 Final report geophysical north ramp

Technical procedures for density and caliper logs, and for check shots, were completed through the draft of June 24, 1992, but lack of funds stopped work on the procedures. Technical review and approval are required at this point prior to issuance. Estimated completion date is September 8, 1992. Logging is scheduled for late September.

Quality Assurance

It was determined, as a result of audit USGS-92-05 and other meetings attended by USBR participants, that resolution of YMP-USGS CAR 92-07 requires USBR to work directly to the YMP-USGS QA Program. Quality-affecting field work requires YMP-USGS authorization to proceed. YMP-USGS procedures for reports must be used. Requirements for data submittal remain unchanged.

Planning and Operations

3GSR005 Field exploration-mapping, drilling excavation

The job package for the second phase of geotechnical investigations is being prepared by the Project. The package contains test pits along road alignments, aggregate source sampling, and percolation testing for leach field design. This work is scheduled to start September 8, 1992.

Variances

The failure to complete the TPP in a reasonable length of time required revising the start date of field exploration from November 1991 to March 1992. The consequent slippage of dependent activities resulted in a reduction in time to perform the work by at least 50 percent. This has resulted in a reduction of submitted data by at least 50 percent and a continuing effort to provide data for use in Title II design.

3GSR005 Field exploration-mapping, drilling, excavation

The failure to complete drill hole NRG-1 on schedule has resulted in no rock testing data submitted for Title II design. It will take at least a month to perform the required testing after receipt of core. Core was received in Denver on July 20, 1992. No testing has been reported by the PI. Laboratory testing is on hold pending compliance to YMP-USGS QA procedures.

3GSR009 Final report on physical properties lab north ramp

3GSR011 Final report mechanical properties lab north ramp

These reports essentially are on hold until the YMP-USGS QA program is in full use by the USBR. This will require some adjustment of USBR procedures.

3GSR013 Final report physical properties field North ramp

3GSR015 Final report mechanical properties field North ramp

Draft reports were submitted on June 5, 1992. Some delay is expected in accomplishing compliance to the YMP-USGS QA program. The estimated completion date is September 8, 1992.

Variances (CONTINUED)

3GSR017 Final report geophysical north ramp

A draft of the report was submitted on June 24, 1992. Some delay is expected in accomplishing compliance to the YMP-USGS QA program. Technical review and approval are required at this point prior to issuance. The estimated completion date is now September 8, 1992. No significant milestone impact is anticipated.

Work Performed but not in Direct Support of the Scheduled Tasks

Cross sections drawn along alignments for the ESF ramps and drifts were prepared in unscheduled work for Raytheon in June. Although "yet-to-be-qualified data", they were submitted in July. These preliminary sections had received no USGS review. When reviewed according to standard USGS technical review procedures, the sections were found to be, for the most part, approximately equivalent in line work, but structural detail and projections were found to have internal inconsistencies and to be unusable for incorporation into the 3-D geologic model. Partial resolution of problems in the sections was accomplished in a meeting with USBR representatives. USBR agreements with USGS representatives will result in revision of the draft sections by USBR personnel and further review of the sections by USGS staff under USGS procedures.

Responses to State of Nevada comments on the soil and rock study plan were completed.

WBS 1.2.3.2.8 Preclosure Tectonics

OBJECTIVE

To develop an understanding of and to characterize the tectonic events and processes that could impact proposed repository structures, systems, or components considered to be important to safety through the operational phase and that could affect the design and operation of certain structures, systems, and components required for exercising the retrieval option. (SCP Section 8.3.1.17)

WBS 1.2.3.2.8.4 Preclosure Tectonics Data Collection and Analysis

OBJECTIVE

To provide data and analyses required by other investigations including the assessments of fault displacement and vibratory ground motion that could affect repository design or performance. (SCP Investigation 8.3.1.17.4)

WBS 1.2.3.2.8.4.1 Historical and Current Seismicity

Principal Investigator - K. Shedlock

OBJECTIVE

To compile information on reported and instrumentally recorded earthquakes that characterize the earthquake potential near Yucca Mountain and to attempt to purge explosion and triggered earthquakes related to weapons testing from existing catalogs of instrumentally determined earthquakes. (SCP Study 8.3.1.17.4.1)

SCP 8.3.1.17.4.1.2 Monitor current seismicity 0G3284HB

Summary Account Manager - K. Shedlock

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GSM157A Continue test lab/field data

Routine testing for maintenance of the existing seismic network occurs periodically.

3GSM160A Monitor 1992 seismicity

This is an ongoing and continuous activity to monitor and record all seismic activity in the southern Great Basin. The existing SGBSN continued to record aftershocks of the Little Skull Mountain earthquake. Seismicity rates were elevated throughout the network with most 'excess' seismicity occurring in the vicinity of Little Skull Mountain although a number of events with $ML > 2$ occurred elsewhere (along and to the west of the Death Valley/Furnace Creek fault systems, a $ML = 4.2$ occurred in the Pahranaagat Shear zone). Due to these high data rates, by the end of August, SGBSN staff were able to keep up with the routine processing of incoming data, but were unable to process any backlogged tapes.

3GSM150A Install SGBSN nodes (1)

Installation of a station processor at the new telemetry node completes this activity.

3GSM164A Reduce data - Little Skull Mountain earthquake

USGS-BGRA personnel continue to process aftershock data from the Little Skull Mountain earthquake.

3GSM155A Test reception SGBSN data

BGRA constantly monitors seismicity in the SGBSN. Reception from each node station is checked periodically and as new stations are added to the network.

Quality Assurance

Planning and Operations

3GSM160A Monitor 1992 seismicity

K. Smith from the UNR visited the BGRA on August 4-5, 1992 to discuss Little Skull Mountain earthquake studies. A YMP-USGS audit of the SGBSN was conducted during the week of August 17-21, 1992. The audit team found no problems.

Variances

Work Performed but not in Direct Support of the Scheduled Tasks

A considerable amount of effort has been spent in the transfer of controlled property from BGRA to the Yucca Mountain project.

WBS 1.2.3.2.8.4.2 Location and Recency of Faulting Near Prospective Surface Facilities

Principal Investigator - J. Whitney

OBJECTIVE

To identify appropriate trench locations to investigate the possible occurrence of late Quaternary surface faulting in the vicinity of planned critical surface facilities; and using surface and trench mapping, locate sites without evidence of significant late Quaternary faulting. (SCP Study 8.3.1.17.4.2)

SCP 8.3.1.17.4.2.1 Identify appropriate trench locations in Midway Valley 0G3284IB

Summary Account Manager - F. Swan

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GPF002 Surficial mapping in Midway valley

Information from soil pits was used to correlate alluvial fan deposits in Midway Valley. Soil descriptions also were used to verify age designations for the surficial map units. Work on the report for the map is anticipated to begin in FY93.

3GPF001 Excavate and log soil pits

All soil pits have been excavated and most have been logged. Three more soil pits were logged and soil units described this month.

Quality Assurance

Planning and Operations

Variances

3GPF001 Excavate and log soil pits

This activity has taken longer than planned due to delays in obtaining necessary environmental clearances, and once excavated, delays were incurred obtaining necessary safety clearances. Because of these delays, excavations did not begin until March and were not completed until June. Project staff also were involved in preparations for a NWTRB meeting on other Midway Valley trenches.

SCP 8.3.1.17.4.2.2 Conduct exploratory trenching in Midway Valley 0G3284JB

Summary Account Manager - F. Swan

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GFP005 Write criteria letters and assemble job packages

No work was performed to this activity this month; however, this is an ongoing activity. As planned activities call for logistical support, job packages are modified to provide detailed instructions for work such as backhoe excavations, cleaning or deepening trenches, backfilling, and any other technical support.

3GFP007 Excavate and log trench through proposed ESF

Soil horizons and other features were marked with flags for identification and level lines were strung over the entire length of the trench. Approximately 200 meters were logged this month. Logging is expected to be complete by the end of the fiscal year; however, description of soil units will not be complete until sometime in October.

3GFP009 Clean and log trench 17

Soil horizons and fault structures were marked with flags for identification and level lines were strung over the entire length of the trench. Approximately 50% of the trench was logged.

3GFP010 Excavate and log trench A-3 on Paintbrush fault

Excavation of this trench will be performed at the same time and under the same job package as other trenches planned for FY93. Therefore, this activity has been rescheduled to begin in October 1993.

Quality Assurance

Planning and Operations

Variances

WBS 1.2.3.2.8.4.3 Quaternary Faulting within 100 km of Yucca Mountain

Principal Investigator - J. Whitney

OBJECTIVE

To identify Quaternary faults within 100 km of Yucca Mountain and to characterize those faults capable of future earthquakes with magnitude such that associated ground shaking could impact design or affect performance of the waste facility. (SCP Study 8.3.1.17.4.3)

SCP 8.3.1.17.4.3.2 Evaluate Quaternary faults within 100 km of Yucca Mountain 0G3284K2

Summary Account Manager - L. Anderson

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GTQ006B Complete study plan

Received copy of review comments from D. Keefer (USGS) on August 4, 1992. Reviewed and provided proposed resolution to those comments that applied to activities 8.3.1.17.4.3.2, 8.3.1.17.4.3.3, and 8.3.1.17.4.3.4.

3GTQ008B Review and synthesize existing work

Work on this activity is continuing. Data sheets have been completed for 30 faults within the study area. References within the bibliographic database for Quaternary faulting within 100 km of Yucca Mountain now total over 916.

3GTQ001B Draft technical procedure - aerial photo interpretation

Revision of the draft technical procedure is on hold due to the reorganization of the USBR-USGS QA program.

3GTQ009B Conduct field reconnaissance - Quaternary faults within 100 km

With the field review of work conducted during the last year by C. Fridrich (USGS), the field reconnaissance of Quaternary faults within 100 km of Yucca Mountain has been completed.

3GTQ002B Compile map - Quaternary faults within 100 km

Work continues on compilation of map data.

3GTQ013B Study Pahrump - Stateline fault system

This activity is presently scheduled for FY93 (3GTQ014B).

3GTQ030 Identify trench locations (Beatty Scarp)

This activity requires detailed field work which also requires approval of study plan and work authorization. Assuming approval of study plan by October 1, 1992, present plan calls for study of the Beatty scarp beginning October 1, 1992 with decision concerning trenches, Beatty scarp (3GTQ030M) made by January 31, 1993.

Quality Assurance

Planning and Operations

Variances

3GTQA04M Submit study plan to NRC

As stated in the May report, the lateness in submittal of the study plan will not impact the completion of milestone activity 3GTQ006M, (Report: Preliminary assessment of Quaternary faulting) by the scheduled completion date of September 30, 1992.

Work Performed but not in Direct Support of the Scheduled Tasks

An estimated 24 hours were spent in support of this task:

L. Anderson prepared input (planning, guidebook, and trip review) into proposed DOE/OCRWM field trip to examine historical earthquakes of the northern Basin and Range.

WBS 1.2.3.2.8.4.4 Quaternary Faulting within Northeast-Trending Fault Zones

Principal Investigator - J. Whitney

OBJECTIVE

To evaluate the potential for ground motion resulting from future movement on Quaternary left-lateral strike-slip faults located east and south of the site area. (SCP Study 8.3.1.17.4.4)

SCP 8.3.1.17.4.4.1 Evaluate the Rock Valley fault system 0G3284O2

Summary Account Manager - D. O'Leary

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GTN007 Compile/analyze map and satellite imagery

Continued analysis of 1:40,000 scale airphotos and 1:250,000 scale SLAR images of Rock Valley - Cane Springs - Mine Mountain fault zones. Progress on this activity has been slower than expected.

3GTN008 Conduct field work - three fault zones

Field work was undertaken for reconnaissance of the three fault zones, with emphasis placed on location of major northeast trending fault traces in alluvium and evidence for strike slip style of deformation. Also, appraisal of fault styles in blocks separated by the northeast striking faults was performed.

3GTN009 Write interim report - field examination of fault zones

Began interim report by compiling published data on structure, topical fault studies, and analysis of maps and imagery.

Quality Assurance

Planning and Operations

3GTN012 Study plan comment resolution

Progress in this activity includes discussions with DOE concerning scheduling of review and anticipated review comments. At present, the study plan is still undergoing DOE review. According to DOE schedules the study plan may not be returned to USGS for comment resolution until late September.

Variances

WBS 1.2.3.2.8.4.5 Detachment Faults

Principal Investigator - J. Whitney

OBJECTIVE

To provide information pertaining to the distribution, displacement rate, and age of detachment faults proximal to Yucca Mountain; and determine whether they represent a significant earthquake source or conceal a significant earthquake source at depth. (SCP Study 8.3.1.17.4.5)

SCP 8.3.1.17.4.5.1 Evaluate the significance of the Miocene-Paleozoic contact in the Calico Hills area to detachment faulting within the site area 0G3284S2

Summary Account Manager - W. Hamilton

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GTD002B Conduct field work FY-92 detachment faults

Progress on this activity has been delayed because the study plan has not received NRC approval and data can not be collected until work authorization is granted.

3GTD007B Complete geologic map of the Calico Hills

Map compilation and air photo interpretation of field work conducted in June, was completed. The preliminary map was completed. Further review of the map will take place under 3GTD008B. The map will be reviewed and published as part of the report (3GTD008M). Progress on this activity was slowed due to staff commitments in other activities.

3GTD008B Write report and map

Work on a rough draft of the report entitled: "Geology and hydrothermal alteration of the Calico Hills" was begun. Compilation of data for figures and tables was completed and a preliminary review of the map produced under 3GTD007B for incorporation into the report was begun.

Quality Assurance

Planning and Operations

Variations

SCP 8.3.1.17.4.5.2 Evaluate postulated detachment faults in the Beatty-Bare Mountain area 0G3284T2

Summary Account Manager - W. Hamilton

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GTD010B Evaluate published and unpublished mapping

Library research and consultations with workers who have performed mapping in the Beatty - Bare Mountain area is now complete. This is an ongoing activity and further evaluation will commence again in FY93.

Quality Assurance

Planning and Operations

3GTD011B Thermobarometry study of lower plate rocks

Preparation of a SNP was started, so that investigators can begin to collect data as soon as the study plan receives NRC approval and work authorization is granted. The SNP is anticipated to be approved by the end of FY92. Data collection is anticipated to begin in FY93.

Variances

WBS 1.2.3.2.8.4.6 Quaternary Faulting within the Site Area

Principal Investigator - J. Whitney

OBJECTIVE

To evaluate the age and recurrence interval of Quaternary faulting and to analyze the probability of future faulting; to determine which faults moved during the Quaternary; and to assess fault probability on the basis of rates of faulting during the Quaternary. (SCP Study 8.3.1.17.4.6)

SCP 8.3.1.17.4.6.1 Evaluate Quaternary geology and potential Quaternary faults at Yucca Mountain

OG3284C2

Summary Account Manager - J. Whitney

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GPF08A Complete field mapping strip map of YM fault zones

Field mapping by J. Whitney was compiled at 1:12,000 scale. Fault locations and observed attributes were plotted on overlays for the 1:12,000 scale orthophotographs. K. Fox began compiling his field mapping on Yucca Mountain air photos; this data will be plotted at 1:12,000 scale on the orthophotograph overlays. The remaining fieldwork will be conducted in October.

Quality Assurance

Planning and Operations

Variances

Work Performed but not in Direct Support of the Scheduled Tasks

An estimated 32 hours were spent on support of the following task:
Work on monthly reports.

SCP 8.3.1.17.4.6.2 Evaluate age and recurrence of movement on suspected and known Quaternary faults

OG3284D2

Summary Account Manager - C. Menges

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GPF17A Relog TR-8 Solitario Canyon fault

Existing trench TR-8 was deepened and the walls were cleaned of debris and auxiliary trench T8a was excavated. Pending safety inspector's approval, both trenches are ready for logging. Logging activity is expected to commence in September.

3GPF09A Study Paintbrush Canyon fault at Busted Butte

Construction and cleaning activities on exposures was completed. Preliminary inspection and identification of soil units and fault structures began.

3GPF15A Hire staff - shallow seismic reflection study

Preliminary consultations and negotiations for use of TEM equipment for electromagnetic surveys continue intermittently during the month.

Quality Assurance

Planning and Operations

Variances

3GPF17A Relog TR-8 \Solitario Canyon fault

Work on TR-8 was delayed until this month by unscheduled delays in securing prerequisite environmental and safety approvals. Trenching activities have commenced and logging is soon to follow. The anticipated completion date is October 1, 1992.

3GPF11A Complete report - Trench logs Windy Wash

No progress is anticipated until FY93. This activity is not critical. Recommendations are under consideration to reassign this activity to another investigator.

3GPF15A Hire staff - shallow seismic reflection study

Planning and scheduling work on this activity has been slowed because an investigation is underway concerning substitution of a more cost effective and technically feasible geophysical method (electro-magnetic surveys).

3GPF17M Report: Trench 8 solitario canyon fault

Because logging activities in trench began late, the report on the results of those findings will not be prepared until September 30, 1992.

Work Performed but not in Direct Support of the Scheduled Tasks

An estimated 64 hours were spent on support of the following tasks:

Continued trench log mapping of trench 14c and 14d on Bow Ridge fault near Exile Hill, which is included in Midway Valley activity 8.3.1.17.4.2

Excavation work was performed on several trenches that will be included on the FY93 C schedule, including CF1 (Fatigue Wash trench), SCF-T1 (new trench on Solitario Canyon fault), SCR-T1, SCR-T2 and SCR-T3 (three new trenches on the Stagecoach Road fault)

WBS 1.2.3.2.8.4.12 Tectonic Models and Synthesis

Principal Investigator - J. Whitney

OBJECTIVE

To synthesize data relevant to tectonics; and to develop a model or range of models that establishes the causal relationship between application of tectonic forces and formation of structures observed at Yucca Mountain and vicinity; link observed rates of formation of those structures with regional rates of crustal strain; forecast changes in tectonic setting and the manner in which those changes will affect both the regional crustal strain rate and tectonic stability in the Yucca Mountain region; and estimate the effect of those changes on rate and nature of crustal strain at Yucca Mountain and vicinity and the future rate of tectonic processes at Yucca Mountain. (SCP Study 8.3.1.17.4.12)

SCP 8.3.1.17.4.12.1 Evaluate tectonic processes and tectonic stability at the site 0G3284A2
Summary Account Manager - W. Hamilton

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GTE06JA Order thematic map 1:100,000 scale

Discussions with the administrative staff at JPL were conducted this month to clear up questions about the contract. The map has been ordered and cleared through JPL administration and is being prepared by their technical staff.

3GTE07JA Integration of tectonic data

W. Hamilton continued study and integration of information obtained during the June earthquakes in California. This is an ongoing activity and data is obtained and integrated as it becomes available.

Quality Assurance

Planning and Operations

3GTE001K Draft study plan and USGS review

The rough draft of the study plan underwent review and is in need of major revision. In light of the importance of this study and the need for integration of more recent tectonic data and geophysical techniques, portions of the study plan will have to be extensively rewritten.

Variiances

3GTE001K Draft study plan and USGS review

The study plan has turned out to be a much more important document than originally envisioned. Work to revise the study plan will be given a higher priority and should be ready for USGS review by early FY93. The study plan is expected to be submitted to DOE for review by March 1993.

3GTE07JA Order thematic map 1:100,000 scale

The map currently is in preparation at JPL. Contract rewriting on the part of NASA caused a delay in submittal to JPL and further clarification of contract details with JPL staff caused a delay in the production of the map. Delivery of the map is anticipated during early FY93. No significant impact to the schedule is expected.

WBS 1.2.3.3 Hydrology
Principal Investigator - D. Appel

OBJECTIVE

To conduct hydrologic investigations to evaluate the suitability of the surface and subsurface environment for siting a nuclear waste repository.

WBS 1.2.3.3.1 Geohydrology

OBJECTIVE

To provide information about geohydrologic characteristics, processes, and conditions, both favorable and potentially adverse, to support resolution of the performance and design issues through the development of a credible geohydrologic model of Yucca Mountain and vicinity. (SCP Section 8.3.1.2)

WBS 1.2.3.3.1.1 Description of the Regional Hydrologic System

OBJECTIVE

To develop a conceptual model of the regional hydrologic system to assist in assessing the site's suitability to contain and isolate waste. (SCP Investigation 8.3.1.2.1)

WBS 1.2.3.3.1.1.1 Precipitation and Meteorological Monitoring for Regional Hydrology

Principal Investigator - A. Flint

OBJECTIVE

To characterize the area surrounding Yucca Mountain in terms of precipitation and other meteorological data and their relationship to surface runoff and infiltration; and to provide input into rainfall-runoff model development for the Fortymile Wash drainage basin. (SCP Study 8.3.1.2.1.1)

SCP 8.3.1.2.1.1.1 Precipitation and meteorological monitoring 0G3311E2

Summary Account Manager - A. Flint

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GMM02A Monitor stations and tipping-bucket gauges FY92

Routine visits were made to each weather station and tipping-bucket gauge site. Maintenance was performed as required.

3GMM05A Acquire regional meteorological data-FY92

Daily precipitation, temperature, and evaporation data were collected for Nevada and California for March 1992. Staff is working with the Western Region Climate Center to obtain digital historical records for numerous sites in southern Nevada and southern California. Such data are essential in studying precipitation at Yucca Mountain within the context of the surrounding region.

3GMM07A Monitor collection gauge network-FY92

Precipitation data were collected from two storm events during August. The first, on August 2, was localized predominately over the northern half of Yucca Mountain. Pagany Wash received up to 11 mm. The second storm event, occurred on the 11th and affected the southern three quarters of the mountain. Solitario Canyon received the most rainfall at 19 mm.

Technical Activities (CONTINUED)

3GMM10A Analysis of station data-FY91

Work continued to reformat these data into spreadsheet format for further study.

3GMM15A Prepare criteria letter

Work continued to locate the potential sites for the expanded tipping-bucket rain gauge network. Not all sites have been selected. A criteria letter will not be necessary because of the plan to install the network without REECo assistance. This activity is considered closed as of August 31, 1992. Environmental and cultural surveys for the individual sites will be requested.

3GMM17A Prepare work order

Installation of the tipping-bucket gauges in the expanded network can be done without REECo support. This item is considered closed out effective August 31, 1992.

3GMM20A Deploy 8-inch collection rain gauge network.

The actual deployment of this network began on July 1, 1992. So far, 10 gauges have been installed. There are plans to install 5 to 6 more, leaving 1 or 2 in reserve.

3GMM23A Collect NTS lightning data-FY92

A great deal of lightning data were collected from regional and localized thunderstorms in August. The storm of August 11 produced lightning on and west of Yucca Mountain. Lightning strikes were helpful in determining the origin, path, and life of this storm.

3GMM034 Analysis of regional data-FY91

This analysis will be on going in several forms. Regional lightning data will be correlated with precipitation patterns and precipitation data from regional sources will be studied geostatistically to determine spatial variability. Geostatistics also will be applied to historical regional data.

3GMM070 Collect GOES data-FY92

Collection and archival of weather satellite imagery continued. Installation of a new satellite data ingest system (from MARTA Systems, Inc) was completed. This enables a variety of imagery types to be collected more frequently; it allows the looping or animation of the data over time, as well as provides the capability to zoom and pan the data. Higher resolution data now are available for analyzing storm development and movement near Yucca Mountain.

3GMM080 Analysis of Yucca Mountain precipitation data-FY91

Work continued to reformat raw tipping-bucket precipitation data into a useable spreadsheet format. Plans to do more geostatistical analyses of the data to determine spatial variability are in the works. No further progress was made in correlating these data with lightning data.

3GMM100 Monitor daily weather patterns-FY92

Daily weather patterns on the synoptic scale, affecting the western U.S., were documented. The southwest monsoon finally appeared in southern Nevada during August and ended before the end of the month. Most monsoon storm activity remained southeast and east of Yucca Mountain in Arizona and Utah for most of the summer. The monsoon months of July and August were both drier than normal in the southern Nevada region.

Quality Assurance

3GMM067 Implementation of all QA requirements
All QA requirements were completed.

Planning and Operations

3GMM18MA Work order approval

It was determined that REECo support is not needed to install our expanded network of tipping-bucket rain gauges. (Reference 3GMM17A)

RPO1M Approval of study plan (NRC)

The Study Plan 8.3.1.2.1.1 was approved by the NRC effective October 21, 1991.

Variances

3GMM034 Analysis of regional data-FY91

This task will continue into FY93; plans are to work with the Western Region Climate Center in an effort to prevent duplication. The WRCC has software in place to do some basic statistical analyses, so regional analyses of data from previous and subsequent years will be simplified greatly.

3GMM080 Analysis of Yucca Mountain precipitation data-FY91

Data from the tipping-bucket rain gauge network are being reformatted into a spread sheet format. This effort will continue into FY93.

3GMM10A Analysis of station data-FY91

These data as well, are still being reformatted into spread sheet format. This effort will continue into FY93.

Work Performed but not in Direct Support of the Scheduled Tasks

Supported tours at the HRF. (12 hours)

Logged neutron boreholes and monitored drilling activities on-site. (15 hours)

WBS 1.2.3.3.1.1.2 Runoff and Streamflow

Principal Investigator - D. Beck

OBJECTIVE

To collect basic data on surface-water runoff at, and peripheral to, Yucca Mountain and its hydrologic flow system; to use the streamflow data to describe the runoff characteristics of the area and assess the response of runoff to precipitation; to assess the potential for flood hazards and related fluvial-debris hazards to the Yucca Mountain Project; and to provide basic data and interpretations of surface-water runoff to investigations that evaluate the amounts and processes of infiltration and ground-water recharge at Yucca Mountain and surrounding areas. (SCP Study 8.3.1.2.1.2)

SCP 8.3.1.2.1.2.1 Surface-water runoff monitoring 0G3311F2

Summary Account Manager - T. Kane

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GRS002A Collect FY92 Runoff and Streamflow Data

Precipitation for the month of August was confined to the following sites at Area 25. North Fork Coyote Wash 0.14 inches, Fortymile Wash at Narrows 0.30 inches, Fortymile Wash near J-13 0.33 inches, Dune Wash near Busted Butte 0.14 inches, Drill Hole Wash 0.29 inches, and Exile Hill 0.02 inches. Rainfall data for Areas 18 and 12 is not available due to restrictions. Off the Test Site, in the Amargosa Valley very little precipitation occurred. The average was 0.02 inches.

T. Kane spoke with G. Ryder (DOE) regarding permits on Eagle Mountain; restrictions are still in place.

T. Kane and P. Cooley attended a field trip to the Amargosa River at Beatty. Bulldozing work was done on the Amargosa River, near Hwy 95 below Beatty. Levels were run on the Amargosa River near Beatty, at Cane Springs and at Yucca Wash establishing datum for new crest stage gages.

P. Cooley worked on TDIFs for the 83-85 Report and environmental monitoring program, and completed the final preparation for transferring the 83-85 Report to the LRC.

3GRS022A Complete FY 83-85 data and prepare report

Report in Carson City for final typing and review by District Chief.

Quality Assurance

3GRS027A Complete technical procedures for streamflow data collection

This activity was completed.

Planning and Operations

3GRS016A Complete installation of two Amargosa gages

A gage house was installed on Pagany Wash. Instrumentation will follow.

Variances

3GRS002A Collect FY92 runoff and streamflow data.

Impact - All activities are impacted by the loss of principal technician (D. BAUER) to illness. T. Kane is presently assuming additional responsibilities. Estimated impact- all activities possibly will be delayed. The time frame is unknown.

3GRS022M Reduced FY 83-85 data to PDA

The TDIF was sent to K. Larson. The activity is complete.

Work Performed but not in Direct Support of the Scheduled Tasks

An estimated 20 hours were spent by T. Kane working on PACS.

T. Kane and P. Cooley prepared for and were involved in the DOE audit. (60 hours)

T. Kane completed QMP, HP reading assignments and a written response to M. Pabst was submitted in regard to future prototype activities. (16 hours)

SCP 8.3.1.2.1.2.2 Transport of debris by severe runoff 0G3311G2

Summary Account Manager - D. Grasso

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

Aerial reconnaissance of severe runoff features

P. Glancy collaborated with J. Coe and J. Whitney in preparing an interpretive report on debris flow at Jakes Ridge. Jakes Ridge, located near Yucca Mountain along Fortymile Wash, north of Yucca Wash, was the site of an extensive debris flow in 1984.

D. Grasso georeferenced a 1954 (pre-flow) aerial photograph of the Potosi Mountain to map pre-existing landforms in the area of extensive debris flows that occurred in 1990. Higher resolution aerial photographs (NAPP program) were also ordered. These 1990 photographs (a stereo pair) will furnish better resolution for mapping small landforms and allow for construction of a digital elevation model (DEM). DEM data will then be used to establish landscape parameters, such as relief and slope, that may have caused the debris flows in the area.

D. Grasso conducted field reconnaissance of Potosi Mountain debris flow and Kyle Canyon alluvial fan. Photogrammetric measurements of landforms underlying the debris flows at Potosi Mountain were field checked. The reconnaissance at Kyle Canyon included a survey of the different age fan surfaces, as originally mapped by J. Sowers.

D. Grasso tried to locate NAPP aerial photographs of the middle Amargosa River area where recent debris flows may have occurred. These flows possibly are related to heavy rainfall in the area on August 18-19, 1983. Preliminary reconnaissance shows that the flows may have extended down-fan into the Amargosa River. The 1983 storm caused severe runoff (10,600 cfs) on the Amargosa River, and destroyed the bridge and gaging station at Tecopa, California. More work is needed to substantiate the level of severity of this storm.

D. Grasso and C. Martinez, USGS-WRD, Las Vegas, continued preparation of a 1968-1992 climatic database of southern Nevada and southeastern California, an area that entirely encompasses the Amargosa River drainage basin. These data will allow analyses of recent severe weather trends in the area, and provide for correlations of precipitation and severe runoff events. Wet weather trends can be compared to region-wide climatic events and lake level fluctuations at Badwater in Death Valley, California; the latter is a lake system that is believed to be directly related to runoff from the Amargosa River and its major tributaries, such as Fortymile Wash.

Quality Assurance

Planning and Operations

Variations

Work Performed but not in Direct Support of the Scheduled Tasks

An estimated 35 hours were spent on the following:

D. Grasso prepared a draft document outlining current flood analysis work on the Amargosa River drainage basin. These activities involve correlations of modern (historic) floods and paleofloods. Much of the work will require evaluations of modern-day flood events to develop accurate parameters for analysis and modeling of the magnitudes and frequencies of paleofloods.

Work Performed but not in Direct Support of the Scheduled Tasks (CONTINUED)

D. Grasso and P. Glancy, accompanied by C. Waythomas (USGS Sediment Research Group in Denver) met with S. Lundstrom of YMP, GSP, at Yucca Mountain for a review of field techniques and concepts used in mapping Quaternary-age surface sediments. Discussions included interpretive hypotheses for recent debris deposition. Debris from historic floods currently is superimposed on older Quaternary-age deposits along the channel boundary of Fortymile Wash. These deposits are particularly valuable in that they enable evaluation of the conditions of the probable maximum flood, and provide a means for identifying areas where fluvial sediments may yield further data on the magnitudes and frequencies of future flood events.

D. Grasso began preparation of a remote sensing method for region-wide mapping of recent severe flooding. The technique uses Landsat multi-spectral satellite data, digital elevation and slope models, and supervised spectral classification procedures. The method will improve regional analysis of those areas that may be subject to recurrent debris flows due to severe runoff.

WBS 1.2.3.3.1.1.3 Regional Ground-Water Flow System

Principal Investigator - J. Czarnecki

OBJECTIVE

To define the potentiometric distribution hydraulic properties, and recharge and discharge for the regional ground-water flow system to determine the magnitude and direction of ground-water flow. (SCP Study 8.3.1.2.1.3)

SCP 8.3.1.2.1.3.2 Regional potentiometric level distribution and hydrogeologic framework studies

0G3311B2

Summary Account Manager - J. Czarnecki

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GRG052 Process existing log data Amargosa Desert

S. Keller provided a set of geophysical and lithologic logs to T. Brady for review of content and format. All initial processing of logs is complete.

3GRG053 Locate additional piezometers in the Amargosa

M. Ciesnik and J. Czarnecki updated water-level records for wells throughout the Amargosa Desert for submission to the LRC.

Discussions were held between J. Czarnecki and D. Lacamera regarding the environmental monitoring program for monitoring water levels and obtaining hydrochemical samples.

3GRG054 Prepare report on existing regional water level data

M. Ciesnik continued responses to technical-review comments on a draft open-file report entitled "Ground-water data from wells in Nye and Inyo Counties, Nevada-California."

3GRG007 Prototype equipment testing for small diameter wells

Repairs were initiated on a 3500 lb. capacity electric winch that failed in field trials of a modular tripod during removal of 410' of 1" steel tubing and sucker rod. An 8,000 lb. winch was purchased and shipped for the next test.

Technical Activities (CONTINUED)

3GRG010 Analyze regional water levels

See 3GRG053.

3GRG009 Analyze hydrostratigraphy and structure

Compilation of computer files for geologic cross sections in the Amargosa Desert is in progress, using the graphics files of the combined geophysical/lithologic logs and borehole locations provided by the mining company. These will serve as a basis for attempting correlations of the basin-filling units.

Quality Assurance

3GRG052 Process existing log data Amargosa Desert

A package of sample collection reports for 300 rock cutting samples from oil-test holes in the Amargosa Desert, NV were prepared by M. Ciesnik and S. Keller. Ciesnik also discussed with L. Linden (SMF) the applicability of AP-6.26Q to the Project's borehole samples, and recommended that an ICN be issued to accommodate borehole-cutting samples.

Planning and Operations

3GRG053 Locate additional piezometers in the Amargosa

J. Czarnecki continued discussion of possible participation in renewed drilling of oil-test holes in the Amargosa Desert with an operator who has requested permits to access sites relinquished by another oil company. Preliminary arrangements were made to participate in collection of cuttings and borehole geophysical data. Discussions also were held with R. Laczniak (USGS LV) regarding the possibility of DOE/ERP converting the oil-test holes to monitoring wells completed at multiple intervals. It was recommended that all three drillholes be completed at one time to minimize the cost of rig mobilization. Further discussions were held with D. Lacamera (USGS LV) regarding the environmental monitoring program's interest in converting the first of the three scheduled oil-test holes. Lacamera was advised not to pursue a "bare-bones" conversion of the oil-test holes (i.e. one completion zone in the Paleozoic rocks and one in the Tertiary/Quaternary sediments). Lacamera also was advised that there would be no reliable estimates on water-levels in the Paleozoic rocks until the drilling fluids could be flushed out of each hole. This would be accomplished utilizing a single pipe string with multiple packers and sliding sleeves.

Variances

3GRG003A Access permits to measure water-levels in Amargosa Wells

J. Czarnecki and M. Ciesnik prepared tables and maps of well locations. Legal descriptions of the wells (quarter-quarter-quarter sections) were provided so that DOE/LV permit-application personnel could perform biological and archeological surveys of the sites. BLM/Barstow will not proceed with permitting until such surveys are completed.

Work Performed but not in Direct Support of the Scheduled Tasks

An estimated 38 hours were spent on the following:

J. Czarnecki prepared chain of custody forms for water samples from well NA-9 and forwarded them to W. Steinkampf (USGS).

J. Czarnecki discussed the need to monitor well USW G-2 with P. Tucci (USGS) because only 4 measurements are reported for that well, all made prior to 1983. Water levels may have dropped about 8 meters based on results from L. Thompson's geophysical logging.

Work Performed but not in Direct Support of the Scheduled Tasks (CONTINUED)

J. Czarnecki performed a technical review of USGS QMP-5.01, R5, and prepared requisitions for various equipment and services.

Final amended responses to AFRs 92-03 and 92-04 were prepared by M. Ciesnik for the QA office.

M. Ciesnik completed a reading assignment of USGS HP-23, R3.

SCP 8.3.1.2.1.3.3 Fortymile Wash recharge study 0G3311C2

Summary Account Manager - C. Savard

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GRG003B complete report on channel loss

A report describing work performed in the Middle East combining channel geometry techniques and modeling was drafted. A report on application of the techniques to the Yucca Mountain area is still being drafted.

3GRG028 Collect FY-92 moisture data

Read rain wedges at UE-25 UZN#92 and UE-29 UZN#91; neutron logged UE-25 UZN #92, UE-29 UZN #91 and UE-25 UZN #85; made depth to water measurements in UE-29 UZN #91, UE-29 a#1, and UE-29 a#2. The data collection frequency was increased to document effects from the Rock Valley earthquake.

Prepared neutron logging cables by labeling the cables with depth markers and then protecting the cables with shrink tubing.

3GRG025 Construct ponding/infiltration sites

Conducted field reconnaissance was made of several sites.

3GRG101A Perform prototype infiltration test

Conducted a field test of a water delivery system for rapid delivery of water to the infiltration tank with energy dissipation, so sediments in the bottom of the tank would be minimally disturbed.

Quality Assurance

Planning and Operations

3GRG001B Complete criteria letter ponding sites

Continued to draft criteria letter.

3GRG006B Complete criteria letter FM & FMN holes

Continued to draft criteria letters.

3GRG010B Continue to site FMN & FM holes

Continued to site possible locations for the FMN & FM holes.

Variances

3GRG001B Complete criteria letter ponding sites

Ponding sites are not finally located. The infiltration test procedure has not been finalized and the extent of other DOE contractors' involvement is not decided. Infiltration tests at the ponding sites will not be run until neutron logging holes are completed. Additional time is required to complete the draft criteria letters. No impact on major deliverables is expected.

3GRG006B Complete criteria letter FM & FMN holes

Additional time is needed to complete the draft criteria letters. Hole locations need to be sited and the sampling schedule during drilling defined. No impact on major deliverables is expected.

3GRG010B Continue to site FMN & FM holes

FMN locations need to be finalized. A balance between holes used to monitor natural conditions and infiltration experiments needs to be defined. No impacts on major deliverables is expected.

Work Performed but not in Direct Support of the Scheduled Tasks

An estimated 60 hours were spent on the following:

Represented the SZ during a public, open house tour of the Yucca Mountain Project.

An abstract, detailing hydrologic data collected in Fortymile Wash, documenting localized recharge to the ground-water system, was drafted, was submitted to colleague review. Replies to colleague review were made, and the abstract was submitted to Central Region. The abstract is targeted for submittal to the American Geophysical Union for the 1992 Fall Meeting.

SCP 8.3.1.2.1.3.4 Evapotranspiration studies 0G3311D2

Summary Account Manager - J. Czarnecki

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GRG201A Perform prototype tests on ET measuring technique

J. Czarnecki became familiar with the operation and programming language of the Campbell Scientific CR-10 datalogger. He successfully used EDLOG to enter a CR-10 datalogger program for running equipment needed to estimate the Bowen ratio.

Quality Assurance

Planning and Operations

3GRG030 Select wt/et sites

Several sites in the northern part of Franklin Lake playa have been identified as likely sites for deployment of piezometer nests and Bowen ratio sites. This activity is complete.

Variances

3GRG209A Obtain permits for piezometer construction

Work is delayed until an evaluation of the potential for chloride profiling can be made. This will change the scope of the permit.

Work Performed but not in Direct Support of the Scheduled Tasks

An estimated 4 hours were spent on the following:

J. Czarnecki initiated a request for a permit extension, from the State of California, for accessing a well in section 36 southeast of Death Valley Junction, CA.

Letters and reprints of reports were sent by J. Czarnecki to participants of the 7th International Conference on Water-Rock Interactions.

WBS 1.2.3.3.1.1.4 Regional Hydrologic System Synthesis and Modeling

Principal Investigator - J. Czarnecki

OBJECTIVE

To synthesize hydrologic, geologic, hydrochemical, and geophysical data into a model and make a qualitative analysis of how the system is functioning; and to represent quantitative observations of hydrologic data pertaining to the ground-water flow system in a comprehensive flow model. (SCP Study 8.3.1.2.1.4)

SCP 8.3.1.2.1.4.2 Subregional two-dimensional areal hydrologic modeling 0G3311I2

Summary Account Manager - J. Czarnecki

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GRM017A Hydrology integration task force participation

J. Czarnecki reviewed a recommendation from the HITF for testing in well USW G-2, and provided suggested changes to E. Springer (LANL). Czarnecki also met with W. Nelson (M&O) and discussed possible validation of SZ codes using the analytic element method. The next meeting of HITF is November 5, 1992 in Las Vegas.

3GRM015A Test finite-element mesh generator

J. Czarnecki successfully implemented Grid Builder 2.0 to construct a finite-element mesh of the Yucca Mountain flow system using a digitized boundary of the model domain. Digitized well locations were used with the program to relocate nodes within the mesh to coincide with the exact well locations.

3GRM016A Digitize boundary of subregional flow domain

A digitized outline of the area of a new subregional model was produced and transferred to an IBM-PC for use in constructing a new finite element mesh. Coordinates for the outline were digitized in UTM coordinates.

Quality Assurance

Planning and Operations

Variances

Work Performed but not in Direct Support of the Scheduled Tasks

An estimated 30 hours were spent on the following:

A letter was forwarded through D. Appel by J. Czarnecki, identifying a need for illustrations from PIs of current work in which they are engaged. The illustrations would be used by D. Lorenz for use in the Yucca Mountain Project display, that travels to various professional meetings such as the annual meeting of the Geological Society of America and the American Geophysical Union.

Work Performed but not in Direct Support of the Scheduled Tasks (CONTNUED)

Recharge conditions observed at Fortymile Wash were discussed by J. Czarnecki with T. Rasmussen (U. Georgia) and C. Savard. Rasmussen has simulated conditions similar to those observed at Fortymile Wash (i.e. increases in soil moisture down to a finite depth, but with an observed rise in water levels beneath the zone in which soil-moisture increased). Rasmussen reasons that macrochannels in the porous media lead to isolated preferential recharge pathways to the water table.

An abstract by C. Savard and others entitled "Runoff, Infiltration, and Recharge in Fortymile Wash near Yucca Mountain, Nevada" was revised, retyped, and submitted for further USGS reviews by J. Czarnecki. The abstract is for inclusion at the American Geophysical Union Fall '92 meeting.

Scoping calculations were made by J. Czarnecki regarding the potential precipitation of calcite resulting from elevated saturated zone temperatures following waste emplacement. Temperature data was provided by T. Buscheck (LLNL). Calcite was shown to precipitate at about 90°C, the upper range of the simulated temperatures in the saturated zone caused by waste emplacement. Discussions with L. Kroitoru indicated that precipitation could occur at much lower temperatures. Precipitation could cause reduced permeability in the saturated zone and a rise in the water table.

Discussions, between J. Czarnecki and M. Ahmad (Ohio University), regarding an abstract by one of Ahmad's students (B. Dressler), that appeared in Groundwater (July-Aug. 1992), took place. The abstract discussed simulation results for various perturbed conditions in the saturated zone, among which was the construction of a barrier downgradient from the design repository area in the saturated zone. The latter caused a rise in the water table 20 m above the repository horizon.

A grading report for activity 8.3.1.2.1.4.2 was prepared by M. Ciesnik.

SCP 8.3.1.2.1.4.4 Regional three-dimensional hydrologic modeling 0G3311K2

Summary Account Manager - J. Downey

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

Quality Assurance

Planning and Operations

3GRM040 Interface GIS with ground-water models

F. D'Agnese spoke with K. Zumalt and B. Hake (Intergraph) concerning upgrades to ERMA that will allow efficient interfacing with MODFLOW. J. Downey spoke with Zumalt concerning present code used by Intergraph for their MODFLOW module.

3GRM08A Begin calibration of numerical model

J. Downey continued model test runs using large model code running on an IBM AIX system at CSM.

3GRM13A Develop visualization software

F. D'Agnese, C. Faunt and K. Turner talked with J. Nelson (SAIC) about the geologic studies program's 3-D modeling. Plans are to meet in early September to insure work is not replicated; different methods can then be exchanged.

Variances

Work Performed but not in Direct Support of the Scheduled Tasks

F. D'Agnese, J. Downey, C. Faunt, K. Turner, and E. Gutentag held and attended a meeting with management at the CSM Center for Geoscience Computing. The meeting discussed up-to-date accomplishments and future work plans on 3-D modeling, future climate and past discharge activities. (3 hours)

At L. Hayes' request, K. Turner attended a 1/2 day meeting with J. Gauthier (TRW-Las Vegas) concerning technical database issues; further discussions are expected.

C. Faunt, F. D'Agnese, K. Turner, J. Downey, D. Perfect and J. Nelson (SAIC/Golden) attended the 2-day Geotech '92 conference at the Denver Tech. Center. Topics included several sessions devoted to 2-D and 3-D GIS applications. The group also met with S. Houlding (Lynx Geosystems, Vancouver BC) to discuss upcoming work of both the Yucca Mountain geologic (block scale) model and the Death Valley hydrogeologic (regional scale) model construction.

The paper by H. Claassen and J. Downey, using program SNODIF has been submitted to the manuscript section and is in final typing for submission to the Director's office for approval. (8 hours)

J. Downey started review of a paper (Open-File) by E. Gutentag, et al., Downey also started review of a paper by C. Faunt.

J. Downey started evaluation of the CLRO series of software in support of the software QA program.

C. Faunt helped with a DOE public tour on Saturday August 22. (8 hours)

C. Faunt attended a meeting concerning how NWIS will interact with GIS, especially ARC/INFO. (2 hours)

WBS 1.2.3.3.1.2 Unsaturated Zone Hydrology

OBJECTIVE

To develop a model of the unsaturated zone hydrologic system at Yucca Mountain that will assist in assessing the suitability of the site to contain and isolate waste. (SCP Investigation 8.3.1.2.2)

WBS 1.2.3.3.1.2.1 Unsaturated Zone Infiltration

Principal Investigator - A. Flint

OBJECTIVE

To determine the effective hydraulic conductivity, storage properties, and transport properties pertinent to unsaturated zone infiltration as functions of moisture content or potential; and to determine the present and to estimate the future spatial distribution of infiltration rate over the repository block at Yucca Mountain. (SCP Study 8.3.1.2.2.1)

SCP 8.3.1.2.2.1.1 Characterization of hydrologic properties of surficial materials 0G3312Z2

Summary Account Manager - A. Flint

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GUI005A Install and check geophysical instruments

Geophysical logging was tested in N54 and N55. Gamma-Gamma logging and Neutron logging were performed. Data were collected by the two source methods. It seems that all the electronic and instrumentation equipment in the geophysical logging van is in working condition.

3GUI007A Analyze spatial variability of soil physical properties

Two watersheds, Split Wash and Pagany Wash, were studied in detail. These washes were divided into several soil units based on areal photo of 1:6000 scale. Field spot check of the soil units is in progress. The soil units will be evaluated to find the similarity or differences between them that may affect the hydrologic properties of the surficial materials. A grid system of 50x50 feet has been used. This grid will be changed to encompass the variability of surficial material.

3GUI020A Prepare open file report outcrop samples

The outline for the open file report and the analyses for the seven outcrop transects are still in progress.

Quality Assurance

3GUI023A Graded QA and other QA requirements

Implementation of all QA requirements was performed as needed.

Planning and Operations

3GUI025A Procure SPARC station for GIS program

This activity has been canceled for FY92. A reinitiation will be incorporated in the FY93 Mission 2001 PACS.

Variances

SCP 8.3.1.2.2.1.2 Evaluation of natural infiltration 0G331212

Summary Account Manager - A. Flint

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GUI303 Continue small scale deterministic model FY92

Boundaries defining alluvial washes, channel segments, side-slope, and ridge-top areas within the Pagany Wash and Split Wash sub-drainages were digitized. These four categories will be used to identify grid cells having different infiltration parameters for the initial watershed model. Additional boundaries defining geology and more detailed surficial material characteristics also will be digitized and used for assigning grid cell parameters. The developed DEM model for Split Wash sub-drainage was formatted to allow for 2- and 3-dimensional mapping, using Golden Graphics' SURFER. This will allow for easy visual inspection of the general accuracy of the digitized elevations. Development of software to calculate slope and aspect for grid cells using the DEM is continuing.

Technical Activities (CONTINUED)

3GUI311A Continue analysis of moisture profiles

Comparison of moisture profiles obtained from the neutron logging program continued, with the addition of profiles obtained from the scheduled logging of all boreholes, in August (activity 3GUI381). As expected, a general decrease in the moisture content for all surficial materials (to a depth of approximately 2 meters) was observed. The decrease in moisture content at most locations is due to evapotranspiration; downward vertical flow is assumed to be insignificant relative to evapotranspiration because no significant changes in moisture profiles were observed below the wetting front. At some locations, evapotranspiration increased relative to July, due to an early August thunderstorm that resulted in up to 10 mm precipitation over the northern portion of Yucca Mountain. In general, approximately 10 percent of the water that infiltrated during the very wet winter and early spring of 1992 is represented by the August 1992 profiles; the water content of surficial materials is close to being at the 1991 minimum. A detailed analysis of moisture profiles for boreholes in Pagany Wash continued in an effort to estimate average daily evapotranspiration rates for periods between precipitation events and logging dates.

3GUI315 Prepare technical paper small scale model

Preparation of this manuscript continued, with a compilation of all model results, using the various texture classes defining model parameters, and will continue according to the changes in program objectives outlined in the Mission 2001 PACS.

3GUI340 Procure tritium analysis

Tritium analysis is continuing on samples from N-55.

3GUI358 Collection & analysis evaporation pan data

Additional problems with the automated system required manual measurements while the problem was being corrected. Data has been compiled in order to compare potential ET measurements with estimates from neutron moisture profiles and Bowen ratio calculations in Pagany Wash, but no analysis has been performed.

3GUI369 Initiate collection and analysis ET data

ET calculated from Bowen ratio data is being compared with mass balance calculations of ET from moisture profiles in Pagany Wash using various boreholes for comparison.

3GUI381 Log neutron access boreholes FY92

Monthly logging of neutron access boreholes continued.

3GUI386 Continue drilling new neutron access holes

N-33 and N-34 were completed in Drill Hole Wash. Tracer permits were approved for drilling within the conceptual repository boundary, or near major faults (e.g. Ghost Dance fault), and apply to N-31, N-32 and N-35. Environmental permits and road grading are progressing so that N-31 and N-32, in upper Split Wash, will be drilled the first week in September. These two holes will provide a northern analog, within the repository boundary, to the WT-2 Wash holes N-54 and N-55 as they are located in a channel and on a side slope and will begin in the Tiva Canyon columnar unit and penetrate through the Topopah Spring caprock.

3GUI388 Procure and calibrate sensors for borehole monitoring

Sensors for this activity have been ordered, but the activity is delayed indefinitely.

Technical Activities (CONTINUED)

3GUI390 Remove borehole casing and install sensors

This activity corresponds to 3GUI388 and because the sensors have not been received, this activity will be delayed until FY93.

3GUI391 Siting boreholes for cross-hole gamma

As discussed in the June report, the cross-hole gamma may be operated along with the field calibrations of the new TDR system. Field sites will therefore correspond to TDR sites located in Jackass Flats. The drill used to install access tubes for the cross-hole gamma requires some work which will not be able to be procured until FY93. Therefore this activity will be delayed until FY3.

3GUI397 Criteria letter for cross-hole gamma boreholes

Work with the cross-hole gamma will proceed in Jackass Flats and shallow access holes to correspond with the TDR will be installed by hand with the jack-leg drill. This activity will therefore be delayed until FY93.

3GUI398 Conduct readiness review

This activity will be delayed until FY93.

3GUI404 Installation of TDR network

Five sets of probes have been installed in Jackass Flats near the ET pan to use with the new TDR system.

3GUI406 Initiate collection and analysis TDR data

The new TDR system is ready to be field calibrated as probes are in place in the field, and all necessary data logging programs have been revised for the new system. Water will be added to the field site in Jackass Flats and as the soil dries out traces will be read, probes will be dug up periodically, and field bulk density measured to determine volumetric water content corresponding to the TDR reading.

Quality Assurance

3GUI409 Graded QA and other QA requirements

Implementation of all QA requirements were performed as needed.

Planning and Operations

Variances

SCP 8.3.1.2.2.1.3 Evaluation of artificial infiltration 0G331222

Summary Account Manager - A. Flint

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GUI606 Prototype infiltrometer field testing

A system has been developed that accurately controls water levels (± 1 mm) within the single and double ring infiltrometers. The system has been calibrated in the laboratory and plans for field calibration are currently being studied.

Technical Activities (CONTINUED)

3GUI608 Develop sampling scheme/field infiltrometer study

Five sets of probes for the Time-domain reflectrometry unit (TDR) have been installed in the field. One monitoring cycle of the probes under in-situ moisture conditions has been completed. As soon as sample bags and additional field equipment arrive, field calibration of the TDR unit at various soil moisture levels will begin.

3GUI616A Develop prototype ponding study

Paper work has been completed and submitted to gain approval to perform a prototype ponding study at the N85 neutron access hole. Suction lysimeter equipment has been acquired. Various pre- and post-infiltration event sampling schemes are being evaluated.

Quality Assurance

3GUI695 Graded QA and other QA requirements

Implementation of all QA requirements was performed as needed.

Planning and Operations

Variances

WBS 1.2.3.3.1.2.3 Percolation in the Unsaturated Zone - Surface Based Study

Principal Investigator - J. Rousseau

OBJECTIVE

To determine the present *in situ* hydrologic properties of the unsaturated zone hydrogeologic units and structural features; to determine the present vertical and lateral variation of percolation flux through the hydrogeologic units and structural features; to investigate the relationships between present flux and past climatic conditions; and to determine the effective hydraulic conductivity, storage properties, and transport properties as functions of moisture content or potential. (SCP Study 8.3.1.2.2.3)

SCP 8.3.1.2.2.3.1 Matrix hydrologic-properties testing 0G3312U2

Summary Account Manager - D. Soeder

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GUP009A Construct and test low-flow permeameter

Construction of this instrument is proceeding on schedule, although the start date was delayed significantly due to procurement problems and extended delivery times on critical components. The frame and instrument panel have been assembled and painted. The high pressure stainless steel tubing, valves and pressure vessels all have been received and are awaiting installation. It is probable that the completion and testing of this unit will not begin until October.

3GUP014A Continue modeling imbibition

This activity has been evaluating the numerical model, developed in cooperation with LBL, of relationships between water characteristic functions and permeability in the unsaturated zone. A new equation has been developed to better define water characteristic curves, and a draft paper is in progress describing the technique.

Technical Activities (CONTINUED)

3GUP17AA Water retention from SPOC analyses

No progress was made on this activity in August because the units have not been received from Oregon State University. Likewise, the controlled-environmental chamber, in which the apparatus was going to be run, was shipped from Wisconsin on August 7, but has not been delivered to the HRF.

3GUP019A Water retention pressure plate tests

No additional progress has been made on this activity because of the technical difficulties in applying this technique to the tight, densely welded tuffs of Yucca Mountain. It is likely that this activity will be replaced by the SPOC technique or another procedure. Plans call for the water retention work (either SPOC or pressure plate) to be continued in FY93.

3GUP023A Develop pore geometry technique

Additional thin sections of fluorescent-dye impregnated tuff have been made up at the HRF for petrographic observation. Samples of Calico Hills tuff were heated to temperatures of 200, 300 and 400 degrees C, and then made into thin sections, to see if heating caused visible changes in flowpaths related to the increase in permeability as identical samples were exposed to higher temperatures. Analyses of other samples from the unsaturated zone are ongoing. Some of this information will be included in a presentation by D. Soeder and J. Dishart, at fall GSA meeting. Additional components for the microscope including a camera adapter, eyepieces and image analysis parts were received.

3GUP028AA Psychrometry on selected transect samples

A technical procedure for analyzing quality-affecting core samples in the CX-2 chilled-mirror psychrometer still is in review. An abstract titled "Effect of rock fragment size on laboratory determination of water potential" by M. Nash, A. Flint, L. Flint and J. Rousseau will be presented at the ASA-CSA-SSSA annual meeting in Minneapolis in November, 1992, which compares data from the CX-2 with thermocouple psychrometers. Moisture retention curves have been measured with the CX-2 on 4 selected Paintbrush Tuff surface samples obtained from transects: upper cliff portion of Tiva Canyon Member, shardy base of Tiva, Yucca Mountain Member, and lower nonlithophysal portion of Topopah Spring Member. A sample of Calico Hills tuff was also analyzed. This activity is on schedule to end on September 30, 1992 and will contribute to parts the planned FY93 schedule.

3GUP029A Transect moisture characteristic curves

Modeling is being performed on the adsorption/desorption data on the five samples listed in 3GUP028AA, collected from the CX-2 studies. Brooks and Corey and van Genuchten equations are being used to fit moisture characteristic curves to the data. The high-saturation end of the curve appears to be the most critical portion of the test, as well as the most difficult to measure accurately. This work is progressing as scheduled, and plans call for the results to be submitted for a presentation at the December, 1992 AGU meeting in San Francisco by A. Flint.

3GUP30AA Neutron core physical property measurements

Measurements on the first batch of new neutron core samples were nearly complete by the end of August. Cores that were finished and returned to the SMF are USW-UZN-15, N-16, N-17 and N-36. Cores that are finished with analysis, but not yet returned to the SMF, are USW-UZN-11 and N-53, while cores from USW-UZN-38 and N-64 are in the final drying process. Analyses on USW-UZN-37 also have been done; the core is being held until a lithologic and stratigraphic examination is completed.

3GUP30AA Neutron core physical property measurements (CONTINUED)

Neutron-log calibration borehole cores from USW-UZN-27, N-54 and N-55 have had nearly all of the tests completed, but are slowly being run through the high-temperature (800°C) ovens to measure total water content. This is taking a long time, because there are only two small (4-inch) muffle furnaces available for this test, and they hold only one sample each. A larger, 12-inch furnace has been obtained, but is not yet calibrated for quality-affecting procedures.

3GUP31AA Neutron core gas pycnometry measurements FY92

This activity has been delayed until a QA-approved technical procedure is in place. The procedure has been written and reviewed, and is currently awaiting approval by USGS QA.

3GUP33AA Imbibition on neutron core samples FY92

This work will be incorporated into the Mission 2001 PACS and is therefore complete for FY92.

3GUP34AA Permeability of selected neutron cores FY92

This activity has been delayed until a QA-approved technical procedure is in place. Quality-affecting data on neutron core cannot be collected until such a procedure has been approved. A technical procedure has been written for the permeameter, but has not been reviewed or approved. Given typical approval times for new procedures, the start date for this activity will be delayed until at least November 2, 1992. This work will also be an important component of the Mission 2001 PACS schedule, so a delay will not significantly impact the current or future schedule.

Quality Assurance

3GUP003A Continue QA procedures, training and calibration FY92

QA training and equipment calibrations were carried out as required. The status of all calibrated and inactive instruments in the hydrology laboratory at the HRF was double-checked prior to the QA surveillance on August 11, 1992.

Planning and Operations

Variances

3GUP009A Construct and test low-flow permeameter

Completion date is moved to December 31, 1992 because of procurement delays and loss of construction technician.

3GUP17AA Water retention from SPOC analyses

Completion is delayed for at least six months to March 31, 1993 because of hold-ups in delivery of SPOC apparatus and environmental chamber.

3GUP31AA Neutron core gas pycnometry measurements

The finish date is delayed until at least December 31, 1992 because the procedure has not been approved for quality-affecting samples.

3GUP33AA Imbibition on neutron core samples FY92

The start date is delayed until at least December 1, 1992 because the data interpretation program is not fully tested and is in prototype stage.

Variances (CONTINUED)

3GUP34AA Permeability of selected neutron cores FY92

The start date is delayed until at least November 1, 1992 because the procedure has not been approved for quality-affecting samples.

Work Performed but not in Direct Support of the Scheduled Tasks

Prepared for QA surveillance. (2 hours)

Tours with U.S. Deputy Secretary of Energy, Greenpeace representatives, U.S. Nuclear Regulatory Commissioner and Idaho News reporter. (4 hours)

Public Tour of the HRF. (4 hours)

Public Outreach Training in Las Vegas. (8 hours)

SCP 8.3.1.2.2.3.2a Surface-based boreholes studies 0G3312V2

Summary Account Manager - J. Rousseau

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GUP003E Instrument and monitor HRF boreholes

Monitoring of HRF boreholes continued.

3GUP021E Construct/test/evaluate multi-station gas sampling apparatus

Multiple station testing of the gas sampling apparatus was started during the last week of August. Testing utilized the two-pressure humidity generator to provide a source of gas at a constant dew point temperature. Results are being evaluated to determine what additional tests are needed before the system is used on the HRF boreholes.

7201M 7201: Deep UZ Borehole (VSP-1) Drilling (start)

Drilling on UZ 16 (VSP-2) continued. Total depth as of August 25, 1992 was 660 feet. Latest projected completion date is March 18, 1993 (as per UZ 16 weekly status meeting August 10, 1992).

3GUP023E Develop/test/evaluate in situ pressure transducer recalibration

Because this activity now is dependent on completion of 3GUP021E (Construct/test/evaluate multi-station gas sampling apparatus), it has been canceled for FY92 and rescheduled in FY93 as part of the Mission 2001 exercise.

Quality Assurance

3GUP059E Complete procedures for thermistor/pressure/psychrometer/calibrations technical procedure

Thermistor calibration procedure has been completely reviewed and edited. Final retype of this procedure is in progress. A final retype of the pressure transducer calibration procedure was completed. The thermocouple psychrometer technical procedure is being reviewed by the project chief.

Planning and Operations

3GUP035E Prepare for instrumentation of UZ-16

A prototype geophone cable mount was constructed by the USGS. The mount will be sent to RSN to evaluate and procure enough mounts for UZ-16 instrumentation.

3GUP042E Prepare procurement documents for UZ-9 borehole instrumentation

Procurement documents for UZ 9 borehole sensors are in preparation and should be ready to be submitted during the first week of October. Electronic data acquisition equipment has been ordered and delivered. Activity is on schedule. Downhole instrument station apparatuses are being manufactured and will probably be delivered within the next 60 days.

Variances

Work Performed but not in Direct Support of the Scheduled Tasks

An addendum to the criteria letter for drilling, testing, and instrumenting UZ-16 was prepared, spelling out details for the VSP surveys to be conducted at UZ-16. These include a first-level reconnaissance survey, followed by a production survey, and if required, a data in-fill survey. Information on VSP field data collection includes seismic source lines, seismic sourcing systems, and seismic data recording systems. (80 hours)

Attended three day meeting in Las Vegas to review requirements for contractor support of the VSP field data acquisition program at UZ-16. Meeting was attended by representatives of DOE, SAIC, RSN, and various seismic services contractors. (32 hours)

Hosted Open House at the HRF Calibration Laboratory, on Saturday, August 22, 1992. (16 hours)

Attended the unsaturated zone modeler's meeting in Las Vegas on Wednesday, August 26, 1992. Made presentation on "Characterization of site structural features from surface-based boreholes." (16 hours)

SCP 8.3.1.2.2.3.2b Vertical seismic profiling 0G331232

Summary Account Manager - J. Rousseau

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GUP045B Identify/evaluate seismic source tool

Evaluation of Oyo orbital vibrator has been delayed pending solution of other problems at Bergen Park (reference 3GUP025B). Bolt Industries has advised that their borehole air gun can be used in a dry hole, and is sending data to corroborate their claim.

3GUP025B VSP prototype field test and data analysis

Four boreholes at Bergen park are complete. Field effort has been focused on keeping water in the boreholes, which is necessary to couple the borehole source to the country rock. Borehole sleeves have been used, but tearing has been a problem. A set of caliper, deviation, and TV camera logs have been run to diagnose the water leakage problem. See discussion under variances for alternative solution to using boreholes at Bergen Park for cross-hole tomography testing.

3GUP019B Continue VSP lab/physical and computer simulation: 2-d method

Image processing on the Yucca Mountain physical model continues and good images are being obtained. Activity is on schedule; planned finish date is November 30, 1992.

Technical Activities (CONTINUED)

3GUP020B VSP lab/physical and computer simulation: 3-D model

This work was completed. Report was written by H. Chang, entitled "Multi-mode cross-hole reflection imaging of multi-component physical model data," Thesis #T-4016.

Quality Assurance

3GUP030B Develop/write VSP technical procedure: data acquisition

A draft of this procedure has been submitted and is in internal project review.

Planning and Operations

3GUP035B Design/test/evaluate geophone mounts

Design has been discussed with RSN, who will complete this activity. A prototype mount was fabricated by the USGS and given to RSN to arrange for procurement of enough units to instrument UZ-16 (VSP-2).

Variances

3GUP025B VSP prototype field test and data analysis

Borehole fluid remains a serious problem. A preliminary cross borehole survey is planned at the CSM experimental mine in late August or early September. If the results are satisfactory, the work site may be shifted to the experimental mine in Idaho Springs. This delay will not affect other scheduled activities, or scheduled date for milestone report P25M.

SCP 8.3.1.2.2.3.2c Integrated Data Acquisition System 0G331242

Summary Account Manager - J. Rousseau

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GUP025C Integration and test design for software

Test plan is approximately 90% complete. Plan still requires formulation of test requirements for PI review and data archiving components. System designs for these components will not be completed until after the HRF restart, currently scheduled for September 8-18, 1992. This activity is closed out for the remainder of this FY. Completion of this activity will be incorporated as part of the final write up and review of the test plan.

3GUP013C Development and module testing software-2

Modifications of the sensor reader Subsystem have been completed to accommodate the HRF restart in September. Modifications to engineering conversion are approximately 90% complete. The patch to the domain control subsystem, that allows use of a temporary bypass of IDAS access control for purposes of meeting the HRF restart schedule is approximately 50% complete. Activity will be completed by planned finish date of September 15, 1992.

3GUP032C Construct prototype IDAS instrument shelter (IIS)

The manufacturer has completed construction of the IIS and is in the process of performing system checkouts of the HVAC and UPS Subsystems. Shelter is scheduled for delivery to NTS in early October.

Technical Activities (CONTINUED)

3GUP051C Evaluate IDAS prototype-2, data from HRF-boreholes

No work on this activity during the reporting period. Restart of data acquisition using IDAS on the HRF boreholes is scheduled for September 8 - 21, 1992. Work cannot continue on this activity until after the HRF restart. No schedule slippage anticipated.

3GUP050C Transfer Denver data, test data from HRF-Boreholes

Software to receive data from HRF boreholes via IDAS archives is being written and tested. Software should be operational in time to meet HRF restart schedule.

Quality Assurance

Planning and Operations

3GUP035C Procure/deliver microwave datacom

REECo Communications is expecting delivery of three radio-modem test units from IMM (the manufacturer/supplier) during the first week of September and plans to conduct field testing of those units in mid-September. The FCC license is still pending. Units with timed frequencies can not be obtained until after license is approved by the FCC.

3GUP063C Write/review/revise, IDAS maintenance procedures

Because delivery of the insulated instrument shelter has been delayed to the first week of October, the remainder of this activity has been delayed into FY93. Current plans are to restart work on this activity after the shelter is delivered and installed at the HRF and the FY93 schedule is being revised accordingly.

Variances

SCP 8.3.1.2.2.3.2d Air-permeability and gaseous-tracer testing 0G331252

Summary Account Manager - G. LeCain

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GUP003 Complete construction of first support trailer

The USBR is assembling the tube bundle and soliciting bids for construction of the boom.

3GUP005D Purchase parts/assembly of 12" packer system #1

All parts for the 12" packer assembly have been purchased and received. The USBR is completing installation of the subs and the system is 90% complete.

3GUP014D Expand hydrologic research facility calibration lab

All required equipment and physical modifications for expansion of the HRF for air-K testing calibration of thermistors and pressure transducers is complete. The expansion to handle high mass flows cannot be accomplished until the bell provers are received. (T, P)

Quality Assurance

Planning and Operations

3GUP001 Purchase mass-flow control calibration system

Contract was awarded to Sierra Instruments for the purchase of two bell provers.

Variances

3GUP010 Complete engineering drawings/assembly/test instr. packer

The USBR fell behind schedule in FY92 due to a lack of staff. The USGS has been informed that this problem has been resolved, with a new schedule lists completion of this activity by September 30, 1992.

WBS 1.2.3.3.1.2.4 Percolation in the Unsaturated Zone - ESF Study

Principal Investigator - M. Chornack

OBJECTIVE

To conduct hydrologic tests in the ESF to supplement and complement the surface-based hydrologic information needed to characterize the Yucca Mountain site; to provide phenomenological information for analyzing fluid flow and the potential for radionuclide transport through unsaturated fractured tuff; and to provide information about water flow through unsaturated fractured tuffs. (SCP Study 8.3.1.2.2.4)

SCP 8.3.1.2.2.4.1a Prototype testing of intact fractures 0G3312N2

Summary Account Manager - G. Severson

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GUS007A Write technical procedure; moire calibration

Little progress was made in August. Time was spent making drafts of standard reference material (SRM) drawings for discussions with machine shops. Critical aspect of the SRM is the defined measurements of the object to be used for calibrating the moire equipment set-up. The calibrated ruler approach, decided upon when the FY92 PACS activity was written in FY91, will not be used with the cosine transform analysis of the data currently used to analyze the profile data. Several approaches are being considered and one will be chosen in September 1992.

3GUS023J Journal paper, moire bench-mark and calibration

The paper entitled, "Projection moire as a tool for the automated determinations of surface topography," was published (Nov/Dec 1991) in the Proceedings of the 1991 International Symposium on Optical Applied Science and Engineering. A disposition for NCR (92-32) was drafted and submitted to the USGS QA program on August 11, 1992. Processing of the paper will continue after the NCR is resolved.

3GUS001A Select analog site for fracture sampling

The "north test pit" (test pit #1) at Yucca Mountain was scheduled to be deepened starting August 10, 1992 for the mapping platform. This "construction" did not start until the week of August 25 due to delays regarding the QA program. One blasting round was set off September 1 and the second and final round is scheduled for September 4. This site will be inspected for possible sampling probably the week of September 14th or 21st, when the mapping work is complete.

3GUS010A Continued development; axial fracture

Laboratory or field work will not be started in FY92. However, the proposed drill rig will be inspected at the subdock at Yucca Mountain when the north test pit is looked at as a possible analog site for fracture sampling.

Technical Activities (CONTINUED)

3GUS003J Evaluate alternative axial fracture coring

Some progress during August. Possible, existing drill rigs that could solve some of the problems with the current axial fracture sampling are being located.

Quality Assurance

3GUS004J Document computer software; Moire QA

G. Severson is documenting the programs used for this technique in greater detail. The documentation for the program FASTEST was to be discussed in detail with Dr. Cardenas the first week of August. However, most of the time in the laboratory in August was spent integrating the high resolution equipment into the present set-up and becoming familiar with the new software for the imaging hardware to be used .

Planning and Operations

Variations

3GUS006A Continued moire projection; method development

Work continues to progress using image digitization and processing to look at moire fringes. Work on bringing the USGS video camera, imaging board and software, and the high resolution monitor into the moire projection system was started the first week of August 1992. Updates to the imaging software were installed but were not worked with in August. This work will continue in September. All the upgrades to higher resolutions are scheduled to be completed in September 1992.

3GUS012J Complete journal paper-Moire automation

A final draft incorporating the technical review comments and the format comments from Applied Optics for the paper entitled, "Implementation and use of an automated projection moire experimental set-up" was submitted to the HIP reports section in August for processing.

3GUS013J Complete journal paper; FFT Moire

A draft of this paper written by Dr. Cardenas is scheduled to be submitted to the HIP reports section for technical review in early September 1992.

3GUS014J Complete journal paper; Stereo viewing moire

A draft of this paper written by Dr. Cardenas is scheduled to be submitted to the HIP reports section for technical review in September 1992 after the FFT journal paper draft is submitted.

3GUS014A Complete design fabricate low-pressure vessel

Final drawings for machine work will be completed in September. Estimates from possible vendors/machine shops will be evaluated in September.

3GUS008J Prepare axial core/vessel; air permeabilities

Further progress is dependent on fabrication of low-pressure vessel.

3GUS016J Complete design, radial fracture test vessel

This activity will be started when the low-pressure vessel design is complete and the vessel is being fabricated.

Variations (CONTINUED)

3GUS015J Complete journal paper; detailed Moire

This paper is presently scheduled to be submitted to the HIP reports section the end of October 1992 and will be written prior to the final report activity 3GUS006J.

3GUS001J Complete design, confining vessel: axial core

Drafts of the sketches for the low-pressure vessel are almost complete. Some of the materials for the vessel have been ordered and the final drawings for the exact location of the penetrations will be completed prior to delivery of the materials for the vessel. The completed drawings for the low-pressure vessel are a prerequisite for the confining cell design.

3GUS015A Begin unconfined tests gaseous phase

Work on this activity has been delayed; it is dependent on the completion of activity 3GUS014A.

Work Performed but not in Direct Support of the Scheduled Tasks

Met with QA specialist and submitted revised ACSR per USGS-QMP-3.15,R0 for the intact fracture test that addressed comments by GAC to USGS-HIP QA specialist for review. (8 hours)

Data General workstation by M. Brodie: Continued work with additional software and operating system updates and network installation. (80 hours)

SCP 8.3.1.2.2.4.2a Prototype infiltration (percolation) testing 0G3312O2

Summary Account Manager - F. Thamir

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GUS029B Prepare data report of imbibition experiments

Data from the imbibition experiments conducted under 3GUS101B have been processed.

3GUS101B Conduct imbibition experiments on small samples

An experiment was repeated to investigate whether a significant difference in directional permeability exists in the rock samples that are being used in the laboratory. Results indicated that there is no significant difference.

3GUS026B Prepare data report of large block ponding test

Data is being collected, indexed, backed-up, processed, and archived on computer disks. The data include water potentials, electrical resistance, and time-domain reflectometry (TDR) to estimate water saturation within the block.

3GUS014B Conduct ponding test on large block, final stage

Activity started on May 11, 1992. Initially, a positive water pressure of about +5.5 cm of water was applied to the top of the block. The flow rate was around 25 cubic cm of water per day in the rock matrix and fracture. Later the water pressure was increased to +7 cm of water. The initial flow rate at the new pressure increased to about 100 cubic cm of water per day, then gradually decreased to zero. Calculations indicate that flow should continue at a higher rate. Additional experiments will be conducted next month to investigate the discrepancy.

Technical Activities (CONTINUED)

3GUS003B Write fracture air perm technical procedure

The technical procedure was completed, and has been through QA review. It has been sent for final typing. This procedure describes detecting and measuring fracture permeability in rock. This activity is considered complete.

3GUS004B Write psychrometry technical procedure

Work on this procedure continues. It describes a method for measuring water potential in fractured welded tuff rock using thermocouple psychrometers. Further work on this activity will be delayed since more effort will be required for activity 3GUS014B.

S003M HP fracture air permeability technical procedure

This milestone is complete.

S07M HP psychrometry technical procedure

This milestone is delayed (see 3GUS004B above).

3GUS013B Write tensiometry technical procedure

Starting date is delayed until October 1, 1992 because extra effort is required for activity 3GUS014B .

Quality Assurance

Planning and Operations

Variances

3GUS035B Measure rock sample hydrologic properties

Originally, this set of measurements was scheduled to be taken at the matrix hydrologic properties laboratory in Nevada. However, the laboratory staff were not able to make the measurements because they currently are building a system that is capable of measuring small permeabilities (in the nanodarcy range which is the range for the samples to be measured).

3GUS035B Measure rock sample hydrologic properties

This delay will not affect the overall finish date since the completion of this activity is linked with the large block ponding experiment which is taking longer than expected.

3GUS034B Prepare data report of hydrologic properties

No progress is reported during this month. This activity is linked to the above mentioned activity (3GUS035B). This variance will not cause a delay in the schedule for the same reasons given in the above activity.

3GUS004B Write psychrometry technical procedure

The finish date will be delayed since extra effort will be required for activity 3GUS014B as indicated above. A preliminary finish date is set to November 1, 1992.

3GUS013B Write tensiometry technical procedure

The start date will be delayed to October 1, 1992 since extra effort is required for activity 3GUS014B.

WBS 1.2.3.3.1.2.6 Gaseous-Phase Movement in the Unsaturated Zone

Principal Investigator - M. Chornack

OBJECTIVE

To describe the pre-waste-emplacment gas-flow field; to identify structural controls on fluid flow; to determine conductive and dispersive properties of the unsaturated zone for gas flow; and to model the transport of water and tracers in the gas phase. (SCP Study 8.3.1.2.2.6)

SCP 8.3.1.2.2.6.1 Gaseous-phase circulation study 0G3312W2

Summary Account Manager - M. Chornack

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GGP06A Tabulate and analyze data

Deficiencies in the gaseous-phase circulation study were discovered during an internal USGS audit conducted in January 1992. As a result of the audit, YMP-USGS-CAR-92-04 was issued on this study. All data collection and analysis activities are suspended pending resolution of the items listed in the corrective action report.

3GGP17A Cont. progress report air flow and gas chemistry

Due to corrective action report, YMP-USGS-CAR-92-04, work on this activity is temporarily suspended.

3GGP002A Collect UZ borehole data

The need to collect additional UZ borehole data is being evaluated. The resolution of YMP-USGS-CAR-92-04 and the addition of staff on the gaseous-phase circulation study may enable the collection of data from boreholes UZ6 and UZ6s in August 1992. The collection of data from additional UZ boreholes is dependent upon the UZ drilling program.

3GGP10A Backlogged data

Continuing to address the issues outlined in the USGS-YMP audit, backlogged data is being examined to determine what data can be qualified. A plan of action to qualify the hotwire anemometer data is being formulated in accordance with the resolution to YMP-USGS-CAR-92-04.

Quality Assurance

Planning and Operations

Variances

3GGP10A Backlogged data

Continuing to address the issues outlined in the USGS-YMP audit, backlogged data is being examined to determine what data can be qualified. A plan of action to qualify the hotwire anemometer data is being formulated in accordance with the resolution to YMP-USGS-CAR-92-04. The hotwire anemometer data is being examined and the propeller anemometer data is being examined to condition the flow direction of the hotwire data. Cause: Problems addressed in YMP-USGS-CAR-92-04, such as the assignment of a PI and under staffing, have delayed the examination of backlogged data. Impact: Level 3 milestones are negatively impacted by this departure from the original schedule.

Variances (CONTINUED)

Corrective Action: A plan of action to qualify the hotwire anemometer data is being formulated in accordance with the resolution of YMP-USGS-CAR-92-04.

WBS 1.2.3.3.1.2.7 Unsaturated Zone Hydrochemistry

Principal Investigator - I. Yang

OBJECTIVE

To understand the gas transport mechanism, direction, flux, and travel time within the unsaturated zone; to design and implement methods for extracting pore fluids from the tuff; to provide independent evidence of flow direction, flux, and travel time of water in the unsaturated zone; to determine the extent of the water-rock interaction; and to model geochemical evolution of ground-water in the unsaturated zone. (SCP Study 8.3.1.2.2.7)

SCP 8.3.1.2.2.7.1 Gaseous-phase chemical investigations 0G3312X2

Summary Account Manager - I. Yang

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GUH010 Fabricate UZ-16 multi packer string (USBR)

C. Peters met with the USBR to discuss progress and budget needs. The packer sections will be completed and ready for leak testing by the end of September. All additional equipment, except for the boom, has been ordered. USBR requires \$25K more for next year to complete the packer. Information on the boom will be compiled and discussed prior to determining how to proceed.

3GUH012 Perform leak and pressure tests on UZ 16 packers

Final leak tests will be performed upon completion of packer units. These leak tests will make sure that there is no leakage through the packer unit and no leakage into packer gas sampling and inflation lines.

3GUH025B Outfit mobile lab with GC, IC, degassing rack

When the chromatographs and data acquisition systems arrive in the Denver UZ hydrochemistry lab, they will be tested and set up in the mobile lab.

The mobile lab is under construction by the manufacturer.

3GUH044B Prepare WRI/OFR, on UZ1 data 1984-1991

P. Striffler was not working on the open file report for UZ1 data this month due to his commitment in UZ16 field work. He is also busy with the report on core-sealing method.

D. Thorstenson is reviewing the UZ1 data interpretation report prepared by A. Yang.

3GUH067B Analyze UZ1 gas samples 1992

UZ-1 gas samples were sent to USGS Reston Isotope Lab, through Denver Central Lab, and Krueger Geochron Lab for analysis of carbon isotopes (¹³C and ¹⁴C) and tritium.

3GUH068B Tabulate data for UZ1 gas samples

Data on UZ1 gas samples collected in 1992 is being entered into the computer files as it arrives. Isotopic data analyzed by outside laboratories were also entered into the computer.

Quality Assurance

3GUHO69B Conduct training for employees on technical procedure

Several technical procedures, recently written by UZ Hydrochemistry Project members to prepare for UZ16 drilling, were read by all members as requested by USGS-QA training coordinator.

Planning and Operations

3GUH070B Procure lab chem, labware, and field apparatus

Hardware (nuts and bolts, tube fittings, etc.,) has been procured. These items will be used in plumbing the new chromatographs.

3GUH037B Procure GC and DAS

Chrompac Model CP-9000 gas Chromatograph and data acquisition system is with REECo procurement. There was a discrepancy between the requisition and the manufacturer's quote. The problem was addressed and as of August 29, 1992 REECo procurement personnel report that the requisition will go through.

3GUH036B Procure 10 kw generator for gas sampling support

The generator was been delivered to HRF, and has been inspected and put together.

Variances

Work Performed but not in Direct Support of the Scheduled Tasks

C. Peters, P. Striffler, and K. Schofield spent time at NTS to monitor trace gas injection at UZ16. (160 hours)

J. Ferarese had several discussions with QA specialists concerning NCRs 92-35 and 92-33. A meeting was held between Ferarese, the UZ hydrochemistry QA specialist and the software QA implementation specialist to determine the extent to which the QMP will apply to the gas and ion chromatograph data acquisition systems. (16 hours)

SCP 8.3.1.2.2.7.2 Aqueous-phase chemical investigations 0G3312Y2

Summary Account Manager - I. Yang

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GUH001A Test H₂O collection method from fractures

Will conduct tests in open borehole if fracture water is encountered after we have obtained Seamist equipment has been obtained.

Quality Assurance

Planning and Operations

3GUH018A Procure ion chromatograph and DAS

Dionex Model DX-100 Ion Chromatograph and data acquisition system is with REECo procurement. There was a discrepancy between the requisition and the manufacturer's quote. The problem was addressed, and as of August 29, 1992 REECo procurement personnel report that the requisition will go through.

Planning and Operations (CONTINUED)

3GUH07AA Procure lab chemical labware and field apparatus

Copper tubing which will be used in plumbing the new chromatograph instruments was procured. The manufacturer sent the wrong size and the tubing had to be returned for proper size.

3GUHO15A Procure "Seamist" fracture-water collector

No progress this month. A requisition for all Seamist purchases anticipated will be prepared in conjunction with G. LeCain for submittal in FY93.

Variances

Work Performed but not in Direct Support of the Scheduled Tasks

J. Ferarese was on annual leave. (40 hours)

Eight cores from UZN55 were extracted for pore-water; the remaining water in the extracted core was distilled for analyses of tritium, and measured on the in-house liquid scintillation counter. (160 hours)

A formal report discussing the counting performance of our LKB-Wallac 1220 Quantulus state-of-the-art liquid scintillation counter has been written by J. Ferarese. Co-author A. Yang has made several suggestions which will be incorporated into the report. (18 hours)

C. Peters worked on software QA, and responses to several NCRs and AFRs with the QA staff. (16 hours)

A. Yang attended the UZ modeling meeting on August 24-25, 1992. (20 hours)

WBS 1.2.3.3.1.2.8 Fluid Flow in Unsaturated Zone Fractured Rock

Principal Investigator - L. Anna

LBL Principal Investigator - G. Bodvarsson

OBJECTIVE

To develop and validate conceptual and numerical models describing gas flow and liquid water and solute movement in unsaturated, fractured rock at the laboratory and sub-REV scales. (SCP Study 8.3.1.2.2.8)

SCP 8.3.1.2.2.8.1 Development of conceptual and numerical models of fluid flow in unsaturated, fractured rock 0G3312T2

Summary Account Manager - L. Anna/E. Kwicklis

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GUF015 Document variable aperture model VSFRAC

Documentation is ongoing, with new data being incorporated into the model.

3GUF0021 Revise scoping calculations of percolation test

New data is being incorporated and recalculated. The percolation test is ongoing.

3GUF0051 Scoping and bounding calculations-FY92

Delayed for further review of calculations.

Quality Assurance

Planning and Operations

3GUF001 Resolve study plan comments (DOE & NRC)

Study plan comments have all been resolved. The activity is complete.

Variances

3GUF0001 Develop graded QA package

The meeting to develop the graded QA package was postponed until September.

3GUF0021 Revise scoping calculations of percolation test

The percolation test is taking much longer than expected; the original expectations of percolation performance have changed.

3GUF015 Document variable aperture model

Documentation is taking longer than expected because of new data and new techniques that are being tested to document the model.

Work Performed but not in Direct Support of the Scheduled Tasks

The report "Numerical simulations of liquid water flow in a variable saturated fracture network" was revised in response to technical reviews by G. Bodvarsson and K. Karasaki, LBL. The report will be submitted to a technical journal after the complete review process.

SCP 8.3.1.2.2.8.1 Development of conceptual and numerical models of fluid flow in unsaturated, fractured rock 0B3312T2

Summary Account Manager - G. Bodvarsson

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GUF002L Complete dual porosity code

Current formulation of the fracture/matrix flow as being of an "on-off" type is being replaced by a leakage term that is a continuous function of the capillary pressure. This will allow leakage to be calculated in a fully implicit manner that is more compatible with the TOUGH code, and is more stable numerically.

3GUF010L Initiate verification of fracture permeability models

R. Zimmerman met with P. Persoff and S. Kumar (Polytechnic University) to outline plans for incorporating fractal representation of aperture distribution into the cylindrical asperity model for fracture permeability.

Prepare journal article on sorptivity analysis

R. Zimmerman gave a presentation on sorptivity analysis at a modeling meeting in Las Vegas. A draft of the article was given to A. Flint and L. Flint who will apply the sorptivity-inversion method to recently collected hydrological data on Yucca Mountain tuffs. (This activity is not scheduled to begin until October 1992.)

Quality Assurance

3GUF007L Continue software QA and all other QA requirements
G. Bodvarsson complete QA training matrices.

Reading assignments were completed by various staff members.

Various updates to the QMP were incorporated.

Planning and Operations

Variances

3GUF002L Complete dual porosity code

The completion date has been changed to September 30, 1992. This should have no long-term impact, since the report/user's guide is not due until March 1993 and other tasks that require completion do not begin until then.

WBS 1.2.3.3.1.2.9 Site Unsaturated Zone Modeling and Synthesis

Principal Investigator - E. Kwicklis

LBL Principal Investigator - G. Bodvarsson

OBJECTIVE

To develop conceptual and numerical models for the site unsaturated zone hydrogeologic system; to apply the models to predict the system response to changing external and internal conditions; to evaluate the accuracy of the models using stochastic modeling, conventional statistical analyses, and sensitivity analyses; and to integrate data and analyses to synthesize a comprehensive qualitative and quantitative description of the site unsaturated-zone hydrogeologic system under present as well as probable, or possible, future conditions. (SCP Study 8.3.1.2.2.9)

SCP 8.3.1.2.2.9.1 Conceptualization of the unsaturated-zone hydrogeologic system 0G3312C2

Summary Account Manager - E. Kwicklis

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GUM05A Construct 2-dimensional cross-sectional model using TOUGH

LBL modelers are continuing to incorporate current USGS geologic and hydrologic data from neutron boreholes in the construction and refinement of 2-cross sectional models. When the model has been completed, it will be used to conduct sensitivity analyses to test hypotheses concerning the hydrologic system and investigate grid effects on moisture flow.

3GUM013A Sensitivity analysis using 2-dimensional cross-sectional model

For several cross-sections across Yucca Mountain, a two-dimensional mesh was extracted from the three-dimensional model in preparation for sensitivity analysis.

Quality Assurance

3GUM010A Graded QA and other QA requirements

Preliminary discussions with the UZ QA Specialist, have indicated that it may not be necessary to grade modeling activities associated with this SCP Activity, because the quality management procedure governing software already includes a scoping or development phase. These issues will be pursued further with QA specialists.

Planning and Operations

3GUM06A Study plan revision and resolution of comments

Modelers from LBL and the USGS continued the revision of the study plan in response to DOE review comments. Responses to some comments required extensive review and analysis of existing data, as well as drafting of new figures and tables.

Variances

3GUM05A Construct 2-dimensional cross-sectional model using TOUGH

This activity is behind schedule because the level of effort required to resolve the study plan review comments was much larger than originally anticipated.

3GUM06A Study plan revision and resolution of comments

This activity is behind schedule because the level of effort required to resolve the study plan review comments was much larger than originally anticipated.

3GUM04A Test decoupled TOUGH hydrologic simulator

This activity is behind schedule because the level of effort required to resolve the study plan review comments was much larger than originally anticipated.

Work Performed but not in Direct Support of the Scheduled Tasks

A field trip was held, to provide UZ modelers and other interested parties with a first hand look at the stratigraphic section within the unsaturated zone at Yucca Mountain, with particular emphasis on fracture and fault characteristics. Fracture intensities were observed to exhibit considerable vertical variability from one subunit to the next. The Ghost Dance Fault was described as being a rather broad zone several hundreds of meters wide rather than a single, planar feature. A meeting of UZ modelers was held to review the current strategy to test faults from within the ESF and elsewhere, present recent modeling work and review recently acquired data.

SCP 8.3.1.2.9.2 Selection, development, and testing of hydrologic-modeling computer codes 0B3312D2 Summary Account Manager - G. Bodvarsson

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GUM010 Review of unsaturated-flow codes

E. Ervin and another scientist visited LBL to learn the TOUGH code. G. Bodvarsson and C. Lai helped them set up a problem investigating the sharp water level gradient at Yucca Mountain.

G. Bodvarsson, R. Zimmerman, and C. Wittwer attended the unsaturated zone modeler's meeting in Las Vegas. The latest results and data were discussed with the USGS and SNL representatives.

G. Bodvarsson presented the results of simulation studies of the steep water level gradient at Yucca Mountain, and studies done by M. McGraw on a two-dimensional cross-section.

Quality Assurance

3GUM18A Grading of QA and other QA requirements
G. Bodvarsson completed QA training matrices.

Reading assignments were completed by various staff members.

Various updates to the QMP were incorporated.

Planning and Operations

3GUM14A Study plan revision and resolution of comments
G. Bodvarsson has prepared responses to many of the comments and sent them to E. Kwicklis for review. The responses to the remaining comments are nearly complete.

Variances

SCP 8.3.1.2.2.9.3 Simulation of the hydrogeologic system 0B3312E2

Summary Account Manager - G. Bodvarsson

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GUM03B Perform preliminary simulation with motion-flow model
This task is complete.

3GUM07B Evaluate model grid effects

Three new 2-D cross-sections through Ghost Dance, Dune Wash, and Abandon Wash fault zones were extracted from the 3-D mesh in order to continue the testing of the grid. TOUGH simulations were successfully run with homogenous rock properties. Further tests are planned to concentrate on the effect of fault characteristics, and the input deck for rock properties is being revised in order to include new results provided by A. Flint's group.

3GUM05B Prepare report on preliminary moisture-flow model

The content of a user's manual was outlined in order to document the development of the moisture-flow model geometry. This manual will describe the approach taken and the various steps involved in the computerized generation of a complex three-dimensional mesh.

C. Wittwer participated in a field trip which consisted of a visit to the new structural features mapped by R. Spengler's group on the Ghost Dance Fault, as well as the structure of other fault zones, e.g. Bow Ridge and Abandon Wash.

G. Bodvarsson, R. Zimmerman, and C. Wittwer attended the unsaturated zone modeler's meeting in Las Vegas. The latest results and data were discussed with the USGS and SNL representatives. Wittwer presented an update on the 3-D model.

Quality Assurance

Planning and Operations

3GUM14B Graded QA and other QA requirements
G. Bodvarsson complete QA training matrices.

Reading assignments were completed by various staff members.

Planning and Operations (CONTINUED)

Various updates to the OMP were incorporated.

3GUM13B Study plan comment and revision

G. Bodvarsson has prepared responses to many of the comments and sent them to E. Kwicklis for review. The responses to the remaining comments are nearly complete.

Variances

WBS 1.2.3.3.1.2.10 Prototype Hydrologic Tests that Support Multiple Site Characterization Activities

Principal Investigator - M. Chornack

OBJECTIVE

To perform prototype hydrologic tests to minimize costly stand-by times; to develop QA procedures; to determine feasibility of the proposed tests; to train new personnel; to help increase likelihood of success of the tests; and to test new instruments, equipment, and procedures.

Prototype Cross-Hole Testing 0G3312I2

Summary Account Manager - G. LeCain

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GUT005C Prepare ALTS data report on testing and methods

The PI continues to work on the ALTS open file report. Sections partially completed include geology, thermistor results, and thermocouple psychrometer results. The psychrometer results show that during cross-hole dry air injection testing, the instruments monitored the wet air front that was pushed ahead of the injected dry air and then picked up the injected dry air as it reached the monitoring zones. This raises some interesting ideas about using the dry vs. in-situ wet air as a tracer.

Quality Assurance

Planning and Operations

Variances

Prototype Tracer Testing 0G3312J2

Summary Account Manager - I. Yang

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GUT03DD Prepare WRI report on aqueous tracer tests

The paper still needs author's response to review comments. During a conference with the author, A. Lewis Russ, it was decided that she is best qualified to respond to the technical reviews. Her responses to the technical reviews are not complete.

Technical Activities (CONTINUED)

3GUT13DD Conduct tracer gas sorption test on stemming materials

On continuous sorption test equipment, the norprene tubing used is slightly porous and is unable to maintain a vacuum for tests running a week or longer, which is the time needed for some of the tests. Therefore, the tubing is not a satisfactory material for vacuum systems. Good vacuum-grade tubing, which will require a different pump, will be needed to solve this deficiency.

The sample flasks used in the batch testing were modified to remove leaks at the cap/septum interface. A teflon adapter was fitted onto the threaded top of the flask. Down the center of the adapter a glass sleeve impinges on a nylon o-ring. The top of the glass sleeve is fitted with a septum and cap that is smaller and thicker than the septa that were previously used.

Batch testing of the sorption of SF₆ on the stemming material is ongoing. An initial test of the stemming material, testing for sorption on three mesh sizes, showed no evidence of adsorption after eight days of continuous testing. Monitoring of the pressure inside the flasks showed that two of the flasks lost pressure during the experiment; however, in only one of the flasks is there evidence of atmospheric contamination affecting the concentration of SF₆.

3GUT01DD Conduct tracer gas sorption tests on tuffs

The three mesh sizes of bedded tuff to be tested for sorption have been dried in an oven to constant weights, and they will be subjected to batch-sorption tests next.

3GUT133D Develop technical procedures for monitoring gas tracer

The reference leak for the Leakmeter 120 was operating improperly and returned to ITI. Methods of calibrating the Leakmeter using standard gases will be tested.

A table listing relevant physical and chemical characteristics of CFCs, HCFCs, HFCs, PFTs, and other possible tracer gases has been compiled. A paper stating the UZ hydrochemistry position on the suitability of these various tracer gases is in the final stages of writing.

3GUT012D Test on-line gas tracer monitoring equipment

The automated injection system is scheduled to be on-line by the end of September. Caltrol currently is assembling the equipment and writing the necessary programs for the operation of this system.

Quality Assurance

Planning and Operations

Variances

Work Performed but not in Direct Support of the Scheduled Tasks

Modified figures for UZ-1 data (1984-1991) which will be published by Yang and others. (2 hours)

Analyzed gas samples squeezed from UZN-55 core on gas chromatograph. (8 hours)

Prototype Dry Coring of Rubble 0G3312L2

Summary Account Manager - C. Peters

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GUT02EE Reduce data for effects of coring methods
Rubble coring data was compiled.

Data from coring in the tunnel was compiled and included with chemical and physical results table for WRIR 3GUT14FF.

3GUT13FF Complete reduction of data effect of core sealing
All compiled data are being rechecked. Graphs and statistics on data are in progress.

3GUT004F Develop technical procedures on core sealing
Cores are being collected at UZ16 according to HP237T. Information obtained to date, is being used to compile HP. HP writing has begun.

3GUT14FF Prepare WRI report: G-Tunnel: effects; blasting, coring on chem
Sections of the report including the introduction, G-Tunnel work, nonwelded and welded excavations, and chemical and physical results, have been completed. Preparation of sections on coring, lab work, effects of blasting and coring, and the summary, has begun.

3GUT03FF Complete preparation of report on G-tunnel work
This work has been combined with 3GUT14FF as described above. Blast excavation sections have been completed. Coring sections are in progress.

3GUT02FF Prepare report for effects of core sealing
The sections on the introduction and methods have been completed. Work on the results and conclusions sections have started.

Quality Assurance

3GUT07FF Develop technical procedure on rubble coring
Further development of the technical procedure will not begin until 3GUT02EE data reduction is completed.

3GUT016F Conduct technical procedures training on core sealing
Work with UZ16, SMF personnel regarding the use of HP237T is continuing.

Planning and Operations

Variances

Prototype Pore-Water Extraction 0G3312M2

Summary Account Manager - I. Yang

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GUT002G Complete ext/analysis chem of pore water, UZ4,5,6, and GT
Pore-water extraction for chemical analyses on UZ#4, #5, and #6 cores was completed. Plots are being made to update the degree of saturation vs. extent of success in water extraction. These data will be useful in selecting specimens which can be expected to produce water by compression.

Technical Activities (CONTINUED)

3GUT027G Submit WRIR triaxial and 1-D methods review and approve

The WRIR titled "Pore-water extraction from unsaturated tuff by triaxial and one-dimensional compression methods, Nevada Test Site, Nevada" is presently in review. Two technical reviews have been received and text has been modified according to the reviewers comments. A third technical reviewer has promised the review soon. Once that has been received, the text will be modified and submitted for editorial review.

3GUT015G Prep WRIR pore-water chem vs press

As reported previously, this WRIR will be replaced by a journal paper. A draft paper that summarizes the results of a comparison of changes in pore-water chemistry vs. pressure during one-dimensional compression is presently being written. New data from the latest chemical analyses are being incorporated into the preliminary conclusions developed for the previous paper published in Water-Rock Interaction.

Quality Assurance

3GUT028G Review and revise technical procedure for high-pressure cell

The technical procedure for high-pressure one-dimensional compression (HP-249, R0) has undergone technical review. Reviewer suggestions required minor editorial changes, which have been completed. The HP is being sent out for QA review.

Planning and Operations

3GUT018G Procure/develop data acquisition software

USBR personnel completed the installation and setup of the hardware for the data acquisition system. USGS personnel have installed the software, reviewed the tutorials, and plan to test the system early in September. This task should be completed as scheduled.

3GUT020G Procure and construct additional high press 1-D cell

The assembly of the inner and outer corpus rings was delayed because of an unforeseen requirement to modify the pressing stops used for the assembly of the first cell. The paperwork to machine the stops has been prepared and the machine shop work should be completed soon. Once the stops have been machined, the corpus rings will be pushed together under the supervision of an outside consultant. Then the cell will be sent to outside shops for final grinding to assure the piston and sleeve will fit properly.

Variances

Work Performed but not in Direct Support of the Scheduled Tasks

M. Beasley read HP-240,R0; HP-239T,R0; HP-231T,R0; HP12,R3. (16 hours)

M. Beasley performed technical review of HP-249,R0. (12 hours)

M. Beasley compressed six UZN55 cores w/s.c all Tiva Canyon member. Three of the six cores yielded water samples from 4.0 to 18.6 ml. (56 hours)

M. Beasley prepared and delivered fracture fill sample from UZN55 core sample to GSP in Building 21, at A. Yang's request. (4 hours)

K. Schofield performed distillations on five UZN-55 cores for tritium concentration, O18/16 and D/H analyses. (32 hours)

Work Performed but not in Direct Support of the Scheduled Tasks (CONTINUED)

K. Schofield conducted tracer gas injection and monitoring at UZ-16. The volume flow of drilling air is measured and calculated, and the appropriate concentration of tracer gas is added to the drilling air by adjusting the mass flow controller. The concentration of tracer gas is maintained at approximately 1.5 ppm. The mass flow controller can be rapidly adjusted to match changes in the volume flow of drilling air. Four sample ports are used to collect air samples, one on the downhole drilling line and three on the up hole drilling line. The concentrations of tracer gas in the drilling air samples are analyzed using the gas chromatograph. (90 hours)

K. Schofield conducted a public outreach tour in the hydro chemistry lab at the HRF. (8 hours)

WBS 1.2.3.3.1.3 Saturated Zone Hydrology

OBJECTIVE

To develop a model of the saturated zone hydrologic system of Yucca Mountain that will assist in assessing the suitability of the site to contain and isolate waste. (SCP Investigation 8.3.1.2.3)

WBS 1.2.3.3.1.3.1 Site Saturated Zone Ground-Water Flow System

Principal Investigator - M. Umari

OBJECTIVE

To determine the hydrogeologic nature of the Solitario Canyon fault in the saturated zone; to determine the time and spatial variation of the potentiometric surface; to determine the character, magnitude, and causes of water-level fluctuations; to estimate elastic and hydraulic properties; to determine transport properties of the saturated zone; to evaluate the relation between hydraulic properties and fracture characteristics; to characterize chemical and physical properties of the saturated zone that affect radionuclide retardation; and to conduct single-and-multiple well tracer tests using conservative and reactive tracers to determine hydrologic, chemical, and physical properties in the saturated zone. (SCP Study 8.3.1.2.3.1)

SCP 8.3.1.2.3.1.2 Site potentiometric-level evaluation 0G3313E2

Summary Account Manager - P. Tucci

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GWF005A Begin 1992 water-level data collection

Three wells are being monitored on a quarterly basis; 15 zones, in 15 wells, are being monitored on a monthly basis; 21 zones, in 13 wells, are being monitored on an hourly basis; continuous analog data is being obtained on four zones, of two wells (included in count on hourly sites); and real-time data is being obtained on nine zones, in six wells, using satellite data-collection platforms (included in count of hourly sites). The status of the network is being evaluated at the end of each month, and recommendations are being made for instruments that should be watched, calibrated, or replaced; and real-time data is being monitored on a daily basis looking for water-level excursions.

Calibrated transducers at the following wells: USW H-3 (upper & lower zones), USW H-4 (upper & lower zones).

Calibrated barometers L821615, 21983, and 20396 at wells G-3, H-4, and WT-11, respectively.

3GWF005A Begin 1992 water-level data collection (CONTINUED)

Water levels in four zones, in two wells continued to be monitored for responses to earthquakes and aftershocks.

A report on water-level responses to the April earthquakes was written by G.M. O'Brien, and received Director's approval on June 8. The report was printed and distributed this month.

Investigation of the water-level and fluid pressure responses in wells at Yucca Mountain to earthquakes on June 28-29 in southern California and Little Skull Mountain is continuing. Preliminary data and analyses were sent to DOE for their use and dissemination. In response to a request from the State of Nevada, data on water-level fluctuations caused by these earthquakes were compiled and forwarded to DOE.

Work continues on investigating barometric, earth-tide, and seismically-induced water-level fluctuations. G. O'Brien continues to consult with D. Galloway (USGS, California District) on the methodology and analysis.

An abstract describing the earthquake-induced water-level fluctuations observed at Yucca Mountain was written by G. O'Brien and P. Tucci. The abstract received technical review, and was approved on August 31. The abstract will be presented as a poster at the Fall meeting of the AGU in San Francisco in December.

3GWF41AA Continue preparing 1989 water-level data report

The report "Water levels in continuously measured wells in the Yucca Mountain area, Nevada, 1989" by D. Lobmeyer and R. Luckey has been written and reviewed. Review comments are being addressed, and the report is being modified accordingly.

3GWF18AA Continue study of accuracy and precision of water-level data

Work continued on the report "Precision and accuracy of water-level measurements taken in the Yucca Mountain area, Nevada, 1988-90" by S. Boucher. Report was forwarded to YMP Branch for review and approval.

3GWF42AA Complete 1990 water-level data report

Regression analyses were done for all transducer calibrations for 1990 and results were compiled into tables suitable for inclusion in the report. Compilation of transducer histories was completed. Because the data for 1990 will be included in a report on continuous water-level measurements for both 1990 and 1991, this activity is considered complete. Further work on the 1990 data will be reported under 3GWF043A, "Begin 1991 water-level report". A draft outline for the report was written and expanded this month.

3GWF027 Evaluate quality of 1991 transducer data

Data has been continuously evaluated through 1991 and plots are available for a more formal evaluation. No other work has been performed on this task.

3GWF004A Prepare report on water-level fluctuations at YM

Data on long-term and seasonal trends are not sufficient to warrant preparation of a separate report on the subject. The results of this investigation will be reported in a section of the revised potentiometric-surface map, which is now ready for technical review. See 3GWM06AA under SCP 8.3.1.2.3.3.1.

Technical Activities (CONTINUED)

3GWF043A Begin 1990-91 water-level report

Work on this activity began in July. This month's work consisted of expanding the outline, table of contents, and list of illustrations for the report, as well as editing previously written text.

Quality Assurance

Planning and Operations

Variances

3GWF027 Evaluate quality of 1991 transducer data

This work is on-going as time allows, a great deal of which was spent in responding to information requests following the late June earthquakes. New PI needs to be trained in the criteria for evaluating the transducer data. Delay in this activity will delay preparation of report for 1990-91 water-level data.

3GWF029 Reduce 1991 continuous water-level data

Work on this activity was not started due to project staff having to respond to information requests concerning earthquake-induced water-level fluctuations. Initiation of work will probably be delayed 2 months or more, as work is done on a report on the effects of the June 28-29 earthquakes on water levels at Yucca Mountain. Delays in this activity will delay completion of the 1990-91 water-level data report.

Work Performed but not in Direct Support of the Scheduled Tasks

S. Boucher gave QA support to various activities, including an evaluation of QA, and a re-organization of QA support for other groups of activities. She prepared for and participated in QA audits at NTS and USGS-92-07. (120 hours)

A great deal of time was spent responding to information requests by DOE, State of Nevada, and the press, related to water-level responses to the earthquakes in late June. (40 hours)

G. O'Brien prepared a presentation on the Yucca Mountain water-level monitoring network for a National Park Service work group on Devil's Hole. (16 hours)

P. Tucci attended the NPS Devil's Hole work group meeting. (8 hours) He also attended field trips to look at stratigraphy of the Paint Brush tuffs and faults at Yucca Mountain. (16 hours) He attended the UZ modelers meeting in Las Vegas and made a presentation on proposed work on the Solitario Canyon Fault study. (8 hours)

SCP 8.3.1.2.3.1.3 Analysis of single- and multiple-well hydraulic-stress tests 0G3313F2

Summary Account Manager - M. Umari

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GWF001D Finish intraborehole flow and stress test report

The hydrology section chief will decide on the disposition of the report. The old (previous to the fully qualified QA program) hydraulic tests to be discussed in this report are not well documented, and the original data cannot be found for most of the tests. However, it was determined that three of the tests may be worth salvaging. Digital data (not original) exist for two of the tests, while results of the third exist only in non-original graphic form. The lead QA specialist for the saturated zone section, S. Boucher, determined that an incomplete QA records package will not prevent approval of the report. Therefore, a plan for a limited scope report, analyzing the three tests mentioned above, and summarizing the remaining tests, was decided on.

3GWF006D Analyze strain-related pressure response in cased holes

G. O'Brien, site saturated zone hydrology project, has been monitoring and analyzing strain-related pressure responses (to atmospheric loading, earth tides, earthquakes, and underground nuclear explosions) in the h-holes. O'Brien has been analyzing the results of water pressure responses to the earthquakes on June 28 and June 29, 1992 in California and Nevada. To that end, he has been communicating with D. Galloway, at the USGS California District office, in Sacramento, California (previously with the USGS-YMP program) who is an expert on the subject. Galloway is directing O'Brien in this analysis.

Quality Assurance

Planning and Operations

Variances

Work Performed but not in Direct Support of the Scheduled Tasks

In the first week of June, the Barbour Logging Company made oriented borehole television logs of UE-25c#2 and UE-25c#3. A. Geldon completed the study of these television logs in August, and prepared tables of fracture locations and densities for the depth of the holes. Geldon also calculated fracture strikes and dips from the television logs using borehole diameter information obtained from existing caliper logs.

SCP 8.3.1.2.3.1.4 Multiple-well interference testing 0G3313G2

Summary Account Manager - M. Umari

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GWF004F Complete (procurements for and) construction of third 3-zone packer string (and packer-string-related items)

Most of the work under this activity is being carried out for the saturated zone fractured rock hydrology project (SZFRHP)/ HIP/ USGS-YMP by the USBR. The USBR informed the SZFRHP in August that the funds for providing this work, including the award of the contract for additional packers (see bullet below), were exhausted. After several meetings, and discussions between the YMP-USBR TPO and the YMP-USGS TPO, the USBR indicated that it will proceed with the packer contract award.

3GWF004F Complete (procurements for and) construction of third 3-zone packer string (and packer-string-related items) (CONTINUED)

The contract for procurement of more packers to complete construction of the third 3-zone packer string, approached the point of award. The TEC concluded that the bid from Baker Tools Co. was not technically acceptable because it did not, among other things, provide the 48 inches of exposed rubber specified in the RFP for providing a water-tight seal with the borehole wall. Technically disqualifying Baker Tools, left Tam International with the only technically acceptable bid.

J. Gemmell worked directly (without assistance from the USBR) with a local machine shop to modify the internal components of the electric-motor-operated ball valves that will be used, in-line, with the transducer reference line of the multiple-zone packer system. The valve motors were not able to provide the necessary torque to operate the valves, leading to the modifications described above.

Purchase requisitions were prepared for procurement of packer-string-related items. Some of these items are: electric connectors and power supplies to build a control box that will operate the multi-zone packer string from land surface, and in-line flow meters to be used in determining flow rates in various closed conduits during the upcoming hydraulic and tracer tests at the c-hole complex (and at the Raymond site).

3GWF013F Develop techniques to analyze cross-hole test results

Using the USGS HST (heat and solute transport) 3-D code, written by K. Kipp, USGS/WRD National Research Program, to develop a 3-dimensional porous-medium-equivalent model of the c-hole complex (the model can be used for cross-hole test design, in addition to analysis of the eventual cross-hole test results): No progress was made in August.

Using the software package FracMan to develop a 3-dimensional fracture-network model for the c-holes (the model can be used for cross-hole test design, in addition to analysis of the eventual cross-hole test results): E. Ervin spent two days at the offices of Golder Associates, in Seattle, Washington, conferring with B. Dershowitz (author of the FracMan code) on ways to modify the program and add pre-processing facilities to allow for input of outcrop fracture mapping data obtained from the Yucca Mountain site. Ervin is doing this work in cooperation with the SZFRHP.

3GWF028F Continue preliminary numerical/analytical modeling to assist in cross-hole test design

Both bullets under item 2 above also support this activity, as indicated in the text of the bullets.

3GWF022F Continue oversight of field simulation of cross-hole tests

This activity encompasses all work related to the U.S. site (Raymond Quarry, near Oakhurst, California) of the DOE/AECL international project. It is intended that the hydraulic and tracer tests planned for the c-holes be prototyped at the Raymond site.

In some previous status reports, this work had been reported under section III (work at the site has been going on since December 1991).

M. Umari, G. Patterson, and J. Gemmell, from the saturated zone fractured rock hydrology project (YMP-USGS), met with K. Karasaki and D. Lippert (LBL), to coordinate the joint effort between the USGS and LBL to conduct cross-hole hydraulic and tracer tests at the Raymond Site. A date of November 16, 1992 was set for the start of hydraulic testing.

Technical Activities (CONTINUED)

Arrangements were made with the USGS/WRD/National Research Program's Borehole Geophysics Unit (BGU) to conduct a suite of logs (caliper, temperature, acoustic televiewer, intraborehole flow) at the nine Raymond holes. The work started August 14, 1992, and was completed on August 20. The logs indicated that the site is heavily fractured in the subsurface (not all the fractures, however, transmit water). The BGU also performed a cross-hole test by pumping water out of one well and conducting intraborehole flow surveys in the other eight wells. This test indicated that there are three or four fracture zones within each well that transmit water.

Two of the 6-inch holes at Raymond need to be enlarged to 10 inches to accommodate the multi-zone packer string being built for the c-holes complex, so it can be tested prior to being used at the c-holes. This enlarging, or reaming, process is planned to be completed by September 2. J. Earl and J. Gemmell of the saturated zone fractured rock hydrology project went to the Raymond site to supervise this work.

A requisition was prepared to purchase six packers from the Rocktest Company to be used at the Raymond site. These packers are for isolating test zones in the seven 6-inch holes. (The other two 10-inch holes will be instrumented with the c-holes-bound packers, as described in the above bullet).

3GWF025F Continue development of scientific notebook for cross-hole tests with prototype string J. Earl, (SZFRHP) has been given the lead role in development of the SNP. He had discussions with S. Boucher, who will provide QA input during drafting of the SNP.

3GWF019F Oversee LBL (develop and) analyze seismic profile for c-holes
E. Majer's field crew, from LBL, completed the cross-hole seismic tomography along the vertical plane between wells UE-25c#2 and UE-25c#3 during late June, and early July 1992. The raw tomographic data are still being analyzed.

3GWF006F Prepare QA drawings for multi-zone packer string
The USBR sought clarification from the SZFRHP regarding the time table for preparation of the QA drawings for the multi-zone packer string. The USBR is responsible for providing detailed QA drawings, showing how the components of the multiple-zone packer system, being constructed for the SZFRHP, are assembled.

Quality Assurance

Planning and Operations

Variances

SCP 8.3.1.2.3.1.4 Multiple-well interference testing 0B3313G2
Summary Account Manager - E. Majer

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GWF03C Develop cross-hole seismic profile

Processing of the seismic data continued. The data were "pre-processed" to sort the files in common shot data sets for preliminary inspection of data quality and travel time. Preliminary inspection of the data reveals very complex structures of the subsurface and good to very good quality data which contains P and S wave arrivals. The frequency content is above 5 Khz.

Quality Assurance

Planning and Operations

Variances

SCP 8.3.1.2.3.1.5 Testing of the C-hole sites with conservative tracers 0G3313H2

Summary Account Manager - M. Umari

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GWF167A Continue Preliminary Modeling for Tracer Tests and 3GWF168A Develop Techniques for Analysis of Tracer Test Results

The following two bullets are repeats of bullets presented under the monthly report for Summary Account number 8.3.1.2.3.1.4, because the two computer modeling activities discussed in the bullets serve activities under accounts 8.3.1.2.3.1.4 and 8.3.1.2.3.1.5 (the present account) at the same time:

Using the USGS HST 3-D code, written by Ken Kipp, USGS/WRD National Research Program, to develop a 3-dimensional porous-medium-equivalent model of the c-hole complex (the model can be used for cross-hole test design, item 3 below, in addition to analysis of the eventual cross-hole test results): No progress was made in August.

Using the software package FracMan to develop a 3-dimensional fracture-network model for the c-holes (the model can be used for cross-hole test design, in addition to analysis of the eventual cross-hole test results): E. Ervin spent 2 days at the offices of Golder Associates, in Seattle WA, conferring with B. Dershowitz on ways to modify the program and add pre-processing facilities to allow for input of outcrop fracture mapping data obtained from the Yucca Mountain site. Ervin is doing this work in cooperation with the SZFRHP.

3GWF151A Construct Tracer Injection System

A requisition for the purchase of the downhole part of the tracer injection system was prepared. The equipment will be purchased from the Baker Tools Company, and will allow for the introduction of the tracer into the test zone of interest, by injection through the central 2-7/8 inch pipe that supports the packers and all other instrumentation for the hole.

Quality Assurance

Planning and Operations

Variances

WBS 1.2.3.3.1.3.2 Saturated Zone Hydrochemistry

Principal Investigator - W. Steinkampf

OBJECTIVE

To describe spatial variations in chemical composition of ground-water; to identify chemical and physical processes that influence ground-water chemistry; to use hydrochemical data to aid in the identification and/or quantification of ground-water travel times; flow paths; fluxes to, from, and within the saturated zone; and climatic conditions during past periods of recharge. (SCP Study 8.3.1.2.3.2)

SCP 8.3.1.2.3.2.1 Assessment of saturated-zone hydrochemical data availability and needs 0G3313J2

Summary Account Manager - W. Steinkampf

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GWH011A Prepare scientific notebook, ion chromatograph

LANL and contractor documents describing ion chromatograph analytical methods were obtained and reviewed for consideration in the development of a USGS procedure.

3GWH023A Complete assessment of data (extant), phase 1

Documents were submitted to maintain the current level of student support for data assessment through FY93. Filling of the identified position (essentially continuation of a current appointment) will depend on funding for FY93.

Quality Assurance

Planning and Operations

Variances

SCP 8.3.1.2.3.2.2 Hydrochemical characterization of water in the upper part of the saturated zone

0G3313K2

Summary Account Manager - W. Steinkampf

Technical Activities

3GWH006A Sample weapons program (ERTDB) GCP holes

The ground-water characterization program (GCP) appears to have been re-vitalized with the assumption of direction by IT Corp. The planned hole in southern Yucca Flat noted in the July 92 report has been completed. The completion, however, is only about 60 meters into the carbonate aquifer, the characterization of which was the intent of the effort. Scheduled depth was on the order of 1100 m, but completed depth is about 760 m; the rationale for the change is unknown. It is not anticipated by USGS/LV staff that the completed borehole will be sufficient to meet initial stated objectives. A program of pumping tests and sampling is currently underway. Attempts have been made to rehabilitate two holes in Yucca Flat with 50% success. Three planned holes in the western part of the NTS, in areas 19 and 20 are of probable interest to YMP hydrochemistry studies. Contact will be made with R. Waddell (GeoTrans) to determine construction and testing schedules in order for (a) YMP investigator(s) to observe sampling by other agencies (LLNL, DRI, State of Nevada, *et al*) prior to work at these three sites, and to plan for future YMP sample collection efforts.

Technical Activities (CONTINUED)

3GWH001B Plan sample-collection methods developments

B. Steinkampf attended a colloid workshop with presentations by investigators from LANL, LBL, LLNL, YMP, Weston, the Universities of New Mexico and Nevada-Las Vegas, Woodward-Clyde, and the Institute for Radiochemistry of the Technical University of Munich. Discussions focussed on YMP needs for colloid studies and the possibilities of information or technology transfer from the German program. Most of the ongoing colloid work throughout the world addresses organic (humic and fulvic) compounds, rather than inorganic colloidal material of the type expected to be most significant to the YMP. It was agreed that currently available information is insufficient to enable a confident estimate of the potential for colloidal radionuclide transport. The information base is equally inadequate to enable a satisfactory answer to the question "Should the YMP study the potential for such transport."

B. Steinkampf discussed with B. Delakowitz site characterization needs that must be satisfied by hydrochemical samples and field and laboratory hydrochemical data. Delakowitz agreed that selected properties (including Ph and Eh) must be measured *in situ*, and that rigorous sampling is mandated in order to obtain representative samples. Discussions also addressed the need for field analytical capability, and the desirable characteristics of a mobile laboratory. Delakowitz expressed interest in the hydrochemical data- and sample-collection equipment planned for purchase by the YMP. Steinkampf provided information on the system and contacts in Sweden.

Quality Assurance

Planning and Operations

Variances

3GWH008A Integrate hydrochemical tool test results (lab)

Tests have not been conducted because the tool has not been purchased. The purchase process will start the first week of September. No impact.

3GWH009A Integrate hydrochemical tool test results (field)

Tests have not been conducted because the tool has not been purchased. The purchase process will start the first week of September. No impact.

3GWH001M Submit weapons-holes data to PDA

No data collected or available.

Work Performed but not in Direct Support of the Scheduled Tasks

An estimated 30 hours were spent on the following:

B. Steinkampf participated in a tour of USGS HRF facilities and the site area with YMP staff and visitors from the Institute of Radiochemistry of the Technical University of Munich.

B. Steinkampf revised, following colleague review, an abstract to be included in the summary report of the results of the jointly sponsored YMP geochemistry and hydrology integration teams workshop.

Work Performed but not in Direct Support of the Scheduled Tasks (CONTINUED)

B. Steinkampf obtained and preliminarily examined the set of analytical data for borehole USW JF-3 from R. LaCamera (USGS/LV). The samples were collected as part of the DOE environmental monitoring program. Because the data indicate that the samples are representative of ground-water chemistry in the Topopah Spring Member of the Paintbrush Tuff, additional samples collected by the YMP for ^{14}C , $\delta^{13}\text{C}$, and ^3H analyses were sent to the NWQL for analyses.

B. Steinkampf attended a meeting in Albuquerque of selected members of the geochemistry integration team, SNL performance assessment investigators, and staff from the University of New Mexico Department of Chemical and Nuclear Engineering to discuss a strategy for determining the need for additional YMP colloid studies.

B. Steinkampf participated in a teleconference of the YMP geochemistry integration team. It was noted that the YMP 'engineering' group would meet August 20 and 21 to discuss repository design perspectives relative to thermal loading scenarios. Participant organization members were urged to notify relevant personnel so that representation at the meeting could be planned. M. Chornack was scheduled to represent the USGS. The next meeting of the team will be September 17, 1992 in Las Vegas.

SCP 8.3.1.2.3.2.3 Regional hydrochemical characterization 0G3313L2

Summary Account Manager - W. Steinkampf

Technical Activities

3GWH905 Select sample sites, phase 1

B. Steinkampf visited with National Park Service (NPS) staff at Death Valley National Monument (DVNM) to clarify YMP objectives relative to, and planned activities for, proposed data and sample collection at springs within the monument. NPS' primary concern is to preclude the interruption of wildlife use of sites to be sampled. The duration of work at each site will be such that the impact on wildlife use will be essentially non-existent.

3GWH910A Collect regional samples, phase 1

B. Steinkampf obtained a collection permit from DVNM staff and collected scoping samples for selected isotope determinations from Nevares Spring in the central part of the monument, and from Virgin Spring in the southern part. Analytical data from the samples will be used to determine the feasibility or suitability of the sites for YMP purposes, and will perhaps provide some insight to the nature of the regional flow system. Samples were delivered to the USGS NWQL and to Z. Peterman.

Quality Assurance

3GWH910A Collect regional samples, phase 1

B. Steinkampf completed chain-of-custody documents and prepared and submitted sample-collection reports for selected samples from USW VH-1 and the DVNM springs noted above.

Planning and Operations

Variations

WBS 1.2.3.3.1.3.3 Saturated Zone Hydrologic System Synthesis and Modeling

Principal Investigator - E. Ervin

LBL Principal Investigator - K. Karasaki

OBJECTIVE

To synthesize available data to develop a conceptual model; to make a qualitative analysis of how the system is functioning; to develop and evaluate porous-media and fracture-network methods for simulating ground-water flow and solute transport; and to estimate ground-water flow direction and magnitude for input to ground-water travel time calculations. (SCP Study 8.3.1.2.3.3)

SCP 8.3.1.2.3.3.1 Conceptualization of saturated zone flow models within the boundaries of the accessible environment OG3313A2

Summary Account Manager - E. Ervin

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GWM006 Synthesize hydraulic data at "H" wells

G. O'Brien continued to examine the water-level data from the "H" wells for their potential for earth-tide analysis. Final analysis of the data by O'Brien has been delayed because of the earthquakes in California and the need to examine their effects on the water levels at Yucca Mountain.

3GWM08AA Enter data to geologic model of the C-holes and site

This activity is complete. A decision has been made not to purchase the necessary GIS software for the geologic model of the C-holes. A conceptual geologic model for the C-holes was developed by A. Geldon. On the site scale, other studies, such as those under 8.3.1.4.2.2 are examining the use of a 3-D GIS for development of a geologic model of part of the Yucca Mountain area .

3GWM09AA Evaluation of conceptual model and existing data

LBL investigators worked on the test 2-D cross-sectional model of the large gradient area, developed by E. Ervin, to obtain initial water-table conditions. The TOUGH2 code is being used because it can simulate two-phase flow and true water-table (variably saturated) conditions and to integrate with the unsaturated-zone modelers who are using the TOUGH code.

E. Ervin attended a one-day field trip led by R. Spengler on fault features in the Yucca Mountain area. The trip included examination of the large block-bounding faults, broken zones, and the Ghost Dance fault. The conceptual model of the saturated-zone will include these large faults and consider their role in affecting ground-water flow.

3GWM06AA Prepare report on potentiometric map

The report entitled "Revised preliminary potentiometric surface map, Yucca Mountain and vicinity, Nevada," by E. Ervin, R. Luckey, and D. Burkhardt was sent for USGS colleague review with B. Lewis and S. Robison. The report describes the revised potentiometric map of 1988 average water levels for the vicinity of Yucca Mountain (scale 1:24,000) and details time-trend analyses, corrections made for temperature and density changes in the water levels of the deep wells, and a conceptual model of the flow system at Yucca Mountain.

Quality Assurance

Planning and Operations

3GWM003A Review (DOE final) study plan 8.3.1.2.3.3

Study plan 8.3.1.2.3.3, "Site saturated zone synthesis and modeling", went through final review by E. Ervin and T. Brady, was recompiled by SAIC, and formally transmitted to the YMPO reviewers for their concurrence. Informal, verbal resolution of the DOE comments was reached by all reviewers with the authors of the study plan. There were 115 comments by seven reviewers--consisting of 71 minor comments and 44 major comments.

Variances

3GWM06AA Prepare report on potentiometric map

Delayed two months because of prolonged illness of the principal investigator and unexpected difficulty in interpreting corrected water levels. Will delay milestone 3GW06M by at least two months, possibly more as review process of that milestone will be more difficult than originally anticipated.

SCP 8.3.1.2.3.3.2 Development of fracture network model 0G3313B2

Summary Account Manager - E. Ervin

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GWM011B Finish fracture mapping in the Crater Flat Tuff

A field trip to finish fracture mapping at Raven Canyon is planned for September to complete mapping in the Prow Pass Member of the Crater Flat Tuff.

3GWM017B Continue to assist LBL add outcrop data to model

The paper entitled "Fracture flow model in the saturated zone at Yucca Mountain," by K. Karasaki, LBL, and E. Ervin has received approval by USGS Headquarters in Reston. The paper is being prepared for a special issue of the Radioactive Waste and the Nuclear Fuel Cycle journal and outlines current fracture-collection efforts, use of the data in fracture modeling at the UE25c-hole complex, and the status of current fracture modeling at that multiple-well complex.

E. Ervin met with B. Dershowitz of Golder and Associates, Redmond, Washington, to use the Crater Flat fracture data in the new heterfrac module of the FRACMAN code. A minor bug was discovered in the code when the data were incorporated into the model. Golder and Associates is in the process of correcting the problem.

3GWM002 Develop conceptual model of fracture network

Analysis of the fracture data from the Crater Flat Tuff for formulation of the conceptual model at the C-hole complex is beginning. Work encompasses incorporating outcrop and borehole data (including some of the older hydrologic tests at the C-hole complex) into a 3-D stochastic model of fractures.

Quality Assurance

3GWM015B Revise fracture mapping technical procedure

E. Ervin and M. Chornack are revising Hydrologic Procedure HP-246,R0 Mapping Fractures on Outcrops for Hydrologic Studies. The procedure was reviewed by E. Verbeek, USGS, Geologic Division.

Planning and Operations

3GWM008B Coordinate LBL fracture-network modeling phase 2

E. Ervin and K. Karasaki, LBL, discussed results from Ervin's trip to Seattle to meet with Golder and Associates about the FRACMAN model. Another paper discussing inclusion of the fracture data from east of Little Skull Mountain into the fracture-network model is being planned.

Variances

3GWM015B Revise fracture mapping technical procedure

Delayed two months because of prolonged illness of the principal investigator and coordination efforts between HIP, GSP and USBR.

SCP 8.3.1.2.3.3.2 Development of fracture network model 0B3313C2

Summary Account Manager - K. Karasaki

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GWM06CA Complete radioactive waste conference journal article

This task is complete.

3GWM02CA Write report on borehole fracture data bias

The report entitled, "Techniques for evaluating the effects of borehole bias on fracture orientation distribution derived from boreholes," by S. Martel and J. Peterson, Jr. was further revised for publication.

3GWM07CA Design code cross verification

Four cases of LBL-LANL cross verification tests were conducted. For the two-dimensional transient cases, numerical results were compared against analytical solutions and excellent agreement was obtained. For the two-dimensional cases, where no analytical solutions were found, results look very reasonable. They have yet to be compared against the LANL results.

3GWM004C Write draft TRINET users manual

As a part of the TRINET user's manual, lists of input variables, internal variables, and subroutines were tabulated.

3GWM05CA Incorporate outcrop data to network model 2

Statistical analyses were conducted on the fracture outcrop mapping data obtained by E. Ervin and M. Chornack for scoping for model input. Fracture length distribution for most fracture sets show log-normal distribution.

Quality Assurance

Planning and Operations

Variances

3GWM02CA Write report on borehole fracture data bias

One of the authors (S. Martel) left LBL, which has delayed the completion of this task. The new estimated completion date is September 30, 1992.

WBS 1.2.3.3.2 Preclosure Hydrology

OBJECTIVE

To examine hydrologic conditions, including flooding, availability of water supply, and characteristics within and above the repository horizon; and to determine whether engineering measures that require excessive cost, or technology beyond that which is reasonably available, will be needed during construction or operation of the repository. (SCP Section 8.3.1.16)

WBS 1.2.3.3.2.1 Flood Recurrence Intervals and Levels at Potential Locations of Surface Facilities

Principal Investigator - P. Glancy

OBJECTIVE

To assess the flood and debris hazards at and near the potential repository surface facilities locations to allow adequate design of facilities to prevent or reduce hazards to an acceptable level. (SCP Study 8.3.1.16.1.1)

SCP 8.3.1.16.1.1.1 Site flood and debris hazards studies 0G3321A2

Summary Account Manager - P. Glancy

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GFR016 Analyze and evaluate FY91 flood data

Analyses and evaluations of FY91 flood data are nearly complete. Interpretations of the results of this work will take place later during the multi-year analysis phase. The multi-year analysis will compare and contrast FY91 floods with those that occurred during the period 1983-92.

3GFR002 Collect, analyze, evaluate FY92 flood data

Thunderstorm activity resumed briefly at Yucca Mountain on August 11, 1992. This storm was virtually documented by a time-lapse video camera mounted atop the HRF building at Jackass Flats and aimed at Yucca Mountain. The storm yield was slight and caused only minor runoff along some roadways. However, this storm provided a good test of the video documentary technique. It showed that the technique is very promising for documenting major, infrequent storm events at Yucca Mountain. The video camera is operated by D. Ambros for the regional/site meteorology study.

P. Glancy reconnoitered the results of a severe storm on July 14, 1992, that occurred on the north side of Mount Rose in northern Nevada. Intense rainfall caused a major fluvial debris transport problem. Viscous, sediment-charged runoff flowed into the Truckee River and caused a prolonged (5 days +) interruption of the municipal water supply for Reno. This event was a near disaster for the metropolitan area. The character of debris mobilization and transport for this event are significant to the Yucca Mountain study. This knowledge is particularly useful for interpreting complex evidence of debris flows from the geologic record, and for interpreting transport mechanisms that caused the deposits.

3GFR018 Reconnoiter Yucca Mountain to assess debris hazards

D. Grasso presented interpretive hypotheses for recent debris deposits that currently are superimposed on older Quaternary-age sediments along the channel boundary. These deposits provide particularly valuable evidence for evaluating the conditions of the probable maximum flood, and for identifying additional site areas where sediments may yield further data on the magnitudes and frequencies of future flood events.

Technical Activities (CONTINUED)

P. Glancy and C. Waythomas conferred with the field geomorphic staff at Geomatrix Corporation, at the sites of their neotectonic trenches in Midway Valley. They examined debris-flow deposits at the base of Alice Ridge and shared their interpretations with Geomatrix scientists. Geomatrix staff provided a tour of their trench exposures and shared interpretations of trench stratigraphy.

Quality Assurance

3GFR002 Collect, analyze, evaluate FY92 flood data

P. Glancy spent a considerable amount of time compiling FY92 flood and runoff data for transmission to the LRC.

Planning and Operations

Variances

3GFR018 Reconnoiter Yucca Mountain to assess debris hazards

This activity has been extended to the end of the calendar year, December 31, 1992.

Work Performed but not in Direct Support of the Scheduled Tasks

An estimated 50 hours were spent in support of the following tasks:

D. Grasso prepared documentation of current work on YMP SCP activity "Regional paleoflood evaluation" and submitted it to D. Appel and others. The draft report summarizes work that is in progress on the Amargosa River and Fortymile Wash and the scientific interconnections between the site flood and debris hazards studies and regional paleoflood evaluation. (30 hours)

D. Grasso began acquiring and preparing digital landscape (DEMs and DLGs), climatic (precipitation), and streamflow runoff data sets for the Yucca Mountain site area. These data are needed for site flood and debris hazards modeling. (20 hours)

WBS 1.2.3.6 Climatology and Meteorology

OBJECTIVE

To collect and analyze climatic, paleoclimatic, future climatic, and Quaternary hydrologic data to evaluate the suitability of the site.

WBS 1.2.3.6.2 Climatology

OBJECTIVE

To characterize the present, paleo-regional, local climate, and hydrologic conditions at Yucca Mountain, and to determine the magnitude and likely effects that future changes in climate will have on repository performance.

WBS 1.2.3.6.2.1 Change in Climatic Conditions

OBJECTIVE

To provide a baseline for determining the changes in climate that potentially affect the waste isolation capabilities of the site. (SCP Investigation 8.3.1.5.1)

WBS 1.2.3.6.2.1.1 Modern Regional Climate

Principal Investigator - R. Forester

OBJECTIVE

To develop a synoptic characterization of the modern regional climate to provide a baseline and a background for the interpretation of climatic variation. (SCP Study 8.3.1.5.1.1)

SCP 8.3.1.5.1.1.1 Synoptic characterization of regional climate 0G3621K2

Summary Account Manager - R. Forester

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GCR006 Hire personnel-establish criteria.
Completed April 23, 1992.

Quality Assurance

Planning and Operations

3GCR005 Develop Study Plan
D. Keefer has been working on a study plan, using the study plan developed for SCP 8.3.1.2.1.1 and adding sections to cover isotope work. Planned completion of the draft is September 30, 1992 with review by USGS and DOE from October 1992 through March of 1993.

Variances

3GCR007 Analyze precipitation data-regional network
3GCR008 Create/modify precipitation station
3GCR012 Release data
The University of Utah subcontractor, designated to do the work in these activities, has not been able to provide any services this year. No dollars have been spent. The activities have been incorporated in the 1993 Mission 2001 schedule as part of activities 3GCR013, 3GCR014, 3GCR015, and 3GCR016. Therefore, activities 3GCR007, 3GCR008, and 3GCR012 are suspended as of August 31, 1992.

WBS 1.2.3.6.2.1.2 Paleoclimate Study of Lake, Playa, and Marsh Deposits

Principal Investigator - R. Forester

OBJECTIVE

To establish the nature, timing duration, and amplitude of paleoclimate changes based on paleontologic, stratigraphic-sedimentologic, chemical, and mineralogic analyses of lacustrine sediments in or near southern Nevada; and provide a chronologic frame work for this paleoclimatic information. (SCP Study 8.3.1.5.1.2)

SCP 8.3.1.5.1.2.2 Analysis of stratigraphy-sedimentology of marsh, lacustrine, and playa deposits

0G3621B2

Summary Account Manager - R. Forester

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GCL002B Conduct reconnaissance - Las Vegas Valley
S. Lundstrom made an 18-mile traverse of the Spring Mountains at high elevations looking for cold climate features that would indicate presence of glaciers during the past. He found some ground patterns above the tree line that indicate the past presence of perennial snow or glaciers. More work will be done to verify his findings.

Quality Assurance

Planning and Operations

3GCL001B Hire and train staff

S. Lundstrom transferred to Las Vegas in July 1992 to provide support for this activity. Training was carried out during July and August. Activity completed August 31, 1992.

Variations

3GCL002B Conduct reconnaissance - Las Vegas Valley

3GCL003B Map sediments in the Las Vegas Valley

These activities have been combined and will be continued into FY93.

Work Performed but not in Direct Support of the Scheduled Tasks

S. Lundstrom obtained some hard-to-find literature on previous work done in this valley by J. Quade and others. This will provide a basis for doing work in future activities.

R. Forester attended the seventh Water Rock Interaction meeting held in Park City Utah. A number of presentations, including those on Yucca Mountain, dealt with climate-lake-ground water and paleohydrological topics that will be helpful in YMP studies.

K. Conrad compiled all of the paleontological information from Trench-14 and nearby areas.

R. Forester attended a planning meeting with the M&O contractor and DOE officials that dealt with developing new plans and milestones for the climate program and attended a PACS meeting to identify progress in climate program and problems with present efforts.

R. Forester completed about 75 percent of the draft on Lake Michigan titled "The Holocene limnological and climate history of Lake Michigan based on ostracode and stable isotope records." The paper is part of a project funded by the coastal erosion program and will be of value to YMP because it and companion manuscripts provide new information about the chronology of the Laurentide Ice Sheet collapse. That collapse should coincide with the Yucca Mountain region's transition from a wetter-colder climate to the modern warm-semi-arid climate.

R. Forester reviewed a manuscript for an AGU special volume for J. McKenzie, Switzerland, and another for Professor O Kinne, Germany, for Marine Biology.

R. Forester, K. Conrad, and R. Whitfield collected water quality and ostracode samples and measured on-site water properties for 26 lakes located along a climate effective moisture gradient from southern Louisiana through eastern New Mexico. This data is funded through and part of a USGS global climate change project, but will be available for paleoclimate reconstructions in the YMP study.

K. Conrad has submitted the lake water samples for cation and anion analyses, and measured alkalinity on a separate set of samples, and is processing the sediment samples for ostracodes.

R. Forester made preliminary inspections of meteorological data obtained by B. Parks for sites near Yucca Mountain. We hope to evaluate the magnitude of modern precipitation variability, especially with regard to El Nino events.

WBS 1.2.3.6.2.1.3 Climatic Implications of Terrestrial Paleocology

Principal Investigator - R. Forester

OBJECTIVE

To determine aspects of past vegetation change; and use vegetation records to provide quantitative estimates of changes in climatic variables for the southern Great Basin. (SCP Study 8.3.1.5.1.3)

SCP 8.3.1.5.1.3.1 Analysis of pack rat middens 0G3621G2

Summary Account Manager - R. Forester

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

Quality Assurance

Planning and Operations

3GCL101 Hire and train staff

With the exception of subcontractors who will do a majority of the work in this project, all USGS employees who will be involved are on board.

Variances

3GCL104 Examine pollen and ostracode spectra

3GCL102 Initiate H, C, O isotope analyses

3GCL103 Initiate paleobotanical studies

The University of Utah subcontractor, designated to do some of the work in these activities, has not been able to provide any services this year. A planned subcontract with the DRI was not put in place, so no work was done by DRI. No dollars have been spent. The activities have been rescheduled for 1993 as shown in Mission 2001.

WBS 1.2.3.6.2.1.4 Paleoenvironmental History of Yucca Mountain

Principal Investigator - J. Whitney

OBJECTIVE

To evaluate the paleoenvironmental record at Yucca Mountain and surroundings in light of inferred paleoclimate history of the southern Great Basin; to model soil properties in the Yucca Mountain region; to map surficial deposits; and to reconstruct the eolian history of the region. (SCP Study 8.3.1.5.1.4)

SCP 8.3.1.5.1.4.2 Surficial deposits mapping of Yucca Mountain area 0G3621I2

Summary Account Manager - E. Taylor

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GCH011A Create map surface dep-north third Yucca Mountain

Initial mapping and field checking of the 3.75 minute quadrangle #26 (EG&G base map at scale of 1:12,000) by S. Lundstrom is near completion.

Mapping of the 3.75 minute quadrangle #20 (EG&G base map at scale of 1:12,000) by S. Lundstrom has been started. This quadrangle includes extensive surficial deposits along the upper Yucca Wash.

Technical Activities (CONTINUED)

3GCH004A Conduct isotope analyses sediments/rocks.

J. Paces completed chemical processing of leaches from four samples collected from Midway Valley soil pits for U-series analysis. U and Th separates are currently counting on the alpha spectrometer. These samples should be representative of the best-developed K horizons or the most carbonate-rich zones within Bk horizons. Data from these samples will help to provide absolute ages for the older alluvial fan surfaces previously identified through Quaternary mapping by J. Wesling (Wesling's Q1, Q2 and Q3 surfaces). Pedogenic carbonate films, coating individual clasts are typically thin and difficult to physically separate. Future experiments may focus on leaching experiments involving whole or partial-clast leaching.

Quality Assurance

Planning and Operations

Variances

3GCH004A Conduct isotope analyses sediments/rocks

This activity has been rescheduled for FY93.

Work Performed but not in Direct Support of the Scheduled Tasks

S. Lundstrom reviewed an abstract by C. Menges on "Tectonics and ground-water hydrology for the UAE".

SCP 8.3.1.5.1.4.3 Eolian history of the Yucca Mountain region 0G3621J2

Summary Account Manager - J. Whitney

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

Quality Assurance

Planning and Operations

Variances

3GCH020C Conduct analyses-strontium/oxygen/carbon isotope

3GCH158C Conduct field trip-sand ramps

3GCH159C Evaluate isotope data

3GCH160C Prepare report concluding study

These activities have been rescheduled to FY93.

WBS 1.2.3.6.2.2 Effects of Future Climatic Conditions on Hydrologic Characteristics

OBJECTIVE

To determine the relations between climatic conditions and hydrologic characteristics in the vicinity of Yucca Mountain during and since the Quaternary; and to predict future hydrologic response to possible future climatic conditions. (SCP Investigation 8.3.1.5.2)

WBS 1.2.3.6.2.2.1 Quaternary Regional Hydrology

Principal Investigator - R. Luckey

OBJECTIVE

To investigate the hydraulic characteristics of paleoflood events and to compare them with modern flooding and related geomorphic processes; to determine past infiltration and percolation history at Yucca Mountain through isotopic and chemical analysis of water from the unsaturated zone; to determine past hydrologic conditions in the regional discharge area; to estimate the conditions and rates of infiltration and ground-water recharge during the Quaternary; and to determine the ages, distribution, origin, and paleohydrologic significance of calcite and opaline silica deposits along faults and fractures. (SCP Study 8.3.1.5.2.1)

SCP 8.3.1.5.2.1.1 Regional paleoflood evaluation 0G3622A2

Summary Account Manager - D. Grasso

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GQH008A Geomorphometric analysis of YM and vicinity

D. Grasso prepared a preliminary draft report outlining current, research, investigative activities on the Amargosa River drainage. Work focuses on modeling past stream flow from Fortymile Wash to the Badwater playa lake in Death Valley via the Amargosa River. The aim of this study is to determine the magnitude and frequency of past runoff from streams in the region of Yucca Mountain, particularly Fortymile Wash. It is anticipated that sedimentary strata, in the Amargosa River drainage basin, will provide hydrologic and chronological information of the relationship between streamflow runoff and known climatic events of the Holocene. These data will ultimately enable development of predictive models relating streamflow and future climate change.

D. Grasso, aided by C. Martinez (USGS-WRD, Las Vegas), continued preparation of a high-resolution, digital database of the Amargosa River drainage basin. Work is progressing on delineating drainages and computing basin area measurements. This work will provide needed data for quantitative analyses of the relationships between precipitation and streamflow runoff. Ultimately, these data will be used to compare modern and past streamflow events that have occurred in the region over the last 10,000 years.

D. Grasso and C. Martinez continued to prepare a precipitation database for southern Nevada and southeastern California. The data base contains monthly precipitation, 1968-92, for all NOAA recording sites (towns) surrounding the Amargosa River drainage basin. The data will allow regional evaluations of the distribution of precipitation related to historical flooding, and provide precipitation-runoff values for modeling past flooding.

D. Grasso began preparation of a multi-spectral satellite analysis method for mapping Quaternary-age alluvial surfaces in the Yucca Mountain region. The method will be applicable to alluvial fan, and possibly alluvial terrace, surface mapping. The advantage of the technique, is that it will allow rapid mapping of the relative age of surfaces, and enable identification of those areas most prone to flash flooding.

Technical Activities (CONTINUED)

D. Grasso continued to search for, and prepared, Landsat TM imagery, aerial photographs, and digital map data needed for geomorphometric analysis of paleoflood features in the southern Nevada and Yucca Mountain region. L. Smith (USGS-WRD, Carson City, Nevada), has been helping to download Landsat TM and DEM data sets, but has not had much success with the tape drive software utility on the Data General. We will continue to pursue putting these data into a usable format for this activity. A DI-1 was submitted to purchase the needed 9-track tape drive for the Las Vegas subdistrict office. The drive would greatly speed the process of preparing Landsat scenes and other digital map data that are commonly provided on 9-track digital tape. Currently, we have 18 tapes that are needed for this activity and we plan to procure additional data sets.

3GQH003A Reconnoiter YM and vicinity for paleoflood evidence

P. Glancy inspected three earthquake fault trenches dug along the foothills of the Sierra Nevada, by the Nevada Bureau of Mines and Geology. The trenches exposed multiple cycles of wildfire and debris flows. Radiocarbon dates on charcoal layers, located between debris flow deposits, would provide a chronology of the recurrence intervals of debris flow events in the area. The entire sequence appears very young, probably middle to late Holocene in age. If so, this evidence corroborates other evidence mentioned in earlier PACS reports that the Holocene was a time of pronounced debris flow activity in the Great Basin.

P. Glancy and D. Grasso, accompanied by C. Waythomas (USGS Sediment Research Group in Denver), met with S. Lundstrom of YMP, GSP at Yucca Mountain for a review of field techniques and concepts used in mapping Quaternary-age surface sediments. Glancy described his techniques to Lundstrom and Waythomas, and reviewed his study findings. Discussions centered on evidence of paleoflooding in the Fortymile Wash area and the development of hypotheses for interpreting this evidence. Thick, channel-wall deposits of Quaternary-age fluvial sediments in Fortymile Wash were examined for signs of hydrologic transport mechanisms related to past flooding. Buried soils contained within this approximately 50-foot thick sequence, indicate that episodes of landscape stability were locally interrupted by periods of more intense runoff and debris deposition.

D. Grasso presented interpretive hypotheses for recent debris deposition. Debris from late-historic flooding is currently superimposed on older Quaternary-age deposits along the channel boundary of Fortymile Wash. These deposits are particularly valuable in that they enable evaluation of the conditions of the probable maximum flood, and provide a means for identifying areas where fluvial sediments may yield further data on the magnitudes and frequencies of future flood events.

P. Glancy described the results of the paleoflood study of Coyote Wash to S. Lundstrom and C. Waythomas. The Coyote Wash trench deposits were re-examined for additional evidence regarding the mechanics of debris transport and deposition. Lundstrom described and demonstrated his techniques for geomorphologic mapping of Yucca Mountain sites. This joint exercise allowed and promoted coordination of geomorphic studies between the staff of HIP and GSP.

Quality Assurance

Planning and Operations

3GQH004A Final DOE review and approval of study plan

S. Keller (SAIC/Golden), continued to investigate the unusual delay by DOE to review and approve the study plan for this activity. At Keller's request, D. Grasso prepared a memorandum stating that early work on the regional paleoflood evaluation will not involve site impacting activities during the next 6 to 9 months. Keller hopes to speed up the approval process.

Variances

SCP 8.3.1.5.2.1.3 Evaluation of past discharge areas 0G3622B2

Summary Account Manager - E. Gutentag

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GQH012 Analyze water by NWQL and GSP isotope staff

Z. Peterman and B. Widmann, B. Parks, E. Gutentag, C. Faunt, and W. Steinkampf, spent several days in the field collecting samples at Yucca Mountain and vicinity. The primary objective of the trip, was to pump well VH-1 in Crater Flat and collect water samples at different time intervals from within the volcanic-hosted saturated zone beneath Crater Flat. Strontium and stable isotope analyses of water samples from VH-1 are needed for comparisons with data obtained from VH-2 further north in Crater Flat. Sr isotope data for VH-2 has unusually high $^{87}\text{Sr}/^{86}\text{Sr}$ ratios (0.7130) compared with data for other samples from elsewhere within the Tertiary aquifer. Analyses from VH-1 will be critical in helping to assess the extent of anomalous ground water isotopic compositions in this area. Also, unaltered, non-welded vitric tuff samples from the northern end of Crater Flat were collected to evaluate the possibility of localized recharge through this material. In addition to field activities in Crater Flat, water samples were collected from several wells in Franklin Lake playa in California. These samples will be analyzed for $^{87}\text{Sr}/^{86}\text{Sr}$ compositions for comparison with other samples from the Tertiary aquifer beneath Yucca Mountain, the Amargosa, and Crater Flat, and further characterization of ground water flow systems. S. Mahan and B. Widmann prepared VH-1 water samples for XRF and mass spectrographic analysis. Preliminary results, indicate that samples collected between 11:40 am and 12:10 pm have $^{87}\text{Sr}/^{86}\text{Sr}$ ratios lower (~0.711) than values obtained from VH-2 water and may suggest a more complex flow pattern than originally expected. However, additional time-series water samples collected later during VH-1 pumping have yet to be analyzed. Twenty-one water samples, collected from wells in the Franklin Lake playa area during the VH-1 sampling trip, also have been prepared and analyzed. Most samples have $^{87}\text{Sr}/^{86}\text{Sr}$ ratios of approximately 0.713 and are similar in isotopic composition to the data from VH-2 in northern Crater Flat. These data may indicate, that water from the Tertiary aquifer to the west of Yucca Mountain, is enriched in radiogenic strontium on a regional scale and is isotopically distinct from Tertiary aquifer waters to the east. We envision that data such as these are critical to deciphering flow paths and defining larger flow systems, however, additional data and modeling efforts are needed to accomplish these goals. S. Mahan submitted 26 water samples to K. Ludwig and K. Simmons for U-series isotopic analysis. Samples included well waters (both potable and brine) as well as spring discharge waters from Yucca Mountain and the surrounding region. Ludwig and Simmons have begun analysis of Yucca Mountain water samples for U isotopic compositions. Preliminary data indicate an average U concentration of approximately 3 ppb and $^{234}\text{U}/^{238}\text{U}$ activity ratios up to 4.

3GQH012 Analyze water by NWQL and GSP isotope staff (CONTINUED)

Z. Peterman completed the first draft of a manuscript entitled "Application of natural tracer isotopes to paleohydrologic studies" co-authored with J. Stuckless. The paper describes general techniques and theory of natural radioactive decay of Sr, U, Pb, Ca, and Nd isotopes in ground water systems, with specific findings from studies at Yucca Mountain and elsewhere. Samples of tufa from Nevares Spring, Death Valley, California have been prepared and analyzed for Sr concentrations and isotopic compositions by K. Futa, S. Mahan and B. Widmann. Peterman compiled initial analytical results which show a remarkable increase in Sr concentration with increasing stratigraphic height (and presumably age) in the spring mound. Sr contents increase in a fairly linear pattern from about 600 ppm at the base of the mound, to nearly 2000 ppm at the top (10 to 11 m above the base). The observed pattern of Sr variation must be recording a systematic change in the composition of the discharging water. Several samples from throughout the mound have been submitted to J. Paces for U-series dating. Preliminary Sr isotopic data do not appear to record a similar history of monotonic variability. $^{87}\text{Sr}/^{86}\text{Sr}$ values for tufa samples range from 0.7196 to 0.7205 and are all higher than the present-day spring water which averages 0.71902.

3GQH028 Analyze faunal samples modern springs FY-92

R. Forester reports that this activity is progressing according to his work schedule.

A report was submitted on August 31 concerning the following topic: "Springs, water chemistry, and ostracode occurrences in Colorado, Kansas, and New Mexico" by E. Gutentag, J. Downey, R. Forester, K. Conrad, J. Watson, K. Malmgren, and S. Buchanen.

3GQH004 Study/analyze results from wet/dry playas

R. Forester reports that this activity is progressing according to his work schedule.

3GQH007 Vegetation mapping phase 1

F. D'Agnese continued the preliminary vegetation mapping study (using ERMA). Supervised training and classification will continue through September.

3GQH008 Collect faunal samples from past discharge sites - FY92

J. Paces completed chemical processing of both leaches and residues from the four samples described last month (two additional samples from Site 199 and two samples from the "Horse Tooth" (Mammoth Tusk) locality along Highway 95) for U-series analysis. U and Th separates are currently counting on the alpha spectrometer. New data from these samples will be compiled, along with previously obtained data from Site 199 in early September, and synthesized in a preliminary geochronological model of discharge history of this site.

3GQH002 Vegetation distribution mapping Amargosa Desert

K. Turner continued work on vegetation analysis in the Amargosa which is being conducted in conjunction with past discharge. The corrected and updated data sets were processed and the manuscript was further developed in rough draft form: appendices, tables, and illustrations (including vegetation classification dendograms) were developed. GIS methods were used to develop initial vegetation maps.

3GQH300, 3GQH305, 3GQH306 Collect/sample ostracodes - playas New Mexico/Texas

No work was done for this activity because the playas in eastern New Mexico and western Texas have remained full. Dr. C. Reeves, of Texas Tech University, is expecting the playa lakes to return to normal sometime this fall if precipitation ceases or slows to normal.

Technical Activities (CONTINUED)

3GQH000 Conduct chemical analysis soil samples

The Geologic Division Branch of Geochemistry has not completed any analyses of the samples submitted in July.

Quality Assurance

Planning and Operations

Variances

3GQH002 Vegetation map Amargosa Desert

K. Turner and C. Faunt have quality controlled all of L. DeMarco's data. More time was required to correct some statistical problems with DeMarco's original analyses. The report is almost completed and is undergoing final GIS evaluation and reformatting.

Variances

3GQH011 Prepare report channel geometry

Report is due after summer field work by W. Osterkamp on or about September 9, 1992.

3GQH300,305,306 Collect ostracodes N. Mexico/Texas

This activity has to be postponed due to extremely wet climatic conditions in the field area. Abnormal climatic conditions have prevented collection of data at this time. It is hoped that data collection can begin either in October or November if climatic conditions change.

Work Performed but not in Direct Support of the Scheduled Tasks

J. Watson initiated a QA requisition request and purchase order, for a QA outside vendor calibration of a newly purchased ASTM glass thermometer. A. Lykins of the QA office assisted in this endeavor. Currently awaiting approval from L. Creager for thermometer calibration.

J. Watson discussed with P. McKinley issues involving 1) the transfer of technical YMP data from E. Gutentag to the USBR and 2) whether it still was acceptable for a PI to use his/her own form of sample collection documentation; this last consideration is absent from the new DOE Admin. Proc. 6.26Q. An ICN to this procedure concerning this item, will be forthcoming. It was discovered through conversation with Gutentag that the technical data transfer and requirements for transfer were being considered and handled by R. Luckey through L. Hayes.

J. Watson met with K. Larsen of QA office (Tech. Data Control) to discuss the various elements involved in putting together a TDP for a report and associated documentation written by M. Schmidt and others in 1986. How the LRC would accept the documentation and in what possible forms, were important matters discussed. Background information was obtained from other sources as to the status, nature, and origin of the report and which study plan/activity had responsibility for it. After getting some of this information, it was determined that G. Abends, A. Flint's QA person in Nevada, should be contacted for any further information concerning QA processing and responsibility. Still awaiting a response. May submit whole package nonetheless.

J. Watson attended the HIP-SZ QA meeting August 24. Basically the same issues as in the first meeting of the month were discussed with emphasis placed on the initiation of a grading package through an ACSR for J. Czarnecki and J. Downey's modeling activities.

Work Performed but not in Direct Support of the Scheduled Tasks (CONTINUED)

Contacted B. Arbogast, of Branch of Geochemistry, to get more specific information about actual lab analysis dates, to use on a TDIF submitted for playa and rock sample geochemical results to K. Larsen (Tech. Data Control), QA office.

SCP 8.3.1.5.2.1.4a Analog recharge sites 0G3622C2

Summary Account Manager - R. Lichty

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GQH012C Collect/reduce hydro data from remote sites FY92

T. Oliver entered the data from the July field trip into the NWIS database.

P. McKinley discussed the July field trip with T. Oliver and reviewed the data recovered during the trip.

On a daily basis, T. Oliver checked the NWIS database for DCP data and performed weekly data pulls from the LRGS to fill missing data.

3GQH012C Collect/reduce hydro data from remote sites FY92 (CONTINUED)

T. Oliver examined calibration data from two 21x data loggers that were found to need repairs.

P. McKinley reviewed the analysis and sent a copy to W. Rodman for QA approval.

3GQH014C Test PRMS model

B. Lichty used daily precipitation, discharge, max and min air temperature, and solar radiation data to develop a WDM (water data management) file for Stewart Creek.

B. Lichty configured Stewart Creek basin data into four simplified HRUs (hydrologic response units) to test and evaluate PRMS computations of potential and actual evapotranspiration, interception, snow accumulation, and melt timing.

B. Lichty decided the main discrepancy between observed and computed streamflow is caused by early simulated snow melt, and the problem may be corrected by refinements in HRU specifications and parameterization.

3GQH018C Prepare data report on Kawich: FY 91

3GQH019C Prepare data report on Stewart: FY 91

3GQH15CA Complete data report Kawich FY 85-90

3GQH16CA Complete data report Stewart FY 85-90

P. McKinley worked on the data report.

P. McKinley contacted H. Klieforth, a climatologist with the DRI, about historical weather data.

3GQH21CA Development of HRU analog basins

T. Oliver calculated average snow depth from the snow course notes for the April 1992 site visit. The snow depth data was then tabulated with map locations for each of the HRUs. The results were given to B. Lichty.

Quality Assurance

Planning and Operations

Variances

3GQH21CA Development of HRU analog basins

Completion of this activity is delayed while B. Lichty reviews the project to determine if enough data is available to model the basins using PRMS.

Work Performed but not in Direct Support of the Scheduled Tasks

B. Lichty attended the YMP-USGS orientation seminar. (4 hours)

SCP 8.3.1.5.2.1.4b Geochemistry of arid-zone infiltration 0G3622E2

Summary Account Manager - A. Riggs

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GQH003C Soil and moisture chemical sampling

Five caliche samples, eleven surface soil samples, and four boulder samples were collected. Whole rock analyses were made of three surface samples, three boulder samples and six caliche samples. Seven boulder samples were analyzed for Gd and B.

3GQH016D Select and preliminary mapping of micro watershed

The full complement of micro watersheds has been chosen and preliminarily mapped.

3GQH004D Install watershed monitoring instrumentation

Two ISSCO samplers have been sent in for maintenance.

3GQH010D Analyze/interpret CL-36 data, etc. by NMIMT

Total Cl content was determined for six caliche and three rock leachates.

Three boulder samples were crushed, leached, ground to powder, and extracted for Cl.

3GQH014D Long term meteorological monitoring

Long term monitoring was initiated and is continuing satisfactorily.

Quality Assurance

3GQH012D Quarterly bulk precipitation collection

Sample collection reports for all the quarterly bulk precipitation samples were prepared and shipped to the LRC.

A sample tracking system was prepared for all the bulk precipitation samples.

3GQH004D Install watershed monitoring instrumentation

A price quote on the soil moisture probe calibrations has not been received from CSU.

The soil thermistors are ready for calibration, but a price quote from Sverdrup will not be received before the close of the fiscal year.

Some soil heat flux plates have been purchased and others have been sent in for calibration.

3GQH018D Calibrate backup meteorological monitoring

A barometer was sent to HIF for calibration.

Planning and Operations

Variances

3GQH004D Install watershed monitoring instrumentation

This activity has been hampered by shortage of personnel, difficulty of having some of the instrumentation calibrated, and delays due to the spending freeze at the end of the fiscal year. Realistically, it should be completed by March 31, 1993.

3GQH002C Long term watershed monitoring

This activity obviously cannot start until the instrumentation has been installed (see 3GQH004D).

Work Performed but not in Direct Support of the Scheduled Tasks

Audit 92-07 consumed 60 hours in preparation and attendance time.

SCP 8.3.1.5.2.1.5 Studies of calcite and opaline silica vein deposits 0G3622D2

Summary Account Manager - J. Whelan

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GQH801A Hiring and training of geologists

This activity has been completed.

3GQH802A Install/calibrate new mass spectrometers

Efforts to install and calibrate the new stable isotope instrumentation in Rye's lab, are still encountering obstacles. The new Finnigan MAT 252 has returned from its R&R (repair and replacement) in Germany but, is now resting in its shipping crates awaiting the arrival of the company engineer to complete the installation; present schedules indicate that installation will begin again sometime between mid-September and early in FY93. The automated carbonate extraction apparatus (Kiel system) has suffered many hardware and software difficulties. During August the Finnigan engineer in charge of this installation returned to Germany to attempt to resolve some of the software problems and operation has improved since his return to Denver but the system has yet to run an entire carousel of samples (46) without some sort of malfunction.

3GQH809A Analyze samples - trench 14 original exposure

J. Whelan completed arrangements for detailed sampling of trench 14D, the long trench east of Exile Hill, and of sand ramp calcretes and fault-filling calcretes at Busted Butte. Relationships between fault events and cross-cutting mineralization at these trenches and exposures recently has been mapped in detail by C. Menges and J. Whitney providing the opportunity to date faulting events and to determine the stable isotope systematics of age-constrained pedogenic calcrete samples. This sampling is scheduled for the first week of September.

3GQH809A Analyze samples - trench 14 original exposure (CONTINUED)

J. Whelan received $d^{18}\text{O}$ data from opal from four trench 14 samples from Arizona State University; these numbers ranged from 24.0 to 31.3‰, but the lowest value was reported to be questionable due to abnormal behavior during extraction. At present the stable isotopes of the coexisting calcite from these samples has not been run; however, assuming a value of 20‰ for the coexisting calcite (trench 14 calcite oxygen isotopic compositions are $20 \pm 1\%$) shows that the opal-calcite fractionations indicate depositional temperatures at or below present day surface conditions. Indeed, some of the samples would indicate temperatures lower than 0°C! (Kita et al, 1985). This suggests, that the opal deposited from meteoric waters having $d^{18}\text{O}$ values higher than those that precipitated the calcite, probably as a result of evaporation. Assuming an initial $d^{18}\text{O}$ of the meteoric water of $\sim -13\%$, these opals precipitated at temperatures of -4°C to +7°C. At mean annual temperatures of 10°C and 20°C, these opals precipitated from fluids with $d^{18}\text{O}$ values between -12 and -8.3‰, and between -9.1 and -5.4‰, respectively. Based on the results of Benson and McKinley (1985), meteoric waters of -10‰ are certainly conceivable, as are ^{18}O -enrichments of several ‰ due to evaporation in the desert soil environment.

3GQH813A Evaluate total carbonate system - Yucca Mountain area

R. Moscati performed the following tasks related to development of cathodoluminescent (CL) stratigraphic sequence, for the fracture filling calcite found in Yucca Mountain drill core: photographed and catalogued CL traverses from 13 polished thick sections; compiled CL data in spreadsheet form; and made a literature review of applications of CL stratigraphy to calcite depositional histories.

R. Moscati described and sampled secondary calcite from fracture coatings or veins from 15 samples from drill cores UE25 a#1 and USW G-3. Moscati prepared polished surfaces from 15 samples of secondary calcite from drill core UE25 b#1H.

J. Whelan received $d^{18}\text{O}$ data from Arizona State University for eleven samples of opal/chalcedony from Yucca Mountain drill core. All of these samples were from the unsaturated zones of the sampled drill holes; the values ranged from 14.7 to 26.6‰. Assuming a value of -13‰ for the depositing waters, implies that these opals deposited at temperatures ranging from 10°C to 58°C (Kita et al., 1985); considering the assumptions involved, this agreement with present day rock temperatures and ground-water compositions, is very good and argues against high temperature hydrothermal fluids depositing the opal.

J. Whelan described and sampled secondary calcite (where possible), from 77 samples of drill core from drill holes USW VH-2, G-3, GU-3, and G-4.

D. Craft prepared eleven samples of deep carbonate veins for Pb isotopic analysis by R. Zartman and L. Kwak. Most samples are from below the water table in holes G-1, G-2, G3/GU-3, and G4.

3GQH814A Prepare reports for drill hole calcite/silica

B. Marshall revised his manuscript entitled "Origin of carbonate deposits in the Yucca Mountain area: results of strontium-isotope analyses at Trench 14 and Busted Butte. This paper will now be published in a WRI report.

3GQH815A Research sites for N-S speleothem transect

R. Moscati completed literature review of speleothem localities possibly suitable for this paleoclimate study.

Quality Assurance

Planning and Operations

Variations

3GQH802A Install/calibrate new mass spectrometers.

During July, the mass spectrometer of the Branch of Petroleum Geology had been utilized on a part-time basis to collect stable isotope data in support of this project. At the end of July, unanticipated power failure due to nearby road construction, resulted in a cascading burnout of electronic components in this instrument that still had not been remedied (largely due to lack of funding) by the end of August. No stable isotope data was collected by calcite/opaline silica project personnel during August.

3GQH804A Integrate/QA verify data re. Sol Canyon & Windy Wash

3GQH805A Prepare reports re. Sol. Canyon & Windy Wash

3GQH807A Integrate/QA verify data - deposits of known origin

3GQH808A Prepare reports - deposits of known origin

Due to unplanned activities by PI and delays in the installation of mass spectrometer, these activities are being replanned for FY93.

Work Performed but not in Direct Support of the Scheduled Tasks

J. Whelan continued preparation of four TDIFs for publication of the CASY paper "Stable isotope geochemistry of fault- and fracture-hosted calcite and ground-water carbonate, Yucca Mountain area".

R. Moscati completed 10 reading assignments.

Work Performed but not in Direct Support of the Scheduled Tasks (CONTINUED)

J. Whelan initiated steps for approval of Rye's lab, as QA vendor for collection of stable isotope data from silicates, sulfides/sulfates, and waters/hydrous minerals. This approval will greatly facilitate Calcite/Opaline Silica's ability to respond quickly to requests from other YMP investigations for miscellaneous stable isotope determinations.

WBS 1.2.3.6.2.2.2 Future Regional Hydrology due to Climate Changes

Principal Investigator - J. Downey

OBJECTIVE

To characterize the impacts of potential future climate changes on the regional and site surface-water system, the site unsaturated zone hydrology, and the regional and site saturated zone hydrology. (SCP Study 8.3.1.5.2.2)

SCP 8.3.1.5.2.2.1 Analysis of future surface hydrology due to climate changes 0G3622F2

Summary Account Manager - D. Grasso

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GFH202A Evaluate surface-water models - arid environment

Surface water models supported by the USGS, are under evaluation for use in this activity. The evaluation will determine how applicable each of these models is for use in the arid environment of Yucca Mountain. Models under evaluation are PRMS, HSPF, A634P, and DR3M. All areas are available with documentation and supported by the USGS. Of particular interest is how well these models can simulate measured (known) precipitation-runoff conditions in an arid environment. In some cases, for example A634P and DR3M, the model cannot adequately simulate low-flow conditions; a situation that commonly occurs.

Quality Assurance

Planning and Operations

3GFH100A DOE approval of study plan

S. Keller (SAIC/Golden) continued to investigate the unusual delay by DOE to review and approve the study plan for this activity. At Keller's request, D. Grasso prepared a memorandum stating how work on this activity will not involve site impacting exercises. Keller hopes that this effort will speed up the approval process.

Variances

Work Performed but not in Direct Support of the Scheduled Tasks

D. Grasso spent a considerable amount of time attempting, without success, to get digital image and map data prepared from 9-track tapes. Because the Las Vegas Subdistrict Office does not have a 9-track tape drive, we must rely on the District Office in Carson City. L. Smith, Carson City, recently supplied digital elevation models of Nevada, Yucca Mountain, and much of the Amargosa River drainage basin. These data sets will be compiled for use in this modeling study within the next few weeks. (30 hours)

SCP 8.3.1.5.2.2.3 Synthesis of effects of possible future recharge due to climate changes on hydrologic characteristics of the Yucca Mountain saturated zone 0G3622G2

Summary Account Manager - J. Downey

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GFH003C Conduct literature search for GSIS and future/quaternary ground water

C. Faunt continued literature search and reviewed reports on directional statistics, UNIX programming, UNIX scripts, AWK, and SQL.

J. Downey continued literature review on regional ground water flow systems, GSIS applications and geohydrology of arid lands, along with reports on INFORMIX SQL and Intergraph MGE.

F. D'Agnese continued literature search and review including: Rantz and Eakin (1971), and Anderson and Woessner (1992), and Bagley and others (1964).

3GFH023C Develop recharge/discharge estimates

F. D'Agnese continued building precipitation grid in ERMA.

F. D'Agnese worked with J. Downey on developing a precipitation-runoff technique based on Bagley and others (1964).

F. D'Agnese and K. Turner contacted K. Paris (SCS), to acquire soils survey data for state of California. (Since SCS is behind schedule on data base development of soil survey data, recharge and discharge calculations are delayed.)

F. D'Agnese continued preliminary vegetation mapping study (using ERMA). Supervised training and classification will continue through September.

J. Downey and F. D'Agnese continued development methods of calculating recharge and ET losses for the regional 3-D model. The data sets required, and their processing, were discussed in depth.

3GFH023C Develop recharge/discharge estimates (CONTINUED)

K. Turner continued work on vegetation analysis in the Amargosa, which is being conducted in conjunction with past discharge (to complete work begun by L. DeMarco). The corrected and updated DeMarco data sets were processed and the manuscript further developed in rough draft form: appendices, tables, and illustrations (including vegetation classification dendograms) were developed. GIS methods were used to develop initial vegetation maps.

3GFH021 Construct 3-D hydrogeologic framework model

C. Faunt continued correlating faults on 2D cross-sections so that correct attribution may be assigned in the computer.

C. Faunt and F. D'Agnese attended an instructional meeting conducted by B. Wales (Intergraph, Houston) at CSM Center for Geoscience Computing in which Wales demonstrated use of the recently developed user code in EP/SECT (cross-section modelling software). Also, completed during this three day meeting, was an overview of EP/DWT (a well translator interface for MGE), EP/MAP (geological map analysis software), and EP/GIMS (2.5D geological modelling software).

C. Faunt continued attributing cross-sections in EP/SECT.

3GFH005C Analyze hydrogeologic framework

The paper on structural analysis is complete. Final maps and figures are being prepared. A rough draft is being reviewed by F. D'Agnese, E. Gutentag, J. Downey and K. Turner.

K. Turner advised C. Faunt on selection of statistical methods to analyze the fault strike data.

C. Faunt and F. D'Agnese began work on paper describing the development of the hydrogeologic map of the Death Valley Region.

3GFH030C Construct schema for GSIS

C. Faunt and D. Perfect continued compiling water chemistry information concerning the regional area from existing USGS files and reports.

K. Malmgren continued entering data into database.

D. Perfect continued transferring township/range data to latitudes/longitudes.

F. D'Agnese continued terrain analysis for surface characterization (recharge, discharge, geomorphic, pedogenic, and hydrologic analysis).

F. D'Agnese and C. Faunt worked with B. Meier and K. Zumalt to update Intergraph software and re-arrange 3-D modeling project schema on Intergraph workstation.

F. D'Agnese and C. Faunt received training from K. Zumalt on creation and modification of project schema and attribute tables in Intergraph GSIS.

F. D'Agnese continued working with B. Meier (Intergraph) to develop a 2.5 dimensional terrain model of the study area to be used in visualization of the 3-dimensional model and YMP tour demonstrations.

3GFH030C Construct schema for GIS (CONTINUED)

P. Deaver (Intergraph, Huntsville) conducted three days of consulting to instruct C. Faunt, F. D'Agnese, J. Downey, and K. Turner on different methods of translating data into Intergraph MGE format. Faunt and Downey conferred on approaches for writing code to implement Deaver's Intergraph scripts.

J. Downey and C. Faunt began preliminary development of code to translate ARC data into an ASCII format that would be readable by Intergraph's ASCII Loader software.

3GFH026C Software QA documentation

J. Downey, C. Faunt, F. D'Agnese and K. Turner held meeting to discuss which software used by the activity would eventually need QA documentation.

J. Downey conferred with J. Watson concerning application of QA to the 3-D modeling effort.

3GFH027C Establish data transfer procedures

C. Faunt, F. D'Agnese, K. Turner, and J. Downey continued work on three open-file reports of GIS data sets. The reports are undergoing final reviews and edits.

J. Downey conferred with K. Kolm concerning review of paper on structural features of the Yucca Mountain area.

Quality Assurance

Planning and Operations

Variances

3GFH021C Construct 3-D hydrogeologic framework model

Completion of this activity is delayed because of the extended period of time required by Intergraph to develop a user defined software code.

3GFH005C Analyze hydrologic framework

This activity was not completed during the month of August as investigators were diverted to other project tasks.

3GFH022C Modify 3-D hydrologic framework

This activity was not started during the month of August and will not begin until completion of 3GFH021C.

Work Performed but not in Direct Support of the Scheduled Tasks

Attended the HIP-SZ QA section meeting on August 10, 1992. Topics discussed were any outstanding QA items that needed to be addressed. The main issues dealt with concerned outstanding AFRs from an audit for activities "QA" overseen by M. Ciesnik, and the need and applicability for QA grading through QMP-3.15 for Czarnecki's and J. Downey's modeling work.

J. Watson met with D. Gockel of the QA office concerning some requirements of documentation for J. Downey's "Chloride" software. Gockel requested another printout of the program for software validation and requested that J. Downey and/or J. Watson write up the user documentation for the program. The implementation of these issues awaits resolution by J. Downey and H. Claassen of other technical elements and specifics.

Work Performed but not in Direct Support of the Scheduled Tasks (CONTINUED)

J. Watson met with D. Porter, D. Gockel, and M. Ciesnik to discuss possible preliminary steps to be taken to initiate the grading process for J. Czarnecki's and J. Downey's activities, as well as to become more familiar with the various requirements involved in the whole ACSR formulation and approval process.

1.2.5 REGULATORY AND INSTITUTIONAL

OBJECTIVE

To support the Department of Energy (DOE)/HQ in the development of the site-related aspects of compliance with Nuclear Regulatory commission agreements, requirements, and policies, environmental and permitting requirements, and related DOE orders, and the development of site-related regulatory documentation; to plan and conduct environmental field investigations and transportation studies related to environmental compliance, permitting and repository design; to plan and conduct socioeconomics studies to assess the regional socioeconomic action studies; to coordinate Project activities with the community and state and local governments; and to plan and implement a public communication plan.

WBS 1.2.5.2 Licensing

OBJECTIVE

To support DOE by providing Project coordination and support of NRC interactions by providing input related to site aspects of proposed NRC regulation changes, and evaluate the impact of the regulation changes on the site activities, strategies, and plans; to support DOE/HQ in the development of site technical position papers by synthesizing site and site performance assessment technical information into Project positions; to develop draft position papers which support these positions; to perform technical evaluation of site data and related reports, technical reports, and conclusions, and draft position papers; to coordinate study plan review; to support the preparation of the semi-annual progress report for site investigations and assessments; and to coordinate and perform technical reviews of the site characterization program.

WBS 1.2.5.2.2 Site Characterization Program

Principal Investigator - W. Dudley, Jr.

OBJECTIVE

To support the DOE in the completion of the Site Characterization Plan; to provide ongoing technical planning and support of site characterization activities; and to integrate results into site characterization activities and programs as appropriate, monitor each site program, and serve as the interface between the principal investigator and the DOE/HQ.

WBS 1.2.5.2.5 Study Plan Coordination

Principal Investigator - L. Hayes

OBJECTIVE

To coordinate the preparation review and revision of SCP Study Plans.

ACTIVITIES AND ACCOMPLISHMENTS

A revised draft of the study plan YMP-USGS SP 8.3.1.2.2.6 (Gaseous-phase diffusion), incorporating author responses to State of Nevada comments, was compiled and transmitted to HIP (J. Woolverton) for final proofing.

The final recompilation of study plan YMP-USGS SP 8.3.1.2.3.3 (Site saturated-zone hydrologic system synthesis and modeling) was reviewed, and the document transmitted under TPO signature to the Project Office.

WBS 1.2.5.4 Environment

OBJECTIVE

To identify data requirements; to collect required environmental field data; and to prepare topical data reports.

WBS 1.2.5.4.8 Water Resources

Principal Investigator - R. La Camera

OBJECTIVE

To provide water resources environmental field activity planning documents, field data and analyses, and topical reports describing the results of field data analyses.

ACTIVITIES AND ACCOMPLISHMENTS

Technical Activities

3GWR0001 Ground-water level/springflow monitoring FY92

Ground-water levels were measured at twenty-seven sites. Springflows were measured at five sites. Water-level and springflow data were checked and filed, and data entry into computerized USGS databases continued.

3GWR007 Ground water monitoring report third quarter-FY92

Water-level and discharge data, collected during the third quarter were reviewed and compiled. Report for the third quarter was completed and distributed.

3GWR010 Aquifer pump test JF-3

Processing, checking, and reviewing of data in computerized USGS databases continued.

3GWR012 Instrument tracer well

Information required to obtain a BLM temporary-use permit at site AD-7 is being prepared.

3GWR018 Consult on revision to EFAP

This activity is complete.

3GWR019 Compile regional water resources data

FY91 data for monitoring network sites found in publications or received from other sources, were compiled, checked, and entered into USGS databases as appropriate. This activity is complete.

3GWR020 Compile water-use data FY91

Data for water year 1991 has been compiled. This activity is complete.

Technical Activities (CONTINUED)

3GWR004A Ground-water quality data collection

Water-quality measurements and samples were collected at four monitoring sites. This completes the water-quality data collection activity for this quarter and for FY92.

Quality Assurance

3GWR014 Capital equipment procurement

The cable and reel portion of the hoist system has been ordered from the vendor. Additional information required for the purchase of a truck-mounted crane (to complete the hoist system) was supplied to USGS procurement officials.

Planning and Operations

Variances

3GWR0001 Ground-water level/springflow monitoring FY92

Water-level data were not collected at MV-1 or AD-6. MV-1 was not measured because it does not have an access tube to allow water-level measurements. The access problems at MV-1 have been discussed with DOE/YMP and alternative corrective actions presented. Water-level data was not collected at AD-6 at owner's request, because it is temporarily the owner's only production well, and the owner fears a water level measurement may affect the operation of the well. Nearby well AD-5 is currently measured to provide for monitoring in the area.

3GWR010 Aquifer pump test JF-3

Processing of electronically collected data in the USGS computerized database was delayed by modifications required to permit proper identification of data sets. Modifications to the database have continued. Delays with this activity will not impact other monitoring activities.

3GWR014 Capital equipment procurement

Procurement of a hoist system and data-acquisition system should be completed by the end of the fiscal year and procurement of a mobile water-quality lab is planned for FY93. Alternative vehicles will be used in the interim which will not impact water-quality data collection.

1.2.9 PROJECT MANAGEMENT

OBJECTIVE

To provide overall management of the Yucca Mountain Project including: project control, quality assurance, technical integration, and interaction with other OCRWM Program demands on Project management activities.

WBS 1.2.9.1 Management and Integration

OBJECTIVE

To provide overall management of the Yucca Mountain Project including: technical integration and interaction with other OCRWM Program elements.

WBS 1.2.9.1.4 Records Management

Principal Investigator - L. Hayes

OBJECTIVE

To provide a Yucca Mountain Project Records Management System that will meet the requirements of: DOE-NNWSI, Quality Assurance Plan, DOE-NNWSI/88-9; DOE-OCRWM Records Management Policies and Requirements, DOE/RW-0194; and the Licensing Support System (LSS); and to establish and operate all local records centers.

ACTIVITIES AND ACCOMPLISHMENTS

To facilitate the records inventory and distribution schedule (RIDS), a YMP-USGS records inventory database has been developed. The underlying software has been adjusted as necessary to accommodate additional needs. A machine readable copy, of the required database output format, was retrieved from YMP, converted, and implemented into the existing database environment. Groups continued to be inventoried for the RIDS and data input into the database.

A modification to QMP-6.01, R5, "Document control", was prepared to incorporate the USBR documents and personnel needs. A draft Revision 6 also has been prepared.

Procurement packages for NCR-91-25 have been identified as not ready for submittal to the LRC due to administrative incompleteness.

Several packages of backlog material have been completed and submitted to the CRF.

Records received into the LRC are now found to be about 98% accurate. A major problem is QA designation on the records. An information sheet explaining QA designation usage, with a letter from the Chief, YMPB, has been prepared for distribution.

The LRC received 396 criteria related "stand-alone" documents and 90 packages which were date stamped and QVC'd. Thirty-four packages were verified and two packages received a "correction request". Thirteen criteria related packages containing 1562 pages were transmitted to the CRF.

The following approved controlled procedures and modifications have been distributed:

- HP-196, R1, Measurement of wind speed using a Met-One Inc. model 014A wind speed sensor.
- HP-194, R1 Approximation of relative humidity using a silica gel tower within unsaturated zone test holes as an aid in determining pumping efficiency.
- HP-219, R0 Method to install, operate & examine a recording streamflow gage using the fluid data - GII manometer system.
- HP-239T, R0 Method for removing traced drilling air from unsaturated zone boreholes.
- HP-240, R0 Method for analysis of Co2 gas samples by gas chromatography using Summit Interest SIP 1000.
- QMP-3.07,R4-M2 YMP-USGS Review procedure
- QMP-17.03,R0-M5 YMP-USGS Local Records Center

Eight full sets and at least one of each additional individual document of the 38 QAGR documents were issued. This issuance was accomplished by YMP-USGS document control for subissuance of this Project Office controlled document.

WBS 1.2.9.1.5 Training

Principal Investigator - L. Hayes

ACTIVITIES AND ACCOMPLISHMENTS

Various routine training functions were performed including providing YMP-USGS Orientation to newly assigned personnel; distributing individual reading assignments; scheduling DOE General Employee Training (GET); administering GET refresher exam for Denver participants; providing information regarding the status of participants' instruction assignment completions; distributing first reminder notices to participants with overdue reading assignments and second reminder notices to their appropriate managers; and processing USBR training records.

Reading assignments were distributed for the following procedures:

AP-3.3Q, R4	ICN 3 - Change control process
AP-5.9Q, R2	Qualification of existing data
AP-6.26Q,R0	Submission and documentation of non-borehole samples to the Sample Management Facility
AP-6.3Q, R1	Procedure for requesting samples for examination at Yucca Mountain Site Characterization Project Sample Management Facility
AP-6.4Q, R2	Procedure for the submittal, review, and approval of requests for YMP geologic specimens
HP-96, R1	Measurement of wind speed using a Met-1 Model 024A wind direction sensor
HP-194, R1	Approximation of relative humidity using a silica gel tower, cold trap, and molecular-sieve within unsaturated zone test holes as an aid in determining pumping efficiency
HP-219, R0	Method to install, operate, and examine a recording streamflow gage using the fluid data G-II manometer system
HP-236T, R0	Installation and operation of PVC Straddle Packer String in UZ boreholes for gas and water vapor sampling
HP-240, R0	Method for analysis of Co2 and/or gas sample concentrations by gas chromatography using Summit Interests SIP 1000

Upon receipt of updated HIP technical procedure assignment matrixes, issued requested reading assignments to the appropriate personnel.

Provided YMP-USGS participant training completion information for USGS Audits 92-07 and 92-08 and USGS Surveillance 92-S10.

Coordinated additional assembling of "User's Guide for the USGS Yucca Mountain Branch Nevada Test Site" and distributing of copies to appropriate personnel.

Draft QMP-2.07,R1-M4 was prepared to include the USBR in the YMP-USGS Instruction Program.

Hosted a visit by the YMPO Office Training Officer for their annual review of the YMP-USGS Training Program. They found our training program to be complete, functioning smoothly, and adequate.

WBS 1.2.9.2 Project Control
Principal Investigator - L. Hayes

OBJECTIVE

To provide Project management support in the areas of cost and schedule planning and control; to develop and maintain an integrated project management system; to implement performance measurement; to support the change control system; and to establish WBS.

ACTIVITIES AND ACCOMPLISHMENTS

Schedules were downloaded from Las Vegas for the first time during the July status process. Usually, several problems occur when a routine is exercised the first time and the schedule download was no exception. Several days were spent trouble shooting computer problems in Las Vegas as well as in Denver. However, a successful download and upload were finally accomplished and many lessons were learned.

The July cost reports were submitted. The draft of the July Monthly Status Narrative Report is in progress.

Planner/Schedulers met with several members of the technical staff, to determine if the dollarized earned value reflected what the technical staff had actually accomplished. The meetings provided an opportunity for the project control staff to show the PIs what extended schedule completion dates did to them from an "earned value" perspective. Analyses will continue to clarify a valid performance status during the August and September status processes.

Comparison reports from the July and June status schedules were generated to identify changes made to the USGS schedule by the M&O. Twenty-five new schedule activities were added by the M&O, 3 schedule activities were deleted, and 41 target dates were changed. Logic diagrams and activity listings were highlighted to identify the changes and distributed to the PIs for their review.

Statused summary accounts were generated and provided, along with the bar charts to the PIs. Mission 2001 summary account plans for FY93, FY94, and the outyears were generated along with a spread sheet identifying budgets by FY out to the year 2001.

A matrix was prepared for the TPO showing, by summary account (SCP activity), the FY92, 93, 94, and outyears budgets, and the number of scheduled activities supporting each account.

Perhaps the biggest challenge currently being undertaken, is identifying existing "open ends" in each SCP activity network and tracing this interface to other networks. Several outyear interfaces are old and may not support current logic. Also, ties have been made to support the Las Vegas schedule without a thorough analysis. Interfaces must be identified and documented, and discussed with the PIs, so that the PIs can judge whether the open ends are properly interfaced; and revise as needed.

WBS 1.2.9.3 Quality Assurance

OBJECTIVE

To establish and implement a Yucca Mountain quality assurance program.

WBS 1.2.9.3.1 Quality Assurance Program Development

Principal Investigator - T. Chaney

OBJECTIVE

To establish and maintain the QA program descriptions.

ACTIVITIES AND ACCOMPLISHMENTS

The following QMPs and/or Modifications were prepared as requested and returned to their respective authors:

OMP-1.01,R4-M1	Organization procedure (prerequisites review)
OMP-2.07,R1-M4	YMP-USGS instruction publications
OMP-3.04, R4	Technical review, approval, and distribution of YMP-USGS publications
OMP-3.07,R4-M2	YMP-USGS review procedure
OMP-4.01, R4	Procurement document control
OMP-5.01,R4-M3	Preparation of technical procedures
OMP-6.01,R5-M2	Document control
OMP-7.01, R5	Control of purchased items and services
OMP-7.04, R0	Vendor evaluation
OMP-16.04, R0	Control of quality deficiency reports
OMP-17.03,R0-M5	Local Records Center

The quality management procedure master list was updated and forwarded to the YMP-USGS QA Office.

In response to CAR-92-07, a major effort was initiated to update all YMP-USGS QMPs to accommodate the USBR working directly to the YMP quality assurance procedures.

WBS 1.2.9.3.2 Quality Assurance - Audits and Surveillances

Principal Investigator - T. Chaney

OBJECTIVE

To verify the QA program through periodic audits and surveillance of Project activities.

ACTIVITIES AND ACCOMPLISHMENTS

Audit finding and observation responses from Audits USGS-9203 and USGS-9204 were evaluated.

An audit of SCP Activity 8.3.1.5.2.1.4b (Audit USGS-92-07) was planned and conducted resulting in one audit finding.

An audit of the BGRA (Audit USGS-92-08) was conducted. The audit resulted in no findings or observations.

Audits 92-07, Geochem, and 92-08, BGRA were conducted.

The audit report of the USBR annual evaluation audit USGS-92-05 was written. The audit resulted in six audit finding reports and the temporary stopping of all USBR technical work. The USBR was not recommended for continued inclusion on the USGS AVL.

Audit USGS-92-09, USGS Denver Stable Isotope Laboratory, was conducted resulting in a recommendation for retention on the AVL.

A field surveillance was conducted of trench work being performed in Midway Valley by Geomatrix (Surveillance USGS-S12) resulting in no findings or observations.

Surveillance Plan USGS-92-S12, for DuPont Chemicals, Inc., a potential vendor to provide Freon gases, was submitted.

ACTIVITIES AND ACCOMPLISHMENTS (CONTINUED)

Vendor evaluations 92-E24, Met-One Instruments, Inc., and 92-E25, Air Products and Chemicals, Inc., were submitted recommending retention of both vendors on the AVL.

Vendor evaluation 92-E22, Satec Systems, Inc. was performed resulting in a recommendation that they be added to the AVL.

A prerequisite review of USBR SCP Activity 8.3.1.4.2.2 was conducted and a report recommending approval to proceed with quality-affecting activities was written.

Special investigative reviews for AFR-USGS-9112-02, AFR-USGS-9204, NCR-92-19, and NCR-92-25, were performed resulting in recommendations for closure.

WBS 1.2.9.3.3 Quality Assurance - Quality Engineering

Principal Investigator - L. Hayes

OBJECTIVE

To provide quality engineering support to the project through reviews of documentation and assistance with QA training.

ACTIVITIES AND ACCOMPLISHMENTS

The QA Implementation Advisor worked on the open items listed below during the month. Many open items required extensions or updates because the majority of time during the month was devoted to the transition efforts to bring the USBR program and personnel into the YMP-USGS QA program.

External Item(s): DOE/YMPO CARs YM-91-74 through YM-91-76 (software requirements), YM-92-29 (records packaging), YM-92-60 (post-installation testing), YM-92-63 (SGBSN calibration forms); and SDR-018 (calibration).

Internal Item(s): AUDITS: 9110-02 (YMP-USGS qualification records), 9115-01 & -02 (USBR QA program), and 9203-04 (TDIF submittals per PACS schedules); CARs: 91-01 (graded QA transition), 91-03 (unapproved vendors), 91-05 (procurement records), 91-07 (misinterpretation of QMP requirements), 91-09 (software requirements), 91-10 (exemptions from procurement QA requirements), 91-11 (scoping activities without documented authorization), 92-03 (management agreements), 92-04 (work authorization for SCP Activity 8.3.1.2.2.6.1), 92-05 (problems with manuscript processing), 92-06 (technical procedure requirements), 92-07 (USBR QA program problems), 92-08 (AP-5.1Q data submittals to LRC/CRF), 92-09 (seismic monitoring activities for 6/29 earthquake), 92-10 (procurements made by outside organizations); NCRs: 90-37 (calibration standards), 91-31 (QA Balance calibrations), 92-02 (SGBSN management agreement), 92-05 (USBR technical procedures), 92-06 (seismic publications), 92-08 (report processing), 92-13 and 92-14 (report processing), 92-26 (LBL activities), and 92-30, -31 & -32 (report processing problems).

Other miscellaneous actions involved, YMP-USGS Audit-92-05 regarding the USBR QA program. CAR-92-07 outlined actions that required several meetings with YMP-USGS and USBR management, to agree upon the transition plan and schedule of actions required to bring the USBR personnel under the YMP-USGS QA program. In addition, the CAR-92-07-required prerequisite reviews of four USBR technical activities requesting resumption or initiation was conducted.

Resolution of review comments for QMP-5.05 (scientific notebooks) continued. Management reviews were completed in accordance with QMP-5.03 during the comment/review cycle for several QMPs.

ACTIVITIES AND ACCOMPLISHMENTS (CONTINUED)

Approximately 110 software documents have been received, reviewed, and/or processed by the SCM Coordinator in accordance with QMP-3.03, R3. The configuration status log has been updated and technical contacts have been notified of the status of their software documents.

An agenda and minutes were prepared by the SCM Coordinator for the CCC meeting held on August 6, 1992. CCC review documentation was completed for each of the CCC reviews conducted at this meeting.

The SCM Coordinator conducted an evaluation of proposed software-related actions for USGS NCR-92-02. A report of the results was provided to the QA Office.

Corrective action for USGS CAR 91-09 has continued. These actions include tracking and follow up for 310+ software classification and control recommendations. A supplemental response was provided to update the status of corrective action associated with this CAR, which incorporates remaining software-related actions for USGS NCR-92-02.

Calibration records were input into the database, reports were printed, and assistance was provided for the DOE audit of calibration records.

WBS 1.2.9.3.4 Quality Assurance - Quality Overview

Principal Investigator - T. Chaney

OBJECTIVE

To provide reviews, analysis, and interpretations of QA requirements and application of QA to technical and scientific disciplines.

ACTIVITIES AND ACCOMPLISHMENTS

The July, open items and trend analysis report was issued. The second quarter 1992 quarterly open items and trend analysis report was written.

The tracking of open items has been assigned to B. Hersh. This involves input of the data, tracking the dates of assignment, and any other details necessary to keep the open items database current. Daily and weekly Status of Open Items were prepared and input to open items database for trending.