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

WBS 1.2.9.1.1

JUN 21 1995

Joseph J. Holonich, Chief
High-Level Waste and Uranium
Recovery Projects Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555

SUBMITTAL OF PARTICIPANTS' MONTHLY STATUS REPORTS (SCPB: N/A)

As you have requested, the U.S. Nuclear Regulatory Commission is on distribution to receive a copy of the Yucca Mountain Site Characterization Project participants' monthly status reports on a regular basis. Enclosed are the Civilian Radioactive Waste Management System Management and Operating Contractor, EG&G Energy Measurements, Inc., Lawrence Livermore National Laboratory, Los Alamos National Laboratory, Sandia National Laboratories, and U.S. Geological Survey monthly status reports.

If you have any questions, please call April V. Gil at (702) 794-7622.

Stephan J. Brocoum
Stephan J. Brocoum
Assistant Manager for
Suitability and Licensing

AMSL:AVG-3601

Enclosure: (NOT RECORD MATERIAL)
List of Status Reports w/encls On the shelf

— Part 1

102.8
WM-11
NH03

Change: rep ltr. Encl.
1 0

delete: NMSS/HLUR

cc w/encl:
A. B. Brownstein, HQ (RW-36) FORS
W. D. Barnard, NWTRB, Arlington, VA
R. I. Holden, National Congress of American Indians, Washington, DC
Elwood Lowery, Nevada Indian Environmental Coalition, Reno, NV
R. R. Loux, State of Nevada, Carson City, NV
Bob Price, State of Nevada, Carson City, NV
Cyril Schank, Churchill County, Fallon, NV
D. A. Bechtel, Clark County, Las Vegas, NV
J. D. Hoffman, Esmeralda County, Goldfield, NV
Eureka County Board of Commissioners, Eureka, NV
B. R. Mettam, Inyo County, Independence, CA
Lander County Board of Commissioners, Battle Mountain, NV
Jason Pitts, Lincoln County, Pioche, NV
V. E. Poe, Mineral County, Hawthorne, NV
L. W. Bradshaw, Nye County, Tonopah, NV
Florindo Mariani, White Pine County, Ely, NV
P. A. Niedzielski-Eichner, Nye County, Chantilly, VA
William Offutt, Nye County, Tonopah, NV
C. L. Sisco, M&O/TRW, Washington, DC

cc w/o encl:
R. A. Milner, HQ (RW-30) FORS
C. E. Einberg, HQ (RW-36) FORS
Samuel Rousso, HQ (RW-40) FORS
P. M. Dunn, M&O/TRW, Vienna, VA

LIST OF STATUS REPORTS

1. CRWMS M&O Monthly
   Summary Report, March 1995
2. EG&G/EM Progress Report,
   Remote Sensing Laboratory,
   April 1995
3. EG&G/EM Progress Report,
   Remote Sensing Laboratory,
   May 1995
4. LLNL YMP Status Report,
   April 1995
5. Los Alamos Monthly Highlights,
   February 1995
6. Los Alamos Monthly Highlights,
   March 1995
7. Los Alamos Monthly Highlights,
   April 1995
8. SNL Monthly Progress Report,
   April 1995
9. USGS Progress Report,
   April 1995

ENCLOSURE

Rec'd 6/2/95

WBS: 9.3.7
QA: N/A

Civilian Radioactive Waste Management System
Management & Operating Contractor

Monthly Summary Report

March 1995

Prepared for:

U.S. Department of Energy
Office of Civilian Radioactive Waste Management
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Prepared by:

TRW Environmental Safety Systems Inc.
2650 Park Tower Drive
Suite 800
Vienna, Virginia 22180

Under Contract Number
DE-AC01-91RW00134

102.8

ENCLOSURE 1

WBS: 9.3.7
QA: N/A

Civilian Radioactive Waste Management System
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EXECUTIVE SUMMARY

General Managers's Summary:

Field operations at Yucca Mountain saw the Tunnel Boring Machine (TBM) perform exceptionally well in March and progress farther than it had in any previous month. Tunneling remains ahead of schedule as a result. Significant deliverables included the Predecisional Draft version of the Proposed Thermal Loading Strategy, the Licensing Support System (LSS) Phase 1 Functional Requirements document, identification of additional potential rail routes through central Nevada, the Repository Layout Options Analyses Report, and completion of the Multi-Purpose Canister (MPC) Best and Final Offer evaluations.

The Management & Operating (M&O) organization continued to evolve as support for Strategic Planning was restructured. Most important, Memorandum Purchase Orders were issued to Sandia National Laboratories (SNL), Las Alamos National Laboratory (LANL), Lawrence Berkeley Laboratory (LBL) and REECo in support of the objective to consolidate participants under the M&O.

Highlights for this reporting period are as follows:

- **TBM Progress** - This period witnessed the best TBM progress to date. The face advanced 200m from construction station 3+49m to 5+49m. The ground condition at the beginning of the period was Category 1 (competent ground) and the primary ground support method was rock bolts with steel channel and wire mesh. Daily advance rates were averaging 10 meters per day. The last week of the period saw the ground condition deteriorate to Category 4 (loose, blocky ground) necessitating the use of steel sets as the ground support method. Falling material created voids that had to be filled to allow the TBM gripper pads to function properly. This slowed progress at the end of the period to less than a meter per day.

- **Site Facilities Interface** - Delivered Level III Milestone TM408 "Site Facilities Interface Final Report" to DOE on March 31, 1995.

- **LSS** - Satisfied a Level II and III milestone by delivering the LSS Phase 1 Functional Requirements document to DOE. This document represents the first of two documents detailing the functionality of the Licensing Support System.

- **Repository Layout Options** - Delivered Level III Milestone TM545 "Repository Layout Options Analyses Report" on March 31, 1995, on time.

- **MPC Procurement Activities** - Completed technical and cost evaluations of the MPC Best and Final Offers. Completed final signoff of the MPC Subsystem QA Classification. The Source Evaluation Board (SEB) report is in process.

- **Waste Package Conceptual Design Report** - Issued the first draft of the MPC with Disposal Container section of the Waste Package Conceptual Design Report. The Waste Package Conceptual Design Report is a DOE superstone due in September 1995.

- **MPC Subcontracts** - Finalized, approved, and delivered the M&O MPC Subcontracts Management Plan and the M&O MPC System Acceptance Plan. These documents provide direction for the execution of the MPC subcontract(s). The former sets forth the process by which the subcontracts will be administered, while the latter defines the activities and responsibilities associated with the acceptance or approval of subcontractor deliverables.

- **MPC Water and Gas Design Analysis** - Completed the design analysis of water and gases in the MPC. The MPC procurement specification is sufficiently stringent to ensure that the fill gas will cause negligible degradation of the MPC and its contents.

- **Alternative Rail Routes** - Evaluated and identified potential rail routes through central Nevada to supplement the routes identified in the Nevada Transportation System Study. The new routes were analyzed at the request of the Program Director to prepare for Congressional hearings. The route analyses were presented to the Director on March 1, 1995, where the advantages and disadvantages of several other potential routes were discussed.

- **Strategic Planning Reorganization** - Systems Analysis was combined with Strategic Planning and International Programs to make up a new Planning and Analysis organization.

- **Fuel Pellet Oxidation and Zircaloy Cladding Evaluation** - Prepared and issued the evaluation of fuel pellet oxidation and Zircaloy cladding. No fuel failures are predicted if the disposal container remains intact until its surface has cooled to the boiling point of water.

- **Thermal Loading Strategy** - Delivered the Predecisional Draft version of the M&O Proposed Thermal Loading Strategy for the OCRWM Program to RW-20. The strategy represents an integrated M&O position and defines near-term evaluations that must be performed before providing a recommended approach.

- **Yucca Mountain Surface Construction** - Completed fill at the surface conveyor tower. Started to construct bent foundations for the conveyor and pour concrete for the Exile Hill water tanks.

Performance Measurement Cost and Schedule Variance

WASTE MANAGEMENT SYSTEM
FY 1995
M/E March
CRWMS M&O PMS DATA (1000)

Actuals Thru 03/31/95

WBS	TITLE	CURRENT MONTH					FISCAL YEAR-TO-DATE					AT COMPLETE		
					VARIANCE					VARIANCE				
		BUDGET	EARNED VALUE	ACTUALS	SCHED	COST	BUDGET	EARNED VALUE	ACTUALS	SCHED	COST	BUDGET	FCST	VAC
1.2	YMP	11,281	11,593	9,868	312	1,726	56,198	53,865	49,092	(2,333)	4,773	118,308	119,931	(1,622)
3.0	WAST PROJECT	1,996	1,888	1,916	(108)	(28)	11,104	10,186	9,346	(918)	840	46,431	46,790	(359)
9.1	PROGRAM QUALITY ASSURANCE	323	323	311	0	12	1,701	1,701	1,598	0	103	3,817	3,742	75
9.2.1	SYSTEMS INTEGRATION	686	630	655	(56)	(25)	3,667	3,560	3,571	(107)	(11)	7,798	7,795	3
9.2.2	REGULATORY & LICENSING	249	209	181	(40)	28	1,060	1,007	1,014	(53)	(6)	2,381	2,360	21
9.3.2	STRATEGIC PLANNING	135	135	87	0	48	616	616	553	0	63	1,299	1,268	31
9.3.3	INTERNATIONAL WASTE MGMT TECH	72	72	62	0	10	334	334	261	0	73	712	676	36
9.3.4	EXTERNAL RELATIONS	216	216	157	0	59	1,178	1,178	920	0	258	2,359	2,359	0
9.3.5	PROGRAM CONTROL & ADMIN	180	173	230	(7)	(57)	1,000	980	844	(20)	136	1,991	1,898	93
9.3.6	INFORMATION MANAGEMENT SERVICES	877	877	740	0	137	4,722	4,722	4,970	0	(248)	11,137	11,322	(185)
9.3.7	CONTRACT BUSINESS MANAGEMENT	2,309	2,309	2,309	0	0	2,785	2,785	2,785	0	0	15,279	476	14,803
1.0.10.11	REPOSITORY IMPACTS	134	134	118	0	16	561	561	420	0	141	1,257	1,257	0
	TOTAL PROGRAM	18,458	18,559	16,633	101	1,926	84,926	81,496	75,374	(3,430)	6,122	212,768	199,873	12,895

* The first month of incorporating SAIC and IRG in the baseline has distorted current month earned value (EV). Fiscal year-to-date EV is correct. The current month position will correct itself next month.

CWBS 1.2 Yucca Mountain Site Characterization Project

Variance thresholds are not exceeded.

CWBS 3.0 Waste Acceptance, Storage and Transportation Project

Variance thresholds are not exceeded.

CWBS 9.1.1 Program Quality Assurance

Variance thresholds are not exceeded.

CWBS 9.2.1, 9.2.2, 9.3.2, 9.3.3, 9.3.5 Program Management and Integration

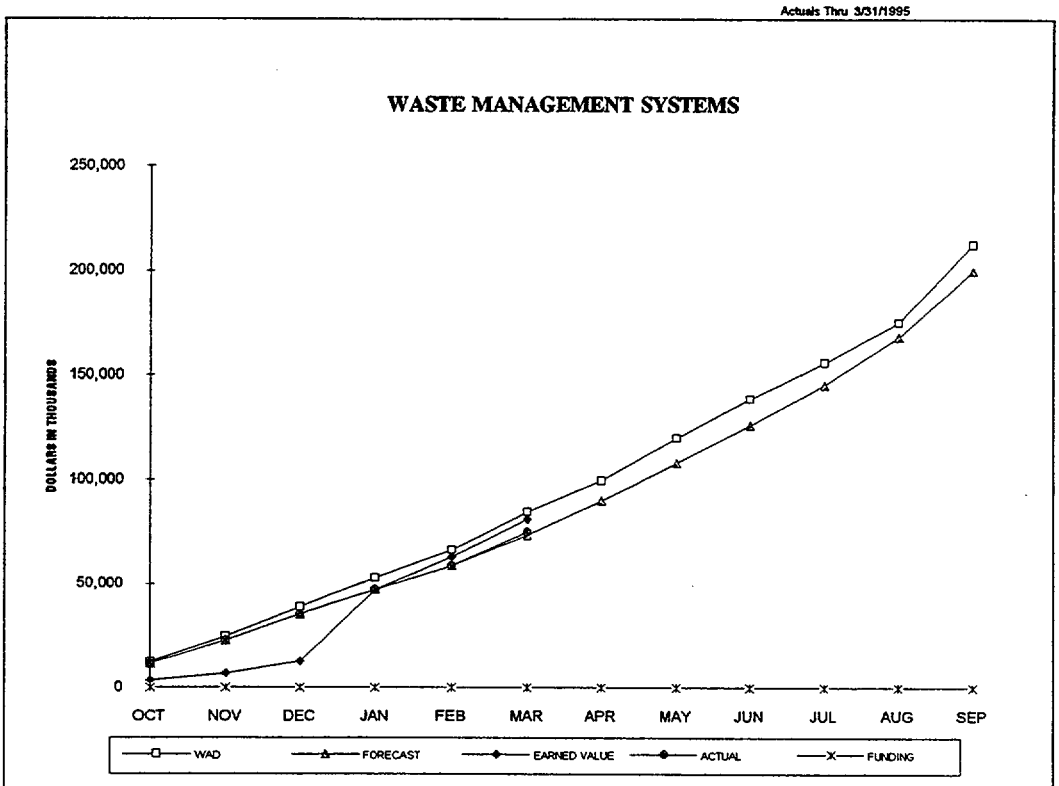
Variance thresholds are not exceeded.

CWBS 9.3.4, 9.3.6 External Relations and Information Resource Management

Variance thresholds are not exceeded.

CWBS 1.0.10 Repository Impacts

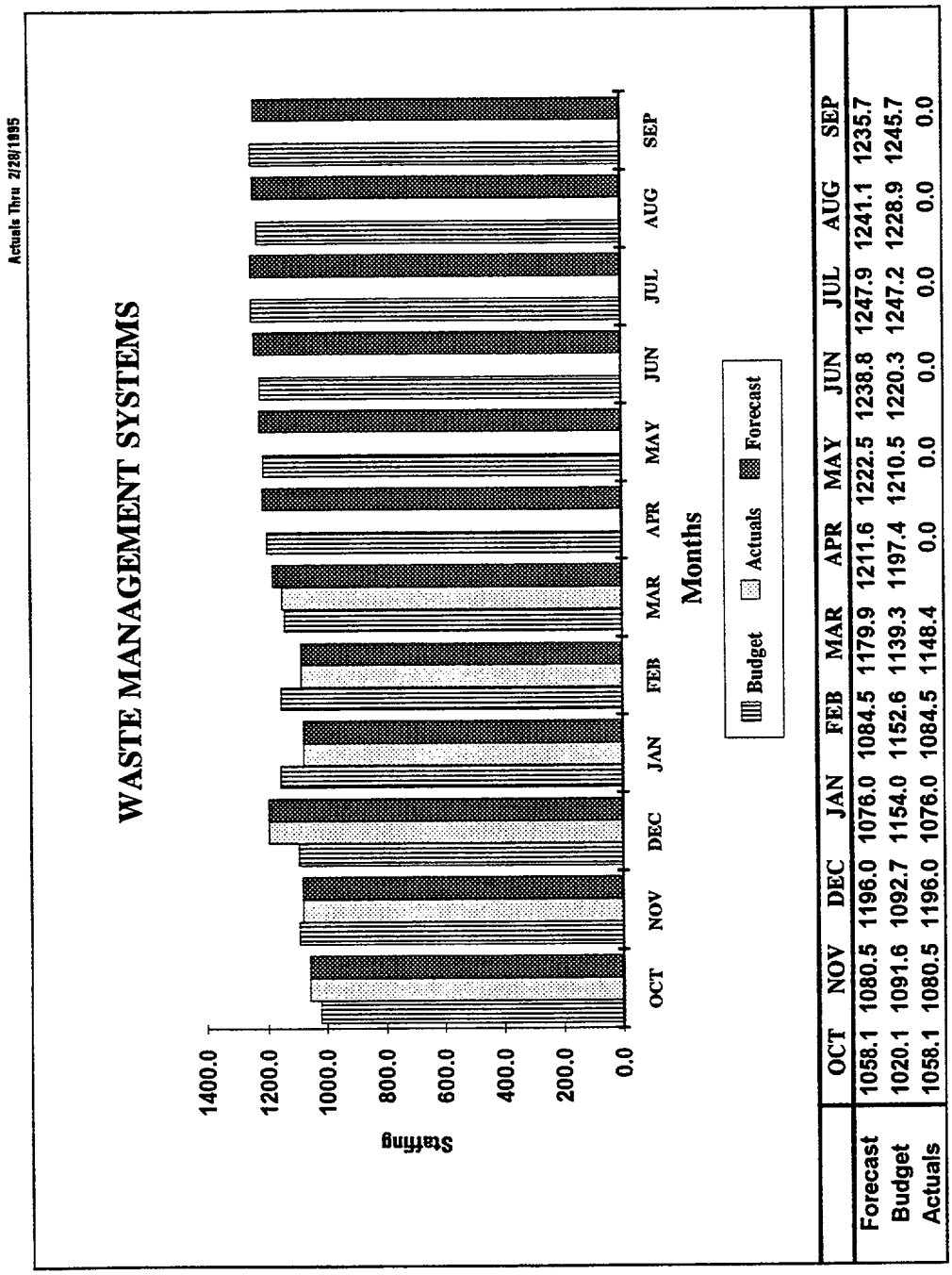
Continuing to work with the YMSCO Project Manager to redefine the deliverables and deliverable schedules.



		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MONTH	WAD	12,294	12,579	13,913	14,186	13,495	18,458	14,851	20,283	18,528	17,232	19,325	37,623
	FORECAST	11,433	11,483	12,527	11,776	11,522	15,163	16,146	17,910	18,217	19,375	22,398	31,923
	EARNED VALUE	3,340	3,320	5,975	34,478	15,823	18,559						
	MONTH ACTUAL	11,433	11,483	12,527	11,776	11,522	16,633						
	VAR/SCH	(8,954)	(9,259)	(7,938)	20,292	2,328	101						
	VAR/COST	(8,093)	(8,163)	(6,552)	22,702	4,301	***1,926***						
CUM	WAD	12,294	24,873	38,786	52,972	66,467	84,926	99,777	120,060	138,588	155,820	175,145	212,768
	FORECAST	11,433	22,916	35,443	47,219	58,741	73,904	90,050	107,960	126,177	145,552	167,950	199,873
	EARNED VALUE	3,340	6,660	12,635	47,113	62,936	81,495						
	ACTUAL	11,433	22,916	35,443	47,219	58,741	75,374						
	VAR/SCH	(8,954)	(18,213)	(26,151)	(5,859)	(3,531)	(3,430)						
	VAR/COST	(8,093)	(16,256)	(22,808)	(106)	4,195	6,121						
FUNDING	FY95 FUNDING	0	0	0	0	0	0	0	0	0	0	0	0
	PREV. FUNDED	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL FUNDING	0	0	0	0	0	0	0	0	0	0	0	0

Current and Cumulative Cost and "At Complete" Variances are a result of actual cost booking for carryover, SAIC, and IRG before their budgets have been baselined.

Total Program Financial Status



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Forecast	1058.1	1080.5	1196.0	1076.0	1084.5	1179.9	1211.6	1222.5	1238.8	1247.9	1241.1	1235.7
Budget	1020.1	1091.6	1092.7	1154.0	1152.6	1139.3	1197.4	1210.5	1220.3	1247.2	1228.9	1245.7
Actuals	1058.1	1080.5	1196.0	1076.0	1084.5	1148.4	0.0	0.0	0.0	0.0	0.0	0.0

Current month staffing variances are a result of actual costs booking for SAIC and IRG before their budgets have been baselined.

Total Program Staffing

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1. INTRODUCTION

1.1 PURPOSE AND SCOPE

This Management and Operating (M&O) Contractor's Monthly Summary Report (MSR) has been prepared to provide both the M&O and Office of Civilian Waste Management (OCRWM) managers with activity and cost updates. The MSR is a compilation of reports that addresses both the M&O Management and Contract Work Breakdown Structure (CWBS) (direct) elements. Each CWBS area reports Budget and Reporting (B&R) progress by describing activities during the reporting period, publications and presentations, and documenting issues and concerns.

1.2 ORGANIZATION OF THE MONTHLY STATUS REPORT

Section 1, Introduction, describes the purpose, scope, and organization of the M&O MSR and the criteria for Program Management Analysis and Performance.

Section 2, M&O Management Staff Activities, provides monthly activity summaries from Contracts and Subcontracts (C&SC), Finance and Administration (F&A), Human Resources (HR), Information Management Services (IMS), and Management Systems (MS) non-B&R activities when these activities meet the Program Management Performance Criteria stated in paragraph 1.4, below.

Section 3, Major System Acquisition (MSA) Projects, provides detailed summary reports from each of the following CWBS areas: Yucca Mountain Site Characterization Project (YMP) and the Waste Acceptance, Storage and Transportation (WAST) Project. In addition, Level 3 B&Rs for YMP and WAST that exceed the cost or schedule variance thresholds are reported in the Business Management section of YMP and the Project Management section of WAST. For this section, Work Authorization Directive (WAD) Cost and Schedule data charts accompany each WAD paragraph to support variance analysis descriptions.

Section 4, Program Support (PS), includes Program Quality Assurance (QA), Systems Integration, Regulatory and Licensing (R&L), External Relations (ER), Program Control and Administration (PC&A), Strategic Planning (SP), International Waste Management Technology (IWMT), Information Management Services (IMS), and Repository Impacts. The format of Section 4 was changed this month to consolidate the CWBS-level reports at the WAD level.

Appendix A, FY95 M&O Major Deliverable Status, identifies all major M&O deliverables as defined in the WADs. It further shows which items were delivered early, on-time, late, and/or have a changed date through the Baseline Change Request (BCR) process.

Appendix B, M&O Monthly Progress/Update Summary, provides monthly financial reporting data representing the B&R cumulative values for budgets, forecasts, Financial Information System (FIS) actuals, and variances.

1.3 PROGRAM MANAGEMENT ANALYSIS CRITERIA

Variance analysis thresholds for FY95 are calculated at the WAD level. These variance thresholds are +/- 10% for the cumulative cost and schedule.

The data is provided as a cost graph at the WAD level. Graphs are also provided at CWBS levels 2 and 3 for areas that contribute to a variance breaking a threshold at the WAD levels. The data contained in the graph represents budget, earned value, and forecast for new FY95 work, approved deferred work from FY94, and carryover work for FY94. The actual costs represent all of the above plus the FY94-95 carryover. Cost graphs also depict FY95 funding, previously funded values (FY94-95 deferred and carryover work), and a total with the two funding sources combined.

Basic and award fees will be shown in Appendix B, B&R #DB093700, Contract Business Management, which includes lease termination funds. These fees have not been budgeted nor booked since the FY95 Annual Plan and Fee Proposal have not been negotiated.

1.4 PROGRAM MANAGEMENT PERFORMANCE CRITERIA

Progress During Report Period lists activities related directly to the B&R. These activities represent significant M&O contributions and involvement and include:

- Progress toward achieving the milestones referred to as "superstones"
- Progress in accomplishing the applicable Performance Evaluation Plan (PEP) criteria
- Actions to correct previous deficiencies
- Significant developments that required expenditure of unplanned resources
- Significant presentations and publications.

Issues and Concerns

- Actions impeding progress toward achieving milestones
- Issues requiring DOE involvement or resolution
- Problems with program or project performance.

2. M&O MANAGEMENT STAFF ACTIVITIES

2.1 CONTRACTS AND SUBCONTRACTS

Contracts

- Received formal approval from the Contracting Officer (CO) to execute a lease for the OCRWM National Information Center at 600 Maryland Avenue, Washington, DC.

- DOE has requested a number of changes to the Prime Contract Appendix A. These requests must go through TRW's Cleveland office and legal review. Advised the CO that it would take approximately 60 days to complete.

- Received the FY95 definitization modification along with the basic Work Authorization Directives (WADs).

- Received Contract Modification A047, which increased the total value of the Prime Contract from $550,410,934 by $79,568,000 to $629,978,934. The additional contract value is associated with the value of REECo, Sandia National Laboratories (SNL), Los Alamos National Laboratory (LANL), and Lawrence Berkeley Laboratory (LBL). The total funding is now set at $517,479,879. The CO requires a fee proposal within 45 days to support negotiation of fee-bearing cost on the additional work effort.

- Working with the Administrative Contracting Officer (ACO) to revise and amend the approval process for the Extended Work Week (EWW). Anticipate the revision to allow the DOE Assistant Manager or Office Director to approve the EWW without review and approval of the ACO or CO. Should close on this issue within the next three weeks.

- Submitted annual report and other data to NN-514.2 for Foreign Ownership, Control, or Influence (FOCI) Certification.

Subcontracts

- Issued a Memorandum Purchase Order (MPO) for LANL.

- Negotiated an MPO with the SNL Contracts and Compliance Manager. SNL finalized and approved the SOW and the Transition Plan, and Martin Marietta's Deputy Technical Project Officer informed SNL that there were no further objections to his signing the MPO.

- A REECo MPO was sent out for signature.

- Continuing to evaluate the MPC proposals and secure DOE approvals.

2.2 FINANCE AND ADMINISTRATION

- Continued work on FOXPRO automation of the DOE monthly close process to provide better reporting and a more efficient process.

- Provided the weekly and monthly letter of credit reporting requirements to the Contracting Officer and to the Controller's Office.

- Worked operational issues in support of consolidating the National Laboratories to the M&O contract April 1, 1995.

- Transitioned SAIC property into the M&O Fixed Asset System.

- Began the indirect forecast in support of the FY96 annual plan.

- Supported the Inspector General Contract Audit.

2.3 HUMAN RESOURCES

- Facilitated a meeting with the General Manager, a Blessing and White consultant, and the M&O organizational development specialist during which the General Manager discussed the M&O vision, mission, and concept of operations development.

- Conducted training for M&O managers and supervisors in Vienna on TRW's new Dispute Resolution Process. This process has replaced the existing grievance procedure and includes, as its final step, the use of an external arbitrator.

- Facilitated a General Manager's meeting at which the AGMs and key staff heads discussed their employees in a relative rank order. In addition, "key contributor," "high potential," and "needs improvement" employees were identified.

- Met with the Deputy General Manager and Vienna AGMs to discuss the Opinion Survey, the action planning process, and progress against the current schedule.

- Extended offers for the Las Vegas summer hire program.

- Submitted the Contractor Salary-Wage Increase Expenditure Report on the exempt merit cycle to DOE.

- Conducted a Managing Personal Growth class in Las Vegas.

- Hosted and coordinated a training meeting for the new participants to introduce them to the new organization, roles, and responsibilities.

- Management Plan for Computer Based Training completed.

- Completed the YMSCO Quality Leadership proposal for conducting a Quality Self-Assessment.

2.4 MANAGEMENT SYSTEMS

- Responded to a General Accounting Office (GAO) question regarding OCRWM FY94 uncosted and unobligated balances being subtracted from the FY96 budget request; supported OCRWM in a meeting with the GAO during which the issue was resolved.

- Supported the Yucca Mountain Independent Management and Financial Review team meeting with the M&O on March 2, 1995, and subsequent budget and schedule discussions.

2.5 ISSUES AND CONCERNS

- None.

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3. MAJOR SYSTEM ACQUISITION PROJECTS

3.1 YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT CWBS 1.2

MANAGER: L. D. Foust

3.1.1 Mined Geologic Disposal System Operations

MANAGER: R. M. Sandifer

OBJECTIVE(S): Provide overall Systems Engineering services in support of the Yucca Mountain Site Characterization Project (YMP). Provide strategic planning and technical integration for the YMP.

3.1.1.1 Progress During Report Period

Advanced Conceptual Design Project Engineering

- Completed the Predecisional Draft version of the M&O Proposed Thermal Loading Strategy for the OCRWM Program and delivered it to RW-20. The strategy represents an integrated M&O position and defines near-term evaluations that must be performed before providing a recommended approach. Several internal reviews were coordinated and completed prior to delivery, including informal customer interactions and briefings to M&O management. This milestone was achieved through a joint effort with the Systems Engineering organizations in Las Vegas and Vienna and involved participation of several M&O and participant organizations.

- Coordinated and delivered a Mined Geologic Disposal System (MGDS) data needs description for thermal parameters in response to a verbal Yucca Mountain Site Characterization Office (YMSCO) request. The request stemmed from a YMSCO review of the "In Situ Thermal Testing Program Strategy" (SLTR95-0001) in which repository and waste package design needs were identified to help justify the need for in situ testing. The review concluded that the data needs were appropriate, that laboratory testing alone may be adequate to support design activities in some cases, and that in situ testing was needed for a specific subset of parameters and for validation of laboratory test data.

- Completed and delivered a letter to YMSCO containing integrated waste package and repository tiered schedules and a recommendation regarding reports consolidation. This was provided in response to a YMSCO request made in January 1995. The integrated tiered schedules are supported by more detailed schedules maintained within the M&O and are consistent with the results of the recent program rebaselining activities. The recommendation for reports consolidation impacted each of the planned Repository Waste Package Advanced Conceptual Design (ACD) Reports by recommending replacement of these reports with Technical Site Suitability (TSS), Environmental Impact Statement (EIS) Design Summary Reports containing somewhat different scopes and schedules more

responsive to TSS/EIS, Multi-Purpose Canister (MPC), and License Application (LA) milestone requirements. A response to the recommendation was requested from YMSCO.

MGDS Development

- Issued the first draft of the MPC with Disposal Container section, the first of three major sections of the design portion of the Waste Package Conceptual Design Report. The Waste Package Conceptual Design Report is a DOE superstone due in September 1995.

- Issued the Waste Package Cost Status Report. This is the first iteration of bottom-to-top analysis of waste package costs. Support for the Total System Life-Cycle Cost (TSLCC) analysis continued through March, although at a low level, to support the March presentations of TSLCC to the DOE.

- Completed the design analysis of water and gases in the MPC. Because the MPC procurement specification is sufficiently stringent, the fill gas will cause negligible degradation of the MPC and its contents.

- Prepared and issued the evaluation of fuel pellet oxidation and Zircaloy cladding. Specific degradation processes considered included oxidation of the cladding, oxidation of the fuel pellets to initiate a macroscopic split in a perforated fuel rod, and propagation of the split due to continued oxidation of the pellets. Evaluation included low and high mass loadings and no backfill or crushed tuff backfill. Results indicate that if the disposal container remains intact until its surface has cooled to the boiling point of water, no fuel failures are predicted. The disposal container is not expected to fail while it is still above the boiling point, because aqueous corrosion cannot occur.

- The effort at Pacific Northwest Laboratory (PNL) is being restarted slowly after the shutdown. The flow-through spent fuel dissolution testing and the Thermogravimetric Analysis (TGA) oxidation tests are being restarted. The dry bath oxidation testing is continuing at PNL. An interim examination showed that the oxygen-to-metal ratios have not changed during the last test period at temperatures of 195°C and below. The U3O8 and UO3 flow-through tests are continuing at LLNL. The UO3 leachate has a lower pH than that of the U3O8. Additional water chemistry samples have been taken to help explain the difference.

- Completed update input to TSLCC for the surface facilities.

- Completed work on the As Low As Reasonably Achievable (ALARA) program documents. Continuing work on qualifying computer codes used in the ALARA analysis. Completed the Life-Cycle Plan for the Verification and Validation (V&V) of MCNP-4A. Began cost-benefit analysis for the transportation cask impact limiters.

- Completed last preparations for the Nuclear Regulatory Commission (NRC) visit scheduled for April 3-6, 1995. Finalized the objective evidence notebooks, conducted training for all managers and Points of Contact for the visit, and finalized briefings in preparation for the visit.

managers and Points of Contact for the visit, and finalized briefings in preparation for the visit.

- Delivered Level III Milestone TM545 "Repository Layout Options Analyses Report" on March 31, 1995, on time.

- Completed general arrangements for the Waste-Handling Building (WHB) Cask Staging Shed and the Air Lock. Continuing development of other WHB general arrangements.

- Completed Quality Assurance Surveillance No. YMP-SR-95-019. The two-week-plus effort on evaluating the remedial action impacting Design Package 2C design output documents for completeness and acceptance prior to release of any design documents went very well. There were no Corrective Action Reports (CARs) generated as a result of the surveillance, but it was recommended that other design products previously released for similar processing to the quality of the 2C Package be examined. It was further determined that the extent of deficiencies corrected after previous audits was also effective.

- Working corrective actions found during the OCRWM Quality Assurance (QA) Audit from February 21-24, 1995. Reviewed the design area thoroughly for compliance with records keeping. Design Package 2C was especially scrutinized. It addressed cross-referencing, timeliness of record submittals, and protection of records. The Nevada Line Procedure (NLP) 3-19 is being cancelled due to closeout of the Raytheon Services Nevada (RSN) comments. Timely inputs to auditors' questions on potential concerns helped eliminate several other potential CARs.

- Coordinated Interface Control Working Group (ICWG) briefers including individuals from Waste Package Development, Repository Design, and Exploratory Studies Facility (ESF) Design and Title II Design. Discussed the high voltage requirements and associated concerns. The design group was tasked to answer the following: Item T2 - Analyze possible credible event regarding 12.47 Kv subsurface power and interface with Waste Package, and Item T3 - Review electro-magnetic interference compatibility of 12.47 Kv with testing control and communication requirements. Briefers indicated these issues were being addressed in their analyses, and designs and were not considered to be problems.

Construction Management

- This period witnessed the best Tunnel Boring Machine (TBM) progress to date. During the month, the face advanced from construction station 3+49m to 5+49m (200m or 656ft). The ground condition at the beginning of the period was Category 1 (competent ground) and the primary ground support method was rock bolts with steel channel and wire mesh. Daily advance rates were averaging 10 meters per day. The last week of the period saw the ground condition deteriorate to Category 4 (loose, blocky ground) necessitating the use of steel sets as the ground support method. Material falling out and creating voids that must be filled with sand, select fill, shotcrete, or a combination to allow the TBM gripper pads to function properly further hampered TBM advance. Filling voids slowed progress at the end of the period to less than a meter per day.

- Progress in surface construction was hampered at times during this period by high winds, rain, and flooding. In spite of the adverse weather conditions, reasonable progress was made. The erection and installation of the metal siding on the Switchgear building continued. Repairs to the Subsurface Switchgear Enclosure were completed by the supplier so that cable pulling in the ductbanks can begin. Installation of underslab utilities and foundations for the Change House building progressed. Earthwork continued on the access road for the surface conveyor. The first concrete pour on the Exile Hill water tanks was made. Completed fill at the conveyor tower and started construction of bent foundations for the surface conveyor. Construction was started on the tank pads and on the buried piping at the Booster Pump Station.

System Engineering

- Evaluated and identified potential rail routes through central Nevada to supplement the routes identified in the Nevada Transportation System Study. The new routes were generated at the request of RW-1 in order to prepare for Congressional hearings. The routes were presented to the Director on Monday March 1, 1995. During this presentation, the advantages and disadvantages of several other potential routes were discussed.

- Updated the MGDS portion of the Total System Life-Cycle Cost (TSLCC) estimate and provided it to the Vienna M&O for inclusion in the overall TSLCC estimate. Presented the MGDS and the overall TSLCC estimate to the RW-1 on March 14, 1995.

- Developed a subset of Exploratory Studies Facility Design Requirements (ESFDR) applicable to construction utilities for increasing the advancement rate of the TBM. This list will be subdivided into the following four categories: 1) does not impact the ability of the site to isolate waste; 2) Safety and Health; 3) supports testing needs; and 4) does not have negative impacts on the environment. These requirements are being documented to provide supporting evidence that the construction utilities approach will maintain the necessary control of the site characterization process until the Architect and Engineering (A&E) designed utilities can be installed.

- Developed the list of allocated requirements as a function of Configuration Item (CI) and coordinated them with the designers of the next design package (formerly 8A and more recently an extension of package 2C). This will aid the designers by fixing the allocated requirements outside of the design package review.

- Presented a recommendation on the contents of the Project Baseline Document to the Yucca Mountain Site Characterization Office (YMSCO) deputy project manager. Documents recommended for baselining are the Site Characterization Program Baseline (SCPB), YMP Cost and Schedule Baseline, ESF Design Requirements Document (DRD), Site Design and Test Requirements Document (SD&TRD), Surface Based Test Facility Requirements Document (SBTFRD), Repository DRD, and the Engineering Barrier DRD. Additionally, the deletion is recommended for Yucca Mountain Site Description (Basis for SCP Chapters 1-5), Conceptual Design of a Repository (Basis for SCP Chapter 6), Waste Package Design Basis (Basis for SCP Chapter 7), MGDS System Requirements Document, and the ESF "Tech Baseline"(upon completion of the SCPB, Revision 14) documents, currently in the

baseline. Generated four Document Action Requests (DARs) to delete these documents. This effort is the first step in a package approach preparation to accomplish the following in one Configuration Control Board (CCB) meeting: 1) QAP 6.2 Review Opened and Closed; 2) Change Request signed; and 3) the Change Directive signed.

- Completed the YMSCO Technical Document Preparation Plan, Revision 5, for the MGDS DRDs giving direction to the DRD preparers on how to revise the DRD by allocating requirements to CIs or Systems, Structures, and Components (SSCs).

- Delivered the TSLCC estimates for two scenarios to YMSCO: 1) a single repository at Yucca Mountain site with a capacity of 96,195 MTU, and 2) a first repository at the Yucca Mountain site with a capacity of 70,000 MTU (first of a two-repository system). The costs for a second repository for the remainder of the fuel were not included in this second scenario. These estimates will be incorporated into the CRWMS 1995 TSLCC.

- Delivered the Interim Study Report on the ESF Communications System Value Engineering Study to YMSCO. This was a formal deliverable.

Site Investigations

- Completed the preliminary draft of the FY96 Drilling Schedule and associated cost estimate. Discussed the draft schedule with YMSCO and M&O representatives. This schedule includes all the drilling and workover and hydrologic testing activities included in the amended 5-year drilling schedule and will be used as a baseline for subsequent FY96 planning.

- Completed the following Test Planning and Job Packages to allow surface based testing to proceed without interruption:

  - Borehole Workovers and/or Reviewing, Testing, and Instrumentation of UE-25 UZ#4, UE-25 UZ#5, USW UZ-6s, USW UZ-7, USW UZ-7a, USW UZ-13, USW NRG-6, USW NRG-7/7a, USW SD-7, and USW SD-12 (TPP T-94-02, Revision 1)

  - Borehole USW UZ-7a Drilling and Testing (TPP T-94-14)

  - Borehole USW UZ-7a Drilling and Testing (JP 95-15)

  - UE-25 UZ#5 Borehole Workover, Testing, and Instrumentation (JP 95-11).

Regulatory and Technical Evaluation

- Received headquarters concurrence on the 11th Site Characterization Progress Report on March 9, 1995. The camera-ready copy was transmitted to DOE Headquarters on March 10, 1995, for printing and distribution.

- Assisted the RW-1 Science Advisor in reviewing performance assessments and other Yucca Mountain Site Characterization Project activities at Sandia and Los Alamos National Laboratories.

- Provided the final draft of the Regulatory Compliance Review Report to Department of Energy Headquarters (DOE HQ) for transmittal to the NRC. This deliverable is a commitment to the NRC made in a DOE November 14, 1994, letter. The report documents the efforts to minimize adverse effects to Yucca Mountain and describes the considerations of 10 CFR 60 requirements incorporated into the Exploratory Study Facility (ESF) design package 2C.

- Completed work on the stratigraphic correlation between the U.S. Geological Survey (USGS) lithologic units and the Thermo/Mechanical model units. The results indicate that a correlation and consolidation of these units for Total System Performance Analysis (TSPA) modeling work is not practical.

- Delivered the MGDS License Application Annotated Outline Revision 0 on schedule to the NRC.

- Presented the DOE approach to calculation of pre-waste-emplacement ground water travel time at a DOE/NRC Technical Exchange. The approach consists of two calculations from the repository to the accessible environment—one under pre-waste conditions and the other under post-waste conditions. The NRC is considering the DOE approach to determine the probability of short paths and appears to be receptive to these methods of establishing the fastest path of likely radionuclide travel.

ESF Site Project Engineering

- As a member of the TBM Accelerated Schedule Management Team, coordinated the completion of accelerated schedule for conveyor procurement, construction, and TBM excavation. Presented schedule results to the Assistant Manager for Engineering and Field Operations (AMEFO) highlighting increasing the TBM advance rate to extend the DOE excavation goal for FY95. The accelerated schedule will be expanded to incorporate additional ESF support systems and facilities construction. The AMEFO emphasized the importance of safety in all accelerated schedule planning.

- Prepared a supplemental response to Site Characterization Analysis (SCA) Question 55 (concern about water from surface-water handling facilities percolating into the underground and affecting site characterization studies) and submitted it to the M&O Regulatory and Licensing Department for inclusion in the Site Characterization Report #12.

- Completed and submitted input for subsection 7.1, Exploratory Studies Facility Design, for Site Characterization Report #12. Continuing support, as required, will be provided through the compilation and reviews prior to being sent to DOE HQ for final review.

3.1.1.2 Issues and Concerns

- None.

3.1.2 Support Operations

MANAGER: D. K. Chandler

OBJECTIVE(S): Provides the products and services to support the CRWMS M&O contract for the YMP in Las Vegas, Nevada, in the areas of Information Management; Training; Institutional and External Affairs; and Environment, Safety, and Regional programs. The support operations include developing computer-based information applications; processing YMP records; providing performance-based training classes; implementing environmental, radiological, and safety and health monitoring and compliance programs; conducting regional socioeconomic studies; and providing public outreach programs, media and communications support, information products, and intergovernmental interactions.

3.1.2.1 Progress During Report Period

Information Management

- Held the kickoff meeting of the Forms Management Natural Working Group (NWG) on February 27, 1995. It included a video conference involving DOE and M&O from both Washington, D.C., and Las Vegas. Briefings were presented identifying the need for three Task Teams (Forms Management, Forms Design Standards, and AFS Architecture), Team Leaders, and the near-term milestones. The Forms Management NWG was chartered by DOE with a final deliverable due September 29, 1995. The purpose of this NWG is to define the current forms management system and identify deficiencies.

- Delivered Planning and Control System (PACS) View for Acceptance Testing on March 29, 1995. This was a major milestone for the PACS group.

- Completed and delivered the M&O Las Vegas submittal to the FY97 UNICALL to the DOE Information Resources Management (IRM) on March 31, 1995.

- Initiated remote Personal Computer (PC) surveillance using the Norton Administrator product. This allows software installed on all Novell clients from the Novell server to be verified and eliminates the need to physically examine each PC.

Environmental Safety and Health

- Received a beneficial use permit extension from the Nevada State Engineer for water well VH-1.

- Submitted a ground water discharge permit application for the mine evaporation pond to the Nevada Division of Environment Protection.

- Received permit approval for the hand-wash facility at Yucca Mountain from the State Division of Health.

- Submitted the draft Environmental Impact Statement (EIS) Annotated Outline to the Assistant Manager for Environment, Safety and Health (AMESH). This outline will be used in planning the EIS and its scoping activities.

- Published the Environmental Monitoring and Mitigation Plan Progress Report. This report details how the DOE successfully conducted site characterization activities to minimize significant adverse environmental impacts.

- Delivered a topical report describing the results of the cold air movement and upper level air diffusion studies conducted in the mountain terrain near Yucca Mountain to the AMESH.

- Delivered the final audit report of the comprehensive environmental, safety, and health audit of the Los Alamos National Laboratory to the AMESH.

- Submitted recommendations for enhancing the TBM ventilation system to properly remove and filter dust to the YMSCO Industrial Hygiene Safety Specialist.

- Submitted the final report "Focused Special Issue Audit 95-4 of the Yucca Mountain Site Characterization Project Hydrocarbon Spill Prevention Measures and Spill Reporting Requirements" for approval to the AMESH.

- Received YMSCO approval of the "Secondary Succession on Disturbed Sites at Yucca Mountain" topical report for publication. This report summarizes the natural recovery of vegetation on sites disturbed by DOE activities.

- Completed the Hazardous Substances Information Facility Report. This report is required for 1995 Nevada Hazardous Material Storage Permit renewal.

- Delivered the Yucca Mountain Biological Resources Monitoring Program: Progress Report, January 1994 - December 1994. This report summarizes environmental monitoring and impact assessment work accomplished in calendar year 1994 and fulfills annual reporting requirements.

- Distributed the YMP Socioeconomic Monitoring Program Employment Data Report for the period from October 1994 through December 1994 to representatives of the State of Nevada and affected units of local government and to other individuals and organizations on the mailing list.

- Transmitted Payments-Equal-to-Taxes property information packages addressing the period from July 1, 1992, through June 30, 1995, to appropriate Clark and Lincoln county officials.

Institutional and External Affairs

- Coordinated the Affected Units of Government meeting, March 10, 1995, in Las Vegas, Nevada. Discussions included updates on the TBM and ESF, transportation, and hydrology studies. Approximately 26 people were in attendance.

- Coordinated and conducted 18 tours to Yucca Mountain for a total of 388 guests. Also conducted a Public Open House tour for 130 guests. Tours for Charles B. Curtis, Under Secretary, U.S.Department of Energy; for guests from the Nuclear Energy Institute; and for guests from the National Association of Regulatory Utility Commissioners were of special interest.

- Staffed the YMP exhibit for the Society for Mining Metallurgy and Exploration, March 6-9, 1995, in Denver, Colorado. Approximately 2,500 people viewed the displays.

- Coordinated and conducted a Girl Scout Geology Merit Badge Workshop at the Las Vegas Yucca Mountain Science Center (YMSC) on March 25, 1995. Thirteen Girl Scouts earned their merit badges by participating in interactive presentations by YMP geologists, learning about rocks and minerals, hydrology and mapping, volcanology, and paleontology. Coordinated and conducted nine Lawrence Livermore Elementary School Science Study of Nature (LESSON) workshops. A total of 310 teachers participated in the workshops, which involved hands-on instruction in science activities that the teachers can use in their classrooms.

- Coordinated and conducted seven teacher workshops on the DOE's curriculum materials for schools--Science, Society, and America's Nuclear Waste. Twenty teachers participated in each of the workshops.

- Coordinated and conducted seven fifth-grade field trip workshops at the Las Vegas YMSC, including workshops on energy, geology, and environmental studies. A total of 440 students participated in the workshops and toured the YMSC.

- The Yucca Mountain Speaker Series "The Song of the Land" was presented by a representative of the Las Vegas Indian Center. Approximately 26 people attended the presentation. Staff developed an announcement for this presentation, published the announcement in newspapers, and distributed fliers.

Training

- Completed a proposal for conducting Quality Self-Assessment to the President's Quality Award for the YMSCO Office of Quality Leadership.

- Completed the Management Plans for CBT "Conversion of the YMP Orientation to Computer-Based Training Via the YMP Local Area Network" and "Alternate CBT/LAN Candidate Courses."

- Completed TRPC0100 "Complete 6th Estimate at Complete Training Class."

- Conducted the following training:

  - Developing an Estimate at Complete
  - Cost/Schedule (C/S) Performance Analysis Techniques
  - Planning, Scheduling, and Cost Estimating

- Computer Security Awareness Training
- M&O Program Indoctrination
- Regulatory Relations
- Inclusionary Records
- Total Quality Management (TQM) Awareness
- CRWMS M&O Overview
- General Employee Training
- General Employee Radiological Training
- Exploratory Studies Facility Visitor's Briefing
- American Red Cross; Standard First Aid
- Effective Listening
- M&O QAP-2-0 (Revision 2)
- M&O Project Overview
- Incorporated Research Institutions in Seismology (IRIS)
- General Underground Training
- PACS Orientation
- PACS Organization and Responsibilities
- Briefing PACS Reports
- Conduct of Operations.

3.1.2.2 Issues and Concerns

- Intermittent electrical outage at new Records location could impact operation of data base. Problem currently being handled locally.

3.1.3 Program Management Organization

MANAGER: R. G. Vawter

OBJECTIVE(S): The Project Management Organization (PMO) provides management support services to the YMSCO by preparing short- and long-term Technical Implementation Plans, integrated project schedules, and draft budget documents for DOE use in its Office of Management and Budget (OMB) and Internal Review Budget (IRB) budget process. The PMO facilitates YMSCO monthly management meetings and prepares YMSCO managers for the Directors Program Review meeting. PMO staff assist YMSCO in monitoring individual participant progress through operating the Planning and Control System (PACS) and through monthly budget and schedule performance analysis. The PMO facilitates YMSCO baseline management through its support of the Level 2 Configuration Control Board (CCB). The PMO provides individual WBS Level 3 Integrators to ensure coordination of each functional work area.

3.1.3.1 Progress During Report Period

- Satisfied a Level II milestone by delivering the Licensing Support System (LSS) Phase 1 Functional Requirements document to DOE. This document represents the first of two documents detailing the required functionality of the Licensing Support System.

- The Licensing Support System Advisory Review Panel met at University of Nevada at Las Vegas (UNLV) on March 22 and 23, 1995. In addition to the panel members, the M&O, YMSCO, and UNLV representatives attended. The major accomplishments included approval of the simplified approach to be used by DOE to determine which documents will be included in the LSS, virtual approval of the header data elements to be used in the LSS, and clarification of a perplexing document linkage suggestion. These decisions will permit DOE to proceed with easier, simpler, and less costly records reprocessing.

- Developed detailed draft guidance for a mid-year financial review of the Yucca Mountain Project. The proposed activity schedule is:

  - Phase 1: Proposed mid-year corrections development (DOE: 3/13/95 - 3/28/95).

  - Phase 2: Proposed implementation plan development (M&O: 3/28/95 - 04/12/95). This supports the Mid-Year Program Review scheduled for 4/27/95.

  - Phase 3: Proposed Implementation Planning Development (M&O/DOE: 4/12/95 - 5/6/95).

- Supported the YMSCO Assistant Manager's (AM) mid-year review. Provided evaluations of the current position and prepared the presentation charts. The YMSCO expressed appreciation for the PMO's support during the review.

- Revised and submitted the report "Proposed Draft DOE Technical Basis Report Scope and Content Guidance" to Assistant Manager of Suitability and Licensing (AMSL) for approval.

Continued efforts to identify and increase external technical colleagues' participation in the technical basis report outreach program.

- Evaluated the impacts of a proposed accelerated schedule for completing the Preclosure Radiation Safety High-Level Finding (HLF).

- Obtained approval for the proposed FY96 planning process from the YMSCO Quality Council. Briefed the plan for the detailed M&O planning portion of that process to M&O Nevada Assistant General Manager (AGM). The plan was accepted. This plan would result in a unified proposal for YMSCO workscope, budget, and schedule, including deliverables and acceptance criteria. The process would begin upon receipt of guidance from YMSCO expected April 17, 1995.

- Finalized the rebaselining summary schedule to include a roll-up of previously proposed site investigation activities. Development of cost loading, bases of estimates, and descriptive information are in progress.

- Facilitated external review and comment resolution processes for the Draft Surface Processes Technical Basis Report and provided a review of the Public Summary document. Compiled the National Academy of Sciences (NAS) informal comments on the Draft Report and proposed resolution alternatives. Continued efforts to facilitate NAS peer review.

3.1.3.2 Issues and Concerns

- None.

3.1.4 Business Management

MANAGER: D. B. Abel

OBJECTIVE(S): Provide overall Project Management, Project Control, Scheduling, and Administration and Facilities for the M&O.

3.1.4.1 Progress During Report Period

Project Management

- Completed the MGDS portion of the first draft of the Period 5 Self Assessment. This draft included a narrative describing how the measurement standards were achieved against the criterion as well as an adjective and numeric rating.

- Developed a statistical analysis of the status of MGDS deliverables to be used in developing a briefing to RW-20.

- Uploaded month-end February 1995 M&O cost, schedule status, and forecast-at-complete in preparation for the project mid-year review. Submitted variance analysis reports for month-end February status.

- Submitted a Cost/Schedule Change Request (C/SCR), DOE form YMP-048-R1, incorporating Technical and Management Support Systems (T&MSS) into the M&O and the Cost Accounting Standards 402 accounting change to the CCB to rebaseline PACS.

- Participated in a 2-day offsite with the Vienna M&O Performance Measurement Organization to discuss the M&O project control concept of operations for future requirements incorporating additional teammates and subcontractors, identification of system enhancements and efficiencies, and roles and responsibilities.

- Conducted seven briefing sessions for Affected Organizations on the new acceptance of deliverables process by the YMSCO, which begins April 3, 1995, as implemented through Yucca Mountain Administrative Procedure-5.1Q, Revision 2, "Document Development, Change, Review, Approval, and Acceptance Control." Began preparation of a procedure revision to clarify the acceptance process based on feedback from the briefing sessions.

- Completed testing data in the new database "Ready" (Review and Acceptance of Deliverables by the YMSCO); the database will be accessible to Affected Organizations for read-only access to view the status of deliverables submitted to the Plans and Procedures Department (PPD) for YMSCO acceptance review as of April 3, 1995.

Support Services

- Administrative Services has completed the integration of Space and Teltrack databases. This is a Continuous Improvement Process project to eliminate duplication of effort and strengthen data integrity. Efforts are underway to complete Teltrack data entry.

- The LV Purchase Requisition Tracking System (PRTS) database is now available for direct access by requesters for Purchase Requisition statusing. Training is underway.

3.1.4.2 Issues and Concerns

- None.

3.1.4.3 Variances

- Variance thresholds are not exceeded.

3.1.4.4 Schedule Variances

- TM101 - The letter from DOE moving the date of this activity has been delayed in the signature cycle. The letter is expected to be signed on May 30, 1995.

- TM199 - The Control Design Assumption (CDA) and Repository Concept of Operations (CONOPS) were two separate documents. The commonality of data of the documents provided an avenue to combine both documents into one. This required additional time to make the combined document cohesive.

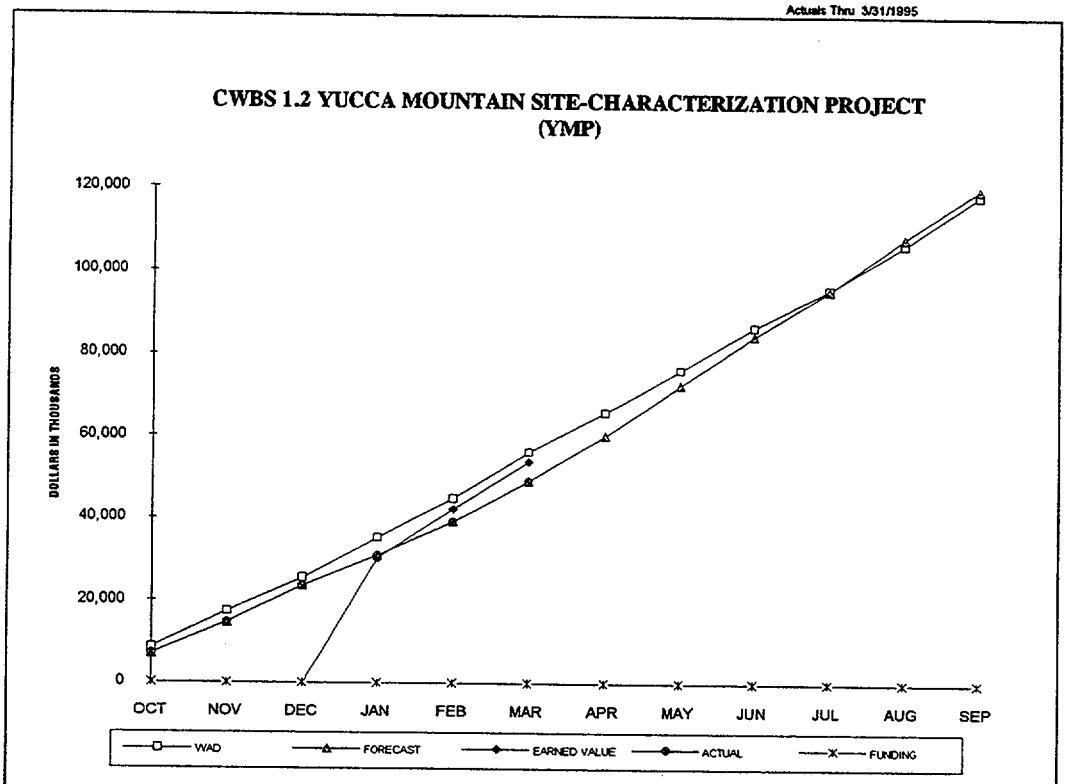
- TM139 - The TBM System Safety Analysis (SSA) and Mapping Gantry SSA took precedence over the Package 2C update. These SSAs were required in order to continue excavating the ESF.

- TM144 - Late definition in the study requirements and resources being directed to support another activity impacted the due date of this deliverable.

- TM140, TM565, TM566 - DOE requested that ESF design activities for Package 8A and Ghost Dance Fault (GDF) be accelerated. Package 8A was accelerated by 4 months. GDF was accelerated by 9 months. This impacted the requirements development for Package 8A. The update now had to include the GDF requirement in order to support the 9-month acceleration. A Cost/Schedule Change Request (C/SCR) was submitted by the ESF Project Engineering Office (PEO). However, DOE changed the direction and requested that Package 8A and GDF design activities become part of the Package 2C design. The work associated to support this change remains the same but the design review activities changed from 50% to 90% design reviews to External Reviews, which do not require the rigor for formal design reviews.

- TM650 - This activity is no longer applicable to the design. A Baseline Change Request (BCR) is pending to delete this activity.

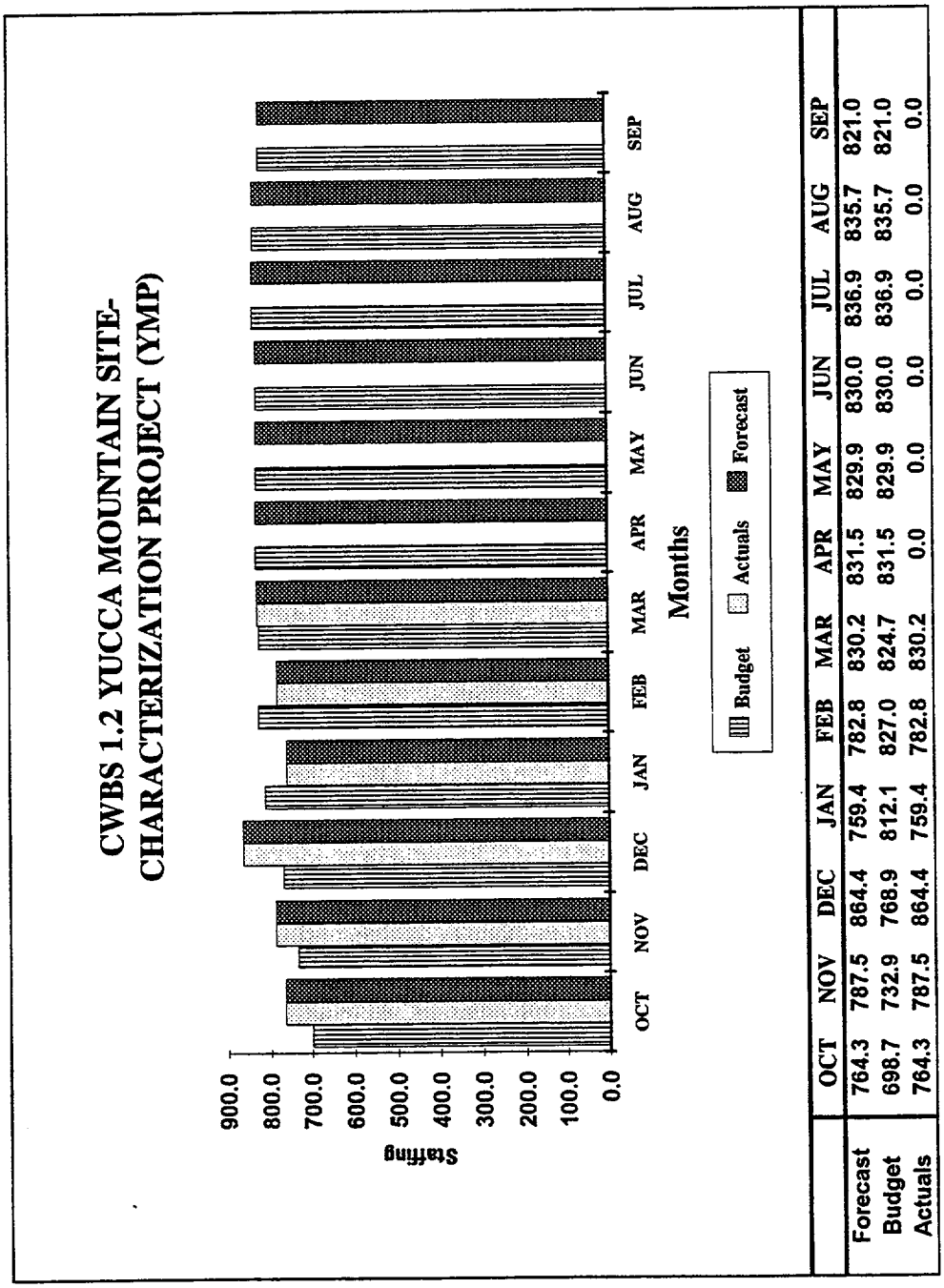
- TM806 - Waiting for a permit from the State of Nevada to finalize a change request. There is no impact to the schedule. A BCR will be submitted.



		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MONTH	WAD	8,764	8,754	7,976	9,850	9,573	11,281	9,694	10,397	10,383	9,168	10,684	11,785
	FORECAST	7,213	7,616	8,721	7,526	8,149	9,868	11,056	12,360	12,059	11,045	12,556	11,763
	EARNED VALUE	0	0	0	30,442	11,830	11,593						
	MONTH ACTUAL	7,213	7,616	8,721	7,526	8,149	9,868						
	VAR/SCH	(8,764)	(8,754)	(7,976)	20,592	2,257	312						
	VAR/COST	(7,213)	(7,616)	(8,721)	22,916	3,681	***1,725***						
CUM	WAD	8,764	17,518	25,494	35,344	44,917	56,198	65,892	76,289	86,672	95,840	106,524	118,309
	FORECAST	7,213	14,829	23,550	31,076	39,225	49,093	60,149	72,509	84,568	95,613	108,169	119,932
	EARNED VALUE	0	0	0	30,442	42,272	53,865						
	ACTUAL	7,213	14,829	23,550	31,076	39,225	49,093						
	VAR/SCH	(8,764)	(17,518)	(25,494)	(4,902)	(2,645)	(2,333)						
	VAR/COST	(7,213)	(14,829)	(23,550)	(634)	3,047	4,772						
FUNDING	FY95 FUNDING	0	0	0	0	0	0	0	0	0	0	0	0
	PREV. FUNDED	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL FUNDING	0	0	0	0	0	0	0	0	0	0	0	0

Current and Cumulative Cost and "At Complete" Variances are the result of actual cost booking for carryover, SAIC, and IRG before their budgets have been baselined.

Figure 1. Yucca Mountain Financial Status



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Forecast	764.3	787.5	864.4	759.4	782.8	830.2	831.5	829.9	830.0	836.9	835.7	821.0
Budget	698.7	732.9	768.9	812.1	827.0	824.7	831.5	829.9	830.0	836.9	835.7	821.0
Actuals	764.3	787.5	864.4	759.4	782.8	830.2	0.0	0.0	0.0	0.0	0.0	0.0

Current month staffing variances are a result of actual costs booking for SAIC and IRG before their budgets have been baselined.

Figure 2. Yucca Mountain Staffing

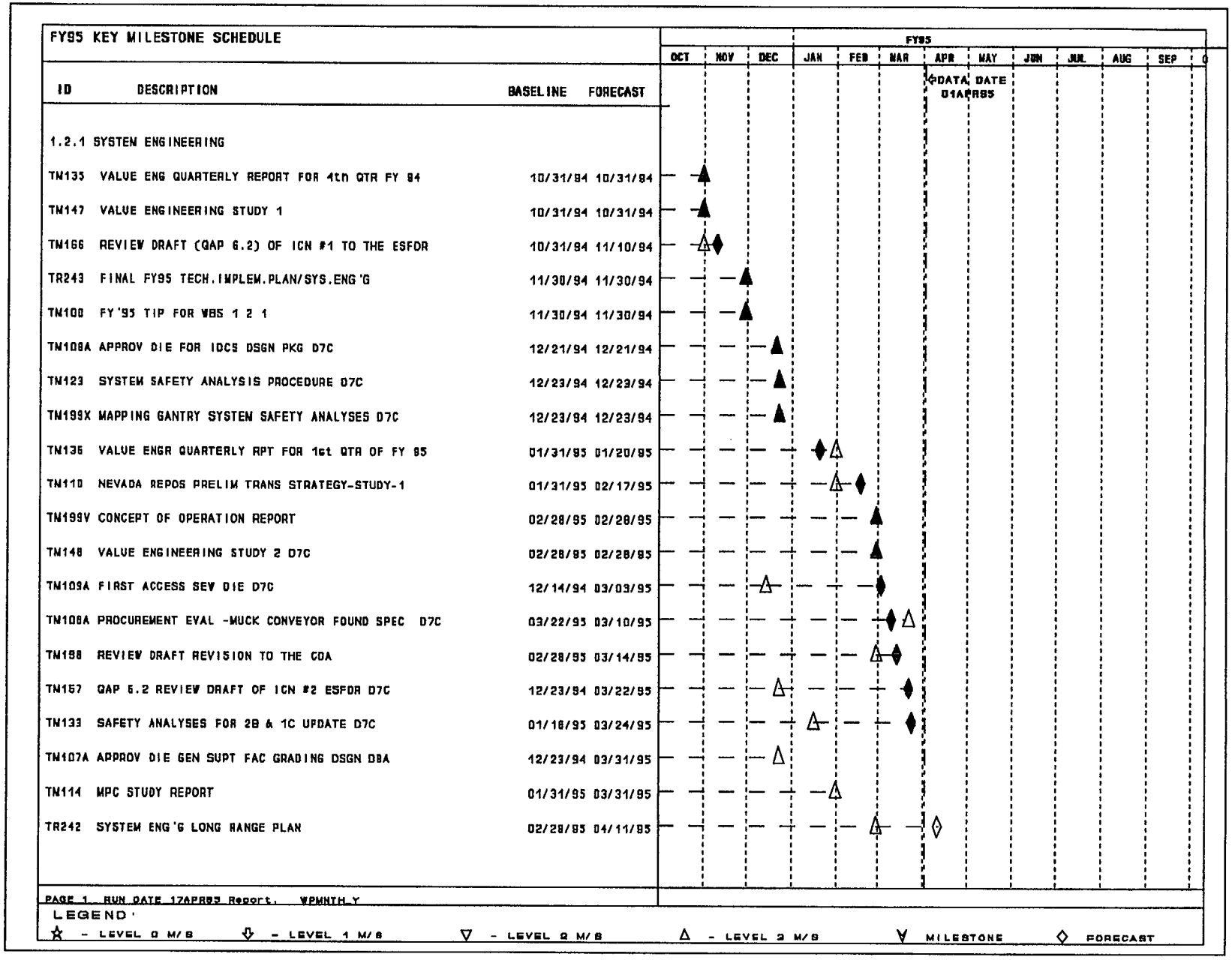


Figure 3. Yucca Mountain Key Milestone Schedule

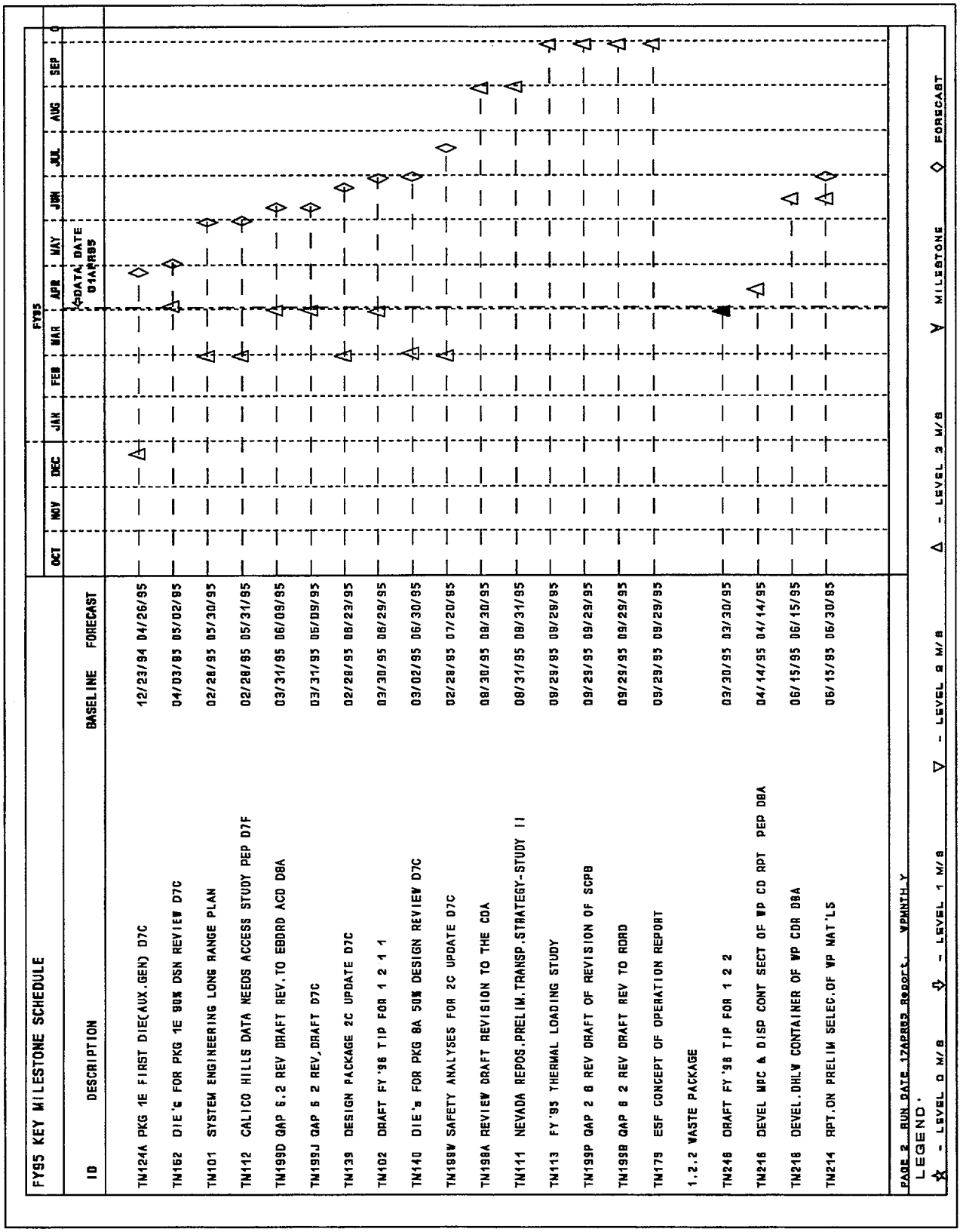


Figure 3. Yucca Mountain Key Milestone Schedule (Continued)

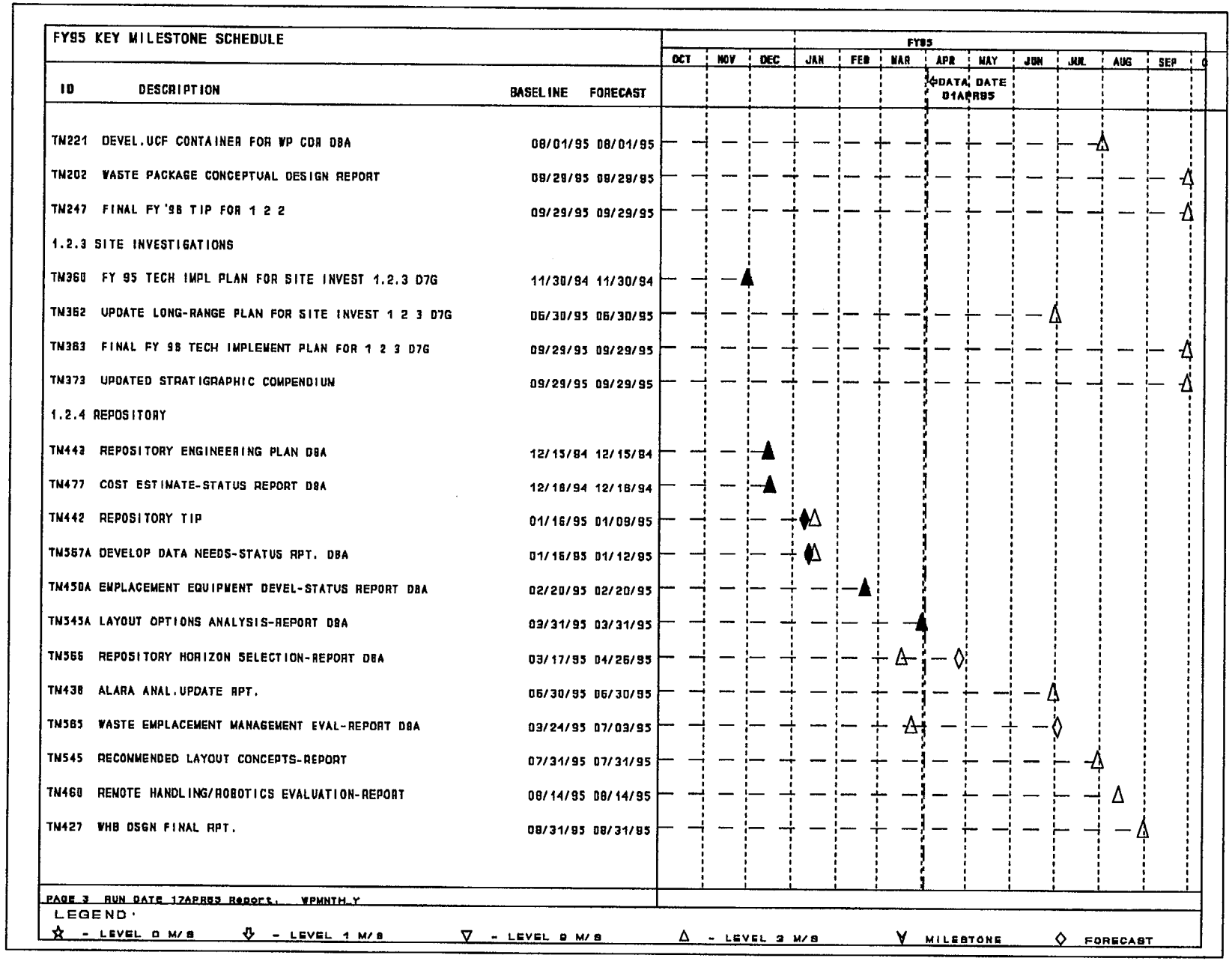


Figure 3. Yucca Mountain Key Milestone Schedule (Continued)

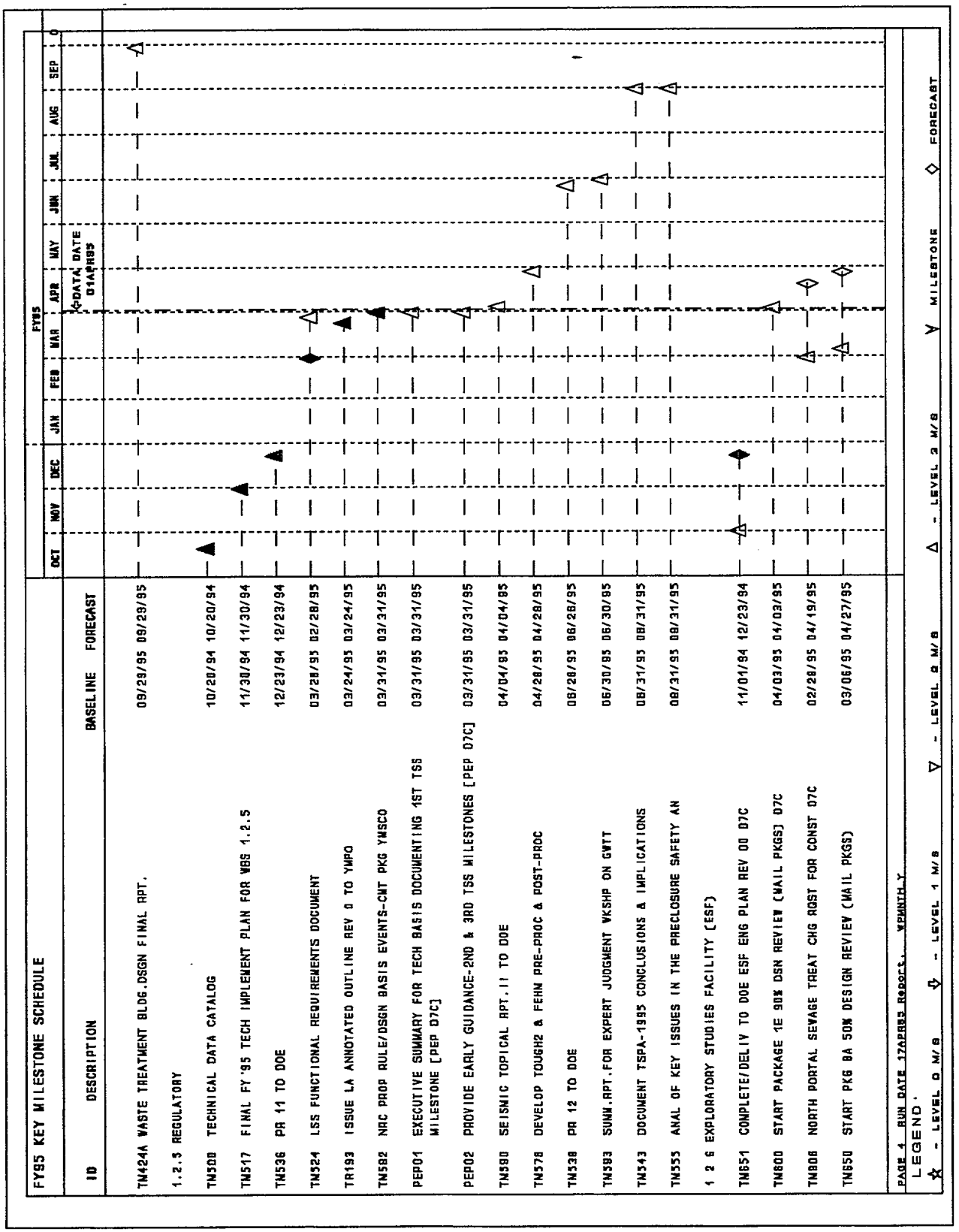


Figure 3. Yucca Mountain Key Milestone Schedule (Continued)

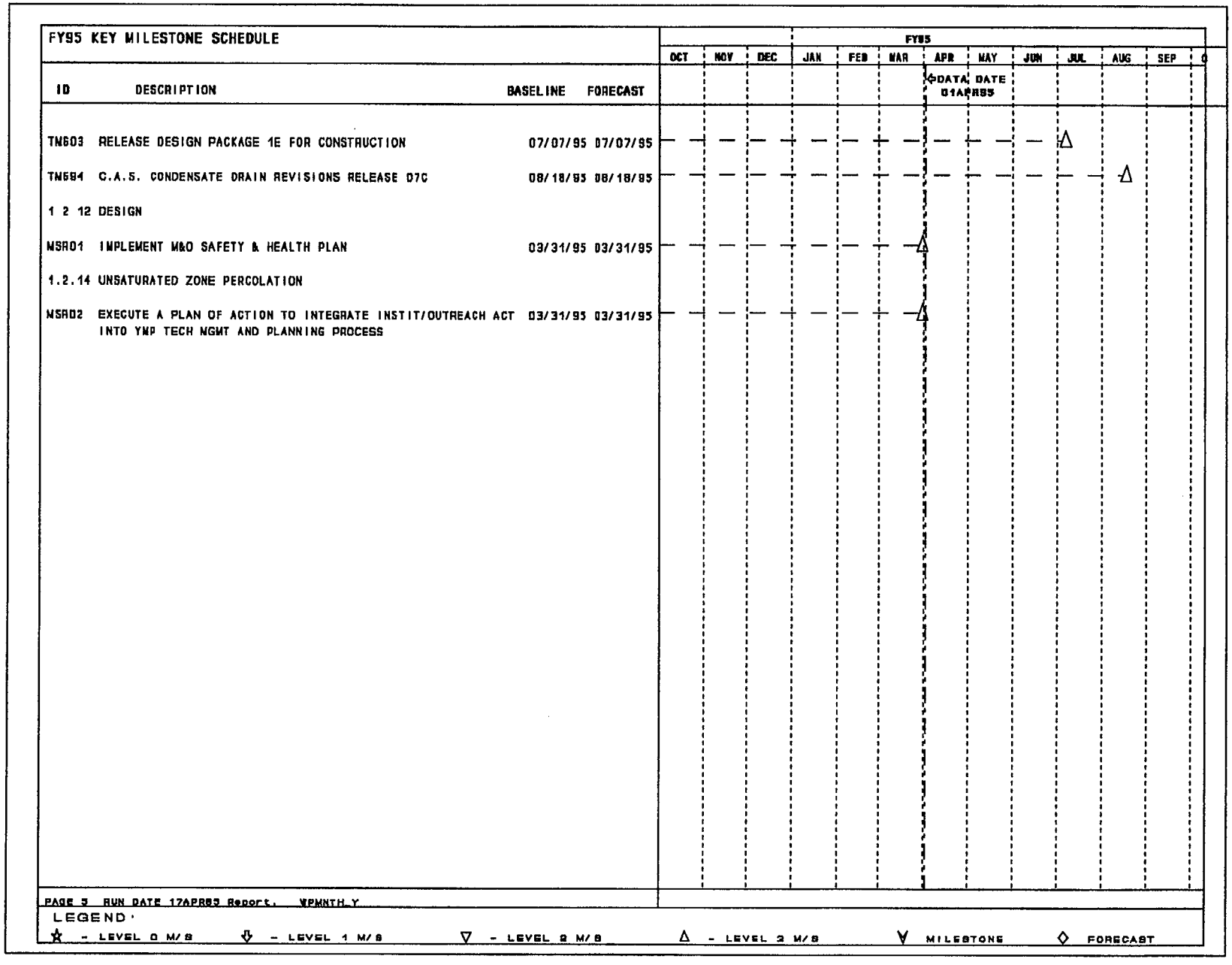


Figure 3. Yucca Mountain Key Milestone Schedule (Continued)

3.2 WASTE ACCEPTANCE, STORAGE AND TRANSPORTATION PROJECT CWBS 3.0

MANAGER: A. S. Kubo

3.2.1 Multi-Purpose Canister

MANAGER: J. R. Clark/L. Smith

OBJECTIVE(S): Provide technical management and integration of activities related to development of the Multi-Purpose Canister (MPC) Subsystems and Dry Transfer System (DTS). Provide technical solicitation evaluation support and management of the MPC Subsystems subcontract. Assist the Office of Civilian Radioactive Waste Management (OCRWM) in all aspects of the WAST MPC licensing process. Assist OCRWM in the development of the MPC Environmental Impact Statement (EIS). Assist OCRWM in supporting public information and institutional tasks regarding MPC activities. Conduct systems engineering in support of WAST.

3.2.1.1 Progress During Report Period

Systems Engineering

- Delivered the final M&O MPC Subcontracts Management Plan and the M&O MPC System Acceptance Plan. The former sets forth the process by which the subcontracts will be administered, while the latter defines the activities and responsibilities associated with the acceptance or approval of subcontractor deliverables.

- Coordinated WAST inputs to the Total System Life-Cycle (TSLCC) analysis being performed by Program Systems Engineering. Supported M&O Program Systems Engineering's TSLCC briefing to RW-1 and development of draft TSLCC report.

- Participated in the OCRWM/M&O Change Management Improvement Working Group. This group is developing an OCRWM-wide integrated technical/workscope/cost/schedule management system.

Engineering Development

- MPC RFP Activities - Completed technical and cost evaluations of the Best and Final Offers. Completed final signoff of the QA Classification of the MPC Subsystem. Finalizing Source Evaluation Board.

- Developed white papers on the Life-Cycle Cost Comparison of two all-MPC Systems using a dry transfer system and on MPCs and Interim Storage.

- Completed a draft of the radiation dose assessment comparing the Single Purpose Cask, Transportable Storage Cask, and the Multi-Purpose Cask subsystems. This study has been provided to the Mined Geologic Disposal System for review and comment, and the

information was used by RW-40 at the Midwest Waste Management Conference in Chicago on March 13, 1995.

Regulatory

- Sent the Memorandum of Understanding (MOU) for cooperating agency status of Naval Reactors in the MPC EIS to NR in draft form on March 6, 1995. The MOU defines points of contact, review cycle arrangements, and dates for draft EIS input.

- Reviewed, commented upon, and consolidated M&O comments on the MPC EIS Implementation Plan (IP). An IP comment resolution meeting is set for April 3, 1995. Revised the IP to be sent to MPC Environmental Impact Statement Integration Group for RW/EH/GC review on April 5, 1995.

Environmental, Safety and Health

- Briefed RW-2 on the MPC schedule and certification options. This effort was coordinated with M&O and OCRWM management and Winston and Strawn staff in response to an RW-2 tasking to resolve schedule disconnects between the Nuclear Regulatory Commission (NRC) and OCRWM. The OCRWM schedule shows deployment of MPCs in January 1998, and the NRC schedule shows December 1998. The M&O is currently evaluating the NRC proposed schedule and other MPC certification options.

- With Las Vegas Participation, continued scoping and planning the Technical Report development to be included in the MPC 10 CFR 60 Design Considerations Report. Presented the integrated management plan to develop this report to senior DOE and M&O management on March 31, 1995. The presentation discusses the M&O plan for development of the report. Initiated development of the Technical Document Preparation Plan (TDPP). A working draft of the TDPP was completed and will be shared with the M&O Requirements and Licensing office (Vienna) to ensure wide review and integration within the M&O and with RW.

3.2.1.2 Issues and Concerns

- None.

3.2.2 Transportation System

MANAGER: R. F. Kelly/L. Smith

OBJECTIVE(S): Provide management and integration of all activities related to transportation cask development, transportation planning and operations, service and maintenance of transportation equipment, application of Systems Engineering to Transportation, collection and maintenance of site-specific engineering and operations data, transportation economic and systems analysis, and integration of transportation with other Civilian Radioactive Waste Management System (CRWMS) program elements. Manage transportation database formulations, model development, and computer code development activities. Assist OCRWM in supporting public information and institutional tasks, including policy analysis and issue resolution.

3.2.2.1 Progress During Report Period

System Engineering

- Completed the development of the "Transportation Geographic Information System Program Plan." The plan includes maps showing years 1 and 2 spent nuclear fuel allocations by site, transportation mode, and fuel type. Also developed maps showing INTERLINE routes servicing a number of CRWMS sites.

- Completed final revisions to the "Rail Transportability of the Large MPC Study Report."

- Participated in Federal Monitoring and Assessment Center Geographic Information System workshop. Identified available Federally-funded data sources required to make informed decisions during radiological emergencies.

Casks

- Participated in a Burnup Credit meeting to present the draft "Actinide Burnup Credit Topical Report" to RW-40, Sandia National Laboratory, and Oak Ridge National Laboratory (ORNL). Presented a discussion on the isotopic validation and an example of burnup credit analysis as described in the topical report. The draft topical report was distributed for review to DOE, M&O, Weston, and the Nuclear Energy Institute. The reviewers were asked to provide comments by April 10, 1995.

- General Atomic's (GA's) contractor, Precision Components Corporation (PCC), began the process of welding the impact limiter support structure ribs to the bottom end of the cask model. PCC expects to complete the rib welding by April 15, 1995. All six impact limiter housing units were shipped to Lee Goebel Enterprises.

- Attended a meeting at Argonne National Laboratory on risk assessment analyses that are being performed by Lawrence Livermore National Laboratories for the GA-4/9 legal-weight truck (LWT) cask. The meeting included discussions of the technical comments on the draft technical report including the appendices on the thermal and impact analyses.

- The dry magnetic particle (MT) inspection of the GA-9 LWT cask trailer was completed on March 3, 1995. The inspection revealed a total of 24 indications (cracks), many of which were previously identified. GA evaluated the defects and made repairs to bring the trailer frame back to within the Commercial Vehicle Safety Alliance minimum standards. Refurbishment should be completed in mid-April 1995. A draft "Durability Test Report" was forwarded to GA for review.

- A GA-4/9 Project Review Meeting was held with General Atomics at their office in San Diego, CA, March 14-16, 1995. The meeting provided updates to the GA-4 half-scale model cask fabrication, GA-9 LWT trailer refurbishment and test report status, and GA-4/9 Final Design Report comments' resolutions and responses. A visit was made to the drop testing vendor's (Maxwell Laboratories, Inc.) test site. GA has not yet received the NRC Round 1 Questions on the GA-4/9 Safety Analysis Reports.

Transportation Support Systems

- Developed a plan for the transmittal of Site-Specific Servicing Plans to Purchasers.

- Developed a preliminary draft of "Rail Rate Negotiation Strategy," which compliments the overall rail strategy currently under development.

- Attended Association of American Railroads (AAR) Bureau of Explosives meeting in Dallas, Texas. AAR representatives were asked to expand their hazardous material training courses to include sessions on spent fuel and nuclear waste.

Project Management

- Completed "Assessment of Legal Issues Regarding Special Train Service in the Transportation of Radioactive Waste," continued analysis of the effect of pending risk analysis legislation on the Transportation program, and researched recent Department of Transportation rulings on Federal preemption of State, local, and Tribal regulations regarding hazardous material transportation.

- Prepared an estimate-to-complete based on the end-of-month February data. Prepared material for presentation to senior M&O management.

- Conducted a Joint RW-46/M&O Transportation Technical Exchange, March 17, 1995. Discussed a variety of current Transportation projects and exchanged ideas among RW, Weston, and M&O staff personnel.

- Attended a meeting at PCC, York, PA, to review the status of the GA-4 half-scale model with the NRC, DOE, and GA personnel. The NRC expressed their satisfaction with the status of the model and its fabrication.

Environmental, Safety and Health

- Completed a report providing a review and analysis of the major critiques of the "NRC Modal Study." This report may be the basis for a more formal response by Lawrence Livermore National Laboratory (who performed the original Modal Study) and provide support for the transportation analysis in the MPC Environmental Impact Statement.

- Completed development of Transportation Risk Management Strategy" and the associated "Transportation Risk Management Guidance Document." These document the Risk Management Program being proposed for Transportation in response to comments from stakeholders.

- Developed a draft scope of work for the Sandia National Laboratory to provide support in the transportation risk assessment area for rail shipments. The objective of these proposed activities is to summarize all existing analyses and crash tests involving rail casks and to compare these with the "worst case" credible rail accident conditions proposed by stakeholders including the AAR.

3.2.2.2 Issues and Concerns

- None.

3.2.3 Waste Acceptance

MANAGER: B. R. Teer

OBJECTIVE(S): Provide management and integration of all activities related to the Standard Disposal Contract, the Spent Nuclear Fuel (SNF) Verification Plan, Waste Acceptance Criteria for Alternative Waste Forms, Materials Control and Accountability, Safeguards and Security, Waste Acceptance Operations Plan, application of Systems Engineering to Waste Acceptance, interaction with the Energy Information Administration, support of Integrated Database (IDB) preparation, and development of a unified database system.

3.2.3.1 Progress During Report Period

Waste Acceptance Process and Operations

- Continued developing a white paper addressing utilities' use of MPCs including evaluating scheduling options impact of site-specific activities utilities must undertake to implement MPCs for on-site storage, estimating the DOE system costs of the options, and estimating the cost benefits of the options to the utilities.

- Continued preparing a white paper for RW-44 addressing use of multi-element canisters (i.e., MPCs, Multi-Element Storage Canisters, etc.) as acceptable waste form options. The paper also addresses including these options in the Standard Disposal Contract and defines under what conditions they would be considered standard or nonstandard waste forms.

- Continued expanding the Notice of Proposed Rulemaking annotated outline, including a review of the Standard Disposal Contract modifications for incorporation in the outline prepared during previous rulemaking efforts.

- Revised and submitted a draft Regulatory Summary Plan to RW-44 detailing a single rather than a two-phased rulemaking effort to modify the Standard Disposal Contract.

- Submitted a draft white paper to RW-44 addressing the need for a two-phased rulemaking effort if the MPC schedule slips significantly.

- Completed the 1994 Acceptance Priority Ranking/Annual Capacity Report (ACR) Report and delivered the camera-ready copy to RW-40.

- Delivered the monthly Delivery Commitment Schedule (DCS) Submittal Status Report to RW-44.

- Completed hardware and software installation and testing for the DCS Information Network; initiated Bulletin Board program modification and source code modification to meet specific program needs.

- Began reviewing a new DCS from the Philadelphia Electric Company. Submitted a draft DOE response to a revised DCS from the Yankee Atomic Electric Company to RW-44.

- Developed a list of approved DCSs for comparison with the ACR.

- Continued SNF Verification Plan development including preparation of Section 2, which provides a discussion of the Verification Plan requirements; Section 3, which provides a discussion of the process for verification of the data related to the SNF to be delivered; and Section 4, which provides a discussion of the process for verification of the required measurements and identification of the SNF to be delivered.

- Obtained RW-44 concurrence on the annotated outline of the Waste Form Criteria Management Plan (WFCMP) and began developing the Plan. Prepared and distributed a WFCMP internal review draft for WAST and RW-44 review and comment.

- Provided RW-44 with a suggested stipulation for the proposed Memorandum of Understanding for Naval SNF; the stipulation requires an interagency agreement for disposal services and the payment of appropriate fees prior to acceptance of Naval SNF.

- Prepared draft Chapters 1 (Introduction), 2 (Scope), and 3 (Applicability) of the Safeguards and Security Model (formerly Safeguards and Security Standard) providing a preliminary analysis of the applicability of Federal safeguards and security regulations to the CRWMS.

- Continued support of RW-44 efforts to bring DOE Safeguards and Security policy and procedures into conformance with the International Atomic Energy Agency (IAEA) safeguards requirements. Revised a white paper relating to OCRWM policy on IAEA requirements and application of the IAEA requirements to MPCs. Attended the Second International Policy Forum on Management and Disposition of Nuclear Weapons Materials at the Landsdowne Conference Center, VA. Participated in a teleconference with EM, RW, and M&O representatives regarding documentation acceptance of defense high-level waste at Yucca Mountain.

- Met with the NRC to prepare a presentation for the IAEA of the U.S. proposal for applying safeguards to the MPC system on March 22, 1995. The effort included editing the paper "Application of IAEA Safeguards to Spent Fuel in Multi-Element Casks in the U.S." and reviewing a new topic for the presentation "Incorporation of Naval Reactors (NR) Fuel in CRWMS." Also at the NRC meeting, prepared for the March 20, 1995, meeting of SAGOR (Safeguards for Final Disposal of Spent Fuel in Geological Repositories) in Vienna, Austria. This effort included editing papers on "Potential Paths for Diversion From the Spent Fuel Disposal System," and assisting in preparing viewgraphs describing the loading of SNF into MPCs and the transfer of MPCs to interim storage casks, to interim Federal storage facilities, and to the final Federal repository storage facility.

- Delivered the Program Plan deliverable "Waste Acceptance Operations Plan (WA-OP), Revision 0." Briefed Yucca Mountain personnel on the purpose and scope of the WA-OP.

- Provided input to the WAST Project Integration on Waste Acceptance life-cycle costs for the TSLCC effort.

Project Management

- Attended the Program Committee meeting of the Institute of Nuclear Material Management; a paper on OCRWM Safeguards was accepted for presentation.

- Prepared a Purchase Requisition (PR) change and revised a Statement of Work (SOW) providing Pacific Northwest Laboratory (PNL) support for the Unified Database (UDB) System development; SOW and PR changes were approved and sent to PNL.

- Prepared a baseline change request to the Work Authorization Directive implementing the UDB System Task Management Plan scheduled deliverables.

- Participated in a WA program review briefing to RW-44 reporting the status on the Verification Plan development, IAEA Safeguards and Security development, coordination of RW-44 Program responsibilities, and other major WA areas.

Program Quality Assurance

- Incorporated interdisciplinary review comments on the QAP-3-9 Design Analysis of Design Basis Fuel and began a comment backcheck with reviewers.

Nuclear Fuel Data

- Supported efforts to revise the Nuclear Fuel Data Survey Form RW-859, including meeting with Z-inc. to review M&O comments to the fourth, fifth, and final drafts of the revised form and to review plans for obtaining the utilities' review of the form.

Energy and Spent Fuel Discharge Projections

- Attended a second meeting on the 1995 Spent Fuel Projections Assumptions to review revised assumptions and consider additional revisions. Attendees included representatives from DOE Nuclear Energy, DOE/Energy Information Agency, RW-44, Z-Inc., David Andress and Associates, and the M&O. The revised assumptions are now very different from last year's and include only two cases: a No-New-Orders case and a License Extension case with the Tennessee Valley Authority's Watts Bar 1 as the only "pipeline" reactor.

Unified DataBase (UDB) System

- Resolved RW quality assurance concerns with UDB development; current work on UDB activities remains non-quality affecting but future UDB activities will be evaluated for quality-affecting status as they are tasked. Completed QAP-2-0 evaluations for the UDB.

- Delivered the UDB Task Management Plan to RW-44.

- Delivered the UDB Preliminary Data Needs Report to RW-44.

- Supported development of the UDB Phase I software prototype including attending a meeting between the UDB Task Force Group and PNL to identify requirements, features, and functions of the UDB prototype. Provided PNL with user interface requirements for the prototype and a data dictionary of the prototype data set. The prototype data will initially draw upon current RW-859 and Facility Interface Capability Assessment data.

3.2.3.2 Issues and Concerns

- None.

3.2.4 Project Management

MANAGER: T. Stevens

OBJECTIVE(S): Conduct project financial and technical integration activities across the WAST project to maintain the WAST project development.

3.2.4.1 Progress During Report Period

- The WAST Project Cost and Schedule Baseline has been processed and printed copies (Government Printing Office) are being distributed.

- The WAST Project Plan was submitted to the Project Office Baseline Change Control Board (POBCCB) for review and approval prior to submittal to the Program Baseline Change Control Board (PBCCB). Comment resolution with the POBCCB was completed, and the WAST Project Plan was submitted to the PBCCB on March 29, 1995.

- The preliminary draft of the Project Management Plan was submitted to the RW-40 staff for review prior to formal submittal to the POBCCB on March 31, 1995.

- The draft Energy System Acquisition Review (ESAR) #2 Package was formally delivered to RW-40 on March 2, 1995. Comments were received on March 9, 1995, and an updated ESAR #2 Package (Revision 1) was delivered on March 15, 1995.

- The WAST Project Monthly Management Review (MMR) was conducted on March 9, 1995. The format followed the DPR, and the presentations focused on issues, concerns, schedule status, and financial performance data.

- The M&O completed and delivered Revision 2.1 of the Cost Loaded Network on March 8, 1995. This was an update to the draft completed on January 20, 1995. Cost data has been updated to be consistent with the Project Cost and Schedule Baseline.

- The M&O developed and delivered a briefing book for RW-50 to use at the Congressional Budget Hearings on March 16, 1995. The book contains summary schedule and budget data, cost and schedule drivers, and sample questions and answers. An FY96 slice version of the Program Plan, Volume 3, was included for reference.

- The M&O began conversion of WAST Project Summary Schedule from Open Plan into Primavera. Revision 13 of the Product Work Breakdown Structure (WBS) is being used for the WBS field. The target is to have the summary level schedule conversion complete for the Mid-Year Review (April 27, 1995) and to have a first draft of the intermediate level (more detailed) for FY95.

3.2.4.2 Issues and Concerns

- None.

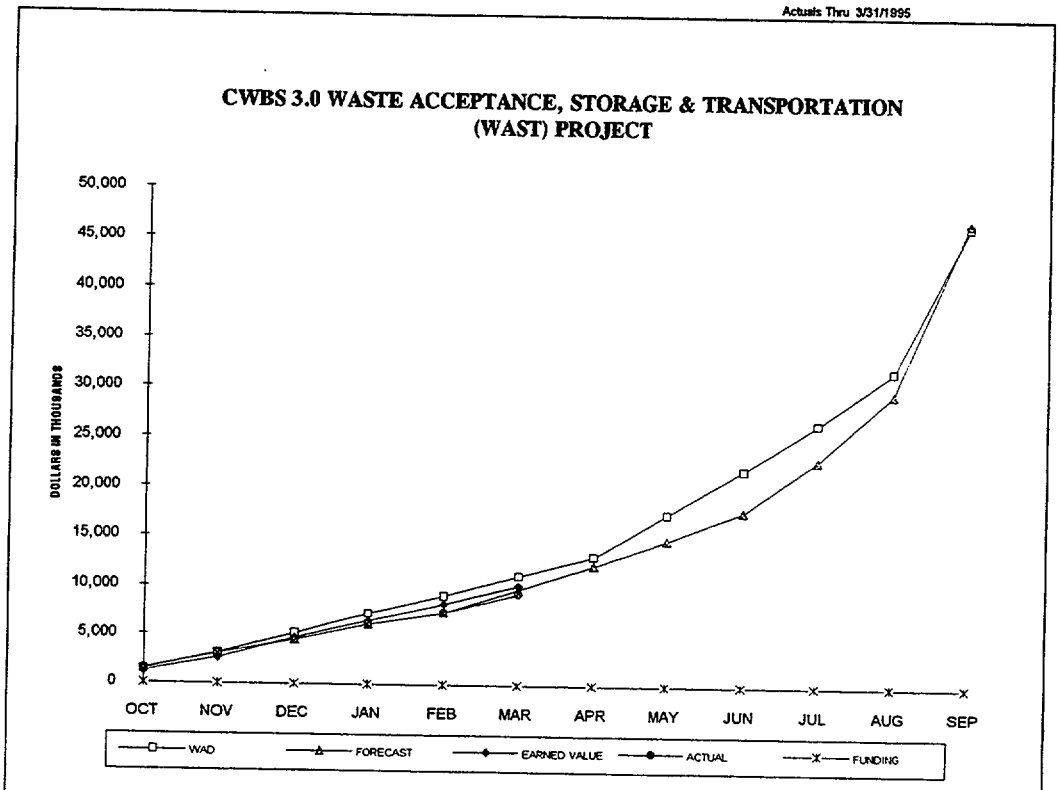
3.2.4.1 Variances

- Variance thresholds are not exceeded.

3.2.4.4 Schedule Variance

- Engineering Development - The workscope has been redirected by the customer to focus on Dry Transfer System (DTS) development and a prototype demonstration based on redirection, BTS will be discontinued. Additional resources will be required to support DTS activities. A corrective action will be to develop a BCR planning package to cancel the BTS and develop M&O DTS support.

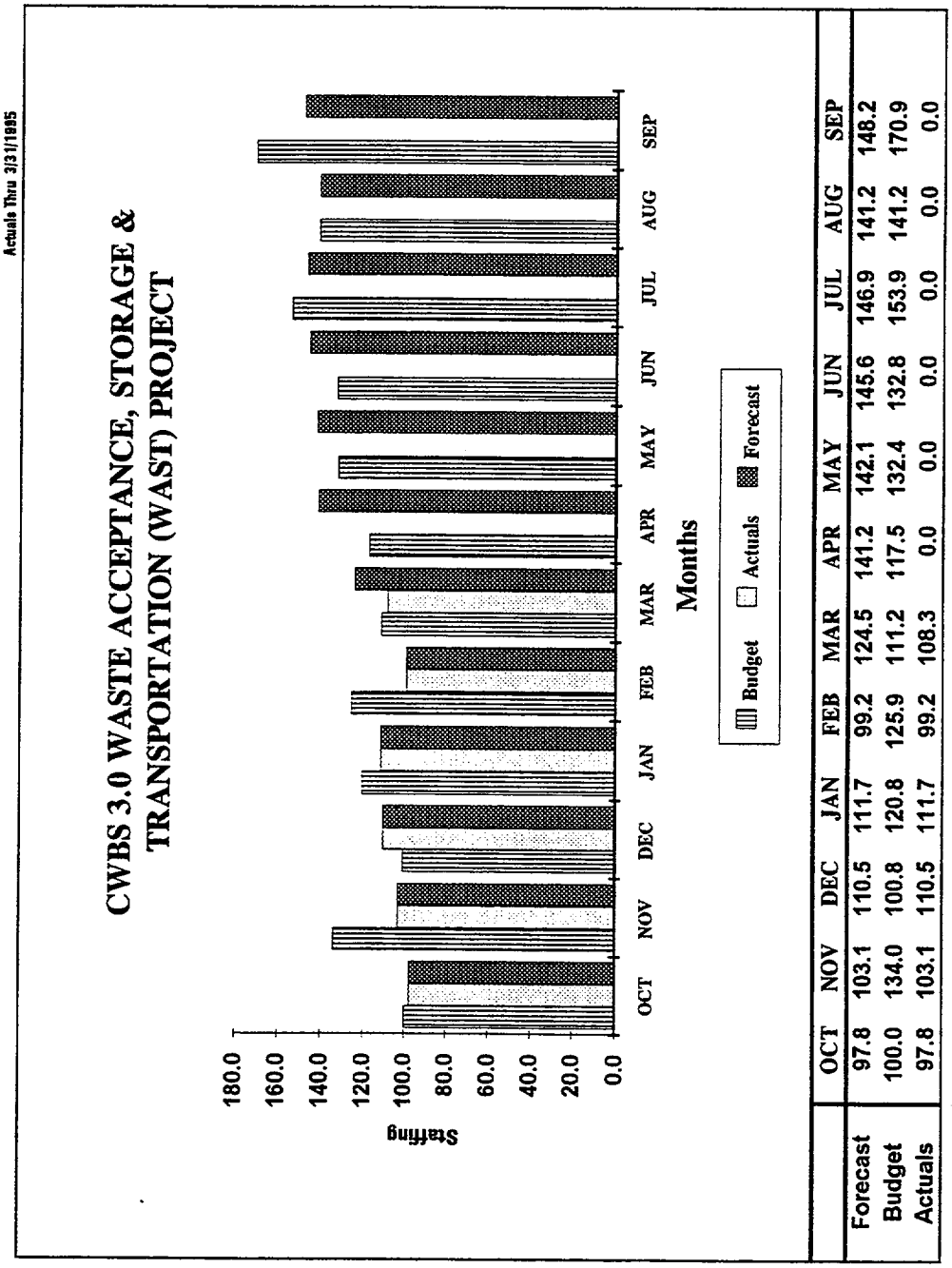
- Environment, Safety and Health - A slower ramp-up for the preparation of the WAST RCP than originally called for, due to a change in its scope and schedule, caused the current month's variance.



		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MONTH	WAD	1,384	1,773	2,027	2,105	1,819	1,997	1,995	4,310	4,500	4,682	5,243	14,597
	FORECAST	1,480	1,627	1,371	1,607	1,346	2,361	2,425	2,588	2,900	5,236	6,694	17,153
	EARNED VALUE	1,258	1,383	2,074	1,759	1,823	1,889						
	MONTH ACTUAL	1,480	1,627	1,371	1,607	1,346	1,916						
	VAR/SCH	(126)	(390)	47	(346)	4	(108)						
	VAR/COST	(222)	(244)	703	152	477	(27)						
CUM	WAD	1,384	3,157	5,184	7,289	9,108	11,105	13,100	17,410	21,910	26,592	31,835	46,432
	FORECAST	1,480	3,107	4,478	6,085	7,431	9,792	12,217	14,805	17,705	22,941	29,635	46,788
	EARNED VALUE	1,258	2,641	4,715	6,474	8,297	10,186						
	ACTUAL	1,480	3,107	4,478	6,085	7,431	9,347						
	VAR/SCH	(126)	(516)	(469)	(815)	(811)	(919)						
	VAR/COST	(222)	(466)	237	389	866	839						
FUNDING	FY95 FUNDING	0	0	0	0	0	0	0	0	0	0	0	0
	PREV. FUNDED	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL FUNDING	0	0	0	0	0	0	0	0	0	0	0	0

Current Month Cost and Schedule Variances are not addressed. See Section 1.3.

Figure 4. WAST Project Financial Status



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Forecast	97.8	103.1	110.5	111.7	99.2	124.5	141.2	142.1	145.6	146.9	141.2	148.2
Budget	100.0	134.0	100.8	120.8	125.9	111.2	117.5	132.4	132.8	153.9	141.2	170.9
Actuals	97.8	103.1	110.5	111.7	99.2	108.3	0.0	0.0	0.0	0.0	0.0	0.0

Figure 5. WAST Project Staffing

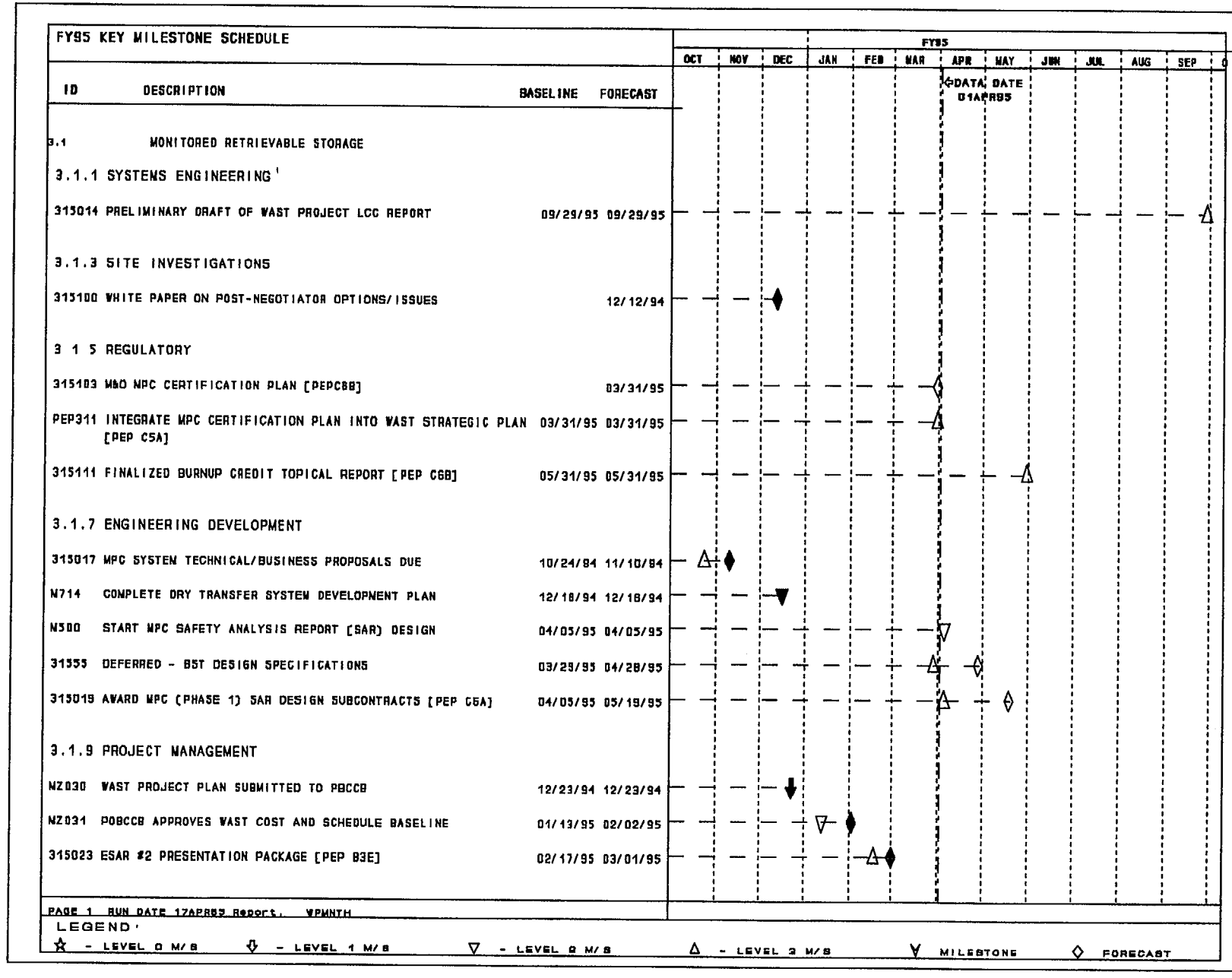


Figure 6. WAST Project Key Milestone Schedule

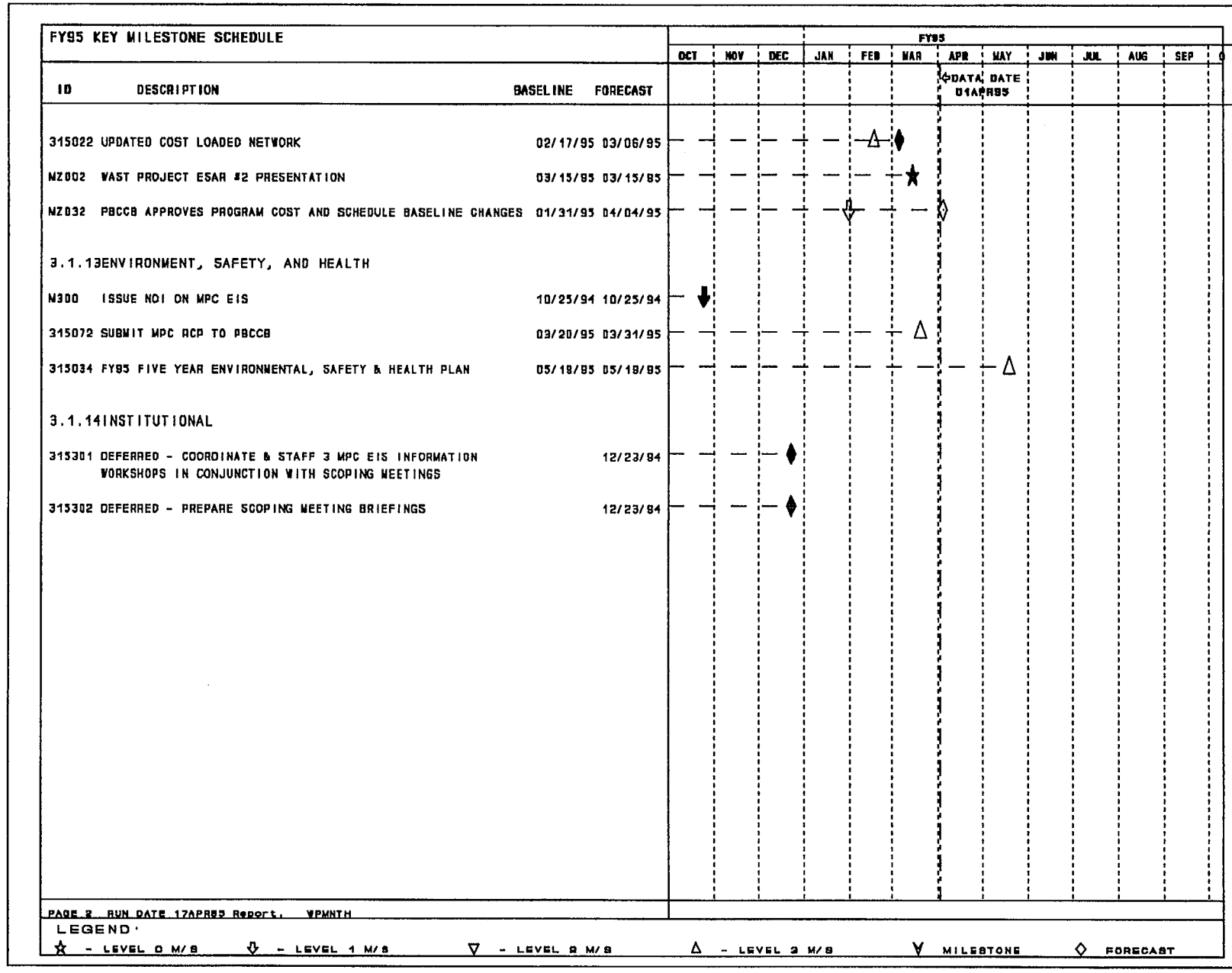


Figure 6. WAST Project Key Milestone Schedule (Continued)

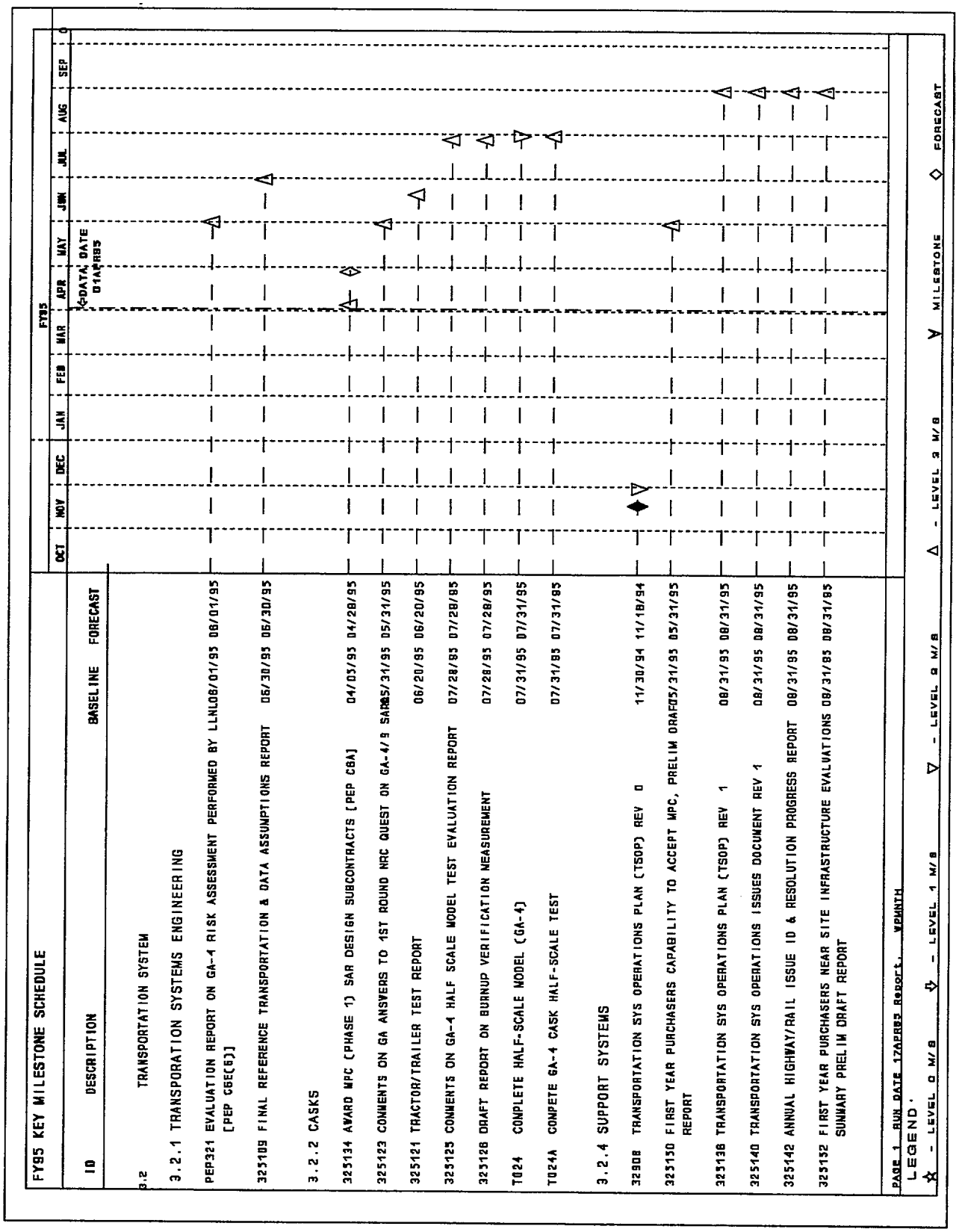


Figure 6. WAST Project Key Milestone Schedule (Continued)

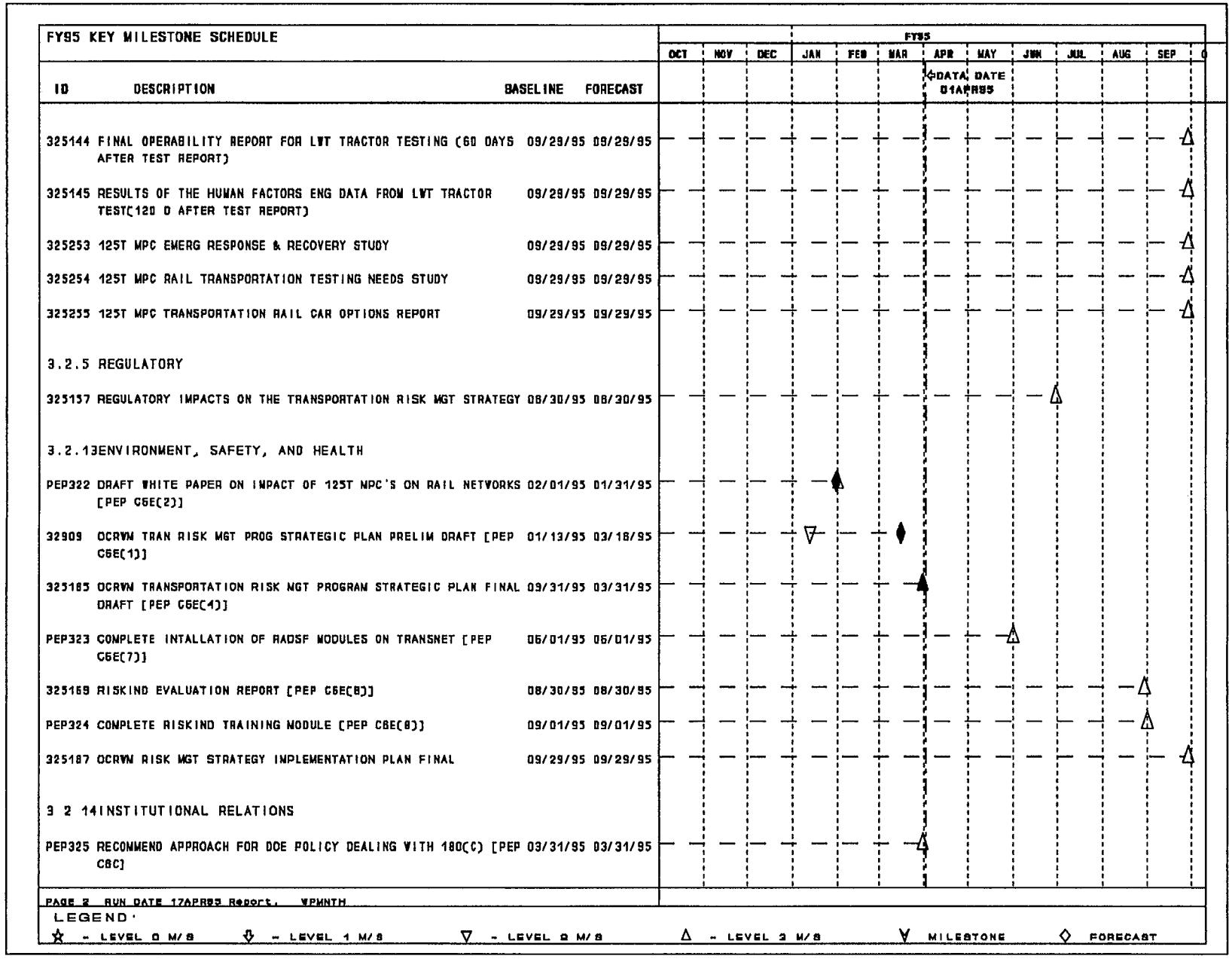


Figure 6. WAST Project Key Milestone Schedule (Continued)

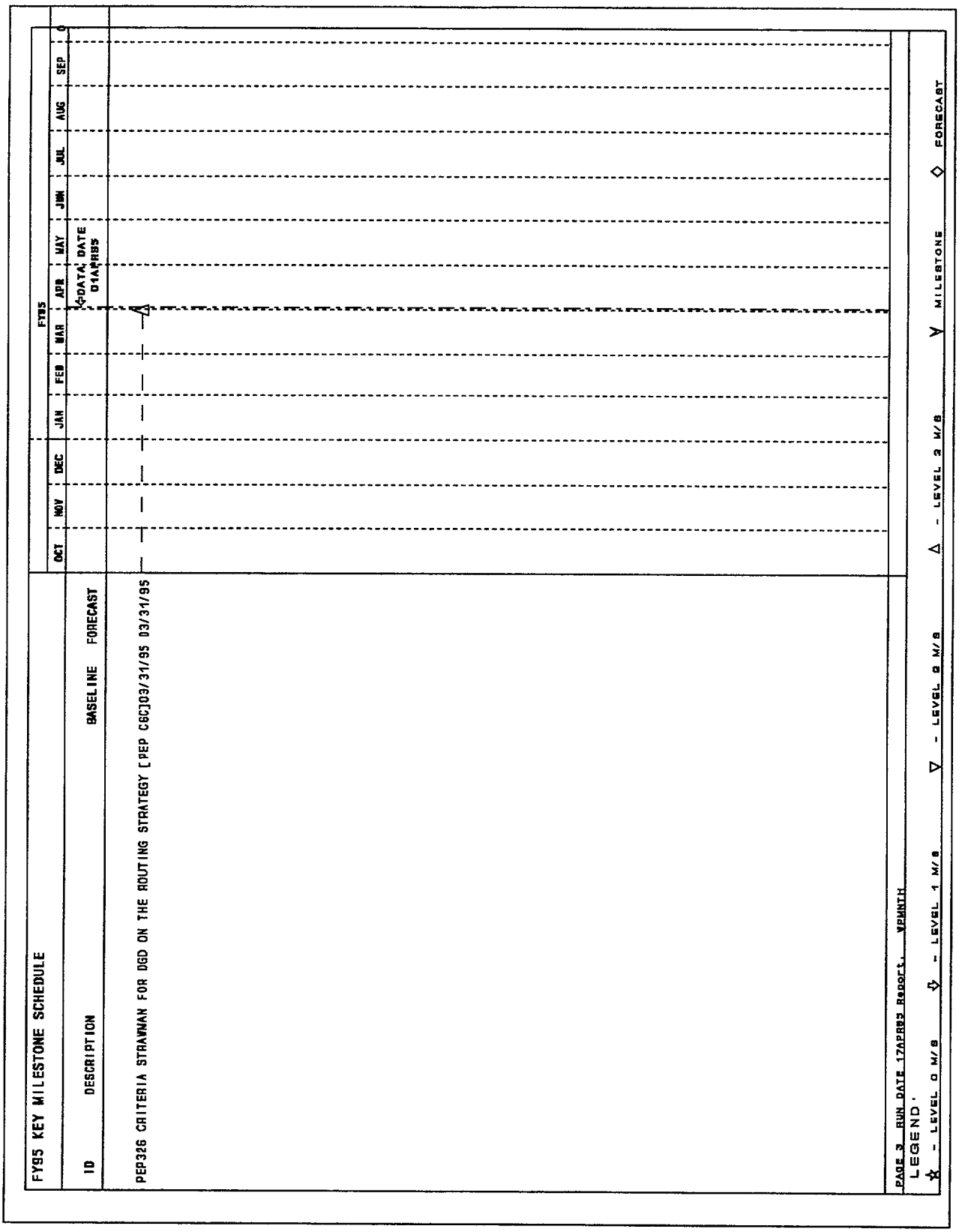
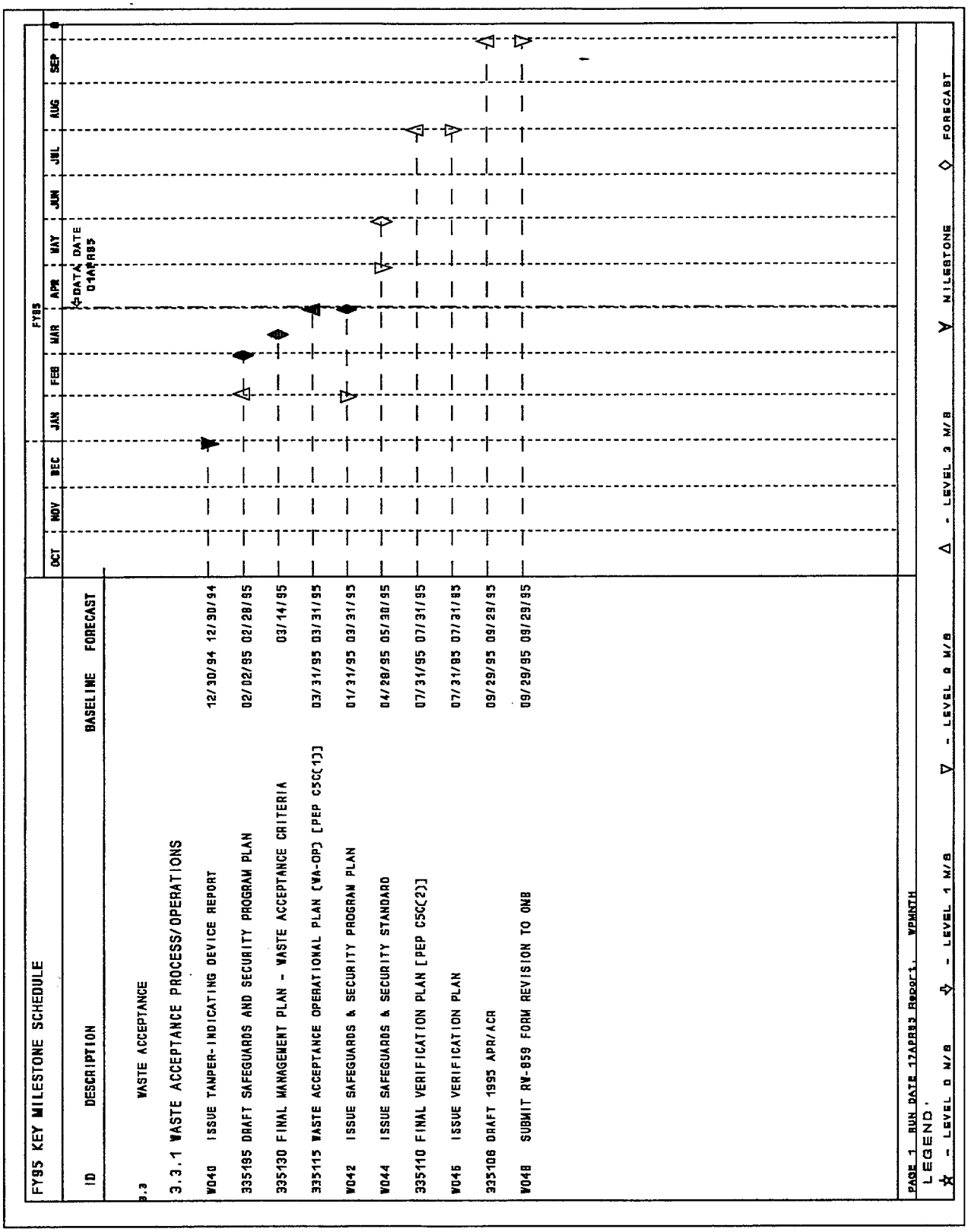


Figure 6. WAST Project Key Milestone Schedule (Continued)



Note: Some dates above are incorrect; however, they reflect the dates in the current WAD. They will be corrected when a new or revised WAD is issued or a Technical Direction Letter (TDL) is received reflecting the correct dates.

Figure 6. WAST Project Key Milestone Schedule (Continued)

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4. PROGRAM SUPPORT
CWBS 9.0

4.1 PROGRAM QUALITY ASSURANCE
CWBS 9.1

MANAGER: R. P. Ruth

OBJECTIVE(S): Establish a quality assurance program that meets the Office of Civilian Radioactive Waste Management (OCRWM) Program Quality Assurance Requirements and Description (QARD) requirements and is maintained through surveillances and reviews of all Civilian Radioactive Waste Management System (CRWMS) M&O quality-affecting activities.

4.1.1 Progress During Report Period

Las Vegas

- The Quality Review Board (QRB) reviewed the following procedures: QAPs 1-0, 2-1, 2-9, and 17-3. A decision was made to withdraw QAPs 4-1 and 7-1 from review and to form a small group of users to work through process and flow problems to better handle future procurements. The group plans to develop seven new QAPs and cancel both QAP-4-1 and QAP-7-1. The new QAPs are proposed to be: Procurement Control Process (an overview similar to QAP-3-0) Procurement Planning; Development of Procurement Requirements; Solicitation, Evaluation, and Award; Supplier Performance; Acceptance; and Procurement Closeout. Estimated completion for this effort is May 22, 1995. It is also likely that one or more Vienna Implementing Line Procedures (ILPs) will be needed after the contents of the above QAPs are finalized.

- Outside of the QRB process the following Nevada Line Procedures (NLPs) were approved and issued: NLP-2-0 Revision 1 effective March 6, 1995, NLP-3-16 Revision 1 effective March 6, 1995 (Cancellation), and NLP-3-17 Revision 2 effective March 6, 1995 (Cancellation). Reviewed NLP-3-10, NLP-5-1, Revision 0, Draft A, AP 16.1Q, YAP 3.4 Q / Interim Change Notice (ICN) 3, and YAP 3.5 Q. Continued development of M&O NLP for certification of field verifications and quality acceptance of items and services based on Technical and Management Support Systems (T&MSS) procedure WI-QA-008. Resolved comments on following documents: Yucca Mountain Site Characterization Project (YMP)/WP/95-05, Revision 0, YMP/WP/95-01, Revision 0, YMP/WP/95-02, Revision 0, and WI-RM-770, Revision 5.

- Participated in an OCRWM-led audit (YM-ARC-95-07) of Lawrence Livermore National Lab the week of March 6-10, 1995. This was the M&O's first participation in an OCRWM audit as a member of the audit team.

- Surveillances conducted with reports issued during the month include: 95-VIS-12 "ORIGEN 2.1 Test Cases," 95-VIS-15 "Design Analysis Preparation and Review," 95-VIS-16 "Closure Verification for Corrective Action Request (CAR) 95-QV-003," 95-NSS-18 "Deficiency

Reporting System - T&MSS," 95-NSS-19 "Non-conformance Reporting - T&MSS." Surveillances currently in progress include: 95-NSS-15 "REECo Fabrication of Steel Sets," 95-NSS-16 "Implementation of NLP-3-10," 95-NSS-17 "T&MSS Transition," and 95-NSS-20 "Records Management - T&MSS."

- Conducted the T&MSS Surveillance 95-016 of Borehole Security; preparing the draft report for this surveillance. Monitored coring activities at SD-7 (tracer gas sampling and coring operations). Monitored the packer removal at C-Hole Complex.

- Issued Vendor Audit Report, AR95-03S, of SAIC Environmental Services Division (ESD), La Jolla, CA. Submitted Supplier Evaluation Report (SER) recommending the SAIC ESD be maintained on the OCRWM Qualified Suppliers List (QSL) with restrictions.

- Started preparation of audit of Schlumberger Well Services to be performed during first week of April.

- Reviewed the following Procurement Documents: 3 Purchase Requisitions (PR 6077055, 6209545, 6209547) 1 T&MSS Drilling/Logging, 1 Purchase Order/Subs (PO/SC). 39-960009- 39 (ESF), Logging PR (Vertical Seismic Profile [VSP] work) is in for preliminary revision review.

- Submitted an SER for Teledyne Brown Engineering recommending that they be maintained on the OCRWM QSL with restrictions. Prepared an SER for Bay Geophysical to be added to the OCRWM QSL.

- Developed an analysis of open CARs for impact on the Alcove Drill and Blast Package.

- Interdiscipline Review of Design Documents included: Analysis for Alcove Drill and Blast; Analysis for Design Package 1 E; Determination of Importance Evaluation for Design Package (IDCS); Analysis for Multi-Purpose Canister (MPC) Weight, Dimension, Configuration, and Determination of Importance Evaluation (DIE) for Sewage Treatment; and ten drawings, two specifications, four analyses, and four Determination of Importance Evaluations. Also reviewed the four analyses; one specification; seven drawings; two Determination of Importance Evaluations; one Controlled Design Assumptions Document; one Technical Document Preparation Plan; one Engineering Plan, Job Package JP 95-12; seven Field Change Requests; and four Baseline Change Proposals.

Vienna

- Performing a review of OCRWM AP-7.4Q, Revision 1, Draft B, Maintenance of the Office of Radioactive Waste Management Qualified Suppliers List. This review supports the OCRWM-requested formal OCRWM QAP 6.2 review. This revision reflects the transition of the audit responsibilities to OCRWM OQA.

- Performing an informal review of Revision 2 of the OCRWM Quality Assurance Requirements and Description (QARD) DOE/RW-0333P. Revising Sections 1, 3, 4, 6, 7,

9, and 12 and applicable Supplements to incorporate changes requested by affected organizations. The planned issue date is July 1, 1995.

- Met with Office of Quality Assurance (OQA) Representatives to discuss Requirements Traceability Network (RTN) Review comments for procedure revisions to QAPs 3-0, 3-2, 3-8, 3-9, 3-10, and 3-12, and VLP-17-9.

- Reviewed a preliminary software life-cycle plan for the Log Analysis and Mapping Program and provided informal comments to the Las Vegas M&O Geophysics group. This group intends to qualify this acquired software under the new QAP-SI-1, Acquired Scientific and Engineering Software.

- Reviewed the life-cycle plans for the Characteristics Data Base - Quantities (CDB_Q) Data Update (QDU) and for the CDB_Q 1992 RW-859 Data Update; recommended and obtained Vienna QA Manager approval for both. These are the first life-cycle plans for developed software produced under the controls of the new QAP-SI-2, Developed Scientific and Engineering Software.

- Conducted surveillances and issued reports during the month including: 95-VIS-12 "ORIGIN 2.1 Test Cases," 95-VIS-15 "Design Analysis Preparation and Review," and 95-VIS-16 "Closure Verification for CAR 95-QV-003." Surveillances currently in progress include: 95-VIS-13, "Software Procedure Development & Review," 95-VIS-17 "Revision and Cancellation of ILPs," 95-VIS-18 "VLP for To Be Verifieds (TBVs) and Traceability Analyses," 95-VIS-20 "Closure Verification for CAR 95-QV-C-008."

- Reviewed and provided comments to M&O licensing on the Nuclear Regulatory Commission (NRC) recommended Scope and Content guidance for the MPC Part 60 Design Considerations Report.

- Coordinated the effort to reevaluate all existing QAP-2-0 activities per OCRWM CAR HQ-94-015. All existing QAP-2-0 activity evaluations were to ensure compliance with the requirements of QAP-2-0, Revision 2. This procedure has undergone a significant revision and provides the methodology for evaluating activities to identify those activities subject to the QARD requirements. The procedure has been streamlined and clarifies the level of detail and procedural steps.

- Attended a meeting initiated by RW-44 to discuss OQA and Quality Assurance Technical Services Support (QATSS) concerns with the Task Management Plan and the QAP-2-0 evaluations for the Unified Database (UDB). Most of OCRWM's concerns seem to be a result of reviewing documents from different viewpoints. The WAST personnel were successful in explaining the documents to address OCRWM's concerns for now. Current work on UDB activities remains non-QA, and future activities will be evaluated for Q-status as they are tasked.

- Reviewed the draft of the OCRWM Test and Evaluation Master Plan (TEMP). This document describes the program Test and Evaluation (T&E) policy, objectives, requirements, general methodology, and scheduling of test phases for CRWMS.

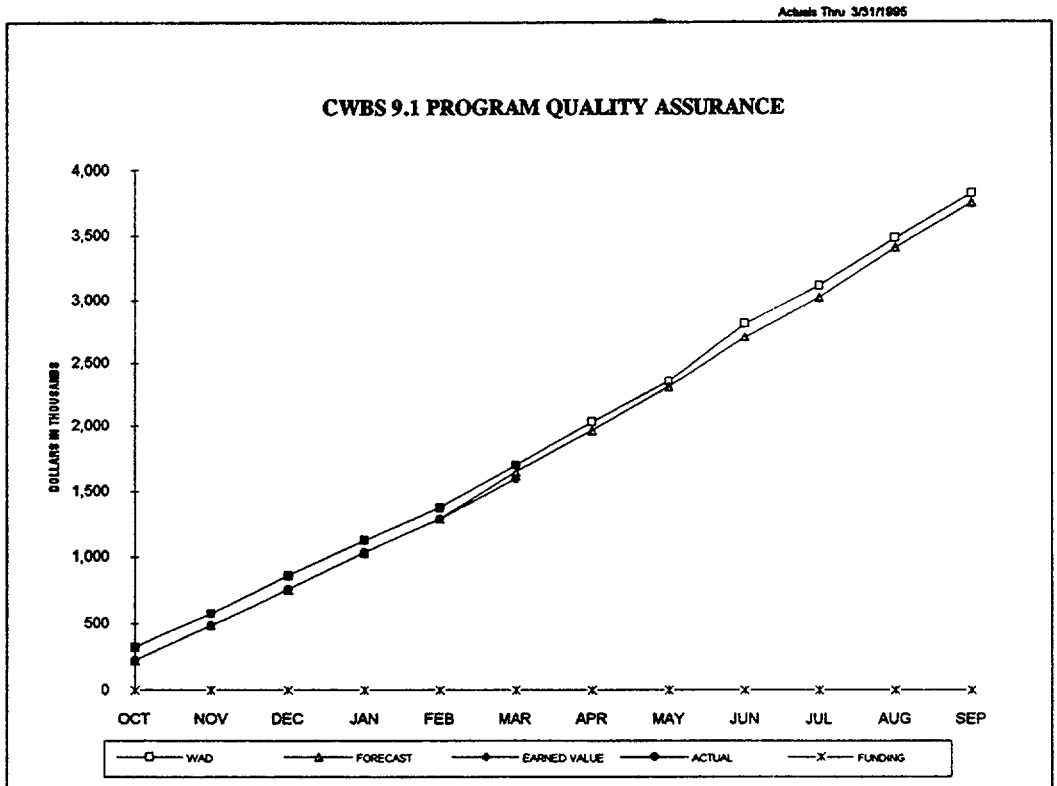
- Reviewed the following non-QA documents: Draft Topical Report on Actnide Only Burnup Credit for Pressurized-Water Reactor (PWR) Spent Fuel Packages, Draft MPC Subcontract Management Plan, and the MPC System Acceptance Plan.

4.1.2 Issues and Concerns

- None.

4.1.3 Variances

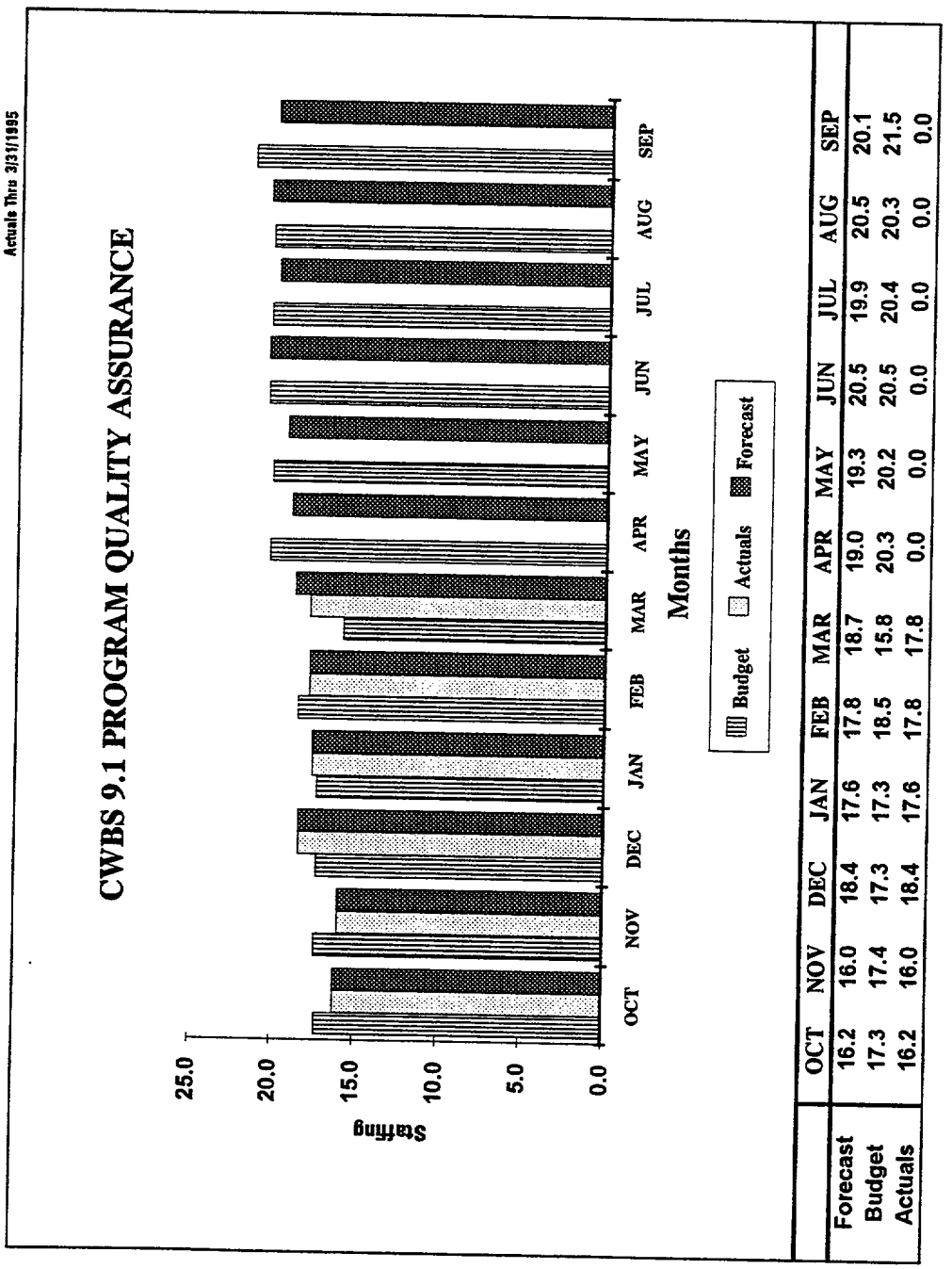
- Variance thresholds are not exceeded.



		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MONTH	WAD	325	255	284	259	254	324	327	325	457	301	360	347
	FORECAST	228	257	273	276	253	362	313	346	398	310	382	344
	EARNED VALUE	326	255	284	259	254	324						
	MONTH ACTUAL	228	257	273	276	253	311						
	VAR/SCH	0	0	0	0	0	0						
	VAR/COST	97	(2)	11	(17)	1	13						
CUM	WAD	325	580	864	1,123	1,377	1,701	2,028	2,353	2,810	3,111	3,471	3,818
	FORECAST	228	485	758	1,034	1,287	1,649	1,962	2,308	2,706	3,016	3,398	3,742
	EARNED VALUE	325	580	864	1,123	1,377	1,701						
	ACTUAL	228	485	758	1,034	1,287	1,598						
	VAR/SCH	0	0	0	0	0	0						
	VAR/COST	97	95	106	89	90	103						
FUNDING	FY95 FUNDING	0	0	0	0	0	0	0	0	0	0	0	0
	PREV. FUNDED	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL FUNDING	0	0	0	0	0	0	0	0	0	0	0	0

Current Month Cost and Schedule Variances are not addressed. See Section 1.3.

Figure 7. Program Quality Assurance Financial Status



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Forecast	16.2	16.0	18.4	17.6	17.8	18.7	19.0	19.3	20.5	19.9	20.5	20.1
Budget	17.3	17.4	17.3	17.3	18.5	15.8	20.3	20.2	20.5	20.4	20.3	21.5
Actuals	16.2	16.0	18.4	17.6	17.8	17.8	0.0	0.0	0.0	0.0	0.0	0.0

Figure 8. Program Quality Assurance Staffing

4.2 PROGRAM MANAGEMENT AND INTEGRATION CWBS 9.2.1, 9.2.2, 9.3.2, 9.3.3, 9.3.5

4.2.1 Systems Integration

MANAGER: J. J. Miller

OBJECTIVE(S): Develop management system documentation, develop automated system for the management of system requirements, integrate engineering specialties, perform system safety and risk assessments, and establish technical performance measurement system and conducts evaluation. Identify systems analysis requirements; develop, integrate, and allocate system requirements; develop program test and evaluation program; maintain the system technical baseline; and verify the adequacy of designs and construction and compliance with system requirements.

4.2.1.1 Progress During Report Period

Systems Management and Integration

- Continued the QAP-3-1 technical review of the CRWMS Requirements Document (CRD) preliminary draft, Revision 2. Completed resolution of the majority of the 500 mandatory comments by the end of March.

- Completed QAP-3-9 development and review of analyses to support resolution of the "to be determined" (TBD) or "to be resolved" (TBR) items in the System Requirements Documents (SRDs) that are important to the MPC procurement process.

- Resolved all but one comment from the QAP-3-1 technical review of a Document Change Notice (DCN) to Revision 1 of the SRDs. Comments resolved included TBDs/TBRs important to the MPC procurement process as well as a Corrective Action Request on Mined Geologic Disposal System (MGDS) traceability.

- Completed initial M&O review of the Program Systems Engineering Management Plan (SEMP), Revision 4, and delivered redline/strikeout copy to RW-37. Revision 4 includes changes based on System Engineering Action Team findings and recommendations and incorporates recently approved Specialty Engineering Plans. This revision satisfies requirements identified for Revisions 4 and 5 in the FY95 Work Authorization Directive (WAD).

- Incorporated initial RW-37 comments into the Program TEMP. Provided a revised draft for OCRWM-wide review prior to submission to the Program Baseline Change Control Board (PBCCB) for formal approval.

- Facilitated and participated in the Program Interface Control Working Group (ICWG) meeting. Prepared and delivered draft minutes that summarized ICWG Interface Management Process decisions regarding to be executed by the ICWG. These decisions were outputs of White Paper options prepared by the M&O, and were closed through

consensus of ICWG members at the meeting. The meeting was attended by DOE and M&O members of the WAST, Program Integration, and MGDS projects. Currently writing the formal Interface Management Process document.

- Established initial Integration Task Teams to address Thermal Strategy and Criticality Control Issues. Task teams include representation from M&O WAST, MGDS, and Program Integration organizations with Program Integration as the lead. The charter for task teams is to coordinate and integrate activities at both working and management levels to minimize duplicate work and ensure consideration of program-wide requirements in technical and resource allocation decisions.

- Participated in integration meetings between Office of Environment Management (EM) and RW on "other waste" at multiple locations via formal teleconference. Greater-than-Class-C waste meetings with EM supported preparation for their upcoming Stakeholder Workshops in April 1995. DOE Spent Nuclear Fuel Steering Group meetings with EM supported task team development and initiation of a process for issue resolution.

Systems Engineering Requirements and Configuration Management

- Completed comment resolution on the Configuration Information System (CIS) Phase 3 Software Requirements Specification (SRS). Received approval from internal M&O management. Incorporated comments from Las Vegas M&O management. Also incorporated new requirements identified during the capability demonstration and updated SRS appendices to reflect capability findings. Document has been resubmitted to Las Vegas for management approval.

- Reviewed and finalized the proposed baseline elements of CIS Version 1.2 scheduled to be installed on April 14, 1995. During installation, all current users will be upgraded to CIS Version 1.2, the latest CIS software release.

- Continued development of CIS Phase 3 and presented a capability demonstration to M&O Las Vegas. When this phase is completed, Level 3 at Las Vegas will be able to access the program-wide CIS system. After this phase, only the Level 2 installation remains to complete the overall development of the change management system.

- Completed the Automated Requirement Management System (ARMS) Survey Report and submitted it to RW-37 for review and comment. The survey identified key user preferences to improve ARMS usability, training, and documentation; specific recommendations were made in each of these areas. Also submitted the Survey Report to RW-30 for review and approval of recommendations.

4.2.1.2 Issues and Concerns

- None.

4.2.2 Regulatory and Licensing
CWBS 9.2.2

MANAGER: D. F. Fenster

OBJECTIVE(S): Coordinate and develop an integrated OCRWM programmatic approach and strategies for regulatory compliance and licensing issues. Coordinate and develop regulatory interpretation and guidance documents. Lead the National Environmental Policy Act (NEPA) policy and compliance approach process. Serve as a point of contact on policy for environmental, safety and health compliance. Coordinate and facilitate NRC interactions.

4.2.2.1 Progress During Report Period

Regulatory Policy And Requirements

- Prepared an evaluation of EIS issues for the 10 CFR Part 71 licensing process for the MPC.
- Revising OCRWM NEPA Guidance Document (formerly titled OCRWM NEPA Procedures Manual) based on the recent round of comments from RW-30, RW-40, and YMSCO.
- Reviewed the OCRWM - Department of the Navy Memorandum of Understanding (MOU) for Cooperating Agency status on the MPC EIS.
- Prepared a Point Paper for RW-1 on the Foreign Research Reactor Fuel EIS for an Executive Concurrence Meeting.

Regulatory Integration

- Conducted a teleconference between YMSCO and HQ to discuss the draft "Procedure for Tracking Regulatory Commitments and Requests Using the Regulatory Tracking System."
- Held a comment resolution meeting on March 10, 1995, to resolve DOE comments on the MGDS Annotated Outline for License Application. The review involved both Headquarters and Las Vegas DOE staff. Approximately 360 comments were received on the document during the review.
- Reviewed and provided comments on three preliminary drafts and the final draft of the Regulatory Compliance Review Report. Assisted HQ in concurrence of the final report and delivered it to the NRC on March 14, 1995.
- Briefed RW-36 on March 27, 1995, regarding the MGDS Annotated Outline scheduled for delivery to the NRC, ACNW, NWTRB, State of Nevada, and Affected Units of Local Government on March 31, 1995.
- Participated in the DOE/NRC technical exchange on ground water travel time (GWTT) on March 29, 1995. The NRC is preparing a staff technical position on this issue for potential release during Summer 1995. The open discussion was viewed as extremely successful.

Debriefed the GWTT working group on what we learned at the technical exchange. The group is now focusing its presentations on the forthcoming meeting with the Advisory Committee on Nuclear Waste (ACNW). Drafted a revised presentation.

- Reviewed the revised responses to NRC comments on the topical report on extreme erosion included in the proposed deliverable package. Discussed comments with M&O LV.

Licensing and Regulatory

- Provided a consolidated markup of HQ comments on the DOE responses to NRC concerns on the Erosion Topical Report. Briefed RW-36 on the main issues with the draft DOE responses.

- Conducted a workshop at Sandia National Laboratories on the licensing process and on Preparing Topical Reports on March 13, 1995.

- Reviewed and commented on the proposed responses to NRC's comments on the topical report on extreme erosion. Participated in teleconferences with DOE, M&O, and LV to resolve comments.

4.2.2.2 Issues and Concerns

- None.

4.2.3 Strategic Planning
CWBS 9.3.2

MANAGER: F. Ridolphi

OBJECTIVE(S): Provide complete strategic and system analyses to DOE OCRWM and to the general manager of the M&O contract

4.2.3.1 Progress During Report Period

- Reorganized support to RW Strategic Planning to enhance efficiency. Combined Systems Analysis with Strategic Planning and International Programs to make up a new Planning and Analysis organization.

- Planning and Analysis continued to coordinate M&O inputs to RW rapid response activities for congressional testimony and answers to questions. This activity has increased the efficiency of M&O support to this activity, but further improvement is required.

- Systems Analysis completed the initial Total System Life-Cycle Cost (TSLCC) scenario development and costing and briefed the results to RW-1/2. A report documenting this effort is in preparation.

- Planning and Analysis participated in the OCRWM Strategic Planning workshop held at Airlie House and is assisting RW-34 in preparing an update draft of the Strategic Plan incorporating the results of the workshop for OCRWM review.

- Program Outreach coordinated Office of Program Management and Integration and DOE Secretary O'Leary's March 1, 1995 Waste Management Policy Meeting with selected program stakeholders in preparation for her March 2, 1995, Congressional testimony. The nuclear utility industry; regulatory bodies; environmental groups; State, local, and Tribal governments; the non-proliferation community; citizen activists; and other DOE offices and Federal agencies represented discussed legislative proposals and major program issues before Congress.

4.2.3.2 Issues and Concerns

- None.

4.2.4 International Waste Management Technology CWBS 9.3.3

MANAGER: F. Ridolphi

OBJECTIVE(S): Maintain an awareness of international activities related to the disposal of spent fuel and high-level waste in order to integrate information from these foreign programs into the domestic program. Report on special issues regarding international program activities and provide specific recommendations.

4.2.4.1 Progress During the Reporting Period

- The Strategic Planning and International Programs organization has been included in a new organizational element called Planning and Analysis. Objectives and activities in support of OCRWM International Programs remain unchanged and is a part of the Planning and International element within Planning and Analysis. With the implementation of contractor consolidation activities, national laboratory support to International Programs cooperative agreements now falls under the M&O.

- The M&O conducted site visits to Yucca Mountain with representatives of both the Japanese and French waste management organizations.

- The M&O completed work on the Annual Technical Progress Report and the Annual Project Plan for the RW cooperative agreement with NAGRA (Switzerland).

4.2.4.2 Issues and Concerns

- None.

4.2.5 Program Control and Administration CWBS 9.3.5

MANAGERS: J. L. Stern/M. H. King

OBJECTIVE(S): Provide Program Control and Administrative support to OCRWM by implementing and maintaining a Program Control System (PCS) for the program and program support elements. Prepare Monthly Program Status Reports and Charts and bi-monthly Director's Program Reviews (DPRs). Develop the FY95 Total-System Life-Cycle Cost (TSLCC) analysis; maintain the Program Cost and Schedule Baseline (PCSB) and Work Breakdown Structure (WBS) dictionaries; and publish weekly and bi-weekly reports from the Management Tracking System (MTS) and Operations Management Tracking System (OMTS) databases.

4.2.5.1 Progress During Report Period

- Submitted change pages to address OCRWM comments on Revision 4 of the Program Cost and Schedule Baseline (PCSB) Document, which incorporates the Program Approach as approved by BCP-00-94-0005, to RW-35.

- Used the draft OCRWM Program Integrated Network (OPIN) to assess the impact of forecast milestone slips reported at the February 9, 1995 DPR. The analysis was provided to RW-35. Using the program summary networks to assess the impact of reported variances is one of the period 5 PEP criteria for a good performance rating.

- Used the cost-loaded OCRWM Program Summary Network (OPSN) to create a "What-If" model to analyze the impact of hypothetical funding cuts on the Yucca Mountain Site Characterization Project schedule. The OPSN model supported the strategic planning group analysis of several proposed funding decrement scenarios and the resultant impact on Technical Site Suitability and License Application Submittal at Yucca Mountain. Using the cost-loaded OPSN to perform funding impact analysis is one of the period 5 PEP criteria for a good performance rating.

- Efforts have been underway to follow up on action items from the February 21, 1995 OCRWM program schedule review meeting. The definition of milestone levels (i.e., Level 0, 1, and 2) has been reviewed and coordinated with the projects resulting in a consistent definition of these milestones throughout the project control organizations. Performed a review of the milestones assigned to these levels; will modify the milestone level assignments during the upcoming FY96 planning process.

- Performed an analysis of the two major scheduling software application programs in use across the program (Open Plan and Primavera) and recommended Primavera to RW-35 as the standard to use throughout the program. Drafted an implementation plan for converting to Primavera and executed the implementation. Established the implementation standard schedule data structure that was agreed to by the project and program scheduling organizations. Schedules presented at the April 27, 1995, mid-year review will be in a consistent Primavera format across the program. The milestone definition effort and the establishment of a common scheduling system are significant steps toward improving the

program-wide project management system and contributes toward the period 5 PEP criteria for outstanding performance.

- Completed inputs on the Change Management Working Group Report (Sub-Group One and Sub-Group Five Reports and Summary Reports) in support of RW-35. The final report was submitted by RW-30 to the Office Directors (ODs) for review and coordination.

- Developed a response to Government Accounting Office (GAO) questions regarding OCRWM FY94 uncosted and unobligated balances and why they should not be subtracted from the FY96 budget request. Supported RW-35 in a meeting with the GAO. The reviewer was satisfied with our answers.

- Developed the outline and development approach for the CRWMS Program Planning and Control System Description and obtained M&O project control personnel concurrence with the approach.

- Received RW-35's approval to continue the OCRWM Cost and Schedule Estimate Implementation Guide development. The major action was an award of a purchase order to Gruber and Flannery (G&F) for the development of a participant appendix to the Guide.

- Briefed RW-1 on the results of the TSLCC effort and delivered "Total System Life-Cycle Cost 1995" in satisfaction of the Interim Life-Cycle Cost Estimates deliverable on March 14, 1995. Initiated preparation of an Executive Summary level TSLCC report for the single repository case in accordance with RW-1 direction at the March 14, 1995, briefing.

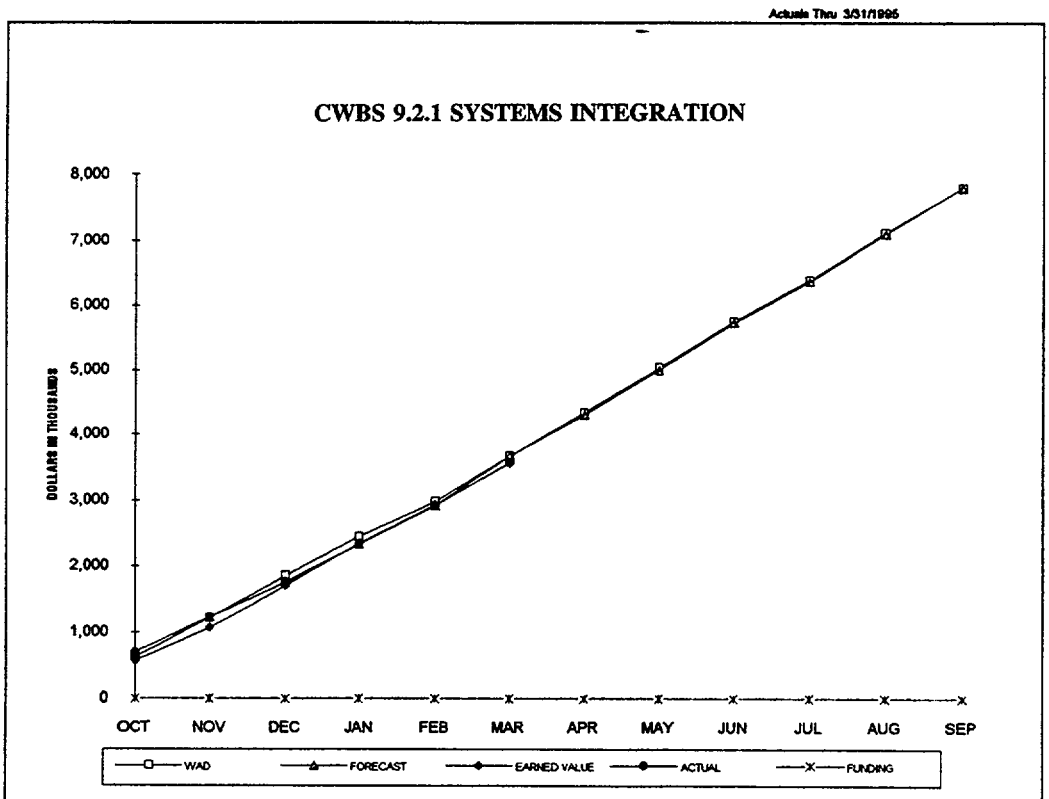
- Reviewed the national laboratories' transition to ensure appropriate funding deobligation from existing contract and obligation to the M&O. Coordinated Approved Funding Program transfer and certification for withdrawal of funds with OCRWM.

4.2.5.2 Issues and Concerns

- None.

4.2.6 Program Management and Integration Variances

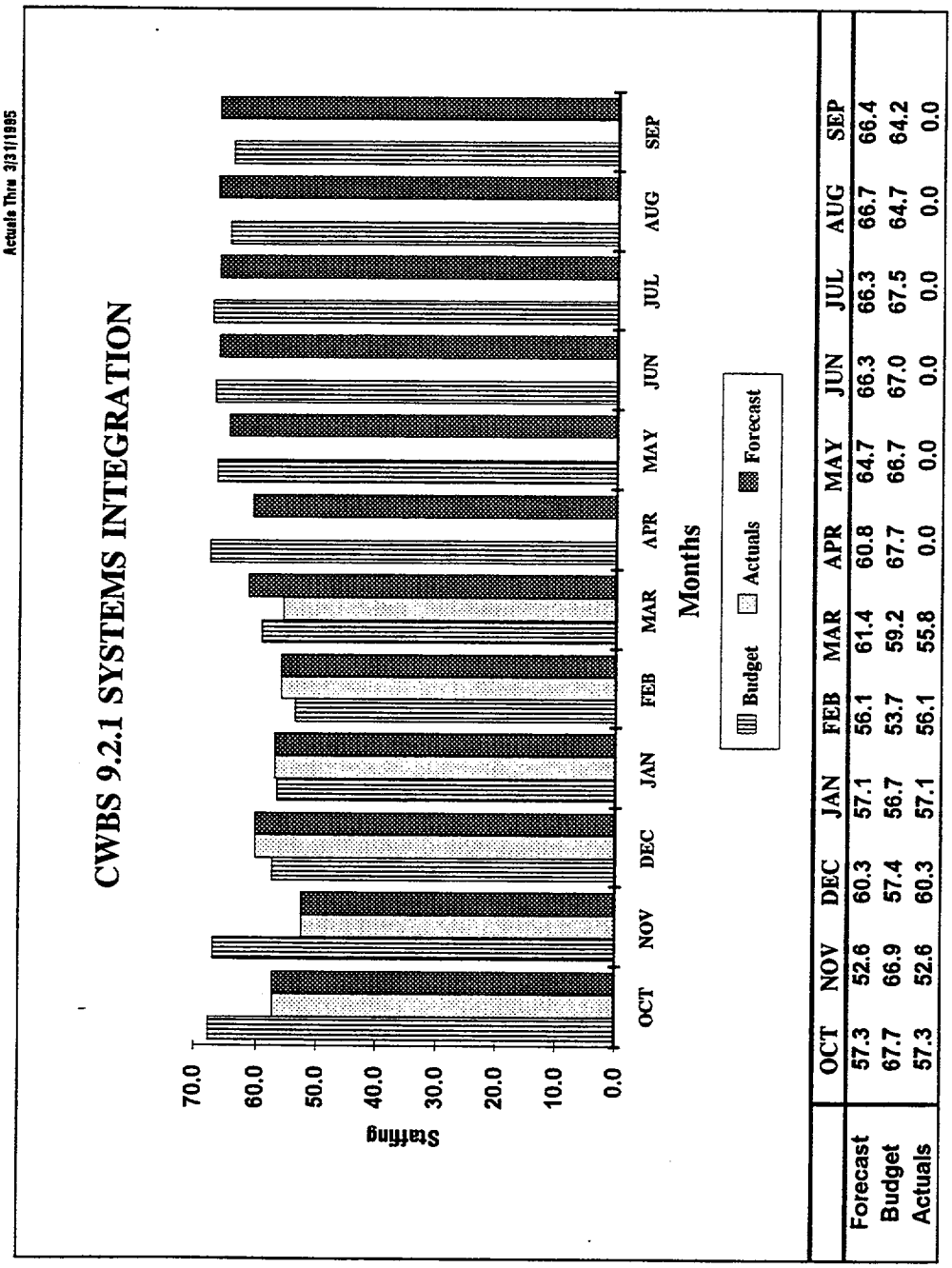
- Variance thresholds are not exceeded.



		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MONTH	WAD	624	600	631	593	532	686	673	698	711	642	729	677
	FORECAST	699	540	512	582	584	746	635	707	720	633	747	692
	EARNED VALUE	565	503	640	631	591	631						
	MONTH ACTUAL	699	540	512	582	584	655						
	VAR/SCH	(59)	(97)	9	38	59	(55)						
	VAR/COST	(134)	(37)	128	49	7	(24)						
CUM	WAD	624	1,224	1,855	2,448	2,980	3,666	4,339	5,037	5,748	6,390	7,119	7,796
	FORECAST	699	1,239	1,751	2,333	2,917	3,663	4,298	5,005	5,725	6,358	7,105	7,797
	EARNED VALUE	565	1,068	1,708	2,339	2,930	3,561						
	ACTUAL	699	1,239	1,751	2,333	2,917	3,572						
	VAR/SCH	(59)	(156)	(147)	(109)	(50)	(105)						
	VAR/COST	(134)	(171)	(43)	6	13	(11)						
FUNDING	FY95 FUNDING	0	0	0	0	0	0	0	0	0	0	0	0
	PREV. FUNDED	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL FUNDING	0	0	0	0	0	0	0	0	0	0	0	0

Current Month Cost and Schedule Variances are not addressed. See Section 1.3.

Figure 9. Systems Integration Financial Status



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Forecast	57.3	52.6	60.3	57.1	56.1	61.4	60.8	64.7	66.3	66.3	66.7	66.4
Budget	67.7	66.9	57.4	56.7	53.7	59.2	67.7	66.7	67.0	67.5	64.7	64.2
Actuals	57.3	52.6	60.3	57.1	56.1	55.8	0.0	0.0	0.0	0.0	0.0	0.0

Figure 10. Systems Integration Staffing

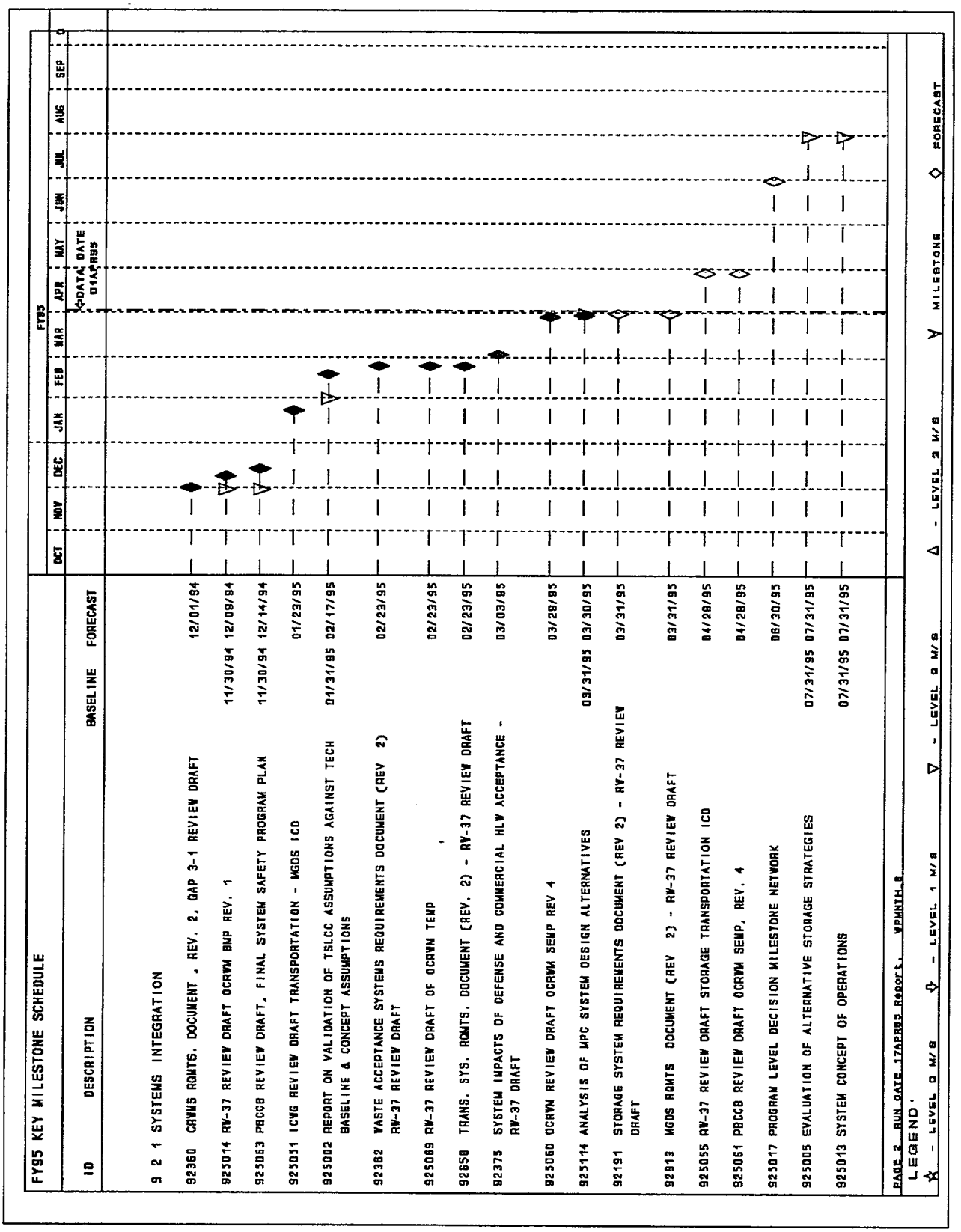


Figure 11. Systems Integration Key Milestone Schedule

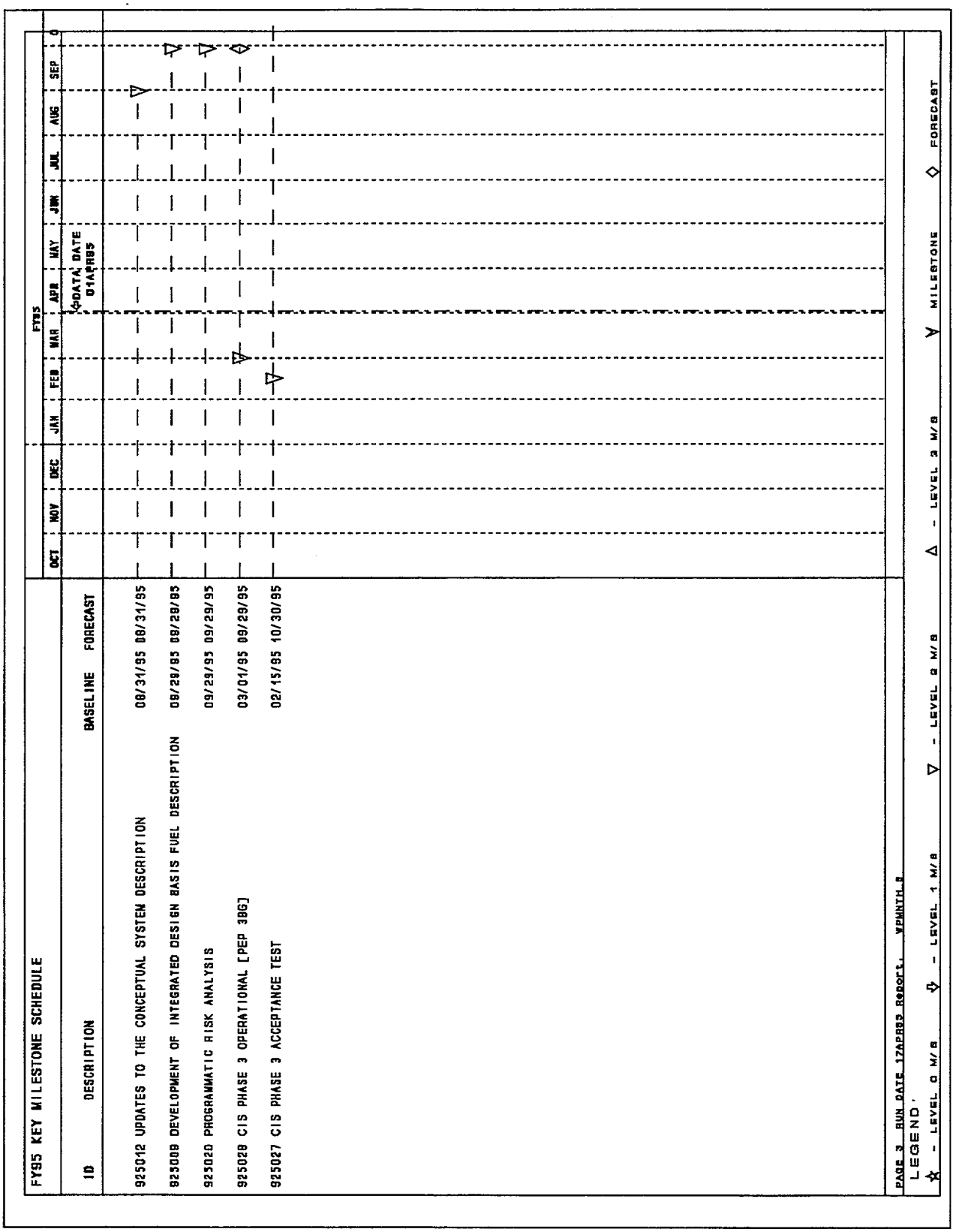
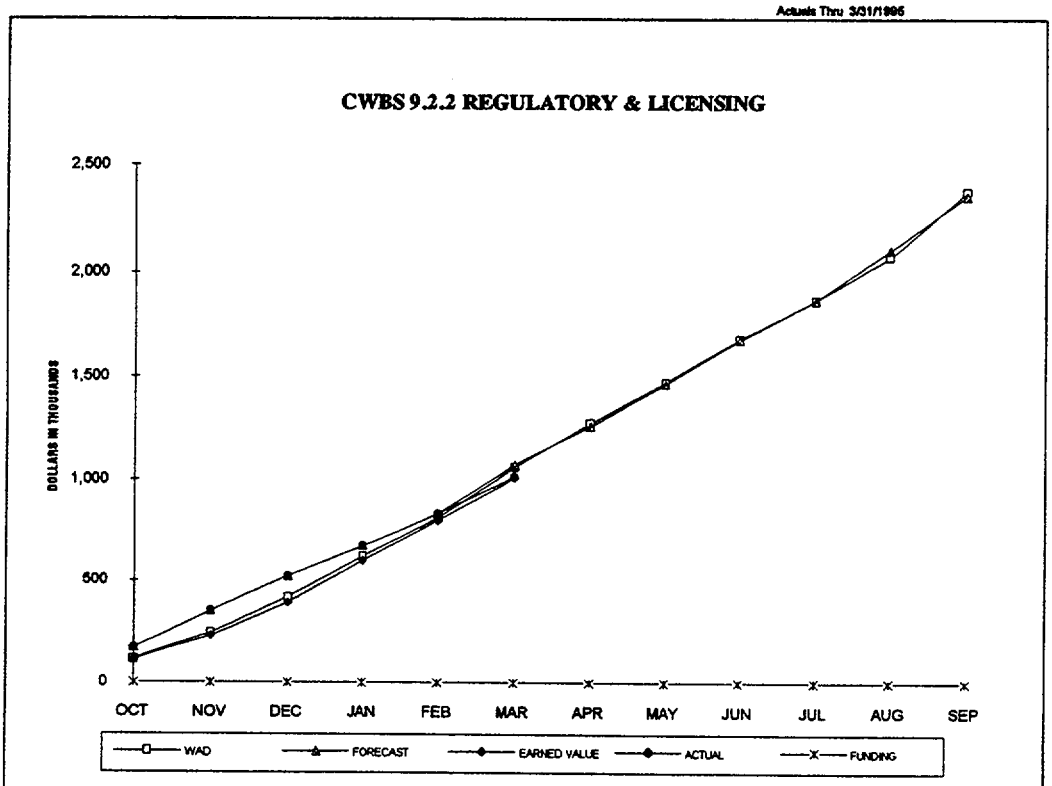


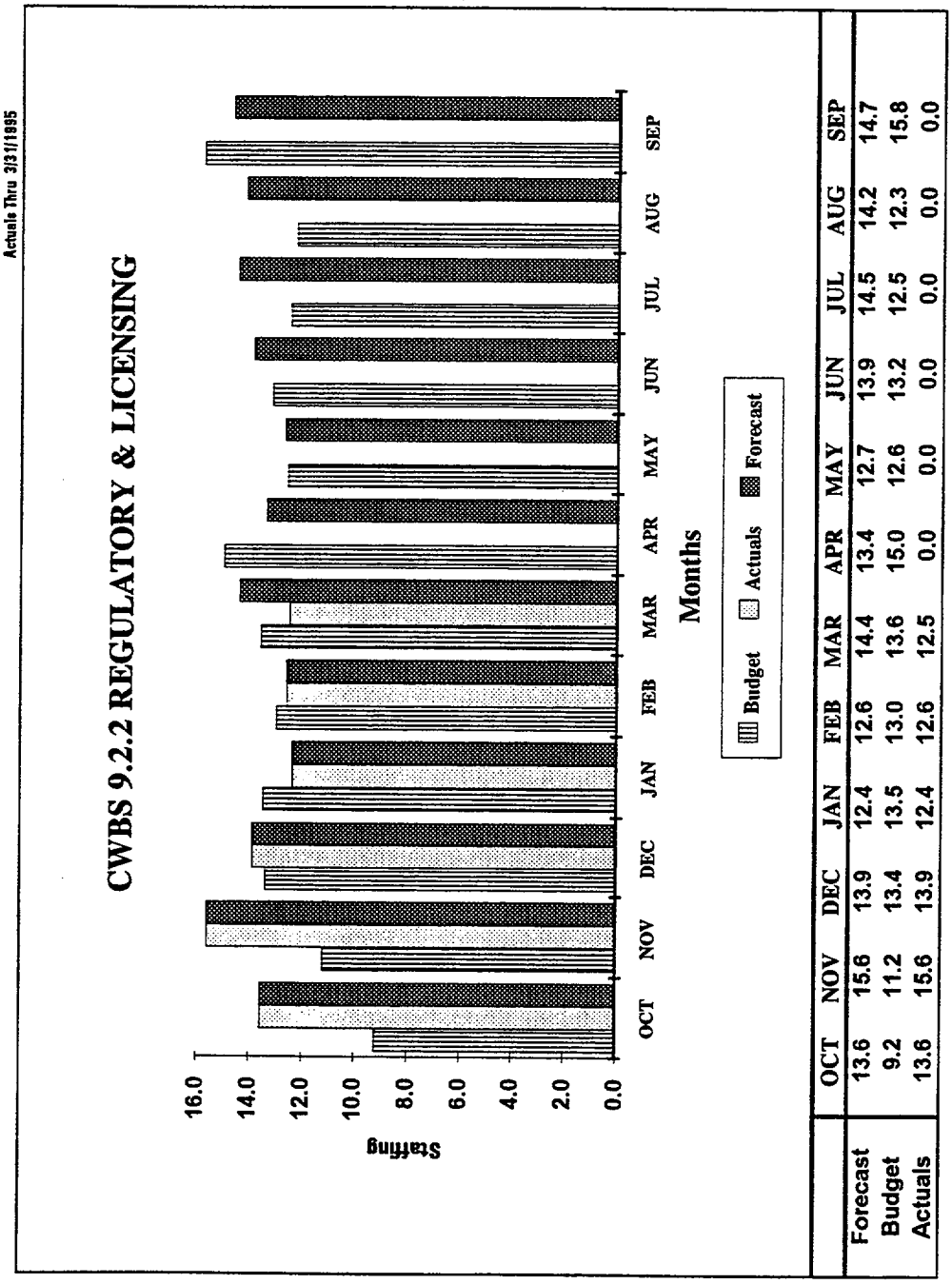
Figure 11. Systems Integration Key Milestone Schedule (Continued)



		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MONTH	WAD	111	131	175	204	190	249	208	204	214	185	203	306
	FORECAST	165	185	173	147	163	238	181	210	220	189	234	256
	EARNED VALUE	107	119	164	211	197	209						
	MONTH ACTUAL	165	185	173	147	163	181						
	VAR/SCH	(4)	(12)	(11)	7	7	*(40)*						
	VAR/COST	(58)	(66)	(9)	64	34	*28*						
CUM	WAD	111	242	417	621	811	1,060	1,268	1,472	1,686	1,871	2,074	2,380
	FORECAST	165	350	523	670	833	1,071	1,252	1,462	1,682	1,871	2,105	2,361
	EARNED VALUE	107	226	390	601	798	1,007						
	ACTUAL	165	350	523	670	833	1,014						
	VAR/SCH	(4)	(16)	(27)	(20)	(13)	(53)						
	VAR/COST	(58)	(124)	(133)	(69)	(35)	(7)						
FUNDING	FY95 FUNDING	0	0	0	0	0	0	0	0	0	0	0	0
	PREV. FUNDED	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL FUNDING	0	0	0	0	0	0	0	0	0	0	0	0

Current Month Cost and Schedule Variances are not addressed. See Section 1.3.

Figure 12. Regulatory and Licensing Financial Status



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Forecast	13.6	15.6	13.9	12.4	12.6	14.4	13.4	12.7	13.9	14.5	14.2	14.7
Budget	9.2	11.2	13.4	13.5	13.0	13.6	15.0	12.6	13.2	12.5	12.3	15.8
Actuals	13.6	15.6	13.9	12.4	12.6	12.5	0.0	0.0	0.0	0.0	0.0	0.0

Figure 13. Regulatory and Licensing Staffing

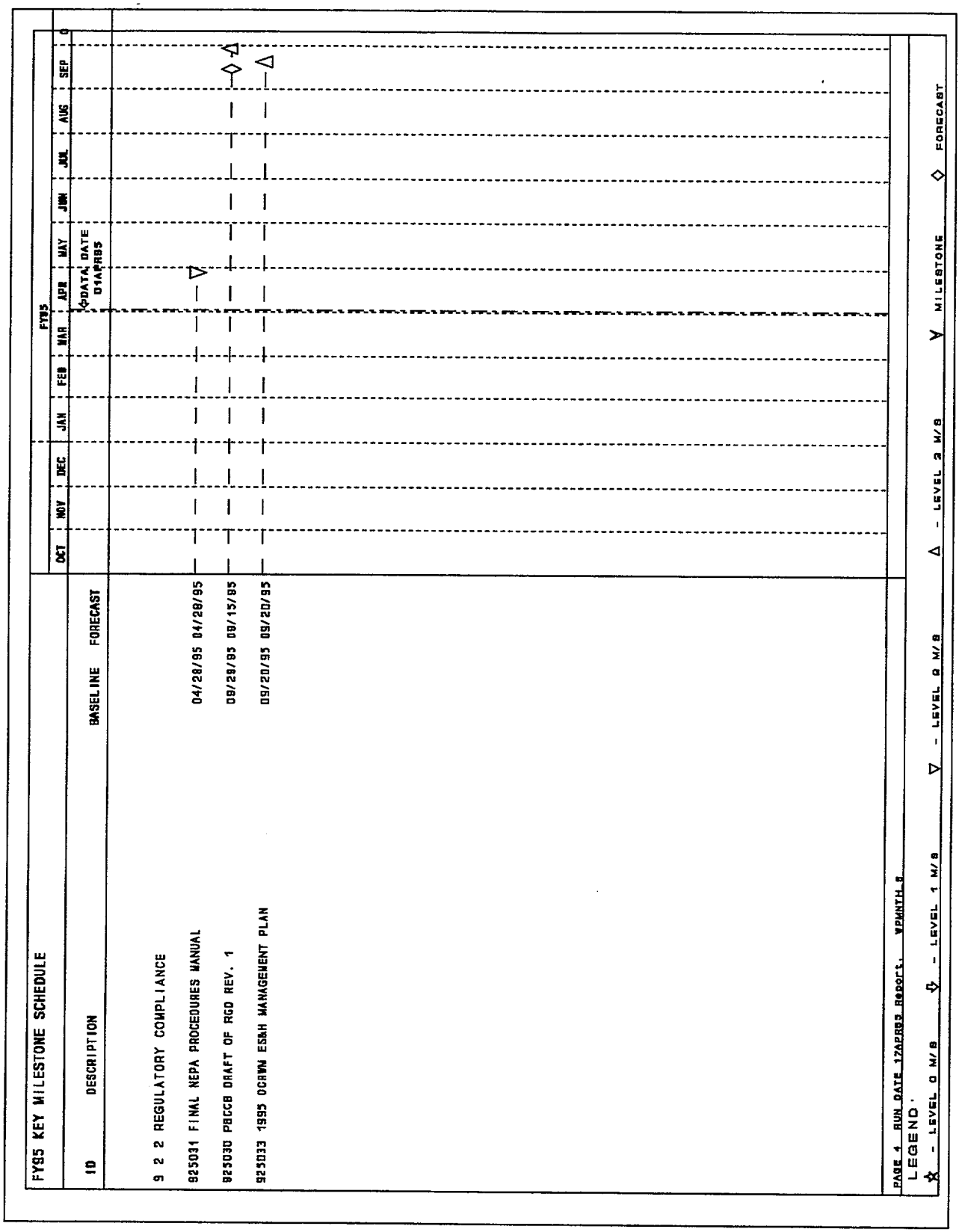
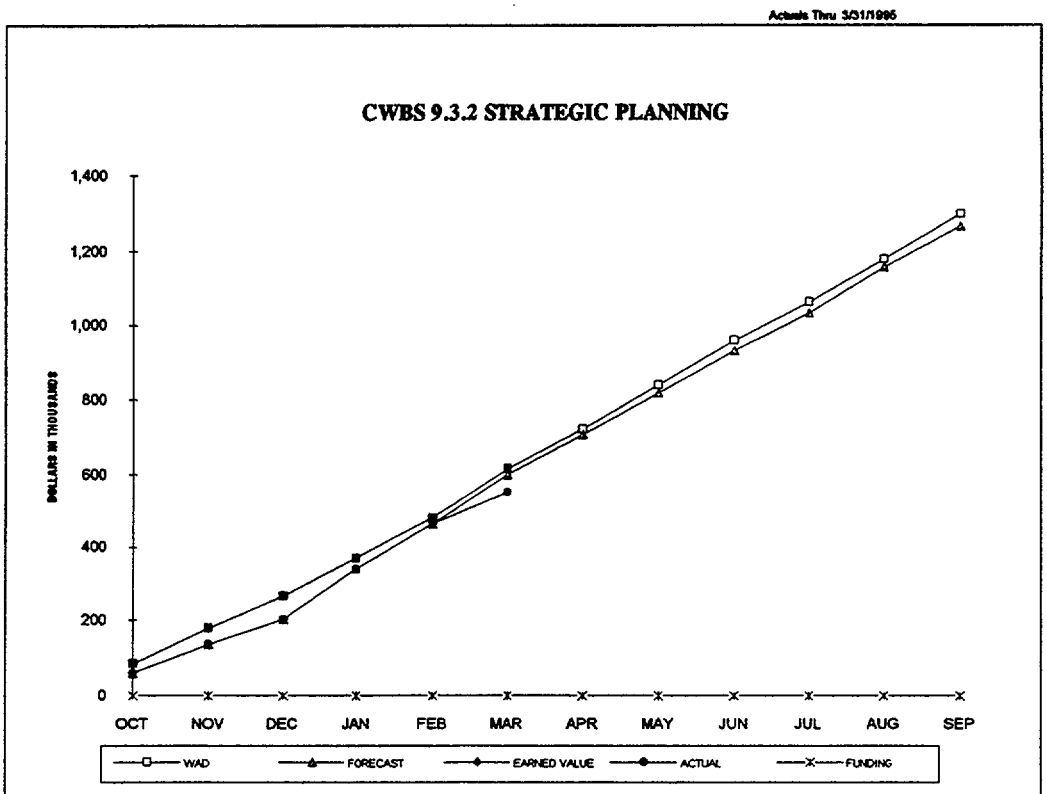


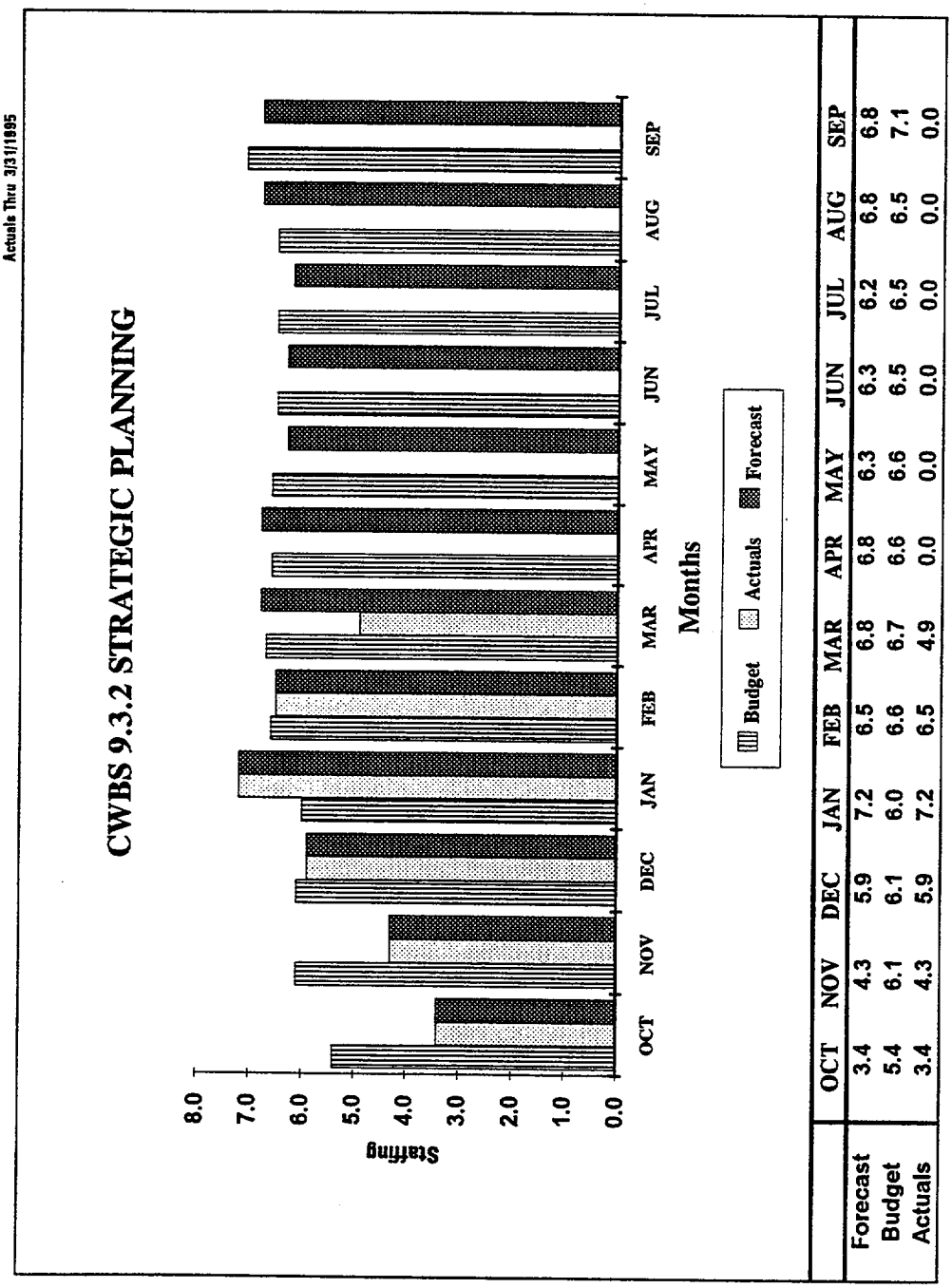
Figure 14. Regulatory and Licensing Key Milestone Schedule



		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MONTH	WAD	84	94	86	107	110	135	106	118	119	103	116	120
	FORECAST	61	75	66	137	126	135	106	112	113	101	123	111
	EARNED VALUE	84	94	86	107	110	135						
	MONTH ACTUAL	61	75	66	137	126	87						
	VAR/SCH	0	0	0	0	0	0						
	VAR/COST	23	19	20	(30)	(16)	***48***						
CUM	WAD	84	178	264	371	481	616	722	840	959	1,062	1,178	1,298
	FORECAST	61	136	202	339	465	600	706	818	931	1,032	1,155	1,266
	EARNED VALUE	84	178	264	371	481	616						
	ACTUAL	61	136	202	339	465	552						
	VAR/SCH	0	0	0	0	0	0						
	VAR/COST	23	42	62	32	16	***64***						
FUNDING	FY95 FUNDING	0	0	0	0	0	0	0	0	0	0	0	0
	PREV. FUNDED	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL FUNDING	0	0	0	0	0	0	0	0	0	0	0	0

Current Month Cost and Schedule Variances are not addressed. See Section 1.3.

Figure 15. Strategic Planning Financial Status



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Forecast	3.4	4.3	5.9	7.2	6.5	6.8	6.8	6.3	6.3	6.2	6.8	6.8
Budget	5.4	6.1	6.1	6.0	6.6	6.7	6.6	6.6	6.5	6.5	6.5	7.1
Actuals	3.4	4.3	5.9	7.2	6.5	4.9	0.0	0.0	0.0	0.0	0.0	0.0

Figure 16. Strategic Planning Staffing

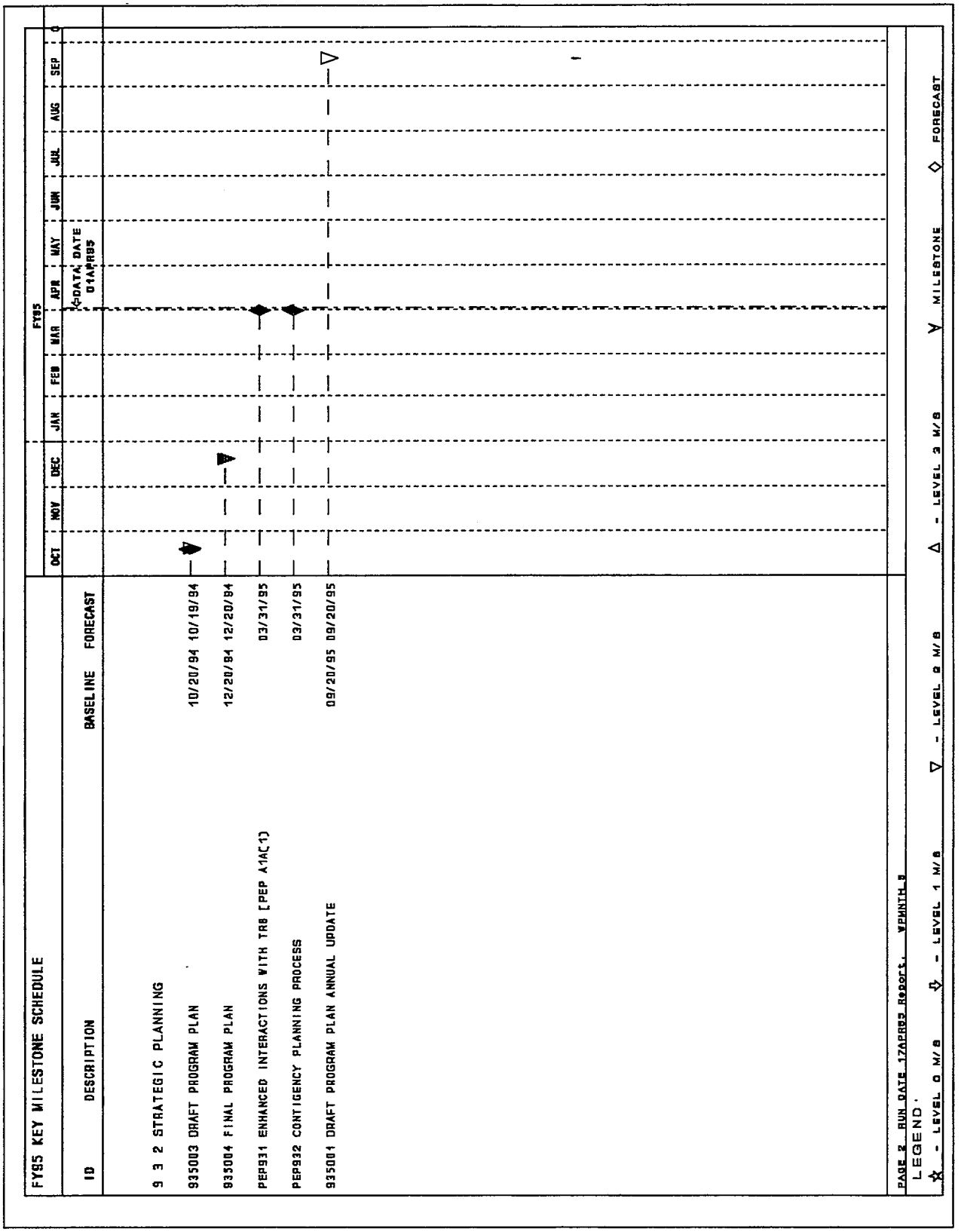
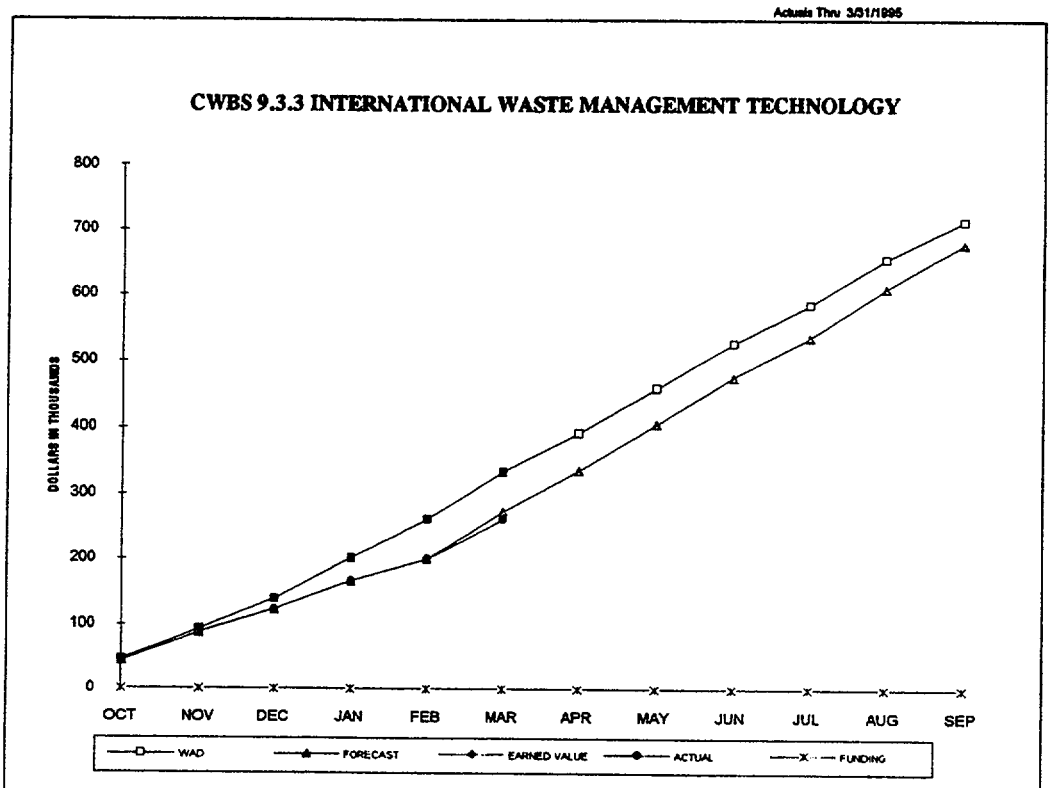


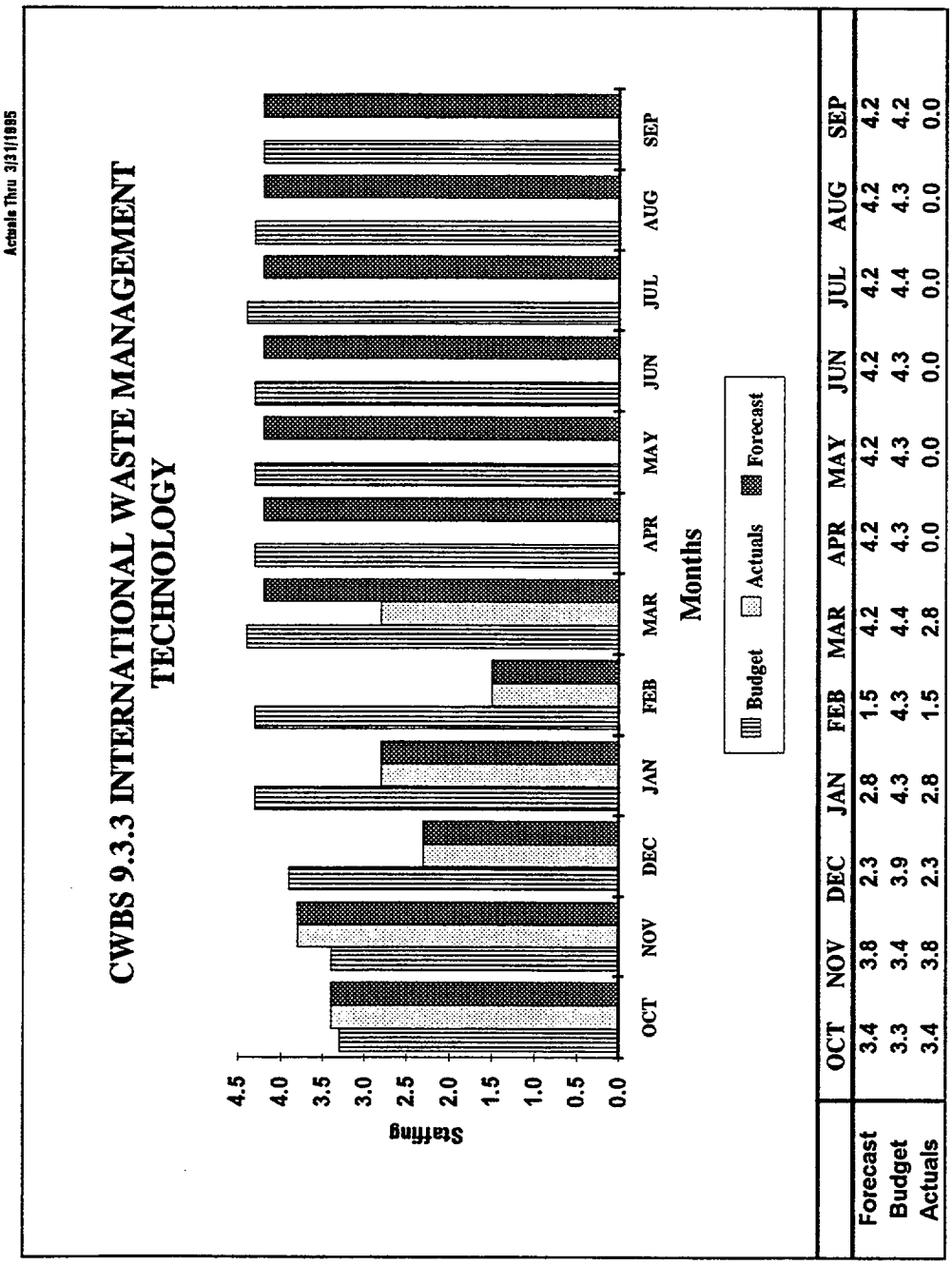
Figure 17. Strategic Planning Key Milestone Schedule



		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MONTH	WAD	46	48	45	63	60	72	59	67	67	58	69	59
	FORECAST	43	46	35	43	33	73	63	70	70	60	73	69
	EARNED VALUE	46	48	45	63	60	72						
	MONTH ACTUAL	43	46	35	43	33	62						
	VAR/SCH	0	0	0	0	0	0						
	VAR/COST	3	2	10	20	27	10						
CUM	WAD	46	94	139	202	262	334	393	460	527	585	654	713
	FORECAST	43	89	124	167	200	273	336	406	476	536	609	678
	EARNED VALUE	46	94	139	202	262	334						
	ACTUAL	43	89	124	167	200	262						
	VAR/SCH	0	0	0	0	0	0						
	VAR/COST	3	5	15	35	62	72						
FUNDING	FY95 FUNDING	0	0	0	0	0	0	0	0	0	0	0	0
	PREV. FUNDED	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL FUNDING	0	0	0	0	0	0	0	0	0	0	0	0

Current Month Cost and Schedule Variances are not addressed. See Section 1.3.

Figure 18. International Waste Management Technology Financial Status



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Forecast	3.4	3.8	2.3	2.8	1.5	4.2	4.2	4.2	4.2	4.2	4.2	4.2
Budget	3.3	3.4	3.9	4.3	4.3	4.4	4.3	4.3	4.3	4.4	4.3	4.2
Actuals	3.4	3.8	2.3	2.8	1.5	2.8	0.0	0.0	0.0	0.0	0.0	0.0

Figure 19. International Waste Management Technology Staffing

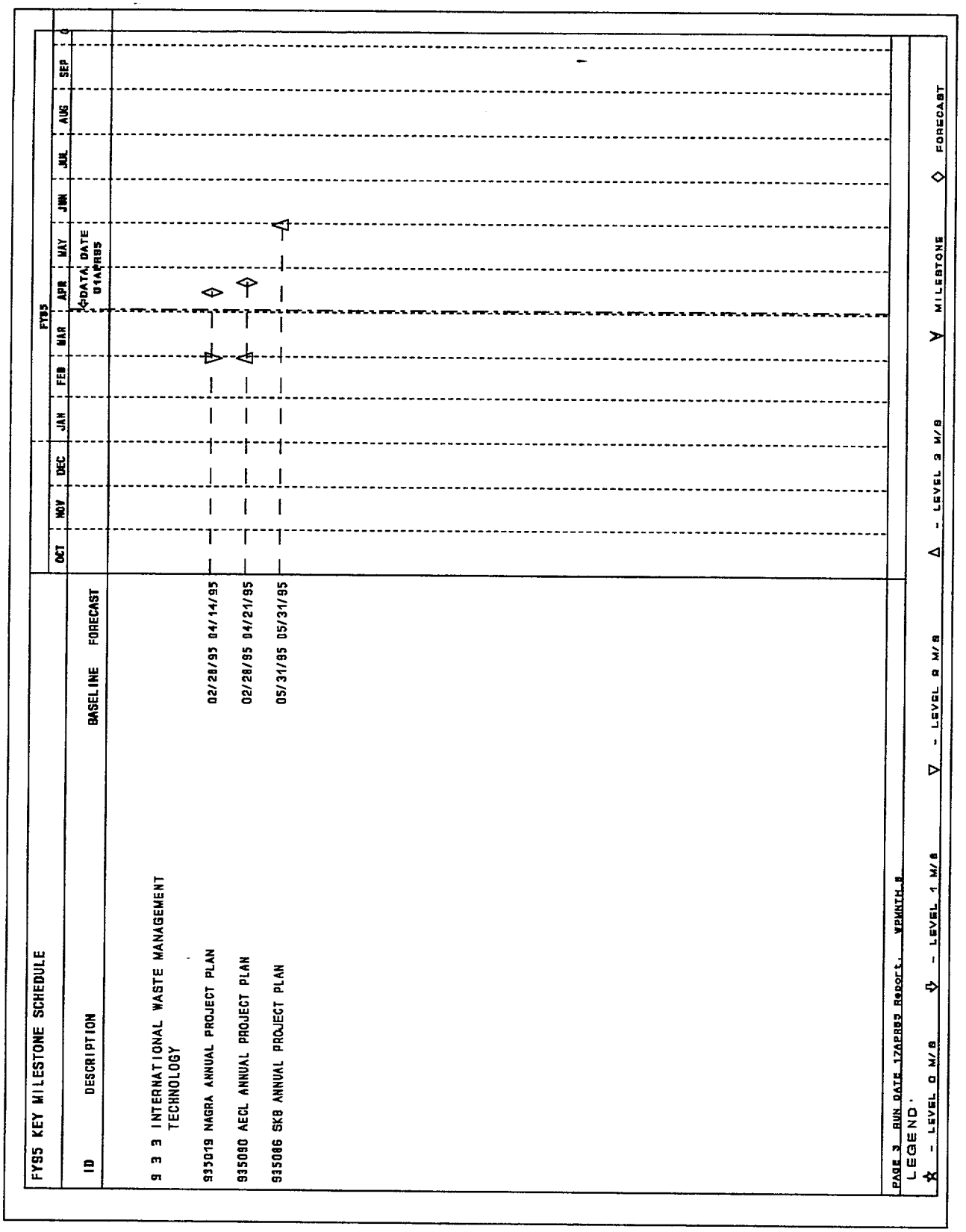
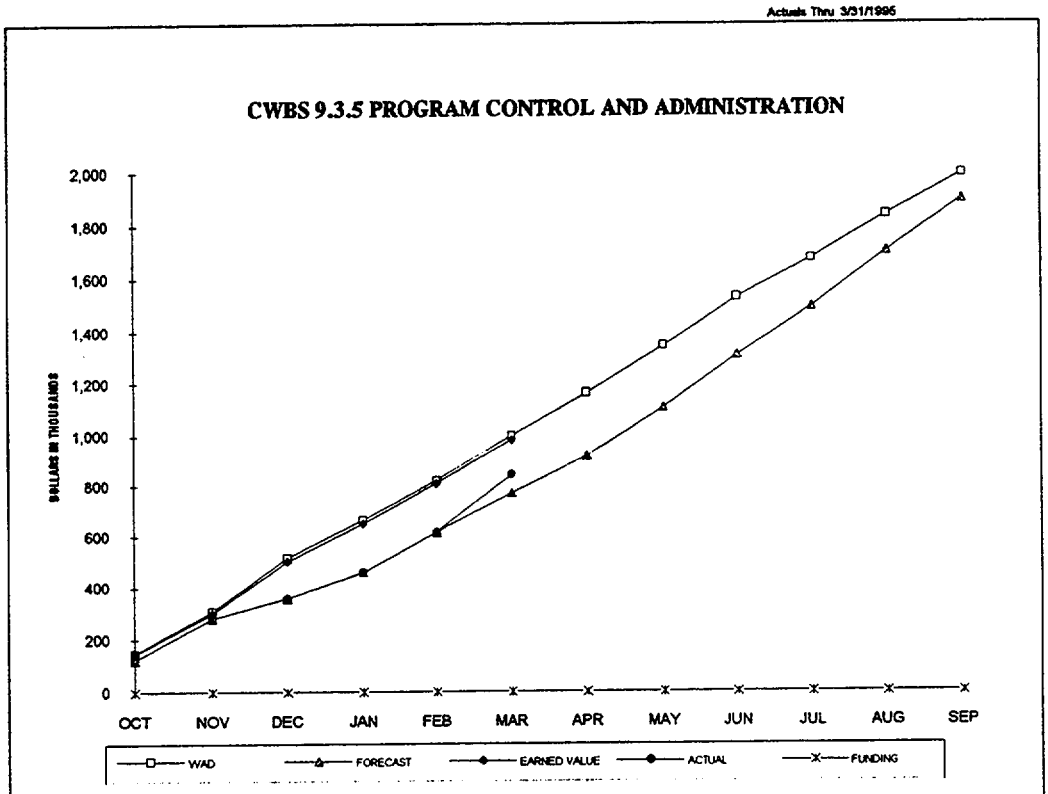


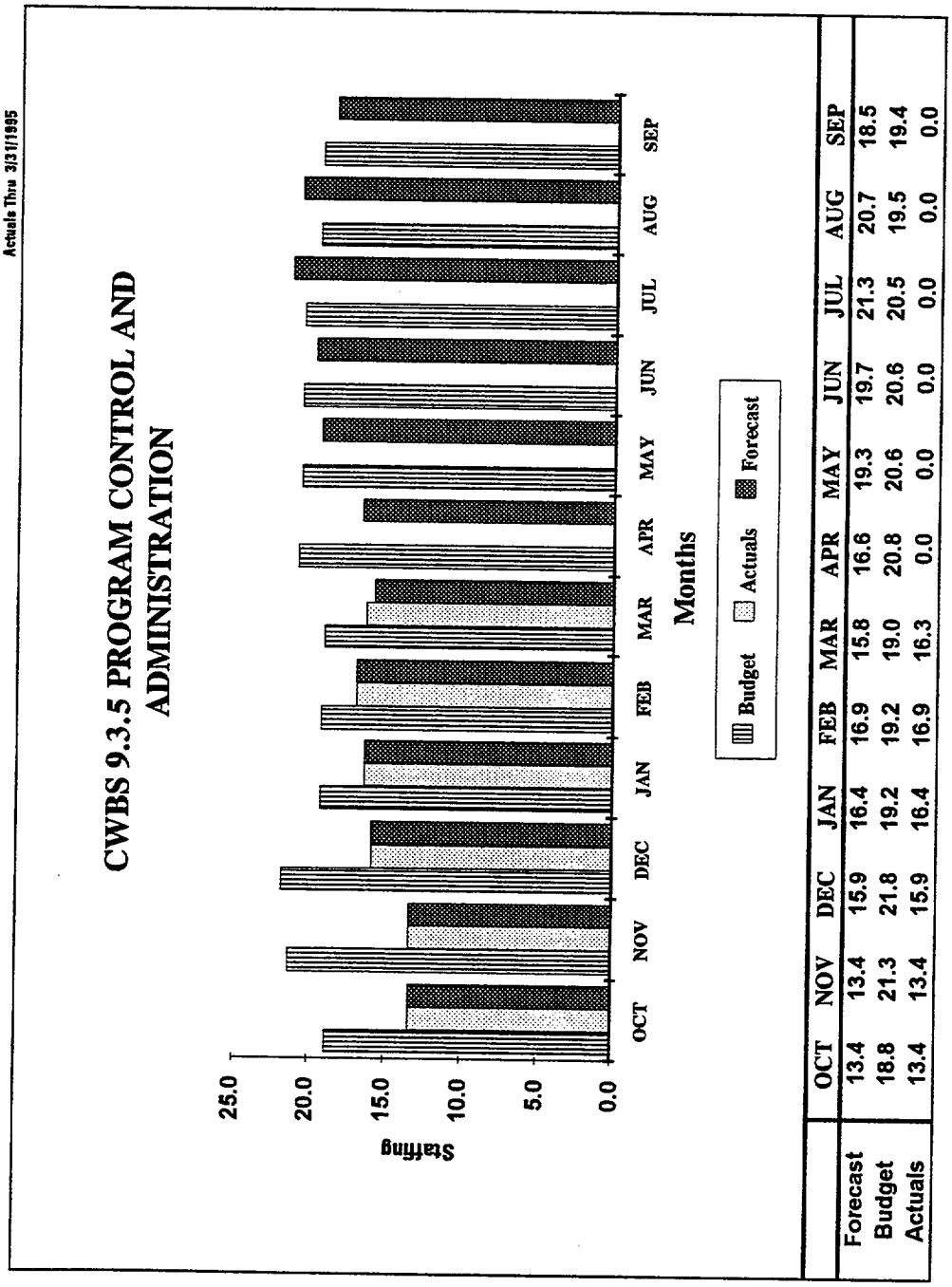
Figure 20. International Waste Management Technology Key Milestone Schedule



		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MONTH	WAD	147	161	206	149	158	179	161	184	184	143	167	152
	FORECAST	123	160	75	101	155	156	149	189	200	184	208	199
	EARNED VALUE	146	155	199	150	158	173						
	MONTH ACTUAL	123	160	75	101	155	230						
	VAR/SCH	(1)	(6)	(7)	1	0	(6)						
	VAR/COST	23	(5)	124	49	3	(57)						
CUM	WAD	147	308	514	663	821	1,000	1,161	1,345	1,529	1,672	1,839	1,991
	FORECAST	123	283	358	459	614	770	919	1,108	1,308	1,492	1,700	1,899
	EARNED VALUE	146	301	500	650	808	981						
	ACTUAL	123	283	358	459	614	844						
	VAR/SCH	(1)	(7)	(14)	(13)	(13)	(19)						
	VAR/COST	23	18	142	191	194	137						
FUNDING	FY95 FUNDING	0	0	0	0	0	0	0	0	0	0	0	0
	PREV. FUNDED	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL FUNDING	0	0	0	0	0	0	0	0	0	0	0	0

Current Month Cost and Schedule Variances are not addressed. See Section 1.3.

Figure 21. Program Control and Administration Financial Status



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Forecast	13.4	13.4	15.9	16.4	16.9	15.8	16.6	19.3	19.7	21.3	20.7	18.5
Budget	18.8	21.3	21.8	19.2	19.2	19.0	20.8	20.6	20.6	20.5	19.5	19.4
Actuals	13.4	13.4	15.9	16.4	16.9	16.3	0.0	0.0	0.0	0.0	0.0	0.0

Figure 22. Program Control and Administration Staffing

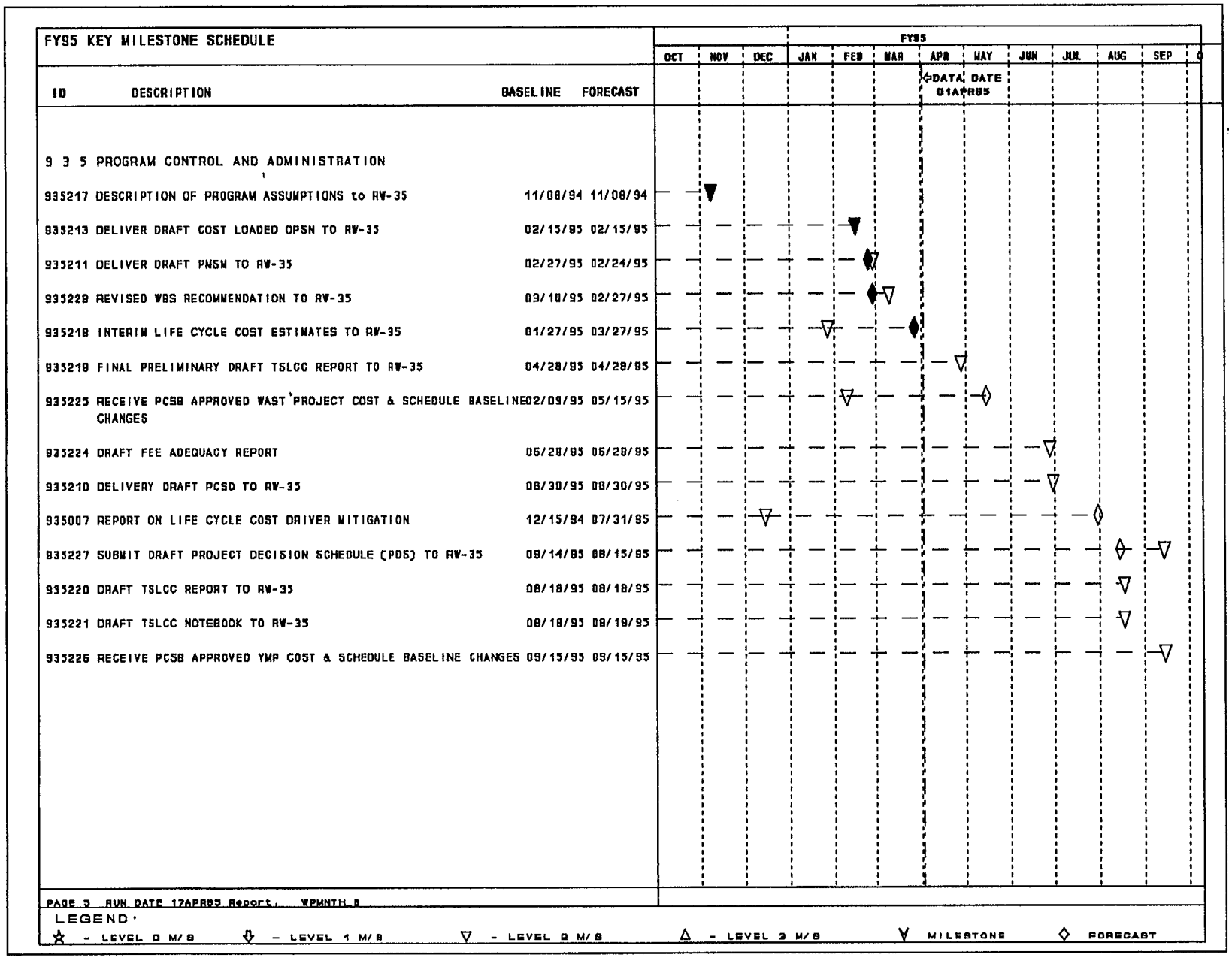


Figure 23. Program Control and Administration Key Milestone Schedule

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4.3 EXTERNAL RELATIONS AND INFORMATION RESOURCE MANAGEMENT CWBS 9.3.4, 9.3.6

4.3.1 External Relations CWBS 9.3.4

MANAGER: K. H. Whitney

OBJECTIVE(S): Manage and operate the OCRWM National Information Center; develop, implement, maintain, integrate, and disseminate program-wide public, educational, and technical information materials, including publications, audiovisual resources, video productions, exhibits, presentations and briefings, INFOLINK, and toll-free telephone response; manage the inventory of materials; and implement the program-wide integration of DOE communications policies and publications procedures.

4.3.1.1 Progress During Report Period

Communications Integration

- Coordinated initial HQ review and submitted "Of Mountains and Science" section of the Spring edition of the *OCRWM Bulletin* for the headquarters concurrence process.

- Developed a draft concurrence process for public information products and submitted the draft to RW-15 personnel for their review and comments.

Public Information

- Developed and submitted the Spring edition of *OCRWM Bulletin* for the headquarters concurrence process.

- Developed text and designs and delivered revised trifold brochures on four program-wide topics: publications, exhibits, curriculum, and videos for the headquarters concurrence process. Developed draft text for trifold brochure on OCRWM Home Page trifold brochure.

- Delivered draft of revised fact sheet on *The Nuclear Waste Fund.*

- Provided draft outline of the new program-wide brochure to RW-15 personnel for their review and suggestions.

- Successfully developed and demonstrated OCRWM Home Page to RW-1 and 2 and Associate Directors (ADs); prepared operations plan, memorandum, and announcements; and, having received authorization from RW-1/2, implemented Internet connectivity.

- Successfully met the March 15, 1995, milestone for importing native file graphics into the Digital Media Database (DMD); pilot tested for uploading and downloading files; continued quality control checking; wrote and finalized the first edition of the Visual Image Processing

System (VIPS) Manual; and led a discussion about format standards at the Multimedia Natural Working Group meeting.

- Responded to 431 requests for information received from the following sources: 256 calls to the 800 phone number, 164 written inquiries, and 11 walk-in visitors.

- Responded to requests for 283 program visuals, including requests from RW-46 for a presentation to the Advisory Committee on Nuclear Waste and from RW-15 for appropriate visuals for consideration for the Annual Report cover.

- Prepared labels for 200 additional dubbed copies of *1994 OCRWM Program in Review* videotape to meet requests from the public.

- Made 30 copies of *Wasteland* videotape as requested by RW-40.

- Mailed copies of *1994 Yucca Mt. Project in Review* videos to universities with nuclear programs and nuclear utility information centers.

- Distributed OCRWM Calendar for March to a mailing list of 200.

- Staffed and delivered reports on the display of OCRWM exhibits at Waste Management '95, the National Association for Science Technology and Society's Science and Technology Literacy Conference, and the Hoosier Association of Science Teachers Annual Conference.

- Staffed OCRWM exhibits at the National Science Teachers Association's Annual Conference and the Association for Supervision and Curriculum Development's Annual Conference.

- Opened nine new INFOLINK accounts; provided support to nine account holders; wrote, edited, and posted multiple news flashes, releases, and abstracts; and posted Secretary O'Leary's March 2, 1995 statement before the Senate Energy and Natural Resources Committee and Dr. Dreyfus' March 16, 1995 statement to the Energy and Water Development Subcommittee on the FY96 OCRWM Budget request.

- Distributed 18,872 OCRWM publications from the warehouse; requested and received authorization to recycle obsolete OCRWM documents.

- Continued work on activities relating to transitioning the 800 phone number and warehouse to YMSCO.

- Received formal DOE approval to relocate the National Information Center (NIC) to TES2.

Education Programs

- Presented and delivered a report on a workshop for educators at the Hoosier Association of Science Teachers.

- Completed preparation for mailing 4,000 letters to educators offering additional Student Readers for *Science, Society, and America's Nuclear Waste* and delivered the letters to OCRWM for mailing.

- Started developing a mailing list for updated editions of the Teachers Guides for *Science, Society and America's Nuclear Waste* curriculum.

- Presented social studies lessons and science lessons and experiments from *Science, Society, and America's Nuclear Waste* at two sessions of an in-service workshop for Clark County, Nevada area teachers.

- Conducted a teacher training workshop at the National Science Teachers Association Annual Conference.

Utility Outreach

- Attended and participated in The Nuclear Energy Institute's Visitors Centers Workshop held in Las Vegas. The conference included tours of Yucca Mountain and the Hoover Dam Visitors Center.

International

- No significant activity in March.

4.3.1.2 Issues and Concerns

- None.

4.3.2 Information Management Services CWBS 9.3.6

MANAGERS: V. M. Skrinak/C. L. Kerrigan

OBJECTIVE(S): Evaluate, develop, and implement plans, policies, procedures, and systems to facilitate the management of OCRWM program information, data, and records. Continue the implementation of InfoSTREAMS to provide office automation and information management capabilities. Design, implement, deploy, and operate the Records Data Management System for the storage and retrieval of electronic images of OCRWM records to replace the current microfilm-based system. Manage and operate the OCRWM Records Management System. Operate OCRWM's Quality Records Center, Correspondence Control Unit, and Mail Room. Provide computer operations and support to the M&O Vienna and Capital Gallery facilities.

4.3.2.1 Progress During Report Period

IRM Planning

- Participated as a member of the OCRWM Information Management (IM) Planning Work Group, chaired by RW-15, in the development of a draft IM Strategic Plan. This planning activity is ongoing and will result in the production of several strategic and planning documents providing a basis for IM planning and IM performance assessment. Also, delivered the UNICALL response (Long Range Plan) to RW-15 on schedule.

Records Data Management System (RDMS)

- The RDMS, planned for a May 15 deployment, will replace the current Records micro-film system with an electronic imaging system for the storage and retrieval of Program records. This transition is important for meeting the requirements of the LSS. Progress made during March included change in architecture to simplify optical platter production in Las Vegas containing official record copy; successful testing of CD-R functions for distributing copies of imaged records to remote sites; received DEOS V2.0 software from DEC providing needed upgrades and fixes to the RDMS software being tested; and completed final drafts of major documents such as the RDMS Computer Operations Plan. Continue to hold weekly status meetings with M&O Las Vegas and KenRob Las Vegas by phone-conference and forward top issues and items for weekly discussion to the customer, IRM Las Vegas. Current risk to May 15, 1995, deployment in Las Vegas is the timely receipt of Alpha Server equipment.

InfoSTREAMS

- Began efforts on a new task from YMSCO IRM customer to revalidate InfoSTREAMS requirements.

Licensing Support System (LSS)

- Participated in the LSS Header Working Group meeting, chaired by Kirk Balcolm, technical consultant to the State of Nevada, to resolve issues concerning the required header for LSS documents and prepare recommendations for the LSSARP (LSS Advisory Review Panel chaired by the NRC) meeting; presented a briefing on technology issues at the LSSARP Meeting; provided cost and risk assessment data for rebaselining of the LSS and Records Management budgets from the OCRWM Program Plan to help YMSCO IRM identify inconsistencies between the Program Plan and the LSS Working Group's budget recommendations.

Digital Media Database (DMD)

- The DMD is a system providing graphics for preparation of briefing charts and supporting material for users (e.g., 'Rapid Response Team' responding to requests for front-office support). Installed Phase 1 of this system, the graphic artists version, at the NIC and at M&O Vienna.

Integrated Action Item Tracking System (ITS)

- The ITS is in response to a front-office-request to provide one action tracking system that everyone can use. Presented a concept of operations to several potential users, including Rich Minning (OCRWM front-office) to validate system requirements. Completed the engineering analysis and briefed the results to an internal review team. Will brief RW-15 customer early April. Implementation of the first phase of ITS by June 30, 1995, will satisfy an RW-15 level 2 milestone. This first phase of ITS will provide a frequently updated, read-only view into several Notes databases identified by the program's front-office as key systems. Subsequent phases of ITS will add additional underlying databases and provide more dynamic access to those underlying databases.

Finance Imaging System

- Provided the final demonstration and training and delivered the stand-alone imaging system to Finance. This system provides a nonnetworked capability to image financial records (e.g., travel vouchers, check requests, etc.) for faster, easier, retrieval during audits. Paper can then be maintained off-site to fulfill contractual obligations to retain same.

Databases

- Completed conversion of WAST's Document Tracking System (DTS) from Foxpro to Access for the Cask System Program. The Access Database Management System (DBMS) provides more flexibility for the DTS and has the advantage of being a standard product supported by Information Management Services (IMS). A second DTS application for the MPC is under development and will be available for operation in late April. Also developed a Lotus Notes database to provide easy user access to the OCRWM Program Plan. Volumes I, II, and III are currently on-line.

Automated Forms System (AFS) V2.0

- The AFS provides desktop capability for retrieving standard forms, filling them in, storing and retrieving the completed form, and e-mailing forms through Lotus Notes. Deployment of AFS V2.0 was initiated and progress made in number of installations (419 users installed by the end of March 1995). A computer-based training (CBT) package was developed and installed with the forms system. Received very favorable comments on the help the CBT provides to the AFS users.

Natural Working Groups (NWGs)

- Hosted the first meeting of the Forms Management NWG, an enterprise-wide initiative to standardize the OCRWM forms management system. Also hosted the Multimedia NWG with representatives from various organizations at HQ, M&O Vienna and Las Vegas and KenRob and YMSCO. Set goals and identified products to be produced by the working group.

Records Awareness Training

- Continued with several makeup classes in Records Awareness Training for Modules 1 and 2 and with the new Module 4 presentation on Records Disposition. This training received praise for its content and delivery.

Vienna Move Support

- Provided extended hours of support to M&O Vienna for a major move involving hundreds of employee workstations and phones. The move went smoothly; received many notes of appreciation for providing timely installations over the March 18-19, 1995, weekend allowing users to have computer and phone access early March 20, 1995.

OCRWM Staff Scientist Support

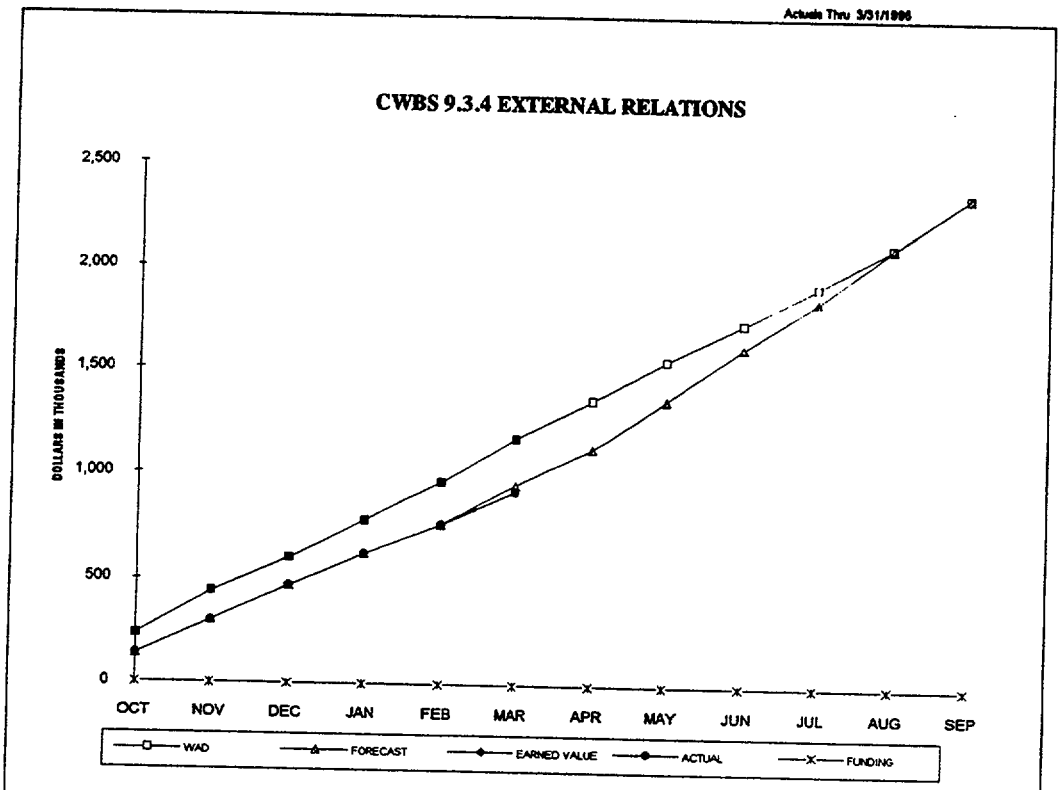
- Briefed and trained OCRWM Staff Scientist, Dr. Hanauer, on use of the records management system to research technical and scientific issues. Also discussed his requirements for a modelling tool and referred him to personnel in TRW's Information Engineering Division who have extensive experience with non-discrete probabilistic risk analysis. Identified two products thus far.

4.3.2.2 Issues and Concerns

- None.

4.3.3 External Relations and Information Resource Management Variances

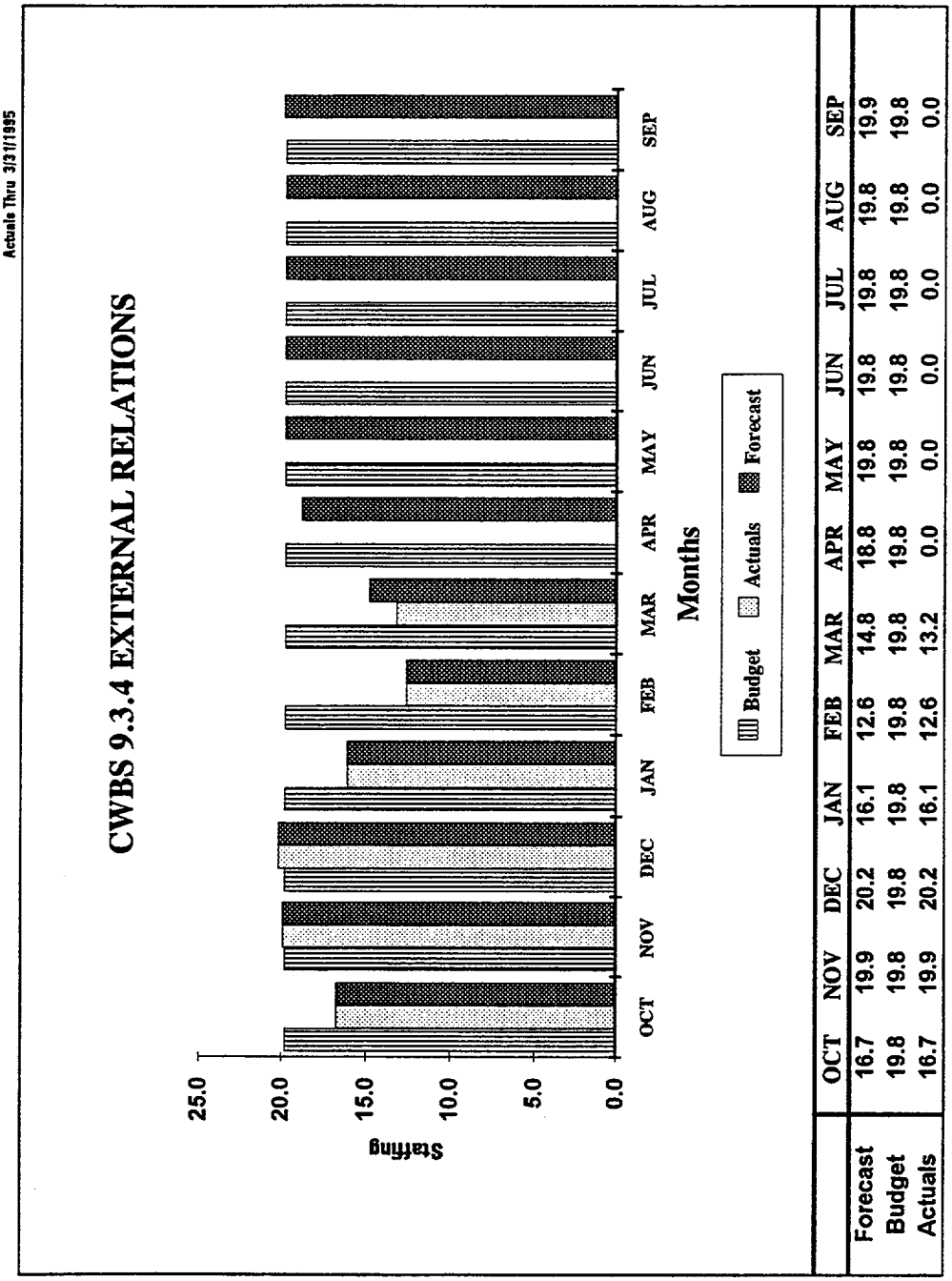
- Variance thresholds are not exceeded.



		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MONTH	WAD	231	211	162	176	182	216	185	185	182	187	199	243
	FORECAST	136	161	176	151	139	189	178	235	249	230	268	247
	EARNED VALUE	231	211	162	176	182	216						
	MONTH ACTUAL	136	161	176	151	139	157						
	VAR/SCH	0	0	0	0	0	0						
	VAR/COST	95	50	(14)	25	43	59						
CUM	WAD	231	442	604	780	962	1,178	1,363	1,548	1,730	1,917	2,116	2,359
	FORECAST	136	297	473	624	763	952	1,130	1,365	1,614	1,844	2,112	2,359
	EARNED VALUE	231	442	604	780	962	1,178						
	ACTUAL	136	297	473	624	763	920						
	VAR/SCH	0	0	0	0	0	0						
	VAR/COST	95	145	131	156	199	258						
FUNDING	FY95 FUNDING	0	0	0	0	0	0	0	0	0	0	0	0
	PREV. FUNDED	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL FUNDING	0	0	0	0	0	0	0	0	0	0	0	0

Current Month Cost and Schedule Variances are not addressed. See Section 1.3.

Figure 24. External Relations Financial Status



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Forecast	16.7	19.9	20.2	16.1	12.6	14.8	18.8	19.8	19.8	19.8	19.8	19.9
Budget	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8
Actuals	16.7	19.9	20.2	16.1	12.6	13.2	0.0	0.0	0.0	0.0	0.0	0.0

Figure 25. External Relations Staffing

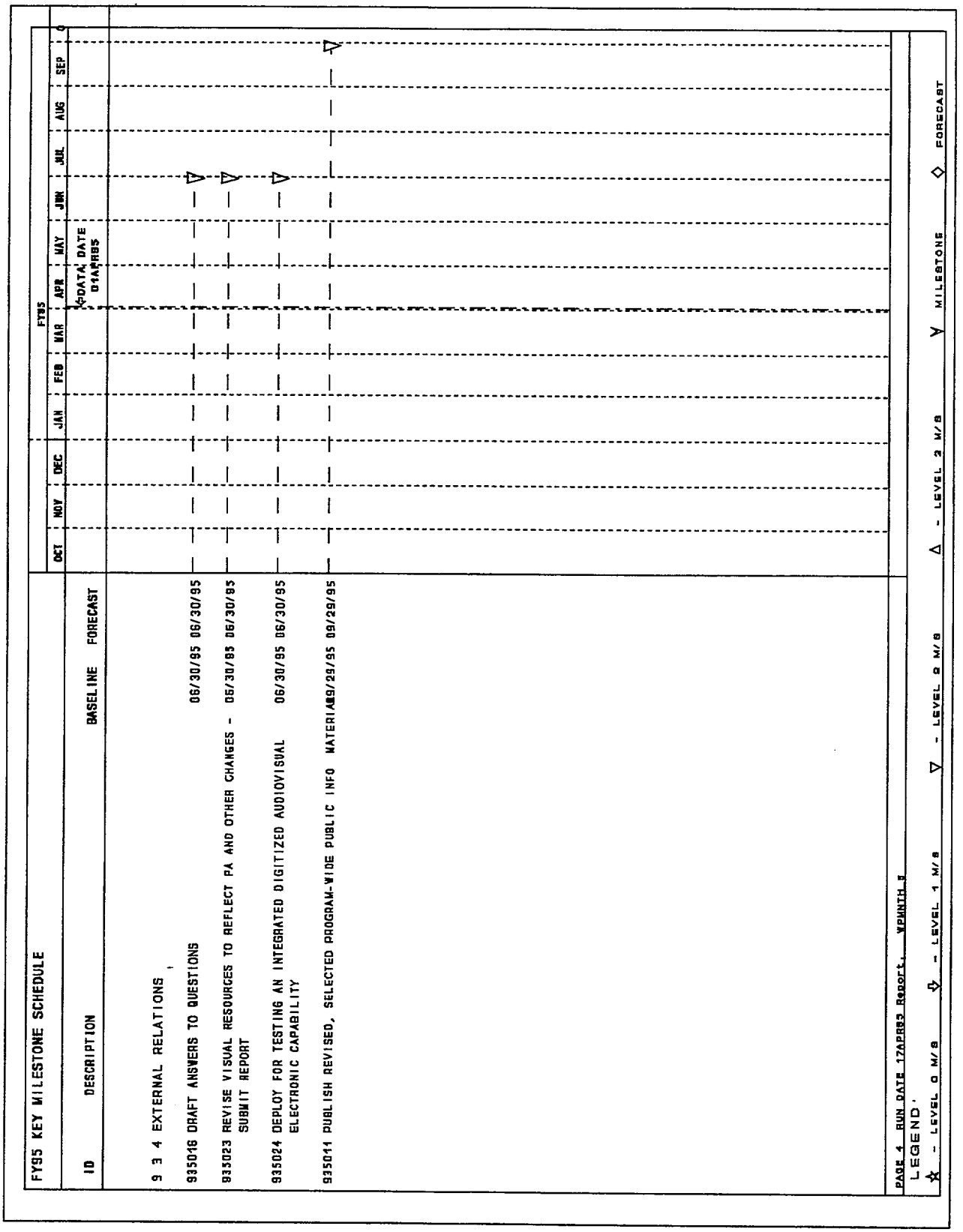
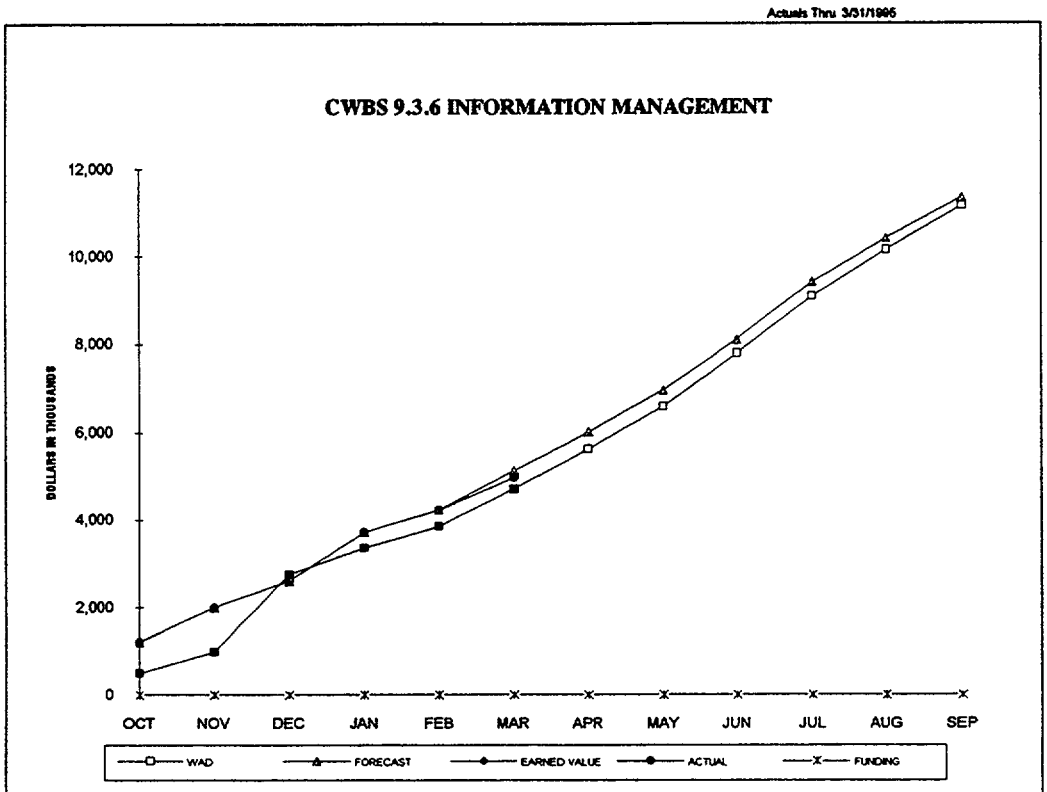


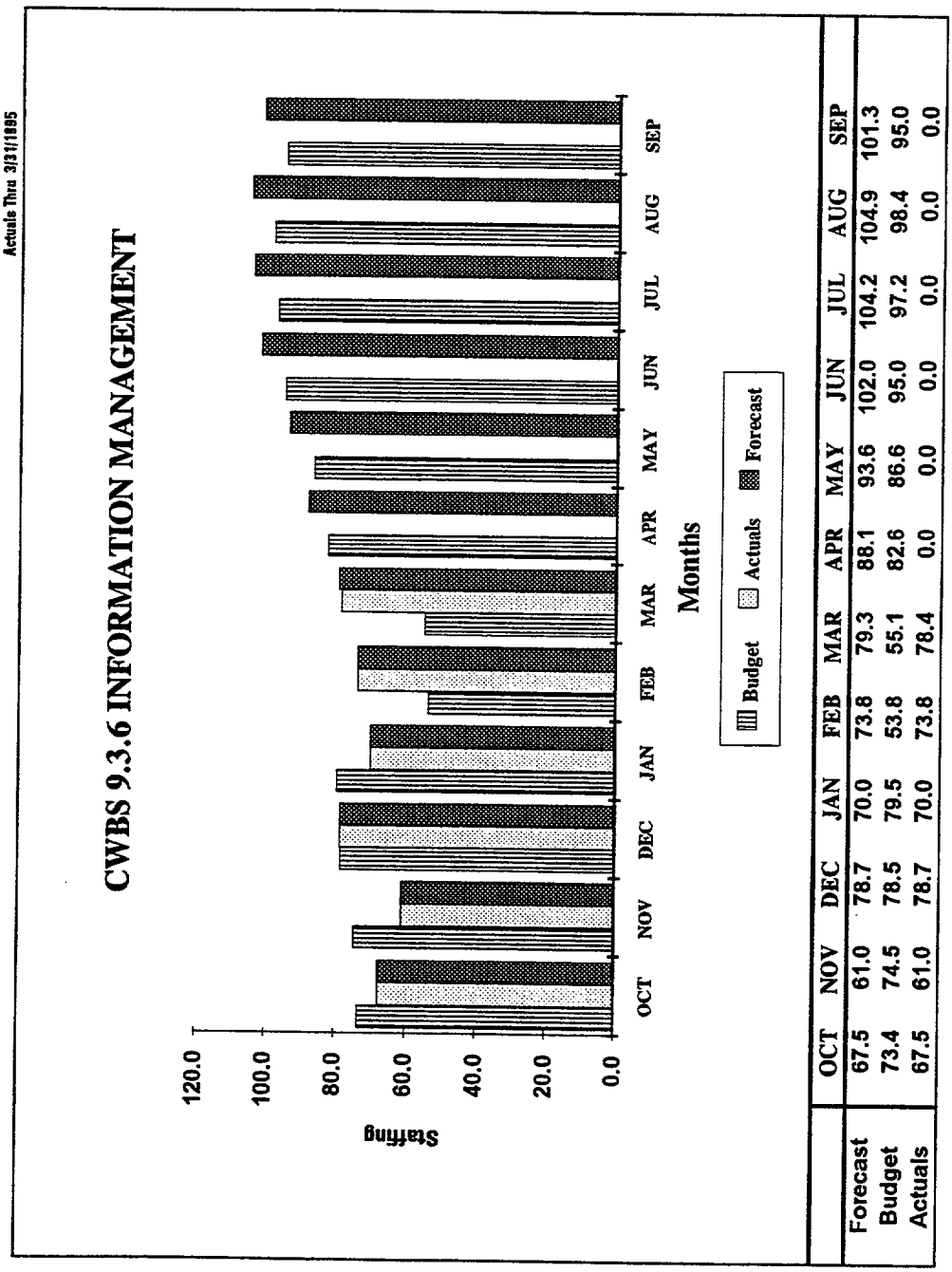
Figure 26. External Relations Key Milestone Schedule



		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MONTH	WAD	498	501	1,733	621	492	876	915	953	1,188	1,286	1,080	992
	FORECAST	1,230	774	589	1,134	503	896	891	938	1,145	1,291	1,019	911
	EARNED VALUE	498	501	1,733	621	492	876						
	MONTH ACTUAL	1,230	774	589	1,134	503	740						
	VAR/SCH	0	0	0	0	0	0						
	VAR/COST	(732)	(273)	1,144	(513)	(11)	136						
CUM	WAD	498	999	2,732	3,353	3,845	4,721	5,636	6,589	7,777	9,063	10,143	11,135
	FORECAST	1,230	2,004	2,593	3,727	4,230	5,126	6,017	6,955	8,100	9,391	10,410	11,321
	EARNED VALUE	498	999	2,732	3,353	3,845	4,721						
	ACTUAL	1,230	2,004	2,593	3,727	4,230	4,970						
	VAR/SCH	0	0	0	0	0	0						
	VAR/COST	(732)	(1,005)	139	(374)	(385)	(249)						
FUNDING	FY95 FUNDING	0	0	0	0	0	0	0	0	0	0	0	0
	PREV. FUNDED	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL FUNDING	0	0	0	0	0	0	0	0	0	0	0	0

Current Month Cost and Schedule Variances are not addressed. See Section 1.3.

Figure 27. Information Management Financial Status



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Forecast	67.5	61.0	78.7	70.0	73.8	79.3	88.1	93.6	102.0	104.2	104.9	101.3
Budget	73.4	74.5	78.5	79.5	53.8	55.1	82.6	86.6	95.0	97.2	98.4	95.0
Actuals	67.5	61.0	78.7	70.0	73.8	78.4	0.0	0.0	0.0	0.0	0.0	0.0

Figure 28. Information Management Staffing

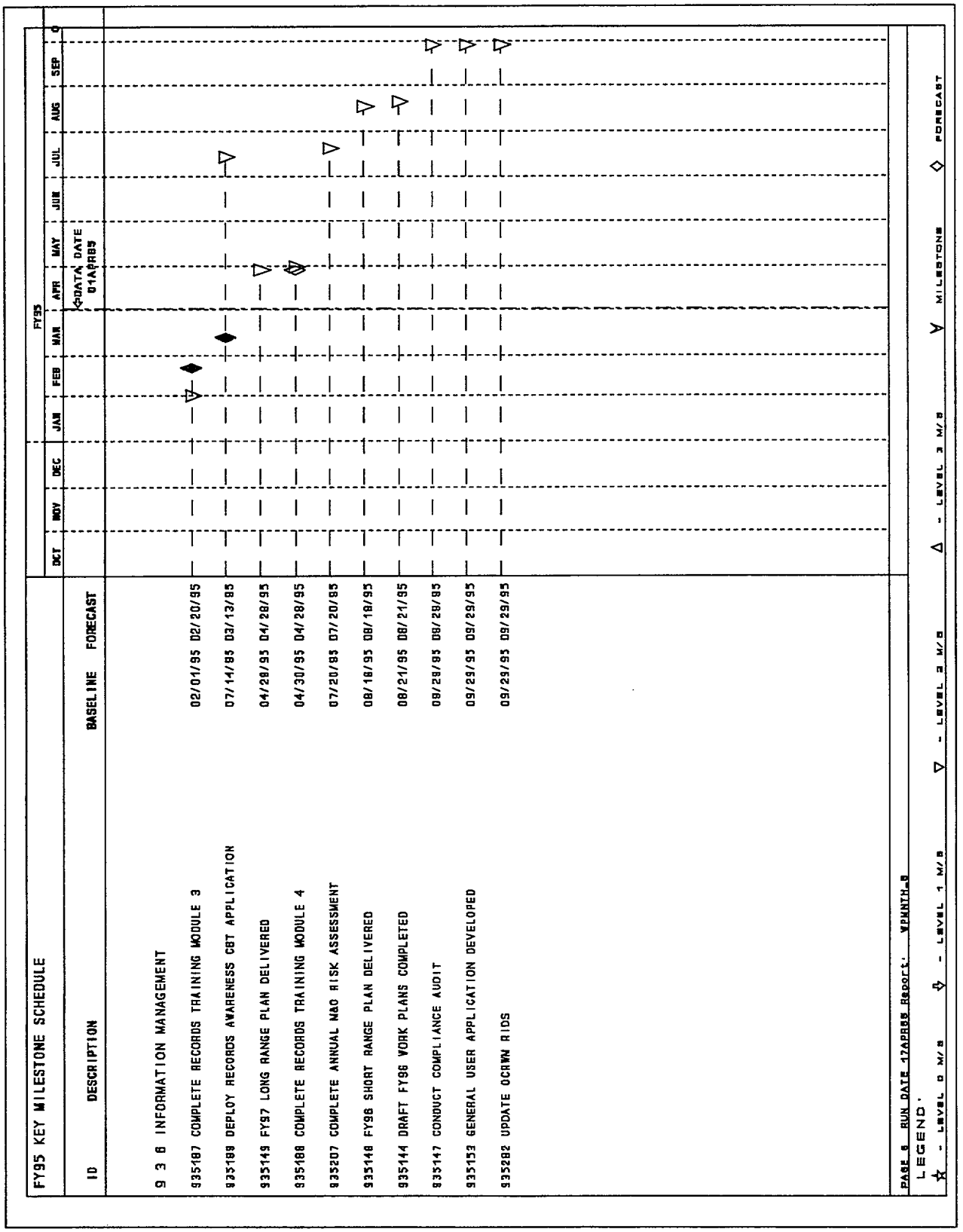


Figure 29. Information Management Key Milestone Schedule

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4.4 REPOSITORY IMPACTS
CWBS 1.0.10

MANAGER: S. S. Sareen

OBJECTIVE(S): In support of a Programmatic Environmental Impact Statement (PEIS) and a DOE Record of Decision (ROD), determine the potential impact of disposing spent fuel from plutonium-burning reactors and/or plutonium immobilized with high-level waste (HLW) on the existing HLW Geologic Program. Assess the regulatory and statutory impacts, develop design basis for a repository, and initiate efforts towards a repository design.

4.4.1 Progress During Report Period

- Developed detailed schedules for the Repository Impacts Task. This integrated schedule was discussed with Sandia National Laboratory (SNL) and incorporated into their program schedule.

Existing MOX reactor

- Developed the logistics data for the existing MOX reactor case. Completed the shielding, thermal, criticality, and structural analyses for this MOX option. Performed only the as-emplaced criticality calculations. The criticality calculations with waste form degradation are in progress.

- Developed data for Total System Performance Analysis (TSPA) and initiated the TSPA effort.

- Completed calculations for effluents and emissions for the surface facility. Developing utility and resource requirements.

- Developed and reviewing preliminary data for the effluents and emissions from the underground facility.

- Developing data for the accident scenarios.

- The existing MOX reactor case is currently on schedule.

Greenfield Glass

- Completed the preliminary logistics and criticality data for Greenfield Glass. Calculated only the as-emplaced criticality; the degraded waste form calculations are in progress.

- The Greenfield Glass subtask is on schedule.

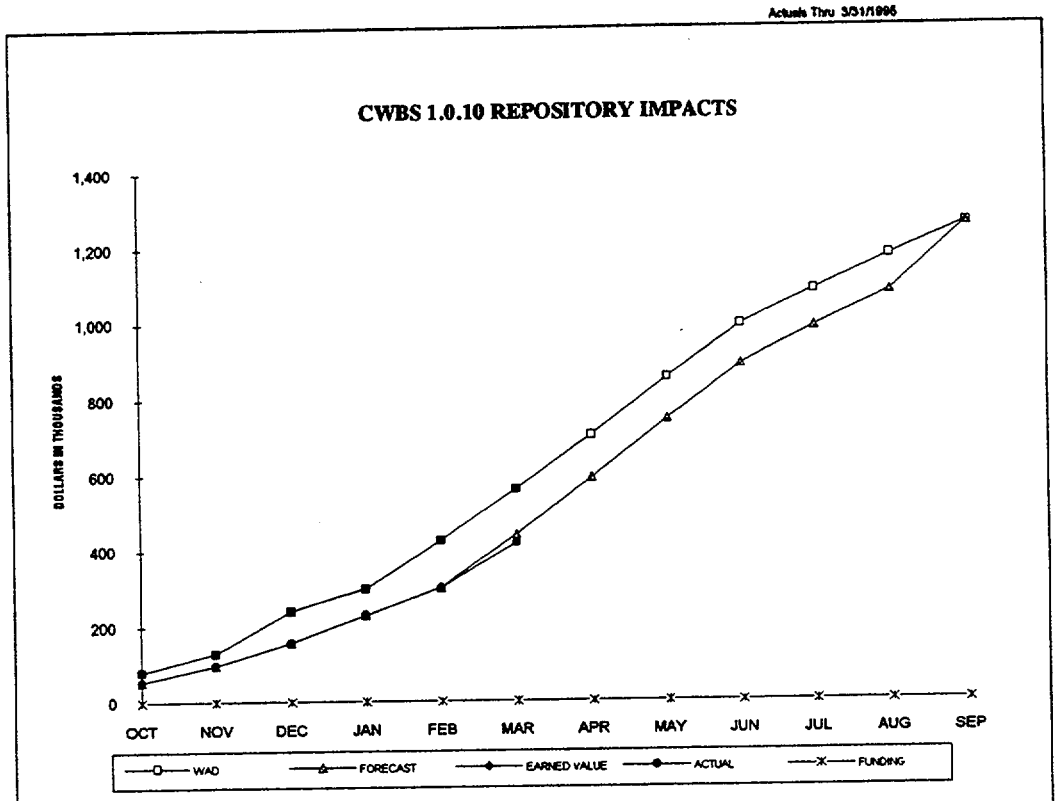
- Added three new waste forms to the Repository Impacts Task on March 15, 1995: GMODS, Metal Immobilization, and U-233. We are waiting for characteristics and disposal schemes (for U-233) for these forms.

4.4.2 Issues and Concerns

- None.

4.4.3 Variances

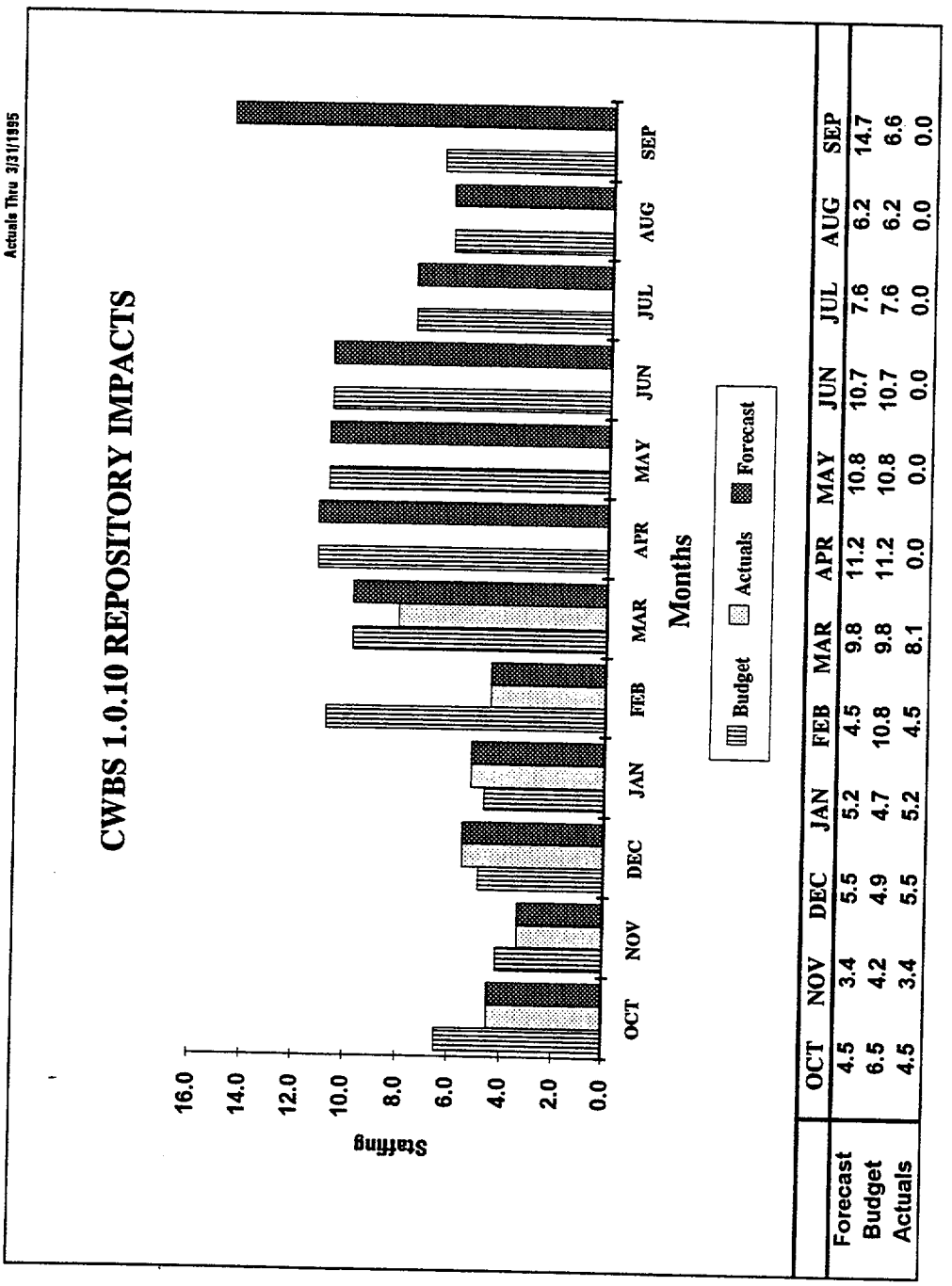
- Prior months' delay of inputs to the Repository Impacts task caused the cumulative cost variance of $142K/25%. The negotiated change in the approach to the Programmatic Environmental Impact Statement (PEIS) data input will reduce this underrun over the next few months.



		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MONTH	WAD	80	50	112	58	126	134	143	150	138	91	90	84
	FORECAST	55	43	60	72	71	140	149	155	144	95	93	180
	EARNED VALUE	80	50	112	58	126	134						
	MONTH ACTUAL	55	43	60	72	71	118						
	VAR/SCH	0	0	0	0	0	0						
	VAR/COST	25	7	52	(14)	55	16						
CUM	WAD	80	130	242	300	426	560	703	853	991	1,082	1,172	1,256
	FORECAST	55	98	158	230	301	441	590	745	889	984	1,077	1,257
	EARNED VALUE	80	130	242	300	426	560						
	ACTUAL	55	98	158	230	301	419						
	VAR/SCH	0	0	0	0	0	0						
	VAR/COST	25	32	84	70	125	*141*						
FUNDING	FY95 FUNDING	0	0	0	0	0	0	0	0	0	0	0	0
	PREV. FUNDED	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL FUNDING	0	0	0	0	0	0	0	0	0	0	0	0

Current Month Cost and Schedule Variances are not addressed. See Section 1.3.

Figure 30. Repository Impacts Financial Status



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Forecast	4.5	3.4	5.5	5.2	4.5	9.8	11.2	10.8	10.7	7.6	6.2	14.7
Budget	6.5	4.2	4.9	4.7	10.8	9.8	11.2	10.8	10.7	7.6	6.2	6.6
Actuals	4.5	3.4	5.5	5.2	4.5	8.1	0.0	0.0	0.0	0.0	0.0	0.0

Figure 31. Repository Impacts Staffing

APPENDIX A

FY95 M&O MAJOR DELIVERABLE STATUS

WBS	MAJOR DELIVERABLE TITLE	DUE DATE	COMPLETE	BCR NUMBER	RESULT OF APPROVED BCR
1.2.1	REVIEW DRAFT REVISION TO THE CDA	28-Feb-95	14-Mar-95		
1.2.1	REVIEW DRAFT REVISION TO THE CDA	25-Aug-95	- -		
1.2.1	QAP 6.2 REV DRAFT REV TO THE RDRD	28-Sep-95	- -		
1.2.1	QAP 6.2 REV DRAFT REV TO THE EBDRD	31-Mar-95	24-Mar-95		
1.2.1	QAP 6.2 REV DRAFT REV TO THE SD&TRD	30-Mar-95	- -		
1.2.1	CONCEPT OF OPERATION REPORT	28-Feb-95	08-Mar-95		
1.2.1	NV REPOS PRELIM TRANSPOR STRATEGY I	26-Jan-95	17-Feb -95		
1.2.1	NV REPOS PREL TRANSP STRATEGY II	31-Aug-95	- -		
1.2.1	CALICO HILLS DATA NEEDS AND ACCESS STUDY	31-May-95	- -		
1.2.1	FY95 THERMAL LOADING STUDY	28-Sep-95	- -		
1.2.1	MPC SYSTEMS STUDY	31-Jan-95	- -		
1.2.1	VALUE ENGINEERING STUDY REPORT #3	28-Apr-95	- -		
1.2.1	VALUE ENGINEERING STUDY REPORT #4	30-Jun-95	- -		
1.2.1	VALUE ENGINEERING STUDY AND REPORT #5	31-Jul-95	- -		
1.2.1	VALUE ENGINEERING STUDY & REPORT #6	28-Sep-95	- -		
1.2.2	WASTE PACKAGE CONCEPTUAL DESIGN RPT	29-Sep-95	- -		
1.2.2	RPT ON PREL SEL WASTE PACTK MATERIALS	14-Jun-95	- -		
1.2.2	INPUT TO CDA DOC	12-May-95	- -		
1.2.2	ISSUE ACD MPC CONTAINER RISK ANALYSIS REPORT	14-Apr-95	- -		
1.2.2	ACD UCF RISK ANALYSIS REPORT	14-Apr-95	- -		
1.2.2	INITIAL DRAFT OF REPOS BURNUP CREDIT	15-Sep-95	- -		

FY95 M&O MAJOR DELIVERABLE STATUS

WBS	MAJOR DELIVERABLE TITLE	DUE DATE	COMPLETE	BCR NUMBER	RESULT OF APPROVED BCR
1.2.2	TDPP FOR REPOSITOTY BURNUP CREDIT TOPICAL RPT	21-Dec-94	16-Dec-94		
1.2.2	ISSUE COST ESTIMATE STATUS REPORT	14-Mar-95	- -		
1.2.3	DRAFT FINAL FISCAL YEAR 1995 TIP FOR WBS 1.2.3	30-Nov-94	30-Nov-94		
1.2.3	DRAFT FINAL FY 1996 TIP FOR WBS 1.2.3	28-Sep-95	- -		
1.2.3	UPDATED STRATIGRAPHIC COMPENDIUM	29-Sep-95	- -		
1.2.4	REP TECH IMP PLAN	13-Jan-95	09-Jan-95		
1.2.4	REPOSITORY TIP	13-Jan-95	09-Jan-95		
1.2.4	REP ENG PLAN	15-Dec-94	15-Dec-94		
1.2.4	ENGINEERING PLAN	15-Dec-94	15-Dec-94		
1.2.4	WASTE TREATMENT BLDG DESIGN FINAL REPORT	29-Sep-95	- -		
1.2.4	WASTE HANDLING BLDG FINAL DESIGN REPORT	30-Aug-95	- -		
1.2.4	EMPLACEMENT EQUIP DEV REPORT	31-Jul-95	- -		
1.2.4	HEATING/COOLING REPORT	07-Apr-95	- -		
1.2.4	EMPLACEMENT MODE EVAL	29-Jun-95	- -		
1.2.4	RECOMMENDED LAYOUT CONCEPTS REPORT	30-Jul-95	- -		
1.2.5	QUARTERLY REGULATORY INTERACTION SUMMARY REPORT	13-Jan-95	13-Jan-95		
1.2.5	QUARTERLY REGULATORY INTERACTION SUMMARY REPORT	14-Apr-95	- -		
1.2.5	QUARTERLY REGULATORY INTERACTION SUMMARY REPORT	14-Jul-95	- -		

FY95 M&O MAJOR DELIVERABLE STATUS

WBS	MAJOR DELIVERABLE TITLE	DUE DATE	COMPLETE	BCR NUMBER	RESULT OF APPROVED BCR
1.2.5	QUARTERLY REGULATORY INTERACTION SUMMARY REPORT	13-Oct-94	14-Oct-94		
1.2.5	COMMENT PKG NRC PROPOSED RULE ON DESIGN BASIS EVEN	31-Mar-95	- -		
1.2.5	MGDS LA AO REV 5 TO YMSCO	28-Sep-95	- -		
1.2.5	SITE CHARACTERIZATION FEEDBACK REPORT LA/AO REV 4	28-Apr-95	- -		
1.2.5	PR11 TO DOE	23-Dec-94	23-Dec-94		
1.2.5	PR12 TO DOE	26-Jun-95	- -		
1.2.5	ISSUE LA ANNOTATED OUTLINE REVISION 4 TO YMSCO	24-Mar-95	24-Mar-95		
1.2.5	RESPONSE TO SCA QUESTION # 80	31-Mar-95	- -		
1.2.5	SEISMIC TOPICAL REPORT II TO DOE	31-Mar-95	- -		
1.2.5	TECHNICAL DATA CATALOG	19-Oct-94	20-Oct-94		
1.2.5	TECHNICAL DATA CATALOG SUPPLEMENT	19-Jan-95	24-Jan-95		
1.2.5	TECHNICAL DATA CATALOG SUPPLEMENT	20-Apr-95	- -		
1.2.5	TECHNICAL DATA CATALOG SUPPLEMENT	20-Jul-95	- -		
1.2.5	DOCUMENT TSPA 1995 CONCLUSIONS & IMPLICATIONS	30-Aug-95	- -		
1.2.5	ANLYS FAR-FIELD THERMOHYDROLOGIC RESPONSE	30-Aug-95	- -		
1.2.6	RELEASE DESIGN PACKAGE 1D	27-Jan-95	03-Feb-95		
1.2.6	DESIGN PACKAGE 1E ACCEPTANCE	14-Jul-95	- -		
1.2.6	ISSUE CONVEYOR FOUNDATION FOR BASELINING	21-Mar-95	- -		
1.2.6	RELEASE DESIGN PACKAGE 2C	11-Oct-94	- -		

FY95 M&O MAJOR DELIVERABLE STATUS

WBS	MAJOR DELIVERABLE TITLE	DUE DATE	COMPLETE	BCR NUMBER	RESULT OF APPROVED BCR
1.2.6	START 8A 50% DESIGN REVIEW	03-Mar-95	- -		
1.2.6	ICDS DESIGN PACKAGE ISSUE	21-Dec-94	- -		
1.2.13	EIS NOTICE OF INTENT (DRAFT)	15-Dec-94	04-Jan-95		
1.2.13	ANNUAL SITE ENVIRONMENTAL REPORT	02-May-95	- -		
1.2.14	DEVELOP & DISTRIBUTE SPECIALTY ANNOUNCEMENT "B"	04-Apr-95	19-Jan-95		
1.2.14	DEVELOP & DISTRIBUTE SPECIALTY ANNOUNCEMENT "A"	05-Dec-94	18-Jan-95		
1.2.14	SUBMIT BULLETIN ARTICLE "A"	03-Jan-95	27-Jan-95		
1.2.14	SUBMIT BULLETIN ARTICLE "B"	27-Mar-95	- -		
1.2.14	SUBMIT BULLETIN ARTICLE "C"	03-Jul-95	- -		
1.2.14	SUBMIT BULLETIN ARTICLE "D"	25-Sep-95	- -		
1.2.14	COUNTY REP REPORTS (MONTHLY)	30-Sep-95	10-Feb-95		
1.2.14	YEAR-END VIDEO	23-Dec-94	11-Jan-95		
1.2.14	PROJECT UPDATE VIDEO	30-Jun-95	- -		
1.2.14	BEW WIRJ UPDATE VIDEOS (SEVEN)	30-Sep-95	- -		
3.1.1	M&O MPC ACCEPTANCE PLAN	31-Mar-95	- -		
3.1.1	PRELIMINARY DRAFT OF REV. 2 WAST PROJECT SEMP	31-Aug-95	- -		
3.1.1	FINAL (POBCCB) DRAFT OF WAST LCCP PLAN	29-Sep-95	- -		
3.1.1	WAST PROJECT TRACEABILITY DATABASE TOOL	29-Sep-95	- -		
3.1.1	PRELIMINARY DRAFT OF WAST PROJECT LCC REPORT	29-Sep-95	- -		

FY95 M&O MAJOR DELIVERABLE STATUS

WBS	MAJOR DELIVERABLE TITLE	DUE DATE	COMPLETE	BCR NUMBER	RESULT OF APPROVED BCR
3.1.1	PRELIMINARY DRAFT REV OF WAST PROJECT CMP AND ATTACHMENTS	31-May-95	- -		
3.1.7	MPC SYSTEM TECHNICAL/BUSINESS PROPOSALS DUE	24-Oct-94	10-Nov-94		
3.1.7	AWARD MPC (PHASE 1) SAR DESIGN SUBCONTRACTS	05-Apr-95	- -	MPC-95-004	DELETE FROM WAD
3.1.9	ESAR #2 PRESENTATION PACKAGE	17-Feb-95	1-Mar-95		
3.1.9	FY 1997 IRB PACKAGE PROJECT	20-Apr-95	- -		
3.1.9	ANNUAL WORK PLAN	29-Sep-95	- -		
3.1.7	INTEGRATED MPC MASTER SCHEDULE (DRAFT)	20-Dec-94	20-Dec-94		
3.1.7	V&V REPORT ON ORIGEN-S AND ANSYS COMPUTER CODE	28-Feb-95	28-Feb-95		
3.1.7	MRS/NO-MRS EVALUATION REPORT	1-Jun-95	- -	WST-95-003	NEW DUE DATE - 06/01/95
3.1.7	PD REV.1 MPC DRD	20-Jul-95	- -		
3.1.7	SSA DECISION	06-Feb-95	- -	MPC-95-004	DELETE FROM WAD
3.1.13	SUBMIT MPC RCP TO PBCCB	20-Mar-95	- -	MRS-95-002	DELETE FROM WAD
3.1.5	FINALIZED BURNUP CREDIT TOPICAL REPORT	31-May-95	- -		
3.1.5	MPC CRITICALITY CONTROL DECISION MATRIX	29-Sep-95	- -		
3.1.1	DEFERRED - PRELIMINARY DRAFT OF WAST PROJECT T&EMP	29-Sep-95	- -		
3.2.14	TRANSPORTATION COORDINATION GROUP (TCG) MTG MINUTES	20-Jun-95	- -		
3.2.14	TRANSPORTATION EXTERNAL COORDINATION WORKING GROUP MINUTES	30-Jan-95	16-Feb-95		

FY95 M&O MAJOR DELIVERABLE STATUS

WBS	MAJOR DELIVERABLE TITLE	DUE DATE	COMPLETE	BCR NUMBER	RESULT OF APPROVED BCR
3.2.14	TRANSPORTATION EXTERNAL COORDINATION WORKING GROUP (TEC/WG) MTG	20-Jul-95	- -		
3.2.1	FINAL RTDA REPORT	30-Jun-95	- -		
3.2.2	COMPLETE TRACTOR/TRAILER TESTING	20-Jun-95	- -		
3.2.2	TRACTOR/TRAILER TEST REPORT	20-Jun-95	- -		
3.2.2	COMMENTS ON GA ANSWERS TO 1ST ROUND NRC QUEST ON GA-4/9 SARs	31-May-95	- -		
3.2.2	DRAFT REPORT ON SFSX	29-Sep-95	- -		
3.2.4	TOPICAL REPORT, REV 1, ON RWR STORAGE/TRANSPORT BURNUP CREDIT	31-Jan-95	- -		
3.2.4	FINAL OPERABILITY REPORT FOR LWT TRACTOR TESTING (60 DAYS AFTER TEST REPORT)	29-Sep-95	- -		
3.2.13	OCRWM TRANSPORTATION RISK MGT PROGRAM STRATEGIC PLAN FINAL DRAFT	31-Mar-95	31-Mar-95		
3.2.13	OCRWM RISK MGT STRATEGY IMPLEMENTATION PLAN FINAL	29-Sep-95	- -		
3.2.13	FINAL TSRA REPORT	30-Jun-95	- -		
3.2.14	DRAFT MATERIALS FOR 180 (c) ANOPR	20-Dec-94	10-Jan-95		
3.2.14	DRAFT MATERIALS FOR 180 (c) NOPR	30-Jun-95	- -		
3.2.14	ROUTING CRITERIA DEVELOPMENT	29-Sep-95	- -		
3.3.1	PRELIMINARY DRAFT ISSUE POSITIONS	31-Jan-95	- -	WST-95-003	NEW DATE 1/95
3.3.1	REGULATORY SUMMARY PLAN	16-Jan-95	- -	WST-95-003	NEW TITLE AND DATE 1/16/95
3.3.1	DRAFT 1995 APR/ACR	29-Sep-95	- -		
3.3.1	FINAL VERIFICATION PLAN	31-Jul-95	- -	WST-95-003	NEW DATE 7/95

FY95 M&O MAJOR DELIVERABLE STATUS

WBS	MAJOR DELIVERABLE TITLE	DUE DATE	COMPLETE	BCR NUMBER	RESULT OF APPROVED BCR
3.3.1	WASTE ACCEPTANCE OPERATIONAL PLAN (WA-OP)	31-Mar-95	- -		
3.3.3	DRAFT REPORT ON POTENTIAL MECHANISMS TO COLLECT RE	31-Jul-95	- -	WST-95-003	NEW TITLE & DATE (8/95)
3.3.1	FINAL MANAGEMENT PLAN - WASTE ACCEPTANCE CRITERIA	06-15-95	14-Mar-95	WST-95-003	2 WEEKS AFTER RECEIPT OF APR/ACR
9.2.1	CIS PHASE 3 OPERATIONAL	01-Mar-95	- -		
9.2.2	FINAL NEPA PROCEDURES MANUAL	30-Apr-95	- -	SIN-95-001	NEW DATE (4/95)
9.2.2	TRAINING MATERIALS FOR OCRWM NEPA WORKSHOPS	30-Jun-95	- -	SIN-95-001	NEW DATE (6/95)
9.3.2	FINAL PROGRAM PLAN	20-Dec-94	20-Dec-94		
9.3.5	FINAL DRAFT COST AND SCHEDULE ESTIMATING GUIDELINE	09-Dec-94	- -	PMA-94-004	TDL 95-5 EXTEND INTO FY95
9.3.4	PUBLISH REVISED, SELECTED PROGRAM-WIDE PUBLIC INFO. MATERIAL	29-Sep-95	- -		
9.3.4	DRAFT ANSWERS TO QUESTIONS	30-Jun-95	- -		
9.3.3	NAGRA ANNUAL PROJECT PLAN	28-Feb-95	- -	SPI-95-001	NEW DUE DATE - 02/95
9.3.4	DEPLOY FOR TESTING AN INTEGRATED DIGITIZED AUDIOVISUAL ELECTRONIC CAPABILITY	30-Jun-95	- -		
9.3.3	SKB ANNUAL PROJECT PLAN	31-May-95	- -	SPI-95-001	NEW DUE DATE - 05/95
9.3.3	AECL ANNUAL PROJECT PLAN	28-Feb-95	- -	SPI-95-001	NEW DUE DATE - 02/95
9.3.6	DRAFT FY96 WORK PLANS COMPLETED	21-Aug-95	- -		
9.3.6	FY96 SHORT RANGE PLAN DELIVERED	18-Aug-95	- -		
9.3.6	GENERAL USER APPLICATION DEVELOPED	29-Sep-95	- -		
9.3.5	DELIVERY DRAFT PCSD TO RW-35	30-Jun-95	- -		

FY95 M&O MAJOR DELIVERABLE STATUS

WBS	MAJOR DELIVERABLE TITLE	DUE DATE	COMPLETE	BCR NUMBER	RESULT OF APPROVED BCR
9.3.5	DELIVER DRAFT PMSM TO RW-35	27-Feb-95	24-Feb-95		
9.3.5	DELIVER DRAFT OPSN TO RW-35	15-Feb-95	15-Feb-95		
9.3.5	DESCRIPTION OF PROGRAM ASSUMPTIONS TO RW-35	08-Nov-94	08-Nov-94		
9.3.5	INTERIM LIFE-CYCLE COST ESTIMATES TO RW-35	27-Jan-95	27-Mar-95		
9.3.5	FINAL PRELIMINARY DRAFT TSLCC REPORT TO RW-35	28-apr-95	- -		
9.3.5	FINAL TSLCC REPORT TO RW-35	15-Sep-95	- -		
9.3.5	DRAFT FEE ADEQUACY REPORT	28-Jun-95	- -		
9.3.5	DRAFT PCSB (MRS/MPC)	30-Jun-95	- -		
9.3.5	RECEIVE PBCCB-APPROVED YMP COST AND SCHEDULE BASELINE CHANGES	15-Sep-95	- -		
9.3.5	REVISED WBS RECOMMENDATION TO RW-35	10-Mar-95	27-Feb-95		

APPENDIX B

M&O Monthly Progress/Update Summary ($K) as of MAR 31, 1995

B&R	B&R Title	0 Total Budget FY95/Defer/ Commit	1 Cum to Date Budget/FY95/ Defer/Commit	2 Cum to Date Forecast/FY 95 Defer/Commit	3 (FIS) Cum to Date Actuals	2-3 Variance (Fore-Act)	4 Total Funding- FY 95 & Previ- ously Funded	1-3 Variance (Cum Budget - Act)	0-3 Variance (Total Budget - Act)
DB0102010	YMP Systems Engineering	8,719	4,755	3,170	3,205	-35	0	1,550	5,514
DB0102020	YMP Waste Package	4,820	2,054	1,575	1,592	-17	0	462	3,228
DB0102030	YMP Site Investigations	13,766	6,581	6,127	6,195	-68	0	386	7,571
DB0102040	YMP Repository	9,051	4,251	2,797	2,828	-31	0	1,423	6,223
DB0102050	YMP Regulatory	14,981	7,599	5,794	5,860	-66	0	1,739	9,121
DB0102060	YMP Exploratory Studies Fac.	19,634	9,424	8,008	8,096	-88	0	1,328	11,538
DB0102070	YMP Test Facilities	4,647	1,879	1,726	1,745	-19	0	134	2,902
DB0102090	YMP Project Management	8,298	4,094	4,245	4,292	-47	0	-198	4,006
DB0102130	YMP Environ., Safety & Health	12,166	5,385	5,509	5,571	-62	0	-186	6,595
DB0102140	YMP Institutional	4,873	2,075	1,780	1,799	-19	0	276	3,074
DB0102150	YMP Support Services	5,807	3,238	3,597	3,636	-39	0	-398	2,171
DB0102160	YMP Quality Assurance	2,447	1,232	1,351	1,366	-15	0	-134	1,081
DB0102170	YMP Information Management	6,780	3,631	3,413	3,451	-38	0	180	3,329
	Total YMP	**115,989**	**56,198**	**49,092**	**49,636**	**-544**	**89,656**	**6,562**	**66,353**
	% of YMP			**87.36%**	**88.32%**	**-0.97%**		**11.68%**	
DB0301010	MRS Systems Engineering	959	403	375	358	17	0	45	601
DB0301030	MRS Site Investigations	42	34	14	11	3	0	23	31
DB0301040	MRS MRS Facility	0	0	0	0	0	0	0	0
DB0301050	MRS Regulatory	1,977	922	834	778	56	0	144	1,199
DB0301070	MRS Engineering Development	24,942	2,167	2,144	2,113	31	0	54	22,829
DB0301090	MRS Project Management	1,820	854	934	877	57	0	-23	943
DB0301110	MRS Quality Assurance	195	73	48	52	-4	0	21	143
DB0301120	MRS Information Management	0	0	0	0	0	0	0	0
DB0301130	MRS Environ., Safety & Health	1,483	705	628	631	-3	0	74	852
DB0301140	MRS Institutional	874	470	225	211	14	0	259	663
DB0301150	MRS Support Services	0	0	0	0	0	0	0	0
	Total MRS	**32,291**	**5,627**	**5,202**	**5,031**	**171**	**0**	**596**	**27,260**
	% of MRS			**92.45%**	**89.41%**	**3.04%**		**10.59%**	
DB0302010	Trans. Systems Engineering	639	245	217	242	-25	0	3	397
DB0302020	Trans. Casks	3,586	1,789	1,164	1,066	98	0	723	2,520
DB0302040	Trans. Support Systems	2,324	724	602	551	51	0	173	1,773
DB0302050	Trans. Regulatory	170	72	27	9	18	0	63	161
DB0302090	Trans. Project Management	742	341	304	301	3	0	40	441
DB0302110	Trans. Quality Assurane	240	55	42	34	8	0	21	206
DB0302120	Trans. Info Management	49	19	3	1	2	0	18	48
DB0302130	Trans. Environ., Safety & Health	1,228	465	240	211	29	0	254	1,017
DB0302140	Trans. Institutional	1,062	447	522	512	10	0	-65	550
DB0302150	Trans. Support Services	0	0	0	0	0	0	0	0
	Total Transportation	**10,040**	**4,157**	**3,121**	**2,927**	**194**	**0**	**1,230**	**7,113**
	% of TRANS			**75.07%**	**70.41%**	**4.67%**		**29.59%**	

NOTE: FIS actuals may not agree with contractual actuals since the FIS cumulative-to-date actuals include depreciation costs. Contractual cumulative-to-date costs reflect total outlays of cash for capital and expenses only. As a result, these two methods of financial reporting may not necessarily agree.

Figure B-1. Monthly Progress/Update Summary

M&O Monthly Progress/Update Summary ($K) as of MAR 31, 1995

B&R	B&R Title	0 Total Budget FY95/Defer/ Commit	1 Cum to Date Budget/FY95/ Defer/Commit	2 Cum to Date Forecast/FY 95 Defer/Commit	3 (FIS) Cum to Date Actuals	2-3 Variance (Fore-Act)	4 Total Funding-FY 95 & Previ-ously Funded	1-3 Variance (Cum Budget - Act)	0-3 Variance (Total Budget - Act)
DB0303010	Waste Accept Prodess/Oprtns	2,968	1,116	1,193	1,229	-36	0	-113	1,739
DB0303020	Waste Acceptance Econ. Stud.	129	0	7	12	-5	0	-12	117
DB0303030	Waste Acceptance Data Collect.	1,003	203	266	252	14	0	-49	751
	Total Waste Acceptance	4,100	1,320	1,466	1,493	-27	0	-179	2,607
	% of WA			111.10%	113.14%	-2.05%		-13.14%	
	TOTAL 3.0 WAST	46,430	11,104	9,759	9,451	338	22,958	1,653	36,979
DB0910030	**Program Quality Assurance**	3,817	1,701	1,649	1,616	33	2,967	85	2,201
	% of PQA			96.97%	95.03%	1.94%		4.97%	
DB0920011	Systems Engineering	6,708	3,100	3,028	2,976	52	0	124	3,732
DB0920012	Systems Planning & Integration	0	0	0	0	0	0	0	0
DB0920013	Configuration Management	1,089	567	634	635	-1	0	-68	454
	Total Systems Engineering	7,798	3,666	3,662	3,611	51	5,592	55	4,187
DB0920021	Regulatory Policy & Requirements	702	323	350	335	15	0	-12	367
DB0920022	Regulatory Integration	1,679	737	721	690	31	0	47	989
	Total Regulatory Compliance	2,381	1,060	1,071	1,025	46	1,854	35	1,356
	% of RC			101.06%	96.72%	4.34%		3.28%	
DB0932000	Strategic Planning	1,299	616	601	559	42	981	57	740
DB0933000	Int'l Waste Management Tech.	712	334	272	263	9	527	71	449
	Total Strategic Planning & Int'l Waste	2,011	951	873	822	51	1,508	129	1,189
	% of SP & IW			91.84%	86.48%	5.37%		13.52%	
GA0101011	**Repository Impacts**	1,257	561	441	424	17	1,308	137	833
	% of PA			78.61%	75.58%	3.03%		24.42%	
DB0934000	**External Relations**	2,359	1,176	953	930	23	1,291		
	% of ER			80.87%	78.92%				
DB0935000	**Program Control & Admin.**	1,991	1,000	769	853	-84	1,796	147	1,138
	% of PC&A			76.87%	85.27%	-8.40%		14.73%	
DB0936010	**Information Resources Mgmt**	11,137	4,722	5,126	5,026	100	8,869	-304	6,111
	% of IRM			108.55%	106.43%	2.12%		-6.43%	
DB0937000	**Contract Business Mgmt**	11,839	2,785	2,785	2816	-31	9,090	-31	9,023
	% of CBM			100.00%	1.01	-1.11%		-1.11%	
	M&O Totals	207,008	84,926	76,210	76,210	0	146,389	8,468	129,370
	M&O Total % of WAD			89.74%	89.74%	0.00%		9.97%	
	M&O Total % of NB&R			36.81%	36.81%	0.00%		4.09%	

NOTE: FIS actuals may not agree with contractual actuals since the FIS cumulative-to-date actuals include depreciation costs. Contractual cumulative-to-date costs reflect total outlays of cash for capital and expenses only. As a result, these two methods of financial reporting may not necessarily agree.

Figure B-1. Monthly Progress/Update Summary (Continued)

cc w/Encl 1

S. Ronshaugen, DOE/NV EMD
W. Dixon, DOE/YMSCO
M. Dockter, DOE/NV
R. Dyer, DOE/YMSCO
D. Foust, M&O/TRW (Encls 1 & 2)
J. Gandi, DOE/YMSCO
A. Gil, DOE/YMSCO
C. Newbury, DOE/YMSCO (Encls 1 & 2)
M. Ryder, DOE/YMSCO
T. Statton, M&O/WCFS
T. Sullivan, DOE/YMSCO
M. Tynan, DOE/YMSCO (Encls 1 & 2)
D. Williams, DOE/YMSCO
W. Wilson, DOE/YMSCO (Encls 1 & 2)
J. Younker, M&O/TRW

ENCLOSURE 2

EG&G ENERGY MEASUREMENTS
Las Vegas Area Operations
EG&G ENERGY MEASUREMENTS, INC., P.O. BOX 1912, LAS VEGAS, NEVADA 89125 TEL(702)

QA: NA
WBS 1.2.5

May 12, 1995
NV-95-328

Mr. Wesley Barnes, Project Manager
Department of Energy
Yucca Mountain Site Characterization Project Office
101 Convention Center Drive
Las Vegas, NV 89109

APRIL 1, 1995 - APRIL 30 , 1995, PROGRESS REPORT - EG&G/ENERGY MEASUREMENTS, REMOTE SENSING LABORATORY SUPPORT TO THE YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT

Enclosed is a progress report on the EG&G Energy Measurements, Inc. (EG&G/EM) Remote Sensing Laboratory (RSL) support to the Yucca Mountain Site Characterization Project (YMP) for April 1, 1995 through April 30, 1995.

The progress report for EG&G/EM RSL support to YMP includes the following sections:

- Work Accomplished
- Expenditures
- Status of Deliverables

If you have any questions, please contact Elaine Ezra at (702) 794-7449.

for James Michael, Manager
NV Program

CE:ns

Enclosures
1. Progress Report
2. Maps

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.3 SITE INVESTIGATIONS

WBS 1.2.3.9.5 SPECIAL STUDIES: THREE-DIMENSIONAL SITE MODEL

SA OE395A95L INTEGRATED 3-D MODEL

REPORT PERIOD: April 1, 1995 - April 30, 1995

REPORT DATE: May 12, 1995

RESPONSIBLE INDIVIDUAL: David Jefferis

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. The lithostratigraphic model YMP.R2.0 developed by USGS/SAIC has been converted to EarthVision. The 3-D geometry of several faults (Sever Wash, Solitario Canyon, Drillhole Wash and Dune Wash) had to be revised, but has resulted in a more geologically correct model. The amount of time necessary to convert Lynx GMS models to EarthVision continues to be reduced, as this conversion has taken approximately two weeks to complete.

2. The Lithostratigraphic Working Group met April 25 at the FOC. The USGS has agreed to delivering a comprehensive borehole database by June 1, 1995. Progress is being made on the resolution of the existing inconsistences that have been plaguing the project for quite some time. As well, the borehole database is being configured such that the logic necessary for the numerical modeling of geologic structures can be accomplished.

3. A small test data set containing a geologic framework model in the format required by LANL was developed. This test case was developed as a precursor to the complete reformatting of the YMP.R2 in support of LANL's transport modeling studies. Following review of the test case by LANL, several adjustments to the mathematical representation have been requested.

4. PACS deliverable OE9A03A was transmitted to Susan Jones (YMSCO) as a report titled "Off-site Access to the Numerical Model Warehouse" on April 3.

5. The following products were generated:

NR95032401 Borehole prognosis for WT-24, UZ-12, and SD-3 for Norma Biggar (M&O/WCFS) on April 4. SNL/Thermal-Mechanical and YMP.R1.1 Lithostratigraphic Models were used as the basis for the prognoses.

NR95031601 Several pagesize maps depicting the overburden between the proposed floor of the repository and surface were generated for M&O/SAIC.

NR95040503 A pagesize map showing topography and the current distribution of faults being used to develop the Site Area Framework Model was generated for the Warren Day (USGS) on April 7.

NR95041101 A data report containing a geological framework model over a limited area was generated for Carl Gable (LANL) on April 14. The geological framework was generated as a series of TINs.

NR95041309 Several page size maps and cross-sections, generated from the YMP.R1.1 model under EarthVision, were generated for the USGS.

MAJOR PROBLEMS AND CORRECTIVE ACTION: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. Complete review of YMP.R2 model by USGS. Resolve any errors found during the review. This framework model will then be used to provide product support to the YMP until the Site Area Geological Framework Model is completed.

2. Develop methodology necessary to provide LANL with a geological framework that can be used to preprocess the geochemistry transport model. This geological framework is due at LANL June 1, 1995.

3. Begin development of the Site Area Geological Framework model, Version 1.0.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.3 SITE INVESTIGATIONS

WBS 1.2.3.9.5 SPECIAL STUDIES: THREE-DIMENSIONAL SITE MODEL

SA OE395E95 3-D AND NUMERICAL MODELING QA

REPORT PERIOD: April 1, 1995 - April 30, 1995

REPORT DATE: May 12, 1995

RESPONSIBLE INDIVIDUAL: David Jefferis

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. Software Qualification of EarthVision version 2.0 continues. The first draft of the Software Qualification Plan was completed and reviewed by the Software Qualification Team. Revisions to the plan are currently in progress. Work continues on the development of a suite of test data sets.

2. Work continues on the development of procedures for Scientific Investigations and Numerical Model validation.

MAJOR PROBLEMS AND CORRECTIVE ACTION: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. Continue development of procedures for Scientific Investigations and Validation of Numerical Models.

2. Continue with the qualification of the EarthVision software.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.3 SITE INVESTIGATIONS

WBS 1.2.3.9.5 SPECIAL STUDIES: THREE-DIMENSIONAL SITE MODEL

SA OE395G95 STUDY PLAN FOR INTEGRATED GEOLOGY OF SITE AREA

REPORT PERIOD: April 1, 1995 - April 30, 1995

REPORT DATE: May 12, 1995

RESPONSIBLE INDIVIDUAL: David Jefferis

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. SCP Study Plan 8.3.1.4.2.3 *Geological Framework and Integrated 3-D Site Model* is still in review.

MAJOR PROBLEMS AND CORRECTIVE ACTION: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. Receive, review, and resolve comments generated by the participants reviewing the study plan.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.3 SITE INVESTIGATIONS

WBS 1.2.3.9.5 SPECIAL STUDIES: THREE-DIMENSIONAL SITE MODEL

SA OE395L95 COMPUTER SUPPORT

REPORT PERIOD: April 1, 1995 - April 30, 1995

REPORT DATE: May 12, 1995

RESPONSIBLE INDIVIDUAL: David Jefferis

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. The mapping and modeling system ZMapPlus was received from Landmark Graphics Corporation.

2. Version 2.0.1 of the geostatistical analysis and modeling system Isatis was received from GEOMATH, Inc.

3. A requirements analysis was undertaken to determine the optimum configuration for an information server for the Numerical Model Warehouse, and an additional workstation to support 3-D modeling. A purchase requisition will be written next month.

MAJOR PROBLEMS AND CORRECTIVE ACTION: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. Install and test ZMapPlus mapping system.

2. Install and test Isatis version 2.0.1.

3. Write purchase request for the Numerical Model Warehouse information server.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.3 SITE INVESTIGATIONS

WBS 1.2.3.9.5 SPECIAL STUDIES: THREE-DIMENSIONAL SITE MODEL

SA OE395B95L REMOTE SENSING MAPPING APPLICATION

REPORT PERIOD: April 1, 1995 - April 30, 1995

REPORT DATE: May 12, 1995

RESPONSIBLE INDIVIDUAL: David Brickey

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. Work continues on producing enhancements of geocoded Landsat Thematic Mapper and SPOT images for structural interpretations, geomorphological, and lithological information. Production of remote sensing datasets and development of remote sensing products is being coordinated with Warren Day (USGS).

MAJOR PROBLEMS AND CORRECTIVE ACTION: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. Output of enhanced satellite imagery and satellite image maps.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 REGULATORY

WBS 1.2.5.3.5 GEOGRAPHIC NODAL INFORMATION STUDY AND EVALUATION SYSTEM (GENISES)

SA OE535L94 TECHNICAL DATABASE INPUT

REPORT PERIOD: April 1, 1995 - April 30, 1995

REPORT DATE: May 12, 1995

RESPONSIBLE INDIVIDUAL: Jim Beckett

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. PACS deliverable OE03 "Status of EG&G/EM Submittals to the YMP Technical Database" was provided to Claudia Newbury on April 3.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. The Environmental Sciences Department continues processing of data acquired from on-going activities.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 REGULATORY

WBS 1.2.5.3.6 GEOGRAPHIC NODAL INFORMATION STUDY AND EVALUATION SYSTEM (GENISES)

SA OE536A95 GENISES TECHNICAL DATABASE

REPORT PERIOD: April 1, 1995 - April 30, 1995

REPORT DATE: May 12, 1995

RESPONSIBLE INDIVIDUAL: J. Beckett

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. Elaine Ezra, Chris Berlien, and Jim Beckett attended the first quarter 1995 meeting of the Technical Database Working Group. The meeting was held on April 5-6 at Los Alamos National Laboratories. The primary discussion centered around the YMP Technical Management Procedures.

2. A meeting was held between EG&G/EM database personnel and the M&O Information Management Department. In attendance were Harry Leek (TRW), Jan Statler (SAIC), Chris Berlien and Jim Beckett (EG&G/EM). The purpose of the meeting was to discuss communication and database integration of the YMP TAB and other M&O databases.

3. A meeting was held between the YMP Technical Database Administrator (TDBA) and the contractor responsible for the Inyo County Database. In attendance were Jim Beckett, the TDBA; Michael King, Converse Environmental Consultants Southwest; and Dr. John Bredehoeft, President, Hydrodynamics Group. Topics discussed included data quality.

4. The on-line application for accessing GENISES has been completed and is currently in beta testing by the M&O. After testing is complete, the application will be provided as part of the YMP Data Distribution System. This system includes on-line data catalog and a CD-ROM.

5. PACS deliverable OE11 on the development of GENISES was delivered as a report to Claudia Newbury (YMSCO) on April 7.

6. PACS deliverable OE07 was delivered as a report titled "Status Report on the Processing of Technical Database Submittals" to Claudia Newbury (YMSCO) on April 7.

7. The following data transfers to the GENISES Technical Database were received during this period.

TM000000000001.062 - ORIGINAL SOURCE DATA AND HARDCOPY BACKUP DATA FOR: ATMOSPHERIC PRESSURE, PRECIPITATION, RELATIVE HUMIDITY, TEMPERATURE, WIND DIRECTION, AND WIND SPEED. RECEIVED BY THE TDB ON 03-APR-1995.

LA000000000086.002 - MINERALOGIC VARIATION IN DRILL CORE UE-25 UZ#16 YUCCA MOUNTAIN, NEVADA RECEIVED BY THE TDB ON 03-APR-1995.

LA000000000100.002 - FRACTURE LINING MINERALS IN DRILL CORE UE-25 UZ#16 RECEIVED BY THE TDB ON 03-APR-1995.

TMBH-VARIOUS95.001 - DIRECTIONAL/DEVIATION GYRO SURVEYS OF THE FOLLOWING BOREHOLES: UE-25 NRG-2, UE-25 NRG-2A, UE-25 NRG-2B, UE-25 NRG-2D, UE-25 NRG-3, UE-25 NRG-4, UE-25 NRG-5, USW NRG-6, USW NRG-7/7A, USW WT-2, UE-25UZ RECEIVED BY THE TDB ON 03-APR-1995.

GS941208312212.017 - SUBSURFACE WATER CONTENT AT YUCCA MOUNTAIN NEVADA-- NEUTRON LOGGING DATA FOR 1/1/94 THRU FY94. RECEIVED BY THE TDB ON 19-APR-1995.

GS941008312212.013 - NEUTRON COUNTS FOR 97 BOREHOLES AT YUCCA MOUNTAIN FROM JANUARY 1, 1994, TO OCTOBER 1, 1994. RECEIVED BY THE TDB ON 20-APR-1995.

GS900983117411.004 - DATA DISCREPANCY IN USGS-OFR-87-80: HISTORICAL CATALOG OF SOUTHERN GREAT BASIN EARTHQUAKES 1868-1978 BY MARK E. MEREMONTE AND ALBERT M. ROGERS. DTN GS900983117411.004 RECEIVED BY THE TDB ON 20-APR-1995.

GS910808312212.001 - GEOHYDROLOGIC DATA COLLECTED FROM SHALLOW NEUTRON-ACCESS BOREHOLES AND RESULTANT, PRELIMINARY GEOHYDROLOGIC EVALUATIONS, YUCCA MOUNTAIN AREA, NYE COUNTY, NEVADA, BY DANIEL O. BLOUT, DALE P. HAMMERMEIS
RECEIVED BY THE TDB ON 24-APR-1995.

LA000000000094.001 - PETROGRAPHY, MINERALOGY, AND CHEMISTRY OF CALCITE-SILICA DEPOSITS AT EXILE HILL, NEVADA, IN COMPARISON WITH LOCAL SPRING DEPOSITS.
RECEIVED BY THE TDB ON 24-APR-1995.

GS930731174101.004 - GEODETIC LEVELING AND QUADRILATERAL SURVEYS (GPS OBSERVATIONS) 1990-1991: FINAL DATA ACQUISITION REPORT, BOOK 1, GARY C. PERASSO, P.I. - L.I. NEIFERT, LEVEL OBSERVER.
RECEIVED BY THE TDB ON 27-APR-1995.

GS950108312232.002 - PRESSURE, TEMPERATURE AND MASS FLOW MEASUREMENTS FROM NRG-6 BOREHOLE AIR INJECTION TESTING BETWEEN 10/11/94 AND 11/04/94.
RECEIVED BY THE TDB ON 28-APR-1995.

GS950108312232.001 - PRESSURE, TEMPERATURE AND MASS FLOW MEASUREMENTS FROM NRG-7A BOREHOLE AIR INJECTION TESTING BETWEEN 7/13/94 AND 9/10/94.
RECEIVED BY THE TDB ON 28-APR-1995.

GS950308312244.001 - AIR-PERMEABILITY TESTING PROGRAM - ESF, ALCOVE 1; SINGLE HOLE INJECTION TESTING, DATA COLLECTED BETWEEN 8/9/94 AND 11/14/94.
RECEIVED BY THE TDB ON 28-APR-1995.

GS950308312211.001 - PRELIMINARY FAULT/FRACTURE PROPERTIES FOR FAST-PATHWAYS MODEL
RECEIVED BY THE TDB ON 28-APR-1995.

8. The following Yucca Mountain Project Technical Database submittals were processed into the GENISES TDB during this period.

GS950308319211.007- ACTIVATION LABORATORIES INAA ELEMENTAL ANALYSES OF DRILL CORE SAMPLES FROM USW G-2.
PROCESSING COMPLETED ON 03-APR-1995.

GS950108312312.001-	WATER-LEVEL ALTITUDE DATA FROM THE PERIODIC NETWORK, FOURTH QUARTER 1994. PROCESSING COMPLETED ON 03-APR-1995.
GS940308314211.017-	TABLE OF CONTACTS FOR THE TIVA CANYON TUFF IN BOREHOLE UE-25 UZN#63, VERSION(S) 1. (N), BY T. MOYER AND J. GESLIN. PROCESSING COMPLETED ON 06-APR-1995.
GS940908314211.043-	TABLE OF LITHOLOGIC CONTACTS FROM THE BASE OF THE TOPOPAH SPRING TUFF TO TOTAL DEPTH IN BOREHOLE USW UZ-14, VERSION(S) 1. (N), BY T. MOYER AND J. GESLIN. THE CONTACT ALTITUDES FOR THE PROW PASS TUFF S PROCESSING COMPLETED ON 06-APR-1995.
GS940908314211.044-	TABLE OF LITHOLOGIC CONTACTS FOR THE PAINTBRUSH GROUP IN BOREHOLE USW SD-12, VERSION(S) 1. (N), BY J. GESLIN AND J. WUNDERLICH. PROCESSING COMPLETED ON 06-APR-1995.
GS941108319211.003-	OXYGEN ISOTOPE DATA ON TIVA CANYON TUFF FROM ANTLER RIDGE SECTION. PROCESSING COMPLETED ON 06-APR-1995.
TM000000SD12RP.005-	USW SD-12 BOREHOLE SAMPLE COLLECTING AND PROCESSING INFORMATION FOR THIS RECORDS/DATA SEGMENT IS RECORDED ON THE FOLLOWING DOCUMENTS: SHIFT DRILLING SUMMARIES (YMP-012-R2), 700.8-703.9; - STRUCTURAL L PROCESSING COMPLETED ON 07-APR-1995.
GS940708314211.034-	MISC. LITHOSTRATIGRAPHIC CONTACTS IN NON-QUALIFIED BOREHOLES (USW G-2 AND G-4, UE-25 A#1), VERSION(S) 1. (N), BY T.C. MOYER. PROCESSING COMPLETED ON 07-APR-1995.
GS941008314211.050-	TABLE OF LITHOLOGIC CONTACTS IN BOREHOLE USW SD-9 FROM THE BASE OF THE PAINTBRUSH GROUP TO TOTAL DEPTH, VERSION(S) 1. (N), BY T. MOYER (RECORDS PACKAGE INCLUDES COMPLETE TABLE OF CONTACTS OF USW SD-9) PROCESSING COMPLETED ON 07-APR-1995.

GS940608314211.026-	LITHOSTRATIGRAPHIC DATA FOR THE CALICO HILLS FORMATION IN UE-25 UZ#16 BY J.K, GESLIN. THESE DATA SUPERSEDE A PORTION OF THE DATA PREVIOUSLY IDENTIFIED BY DTN GS931208314211.047. PROCESSING COMPLETED ON 10-APR-1995.
GS940908315213.002-	UTH ISOTOPIC DATA AND U-SERIES DISEQUILIBRIUM DATING OF SPRING DISCHARGE DEPOSITS NEAR THE SOUTHERN END OF CRATER FLAT. PROCESSING COMPLETED ON 10-APR-1995.
GS941108312132.003-	HEAT-PULSE FLOWMETER SURVEY DATA FROM WELL USE G-2. PROCESSING COMPLETED ON 10-APR-1995.
GS940308314211.011-	TABLE OF CONTACTS FOR THE TIVA CANYON TUFF IN BOREHOLE USW UZ-N38 BY T. MOYER. PROCESSING COMPLETED ON 10-APR-1995.
GS940308314211.016-	TABLE OF CONTACTS FOR THE TIVA CANYON TUFF IN BOREHOLE USW USN-64, VERSION(S) 1. (N), BY T. MOYER AND J. GESLIN. PROCESSING COMPLETED ON 10-APR-1995.
GS940308314211.018-	TABLE OF CONTACTS FOR THE TIVA CANYON TUFF IN BOREHOLE USW UZ-N36, VERSION(S) 1. (N), BY T. MOYER AND J. GESLIN. PROCESSING COMPLETED ON 10-APR-1995.
GS940308314211.019-	TABLE OF CONTACTS FOR THE TIVA CANYON TUFF IN BOREHOLES USW UZ-N15, USW UZ-N16, AND USW UZ-N17, VERSION (S) 1. (N), BY T. MOYER AND J. GESLIN PROCESSING COMPLETED ON 10-APR-1995.
GS920708312111.005-	PRECIPITATION DEPTH, IN INCHES, COLLECTED USING A NETWORK OF NON-AUTOMATED, COLLECTOR-TYPE PLASTIC GAUGES. MEASUREMENTS WERE TAKEN AFTER EACH MAJOR PRECIPITATION EVENT AND TOTALLED FOR EACH MONTH. PROCESSING COMPLETED ON 11-APR-1995.

GS940708312212.011-	VOLUMETRIC WATER CONTENT FROM NEUTRON MOISTURE METER COUNTS FOR 99 BOREHOLES FROM 5/3/89 OR FROM THE TIME THEY WERE DRILLED UNTIL 12/31/93. THESE DATA SUPERSEDE DATA PREVIOUSLY IDENTIFIED BY DTN: GS9 PROCESSING COMPLETED ON 17-APR-1995.
GS940708312212.010-	VOLUMETRIC WATER CONTENT FROM NEUTRON MOISTURE METER COUNTS FOR 74 BOREHOLES FROM THE TIME THEY WERE DRILLED UNTIL 5/2/89 PROCESSING COMPLETED ON 17-APR-1995.
TM000000SD12RP.001-	USW SD-12 BOREHOLE SAMPLE COLLECTING AND PROCESSING INFORMATION: SHIFT DRILLING SUMMARIES(YMP-012-R2) STRUCTURAL LOGS(YMP-011-R4) LITHOLOGIC LOGS(YMP-009-R4) Processing completed on 17-apr-1995.
GS931208314221.012-	FAULT ATTITUDE DATA OF THE PAINTBRUSH CANYON FAULT SYSTEM PROCESSING COMPLETED ON 24-APR-1995.
GS941008312212.013-	NEUTRON COUNTS FOR 97 BOREHOLES AT YUCCA MOUNTAIN FROM JANUARY 1, 1994, TO OCTOBER 1, 1994. PROCESSING COMPLETED ON 24-APR-1995.
GS941208312212.017-	SUBSURFACE WATER CONTENT AT YUCCA MOUNTAIN NEVADA-- NEUTRON LOGGING DATA FOR 1/1/94 THRU FY94. PROCESSING COMPLETED ON 24-APR-1995.
TM000000SD12RP.002-	USW SD-12 BOREHOLE SAMPLE COLLECTING AND PROCESSING INFORMATION FOR THIS RECORDS/DATA SEGMENT IS FROM 540.7-600.7' AND IS RECORDED ON THE FOLLOWING DOCUMENTS: SHIFT DRILLING SUMMARIES, STRUCTURAL LOGS PROCESSING COMPLETED ON 25-APR-1995.
TM000000SD12RP.004-	USW SD-12 BOREHOLE SAMPLE COLLECTING AND PROCESSING INFORMATION FOR THIS RECORDS/DATA SEGMENT IS RECORDED ON THE FOLLOWING DOCUMENTS: SHIFT DRILLING SUMMARIES,

	STRUCTURAL LOGS, LITHOLOGIC LOGS. PROCESSING COMPLETED ON 25-APR-1995.
GS940608314211.022-	LITHOSTRATIGRAPHIC DATA FOR THE PROW PASS IN USW G-1, G-2, GU-3, AND G-4, UE-25 C#1, C#2, AND C#3, AND FIELD OBSERVATIONS FROM RAVEN CANYON AND PROW PASS. PROCESSING COMPLETED ON 25-APR-1995.
GS930983117432.014-	FLUVIAL ORIGIN OF THE BEATTY SCARP, NYE COUNTY, NEVADA, BY L.W. ANDERSON. PROCESSING COMPLETED ON 25-APR-1995.
TM000000000001.062-	ORIGINAL SOURCE DATA AND HARDCOPY BACKUP DATA FOR: ATMOSPHERIC PRESSURE, PRECIPITATION, RELATIVE HUMIDITY, TEMPERATURE, WIND DIRECTION, AND WIND SPEED. PROCESSING COMPLETED ON 26-APR-1995.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. The on-line access to the TDB databases located in the GENISES system will be ready for distribution by June 30, 1995. The application is part of the CD-ROM Data Distribution system. It provides the user with browse capability from the GENISES file server with the ability to copy data from the CD-ROM.

2. Processing of submittal data will continue.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 REGULATORY

WBS 1.2.5.3.6 GEOGRAPHIC INFORMATION STUDY AND EVALUATION SYSTEM (GENISES)

SA OE536B4 GIS DATABASE, SITE ATLAS, ARCVIEW AND GIS DATA CATALOG

REPORT PERIOD: April 1 - April 30, 1995

REPORT DATE: May 12, 1995

RESPONSIBLE INDIVIDUAL: S. Ross

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. Fifty additional copies of the 1994 Site Atlas were delivered to YMSCO Document Control on April 3. Requests for the 1994 Site Atlas continue, and another 50 copies are being prepared, bringing the total to 200.

2. Preparation of the 1995 first quarter GIS Data Catalog (March 31, 1995) was completed. 186 copies were delivered to YMSCO on April 27.

3. The "baseline" area of the YMP GIS database continues to be evaluated, reformatted and verified to facilitate production activities, and to meet Federal Spatial Data Transfer and Metadata standards.

4. A copy of the GIS Data Catalog dated 9/30/95 was provided to Dennis Hansen (EG&G/ESD) on April 18.

5. Elaine Ezra and Sue Ross met with John Raines and John Carlson (SAIC) on April 11 to discuss GIS and mapping products required for socioeconomic studies.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. The third distribution of the 1994 Site Atlas is expected by the end of May.

2. The FY1995 Site Atlas planning will be initiated.

3. Processing and verification of GIS data will continue in support of the quarterly update of the GIS Data Catalog and the 1995 Site Atlas.

4. Processing of ArcView datasets will continue.

5. Metadata documentation efforts will continue.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 REGULATORY

WBS 1.2.5.3.6 GENISES

SA OE536C95 GIS, MAPPING AND ANALYSIS SUPPORT

REPORT PERIOD: April 1, 1995 - April 30, 1995

REPORT DATE: May 12, 1995

RESPONSIBLE INDIVIDUAL: Jeff Donovan

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. GIS map products were generated to support project participants and are detailed in the "Deliverables" section of this report.

2. The following photo products were generated:

NR95032803 Two copies each of the 30 sheets of 1:6,000 scale orthophotos and contours at a 50% reduction were prepared for John Gauthier (M&O/WCFS) on April 4.

NR95031503 One contact color print of the following EG&G negatives were prepared for Scott Lundstrom (USGS) on April 5:

Perf	Frames
6766	7507-7589
6767	7667-7710; 7825-7866
6770	8519-8589
6771	8628-8745; 8792-8803
6772	8894-8927; 8994-9015

NR95033004 One blackline copy each of the 1990 20 foot elevation contours for sheets 13-16; 19-22; 25-28; and 31-34 was provided to Mark Bandurraga (LBL) on April 5.

NR95032805 Four blackline copies each of the 1990 1:6,000 scale orthophotos with elevation contours for sheets 9-11; 15-17; and 21-23 were provided to Warren Day (USGS) on April 5.

NR95032901 — 41 viewgraphs of EG&G #89D0655L were prepared for Mary Margaret Coates (USGS) on April 6.

NR95032206 — One copy of sheet #16 1:6,000 scale 10 foot elevation contours was provided to Kean Finnegan (LANL) on April 6.

NR95032705 — Five 22"x36" color prints of Negative #95D052L "The Earth's Fractured Surface" was prepared for Allison Inglett (SAIC) on April 7.

NR95040603 — Two slides and two viewgraphs of EG&G 6301-069 was prepared for Chris Potter (USGS) on April 12.

NR95040601 — One 10"x10" color print of EG&G #7488-133 was prepared for Carma Hernandez (SAIC) on April 12.

NR95012303 — Two each 4"x5" color prints of the following EG&G negatives were prepared for Allison Inglett (SAIC) on April 14:

8091-01 thru 8091-11
8092-01 thru 8092-12
8093-01 thru 8093-12
8094-01 thru 8094-09

NR95041208 — One viewgraph and two slides each of EG&G negatives 6032-074 and 7646-11 were prepared for Ron Green (EG&G/ESD) on April 18.

NR95041906 — Five blackline copies of Sheet 15 of the 1990 1:6,000 scale orthophotos with contours were provided to Warren Day (USGS) on April 24.

3. The following digital data transfers were provided:

YMP-95-032.2 — Two QIC tapes of Arc Export files of the 10 foot elevation contours were prepared for Russ Blackburn (SAIC) on April 7.

YMP-95-237.0 — A DOS Colorado Backup tape containing Arc Export coverages of GIS Data Catalog files was provided to Steve Bodnar (M&O) to satisfy Inyo County request NN1-1995-0044 on April 21.

YMP-95-265.0 — A 3.5" diskette in Arc Export format for a SUN system of ESF ramps and Controlled Area Boundary was provided to Jim Nelson (USGS/SAIC) on April 27.

4. The following miscellaneous products were generated:

YMP-95-223.0	A report of the coordinates defining the "Ranch" and "Core Area" boundaries was provided to Karen Olsson (SAIC) on April 12.
YMP-95-238.0	An updated TIDBITS report was generated for Jim Agnew (M&O/WCFS) on April 18.
YMP-95-239.0	A data report for the DTN's LLLLYMP9104035.000 and LA000000000017.002 was prepared for Mark Bandurraga (LBL) on April 20.
YMP-95-250.0	A report providing the areas of reference polygons over the preliminary surficial deposits map was provided to Scott Lundstrom (USGS) on April 26.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. Continued level-of-effort.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 REGULATORY

WBS 1.2.5.3.6 GENISES

SA OE536E95 COMPUTER SUPPORT

REPORT PERIOD: April 1, 1995 - April 30, 1995

REPORT DATE: May 12, 1995

RESPONSIBLE INDIVIDUAL: TBD

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. ArcView 2.0 was installed on the YMP fileserver on April 3.

2. INGRES Windows 4GL was installed and the system configured to allow the INGRES client/server access from the RSL Sun Platforms.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD: None

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 REGULATORY

WBS 1.2.5.3.6 GENISES

SA OE536G95 CAPITAL EQUIPMENT

REPORT PERIOD: April 1, 1995 - April 30, 1995

REPORT DATE: May 12, 1995

RESPONSIBLE INDIVIDUAL: Elaine Ezra

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD: None.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD: None.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 REGULATORY

WBS 1.2.5.3.6 GENISES

SA OE536D95 PROJECT MANAGEMENT

REPORT PERIOD: April 1, 1995 - April 30, 1995

REPORT DATE: May 12, 1995

RESPONSIBLE INDIVIDUAL: Elaine Ezra

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

Reporting/Tracking/Planning

1. EG&G/EM RSL March Progress report was compiled and submitted to YMSCO (NV-95-266).

2. March PACS input was compiled (ATP-95-052) and submitted to Robert Spiro (M&O).

Meetings/Briefings/Tours:

1. Elaine Ezra, Jim Beckett and Chris Berlien attended the quarterly Technical Data Mangers Meeting at Los Alamos National Laboratory on April 5-6.

2. Elaine Ezra represented Claudia Newbury (DOE/YMSCO) at the NTS/GIS Steering Committee meeting at DOE/NV on April 3.

3. Elaine Ezra and Jim Beckett attended the Technical Data Management weekly staff meetings on April 5 and 18.

Employee Actions:

1. James Ephlin, a YMPSAS computer technician resigned his position on April 21. Systems administration and plotter maintenance are being provided by RSL computer support staff.

ES&H:

1. A monthly safety meeting was conducted and safety checks completed for Suite 1010.

Quality Assurance:

1. YLP-SI.2Q-EGG, Software Qualification, Draft A comments have been received and are being resolved. Comments included the request for a QARD, Supplement I requirements matrix, as well as converting the EG&G Configuration Management System procedure into a YLP. The matrix has been generated and the CMS procedure has been converted to YLP format and submitted to YMP Procedures, Plans and Documents organization. The remaining comments were of an editorial nature and have been resolved.

2. Monthly internal audit of the EG&G/EM, SAIC, and YMP Controlled Documents was completed. No discrepancies were identified.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN:

The M&O transition needs to be resolved.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD: None.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 SITE INVESTIGATIONS

WBS 1.2.5.3.7 SPECIAL STUDIES: TRACERS, FLUIDS AND MATERIALS

SA OE394A TRACERS, FLUIDS AND MATERIALS

REPORT PERIOD: April 1, 1995 - April 31, 1995

REPORT DATE: May 12, 1995

RESPONSIBLE INDIVIDUAL: Jim Beckett

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. The YMP TFM Reporting and Management Procedures, YMP-2.8 has been approved. This procedure outlines the interaction of the TFM database and the TFM data providers. The new procedure imposes numerous requirements on the storage and retrieval of data from the TFM on-line database. Modifications to the database and the on-line application are currently underway.

2. The Determination of Importance (DIE) Process Effectiveness Team has met weekly during the month of April. The team will provide suggestions to the existing TFM process.

3. The following TFM data were received and processed during this period:

BAAAF0000-01717-22-	EVALUATED TFMS ASSOCIATED WITH THE WORKOVER, INSTRUMENTATION AND TESTING OF MISCELLANEOUS BOREHOLES, (BAAAF0000-01717-2200-00004 REV. 01) PROCESSING COMPLETED ON 17-APR-1995.
R-94-008 -	R-94-008 AS-BUILT QUANTITIES USED DURING CONSTRUCTION OF THE "ESF TEST ALCOVE AT THE NORTH RAMP." PROCESSING COMPLETED ON 18-APR-1995.
R-94-006 -	R-94-006 AS-BUILT QUANTITIES USED DURING CONSTRUCTION OF THE "ESF STARTER TUNNEL AT THE NORTH RAMP." PROCESSING COMPLETED ON 20-APR-1995.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN:

The installation of the communications software required to access GENISES (TCPIP) is being installed on the YMP communications backbone. The installers estimated it will take one year to complete the installation. Access to the TFM database will not be possible without this software.

The transfer of the Los Alamos TFM database into GENISES is still on hold. It will be complete and an acceptance letter provided to YMP after verification of the data by the M&O.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. As YMP TFM Reporting and Management Procedures, YMP-2.8 has been approved by DOE, modification of the TFM database will be complete by June 1, 1995. This will also require modification to the existing data in the database.

2. After the completion of the modifications and the successful completion of the TFM database Version 0.9 testing, the TFM application will be made available to all requesters. At that time, a letter will be generated notifying the DOE of the on-line availability of the database.

3. All TFM database personnel will be trained to the new TFM procedure by mid May.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.12 RECORDS MANAGEMENT

SA OEC23A95 RECORDS MANAGEMENT

REPORT PERIOD: April 1, 1995 - April 30, 1995

REPORT DATE: May 12, 1995

RESPONSIBLE INDIVIDUAL: J. Wiggins

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. 153 Accession numbers were received from the YMP Records Management organization for quality record packages.

2. 42 QARs were processed into the YMP Records Management System.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN:

Allocated funds for FY95 are nearly expended and are expected to run out by June. The M&O Transition Plan needs to be in place so that Records Management responsibilities can be transferred to the M&O or additional funds established for EG&G/EM.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD: None.

STATUS OF DELIVERABLES FOR EG&G/EM RSL SUPPORT TO YMP
April 1, 1995 - April 30, 1995

GIS MAP SUPPORT

Description	Requested by/ Organization	Date Sent	Size	No. of Copies
YMP-95-139.0 DIE General Reference	Bartley/Duke	4/3/95	Full	1
YMP-95-147.0 Preliminary Geologic Map of YM, Nevada, Map Sheet 16	Day/USGS	4/3/95	Full	1
YMP-95-165.0 Mylar Overlay for YMP-95-093.0	Sassani/M&O	4/3/95	Full	2
YMP-95-093.0 Preliminary Geologic Map of YM, NV	Sassani/M&O	4/3/95	Full	3
YMP-95-190.0 Planned FY96 Borehole Workovers, Testing and Instrumentation	Biggar/M&O	4/4/95	Page	2
YMP-95-191.0 Planned FY96 Soil Pits in the Site Area (Proposed Locations)	Biggar/M&O	4/4/95	Page	2
YMP-95-192.0 Planned FY96 Boreholes in the Site Area	Biggar/M&O	4/4/95	Page	2
YMP-95-193.0 Planned Borehole Geophysical Logging in FY96 and Remainder of FY95 (Site Area)	Biggar/M&O	4/4/95	Page	2
YMP-95-194.0 Planned Borehole Geophysical Logging in FY96 and Remainder of FY95 (Regional Investigations)	Biggar/M&O	4/4/95	Page	2

YMP-95-195.0 Planned FY96 Trenches and Test Pits in Regional Investigations (Proposed Locations)	Biggar/M&O	4/4/95	Page	2
YMP-93-007.0 YMP, Near Field Radiological Monitoring Sites	Hernandez/SAIC	4/4/95	Full	1
YMP-95-045.3 Proposed Rail Routes through Nellis Air Force Range	Gehner/TRW	4/5/95	Full Page	1 3
YMP-95-138.0 7.5' and 15' Map Index for Use with Preliminary Transportation Studies	Gehner/TRW	4/5/95	Full	2
YMP-95-014.1 Preliminary Surficial Deposits Map	Coates/USGS	4/6/95	Full	40
YMP-95-208.0 PRO and ESF Ramps for EG&G Airphoto 7287-013	Inglett/SAIC	4/7/95	Page	1
YMP-95-217.0 Location of the Proposed Repository Block and Depth from the Surface	Murray/WCFS	4/7/95	Page	3
YMP-95-213.0 Site Area Fault Map, Topographic Contour Interval: 200 ft	Day/USGS	4/7/95	Page	1
YMP-95-051.0 Legal Weight Truck Highway Map	Inglett/SAIC	4/7/95	Page	1
YMP-95-203.0 Existing and Planned Trenches	DeKlever/M&O	4/10/95	Full	1
YMP-95-196.0 Planned Ecological Study Plots	Biggar/M&O	4/10/95	Full	2

YMP-95-204.0 Selected Surface-Based Testing Activities	Bartley/M&O	4/10/95	Full	1
SA94-1-20 Historical Seismic Activity Earthquake Epicenters	Coates/USGS	4/10/95	Full	1
YMP-95-210.0 Borehole Summary (A/O April 1, 1995)	Weeks/SAIC	4/11/95	Page	2
YMP-95-220.0 Untitled, Theme is PRO and Selected Boreholes	Linden/SAIC	4/11/95	Page	1
YMP-95-118.2 YMP, Seismic Reflection Lines	Inglett/SAIC	4/13/95	Page	1
YMP-95-157.2 Selected Boreholes and PRO	Inglett/SAIC	4/13/95	Page	1
YMP-95-086.1 Cross Section A-A' through Thermal Mechanical Model	Inglett/SAIC	4/13/95	Page	1
YMP-95-112.2 Boreholes Used in Pneumatic Studies (LA)	Inglett/SAIC	4/13/95	Page	1
YMP-95-052.1 High Level Waste 75ton/125ton Rail Map	Gehner/TRW	4/13/95	Full	1
YMP-95-051.1 Legal Weight Truck Highway Map	Gehner/TRW	4/13/95	Full	1
YMP-95-007.0 Near Field Radiological Monitoring Sites	Inglett/SAIC	4/13/95	Full	5
YMP-95-166.0 Existing Trenches	Girdley/YMSCO	4/13/95	Full	4
YMP-95-167.0 Existing Trenches	Girdley/YMSCO	4/13/95	Full	4

YMP-95-211.0 Existing Trenches	Girdley/YMSCO	4/13/95	Full	4
YMP-95-212.0 Existing Trenches	Girdley/YMSCO	4/13/95	Full	4
YMP-94-074.0 YMP Existing Boreholes	Reynolds/WCFS	4/13/95	Full	1
YMP-95-203.1 Existing and Planned Trenches	DeKlever/M&O	4/13/95	Full	4
YMP-95-168.0 Meteorology, Air Quality, Radiological, and Water Resources Studies	Hernandez/SAIC	4/14/95	Full	1
YMP-95-219.0 Proposed Routes, Heavy Haul Truck	Gehner/TRW	4/14/95	Full	2
YMP-95-206.0 Preliminary Geologic Map Yucca Mountain, NV	Altman/SNL	4/14/95	Full	1
YMP-95-234.0 Base Map with Cross-Section Location	Whitney/USGS	4/14/95	Page	3
YMP-95-235.0 Cross-Section A-A'	Whitney/USGS	4/14/95	Page	3
YMP-95-236.0 Cross-Section with 200M-IN Near Ghost Dance Fault	Whitney/USGS	4/14/95	Page	3
YMP-94-475.0 Preliminary Geologic Map of YM, Nevada	Hudson/USGS	4/19/95	Full	1
YMP-95-218.0 DIE General Reference	Bartley/M&O	4/19/95	Full	1
YMP-95-051.2 Legal Weight Truck Map	Gehner/TRW	4/19/95	Full	2
YMP-95-052.2 High Level Waste Rail Map	Gehner/TRW	4/19/95	Full	2

YMP-95-168.1 Meteorology, Air Quality, Radiological and Water Resources Studies	Fasano/SAIC	4/19/95	Full	2
YMP-95-012.1 Biological Studies	Hernandez/SAIC	4/19/95	Full	2
YMP-95-052.3 High Level Waste 75 ton/125 ton Rail Map	Gehner/TRW	4/19/95	Full	2
YMP-95-051.3 Legal Weight Truck Highway Map	Gehner/TRW	4/19/95	Full	2
YMP-95-023.2 Biological Studies	Fasano/SAIC	4/19/95	Full	1
YMP-95-209.0 Existing Trenches	DeKlever/M&O	4/20/95	Full	2
YMP-95-203.1 Planned & Existing Trenches	DeKlever/M&O	4/20/95	Full	1
Transportation Study Map: YMP-95-169.0 Cane Springs, NV YMP-95-170.0 Specter Range, NV YMP-95-171.0 Mercury, NV YMP-95-172.0 Topopah Springs, NV YMP-95-173.0 Lathrop Wells, NV YMP-95-174.0 Charleston Peak, NV YMP-95-175.0 Corn Creek, NV YMP-95-176.0 Gass Peak, NV YMP-95-177.0 Dry Lake, NV YMP-95-178.0 Blue Diamond, NV YMP-95-179.0 Indian Springs, NV YMP-95-180.0 Indian Springs, NV YMP-95-181.0 Heavens Well, NV YMP-95-224.0 Black Hills, SW, NV YMP-95-225.0 Black Hills, NW, NV YMP-95-226.0 Black Hills, NV YMP-95-227.0 White Sage Flat, NV YMP-95-228.0 Las Vegas, NW, NV YMP-95-229.0 Las Vegas, NE, NV YMP-95-230.0 Frenchman Mountain, NV	Gehner/TRW	4/21/95	Full	40

YMP-94-475.0 Preliminary Geologic Map of YM, NV	Nieder-Westermann Morison-Knudson	4/24/95	Full	1
YMP-94-366.1	Hennessy/USGS	4/25/95	Page	1
YMP-94-367.1	Hennessy/USGS	4/25/95	Page	1
YMP-94-368.1	Hennessy/USGS	4/25/95	Page	1
YMP-94-369.1	Hennessy/USGS	4/25/95	Page	1
YMP-94-445.0	Hennessy/USGS	4/25/95	Page	1
YMP-94-448.0	Hennessy/USGS	4/25/95	Page	1
YMP-94-449.0	Hennessy/USGS	4/25/95	Page	1
YMP-94-450.0	Hennessy/USGS	4/25/95	Page	1
YMP-94-451.0	Hennessy/USGS	4/25/95	Page	1
YMP-94-452.0	Hennessy/USGS	4/25/95	Page	1
YMP-94-453.0	Hennessy/USGS	4/25/95	Page	1
YMP-94-454.0	Hennessy/USGS	4/25/95	Page	1
YMP-94-455.0	Hennessy/USGS	4/25/95	Page	1
YMP-94-456.0	Hennessy/USGS	4/25/95	Page	1
YMP-94-491.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-013.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-014.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-014.1	Hennessy/USGS	4/25/95	Page	1
YMP-95-021.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-023.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-023.1	Hennessy/USGS	4/25/95	Page	1
YMP-95-024.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-025.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-026.1	Hennessy/USGS	4/25/95	Page	1
YMP-95-026.2	Hennessy/USGS	4/25/95	Page	1
YMP-95-054.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-055.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-056.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-057.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-066.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-068.1	Hennessy/USGS	4/25/95	Page	1
YMP-95-069.1	Hennessy/USGS	4/25/95	Page	1
YMP-95-070.1	Hennessy/USGS	4/25/95	Page	1
YMP-95-071.1	Hennessy/USGS	4/25/95	Page	1
YMP-95-094.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-095.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-096.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-097.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-098.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-105.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-106.0	Hennessy/USGS	4/25/95	Page	1

YMP-95-107.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-107.1	Hennessy/USGS	4/25/95	Page	1
YMP-95-108.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-108.1	Hennessy/USGS	4/25/95	Page	1
YMP-95-109.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-109.1	Hennessy/USGS	4/25/95	Page	1
YMP-95-109.2	Hennessy/USGS	4/25/95	Page	1
YMP-95-110.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-110.1	Hennessy/USGS	4/25/95	Page	1
YMP-95-110.2	Hennessy/USGS	4/25/95	Page	1
YMP-95-111.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-111.1	Hennessy/USGS	4/25/95	Page	1
YMP-95-111.2	Hennessy/USGS	4/25/95	Page	1
YMP-95-112.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-112.1	Hennessy/USGS	4/25/95	Page	1
YMP-95-112.2	Hennessy/USGS	4/25/95	Page	1
YMP-95-113.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-113.1	Hennessy/USGS	4/25/95	Page	1
YMP-95-113.2	Hennessy/USGS	4/25/95	Page	1
YMP-95-114.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-114.1	Hennessy/USGS	4/25/95	Page	1
YMP-95-114.2	Hennessy/USGS	4/25/95	Page	1
YMP-95-115.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-115.1	Hennessy/USGS	4/25/95	Page	1
YMP-95-115.2	Hennessy/USGS	4/25/95	Page	1
YMP-95-116.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-116.1	Hennessy/USGS	4/25/95	Page	1
YMP-95-117.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-117.1	Hennessy/USGS	4/25/95	Page	1
YMP-95-118.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-118.1	Hennessy/USGS	4/25/95	Page	1
YMP-95-118.2	Hennessy/USGS	4/25/95	Page	1
YMP-95-119.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-119.1	Hennessy/USGS	4/25/95	Page	1
YMP-95-120.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-126.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-130.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-131.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-141.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-146.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-148.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-149.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-150.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-151.0	Hennessy/USGS	4/25/95	Page	1

YMP-95-152.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-153.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-154.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-155.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-157.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-157.1	Hennessy/USGS	4/25/95	Page	1
YMP-95-157.2	Hennessy/USGS	4/25/95	Page	1
YMP-95-189.0	Hennessy/USGS	4/25/95	Page	1
YMP-95-245.0 Existing Boreholes in the Calico Hills (CHn)	Henning/WCFS	4/26/95	Page	3
YMP-95-014.0 Preliminary Surficial Deposits Map	Banks/YMPO	4/26/95	Full	1
YMP-95-251.0 Reference Polygons over Preliminary Surficial Deposits Map	Lundstrom/USGS	4/26/95	Full	1
2YMP-95-014.1 Preliminary Surficial Deposits Map	Lundstrom/USGS	4/26/95	Full	2
YMP-94-033.0 Saturated Zone Boreholes and Groundwater Geochemistry Monitoring Stations	Fasano/SAIC	4/26/95	Full	1
YMP-95-249.0 Planned Boreholes (FY95-FY99) in the Calico Hills (CHn)	Henning/M&O	4/27/95	Page	3
YMP-95-248.0 Existing (QA) and Planned Boreholes (FY95-FY99) in the Calico Hills (CHn)	Henning/M&O	4/27/95	Page	3
YMP-95-240.0 Proposed USW WT-24 Borehole Location	Esp/SAIC	4/27/95	Page	5
YMP-95-221.0 NTS Survey Control Locations	Brickey/EG&G/EM	4/27/95	Full	2

YMP-95-252.0 YM Site Relative to Nevada Counties	Raines/SAIC	4/28/95	Page	1
YMP-95-242.0 Federal Lands Adjacent to the YMP	Raines/SAIC	4/28/95	Page	1
Transportation Study Map: YMP-95-179.1 Mercury, NV YMP-95-275.1 Corn Creek NV YMP-95-176.1 Gass Peak, NV YMP-95-177.1 Dry Lake, NV YMP-95-179.2 Indian Springs, NV, NV YMP-95-180.2 Indian Springs, NV YMP-95-181.2 Heavens, Well, NV YMP-95-224.2 Black Hills, SW, NV YMP-95-225.2 Black Hills, NW, NV YMP-95-226.2 Black Hills, NV YMP-95-227.2 White Sage Flat, NV YMP-95-266.0 Indian Springs, SE, Nevada YMP-95-179.1 Indian Springs, NW, Nevada YMP-95-180.1 Indian Springs, NV YMP-95-181.1 Heavens Well, NV YMP-95-224.1 Black Hills, SW, NV YMP-95-225.1 Black Hills, NW, NV YMP-95-226.1 Black Hills, NV YMP-95-227.1 White Sage Flat, NV YMP-95-228.1 Las Vegas, NW, Nevada YMP-95-229.1 Las Vegas, NE, Nevada YMP-95-230.1 Frenchman Mountain, NV	Gehner/TRW	4/28/95	Full	42
YMP-95-296.1 Existing and Planned Boreholes	Gromny/WCFS	4/28/95	Full	1

TOTAL MAPS 344

TOTAL NEW MAPS 34

EG&G ENERGY MEASUREMENTS

Las Vegas Area Operations

EG&G ENERGY MEASUREMENTS, INC., P.O. BOX 1912, LAS VEGAS, NEVADA 89125

QA: NA
WBS 1.2.5

June 7, 1995
NV-95-372

Mr. Wesley Barnes, Project Manager
Department of Energy
Yucca Mountain Site Characterization Project Office
101 Convention Center Drive
Las Vegas, NV 89109

MAY 1, 1995 - MAY 31, 1995, PROGRESS REPORT - EG&G/ENERGY MEASUREMENTS, REMOTE SENSING LABORATORY SUPPORT TO THE YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT

Enclosed is a progress report on the EG&G Energy Measurements, Inc. (EG&G/EM) Remote Sensing Laboratory (RSL) support to the Yucca Mountain Site Characterization Project (YMP) for May 1, 1995 through May 31, 1995.

The progress report for EG&G/EM RSL support to YMP includes the following sections:

- Work Accomplished
- Expenditures
- Status of Deliverables

If you have any questions, please contact Elaine Ezra at (702) 794-7449.

for James Michael, Manager
NV Program

CE:ns

Enclosures
1. Progress Report
2. Maps

3/5
w/o Ass't Mgrs (7) / Wilson w
Dyer w / Lynch w
w/o Horton / Ryder w
Gandi w /
[redacted] w
Dewbury w
Sullivan w
Williams / D w
6/8/95

ENCLOSURE 3

cc w/Encl 1

S. Ronshaugen, DOE/NV EMD
W. Dixon, DOE/YMSCO
M. Dockter, DOE/NV
R. Dyer, DOE/YMSCO
D. Foust, M&O/TRW (Encls 1 & 2)
J. Gandi, DOE/YMSCO
A. Gil, DOE/YMSCO
C. Newbury, DOE/YMSCO (Encls 1 & 2)
M. Ryder, DOE/YMSCO
T. Statton, M&O/WCFS
T. Sullivan, DOE/YMSCO
M. Tynan, DOE/YMSCO (Encls 1 & 2)
D. Williams, DOE/YMSCO
W. Wilson, DOE/YMSCO (Encls 1 & 2)
J. Younker, M&O/TRW

EG&G ENERGY MEASUREMENTS
Las Vegas Area Operations
EG&G ENERGY MEASUREMENTS, INC., P.O. BOX 1912, LAS VEGAS, NEVADA 89125

QA: NA
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1. Progress Report
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PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.3 SITE INVESTIGATIONS

WBS 1.2.3.9.5 SPECIAL STUDIES: THREE-DIMENSIONAL SITE MODEL

SA OE395A95L INTEGRATED 3-D MODEL

REPORT PERIOD: May 1, 1995 - May 31, 1995

REPORT DATE: June 7, 1995

RESPONSIBLE INDIVIDUAL: David Jefferis

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. Thirteen structure contour maps were generated from the USGS lithostratigraphic model (YMP.R2.0) that was converted from Lynx GMS to EarthVision by EG&G. These structure contour maps were transmitted to the USGS Rock Characteristics Group to provide the basis of a formal review of the conversion process. A formal review is required prior to using the converted lithostratigraphic model to generate surfaces for transport modeling studies by LANL. A meeting was held May 26 in Denver, with the USGS, SAIC, and EG&G in attendance. The results of the formal review by the USGS and SAIC were discussed. Several areas were found to be in need of minor corrections, but no major discrepancies were found. EG&G has made several corrections to various faults and lithostratigraphic horizons and regenerated the YMP.R2.0 model under EarthVision. Work has started on the generation of surfaces for LANL.

2. David Jefferis attended the DOE/NRC Yucca Mountain Field Trip, May 17. He gave a presentation on the progress made to date during fiscal 1995 by EG&G in regard to: geological framework and integrated modeling; the development of the Numerical Model Warehouse; software qualification of EarthVision; and other level-of-effort activities.

3. A preliminary first derivative map of the residual magnetic field in the vicinity of Yucca Mountain was generated and overlaid with a map of the faults in the same region. This map was taken to the DOE/NRC field trip and discussed with the USGS. Work continues on generating first derivative maps over a larger region for the USGS.

4. A meeting was attended in Houston, Texas, on May 16 with the Petrotechnical Open Software Corporation (POSC). EG&G was given a briefing on the POSC data model EPICENTER. EG&G is in the process of evaluating various commercial data models as the means to expedite the development of the Numerical Modeling Production Database to support the development of the Site Geological Framework and Integrated Model.

5. The following products were generated as level of effort activities:

   NR95042408 Montage of four cross-sections based on YMP.R2.0 lithostratigraphic model for M&O/WCFS.

   NR95042408 Map showing faults mapped by USGS with overlay of faults generated by the USGS as part of the Fault Working Group. Product generated for the USGS.

   NR95050215 Three full size cross-sections were generated using the YMP.R2.0 lithostratigraphic model. The cross-sections are oriented along the north ramp, main drift, and south ramp of the ESF. Product was generated for M&O/INTERA.

MAJOR PROBLEMS AND CORRECTIVE ACTION: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. Develop methodology necessary to provide LANL with a geological framework that can be used to preprocess the geochemistry transport model. This geological framework is due at LANL June 1, 1995, but will be late due to the need to fix several problems in the model found as part of the formal review by the USGS.

2. Begin development of the Site Area Geological Framework model, Version 1.0.

3. Extend YMP.R2.0 to include Top Paleozoic.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.3 SITE INVESTIGATIONS

WBS 1.2.3.9.5 SPECIAL STUDIES: THREE-DIMENSIONAL SITE MODEL

SA OE395E95 3-D AND NUMERICAL MODELING QA

REPORT PERIOD: May 1, 1995 - May 31, 1995

REPORT DATE: June 7, 1995

RESPONSIBLE INDIVIDUAL: David Jefferis

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. Software Qualification of EarthVision version 2.0 continues. The Test Plan has been reviewed and is currently being revised. All test cases have been developed and testing has been initiated.

2. Work continues on the development of procedures for Scientific Investigations and Numerical Model validation.

MAJOR PROBLEMS AND CORRECTIVE ACTION: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. Continue development of procedures for Scientific Investigations and Validation of Numerical Models.

2. Continue with the qualification of the EarthVision software.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.3 SITE INVESTIGATIONS

WBS 1.2.3.9.5 SPECIAL STUDIES: THREE-DIMENSIONAL SITE MODEL

SA OE395G95 STUDY PLAN FOR INTEGRATED GEOLOGY OF SITE AREA

REPORT PERIOD: May 1, 1995 - May 31, 1995

REPORT DATE: June 7, 1995

RESPONSIBLE INDIVIDUAL: David Jefferis

1. Project Office reviews of SCP Study Plan 8.3.1.4.2.3 *Geological Framework and Integrated 3-D Site Model* has been completed. Comments by the reviewers have been delivered to the Principal Investigator for resolution.

MAJOR PROBLEMS AND CORRECTIVE ACTION: None

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. Review and resolve comments and generate revised Study Plan.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.3 SITE INVESTIGATIONS

WBS 1.2.3.9.5 SPECIAL STUDIES: THREE-DIMENSIONAL SITE MODEL

SA OE395L95 COMPUTER SUPPORT

REPORT PERIOD: May 1, 1995 - May 31, 1995

REPORT DATE: June 7, 1995

RESPONSIBLE INDIVIDUAL: David Jefferis

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. Nothing to report.

MAJOR PROBLEMS AND CORRECTIVE ACTION: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD

1. Install and test ZMapPlus mapping system.
2. Install and test Isatis version 2.0.1.
3. Write purchase request for the Numerical Model Warehouse information server.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.3 SITE INVESTIGATIONS

WBS 1.2.3.9.5 SPECIAL STUDIES: THREE-DIMENSIONAL SITE MODEL

SA OE395B95L REMOTE SENSING MAPPING APPLICATION

REPORT PERIOD: May 1, 1995 - May 31, 1995

REPORT DATE: June 7, 1995

RESPONSIBLE INDIVIDUAL: David Brickey

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. The following products were generated:

   YMP-95-255.0 An image map titled "Subset of 1990, 1:12,000 Scale Orthophoto Sheet #21 with Merged Lineaments" was prepared for Warren Day (USGS) on May 3.

   YMP-95-254.0 A QIC cartridge with the digital version of the image map and FGDC compliant document file was provided to Warren Day (USGS) on May 3.

2. Work continues on producing enhancements of geocoded Landsat Thematic Mapper and SPOT images for structural interpretations, geomorphological, and lithological information. Production of remote sensing datasets and development of remote sensing products is being coordinated with Warren Day (USGS).

MAJOR PROBLEMS AND CORRECTIVE ACTION: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. Output of enhanced satellite imagery and satellite image maps.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 REGULATORY

WBS 1.2.5.3.5 GEOGRAPHIC NODAL INFORMATION STUDY AND EVALUATION SYSTEM (GENISES)

SA OE535L94 TECHNICAL DATABASE INPUT

REPORT PERIOD: May 1, 1995 - May 31, 1995

REPORT DATE: June 7, 1995

RESPONSIBLE INDIVIDUAL: Jim Beckett

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. On May 31, 1995, a revision of the EG&G Energy Measurements, Inc. planned FY 1995 schedule for submittal of technical data to the YMP Technical Database was provided to the Technical Data Manager for approval.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. The Environmental Sciences Department continues processing of data acquired from on-going activities.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 REGULATORY

WBS 1.2.5.3.6 GEOGRAPHIC NODAL INFORMATION STUDY AND EVALUATION SYSTEM (GENISES)

SA OE536A95 GENISES TECHNICAL DATABASE

REPORT PERIOD: May 1, 1995 - May 31, 1995

REPORT DATE: June 7, 1995

RESPONSIBLE INDIVIDUAL: J. Beckett

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. A meeting was held between EG&G/EM Environmental Sciences Department and Technical Database Administrator on May 2, 1995. The purpose of the meeting was to review data requirements.

2. A meeting was held on May 22, 1995, between Mark Karznach (USGS) and Jim Beckett. The purpose of the meeting was to discuss future data submittals.

3. A meeting was held on May 24, 1995, between Jim Hall (CER) and Jim Beckett . The purpose of the meeting was to discuss the development of a tracking system by Los Alamos for data they intend to store and distribute. Hall requested to review the current tracking system currently in use by EG&G/EM for tracking products.

4. The following technical data submittals were received during this period:

   SNF29041993002.051 - YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT GEOLOGY AND ROCK STRUCTURE LOG FOR HOLE USW SD-9, 700-850 FT, REV. 0. RECEIVED BY THE TDB ON 01-MAY-1995.

   SNF29041993002.052 - YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT CORE HOLE ROCK STRUCTURAL DATA SUMMARY FOR HOLE USW SD-9, REV. 0 RECEIVED BY THE TDB ON 01-MAY-1995.

SNF29041993002.054 - YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT GEOLOGY AND ROCK STRUCTURE LOG FOR DRILLHOLE USW SD-12, 650-800 FT., REV. 0. RECEIVED BY THE TDB ON 01-MAY-1995.

SNF29041993002.055 - YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT CORE HOLE ROCK STRUCTURAL DATA SUMMARY FOR HOLE USW SD-12, REV. 0. RECEIVED BY THE TDB ON 01-MAY-1995.

SNF29041993002.057 - YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT ROCK MASS MECHANICAL PROPERTIES ESTIMATES FOR TOPOPAH SPRING, MIDDLE NONLITHOPHYSAL ZONE (BASED ON ESTIMATES FOR USW NRG-6 & 7/7A, SD-9 & SD-12), REV.). RECEIVED BY THE TDB ON 01-MAY-1995.

SNF29041993002.058 - YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT RANK-ORDERED ROCK MASS QUALITY INDICES Q AND RQD FOR BOREHOLES NRG-6, NRG-7/7A, SD-9 AND SD-12, REV. 0. RECEIVED BY THE TDB ON 01-MAY-1995.

SNF29041993002.053 - YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT ESTIMATED ROCK MASS QUALITY INDICES BASED ON CORE LOG DATA FOR HOLE USW SD-9, MIDDLE NONLITHOPHYSAL ZONE, REV. 0. RECEIVED BY THE TDB ON 01-MAY-1995.

SNF29041993002.056 - YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT ESTIMATED ROCK MASS QUALITY INDICES BASED ON CORE LOG DATA FOR HOLE USW SD-12, MIDDLE NONLITHOPHYSAL ZONE, REV. 0. RECEIVED BY THE TDB ON 01-MAY-1995.

GS931008312261.002 - CARBON DIOXIDE, METHANE, CARBON-14, CARBON 13/12, AND OXYGEN 18/16 GAS RESULTS FROM USW UZ-6, USW UZ-6S, USW UZ-N71, USW UZ-N72, USW UZ-N73, USW UZ-N74, USW UZ-N75, USW UZ-N76, USW UZ-N93, USW UZ-N94, RECEIVED BY THE TDB ON 08-MAY-1995.

GS941208312261.008 - CARBON DIOXIDE, METHANE, CARBON 14, AND CARBON 13/12 DATA FROM USW NRG-6 AND USW NRG-7 FOR MAY AND JUNE 1994; AND CARBON 14 DATA FROM USW WELLS NRG#5, UZ-6S, UZ-N27, UZ-N62, UZ-N64, UZ-N93, UZ-N94, AN
RECEIVED BY THE TDB ON 08-MAY-1995.

GS940708312261.005 - CARBON DIOXIDE, METHANE, CARBON 13/12, AND OXYGEN 18/16 RESULTS FROM USW UZ-6, USW UZ-6S, USW UZ-N27, USW UZ-N62, USW UZ-N64, USW UZ-N75, USW UZ-N93, USW UZ-N94, USW UZ-N95, UE-25 NRG#2B, UE-25 NRG#4,
RECEIVED BY THE TDB ON 08-MAY-1995.

GS941208319211.004 - OXYGEN ISOTOPE DATA ON TUFF BRECCIA SAMPLES FROM TRENCH 14 AND BUSTED BUTTE.
RECEIVED BY THE TDB ON 08-MAY-1995.

GS950208319211.002 - OXYGEN ISOTOPE DATA ON TUFF SAMPLES OF TIVA CANYON (UPPER CLIFF AND CAPROCK ZONES).
RECEIVED BY THE TDB ON 08-MAY-1995.

GS941108319211.002 - LEAD ISOTOPE RATIOS AND ISOTOPE DILUTION DATA FOR URANIUM, THORIUM, AND LEAD, APRIL TO JULY 1994.
RECEIVED BY THE TDB ON 08-MAY-1995.

GS950208319211.001 - INAA ELEMENTAL ANALYSES OF TIVA CANYON TUFF (UPPER CLIFF AND CAPROCK ZONES).
RECEIVED BY THE TDB ON 08-MAY-1995.

GS950308314211.015 - ASSESSING THE NATURAL PERFORMANCE OF FELSIC TUFFS USING THE RB-SR AND SM-ND SYSTEMS -- A STUDY OF THE ALTERED ZONE IN THE TOPOPAH SPRING MEMBER, PAINTBRUSH TUFF, YUCCA MOUNTAIN, NEVADA, BY Z.E. PETERMANN.
RECEIVED BY THE TDB ON 09-MAY-1995.

SNF29041993002.060 - GEOTECHNICAL ENGINEERING INVESTIGATION FOR THE PROPOSED MUCK CONVEYOR FOUNDATIONS AT THE ESF.
RECEIVED BY THE DB ON 09-MAY-1995.

SNF29041993002.059 - YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT COMPARISON OF DOWNHOLE VIDEO DATA FOR HOLE UE25 NRG-4, -5, USW NRG-6, -7/7A, REV 0.
RECEIVED BY THE TDB ON 09-MAY-1995.

GS950331174102.001 - GLOBAL POSITIONING SYSTEM PROFILE: YUCCA MOUNTAIN TO SIERRA NEVADA, J.C. SAVAGE
RECEIVED BY THE TDB ON 11-MAY-1995.

GS950208312261.001 - SHUT-IN PRESSURE TEST DATA FROM MAY 1994 TO SEPTEMBER 19194 FROM BOREHOLE UE-25 NRG #4.
RECEIVED BY THE TDB ON 25-MAY-1995.

LLLLYMP9109192.000 - DISSOLUTION AND PRECIPITATION KINETICS OF GIBBSITE AT 80 DEGREES C AND PH3: THE DEPENDENCE ON SOLUTION SATURATION STATE
RECEIVED BY THE TDB ON 26-MAY-1995.

LLLLYMP9110169.000 - RATE OF GRAIN VOLUME FRONT PROPAGATION UO (2) TO U (4) 0 (9) AND ACTIVATION ENERGY FOR THIS RATE.
RECEIVED BY THE TDB ON 26-MAY-1995.

LA000000000033.002 - MEASURED SOLUBILITIES AND SPECIATIONS FROM OVERSATURATION EXPERIMENTS OF NEPTUNIUM, PLUTONIUM AND AMERICIUM IN UE25P#1 WELL WATER FROM THE YUCCA MOUNTAIN PROJECT.
RECEIVED BY THE TDB ON 30-MAY-1995.

GS950408318523.001 - TEMPERATURE, THERMAL CONDUCTIVITY, AND HEAT FLOW NEAR YUCCA MOUNTAIN, NEVADA: SOME TECTONIC AND HYDROLOGIC IMPLICATIONS, BY J.H. SASS, A.H. LACHENBRUCH, W.W. DUDLEY, JR., S.S. PRIEST,

AND R.J. MUNROE
RECEIVED BY THE TDB ON 31-MAY-1995.

9. The following technical data submittal were processed into the TDB during this period:

GS921008312312.021-	WATER LEVELS IN CONTINUOUSLY MONITORED WELLS IN THE YUCCA MOUNTAIN AREA, NEVADA, 1989. BY D.H. LOBMEYER, R.R. LUCKEY AND D.J. BURKHARDT. PROCESSING COMPLETED ON 02-MAY-1995 .
GS940608314211.027-	LITHOSTRATIGRAPHIC DATA FOR THE CALICO HILLS FORMATION IN USW UZ-14 BY J.K. GESLIN. PROCESSING COMPLETED ON 04-MAY-1995 .
LL950103004244.004-	PROGRESS REPORT FOR LARGE BLOCK TEST OF COUPLED THERMAL-MECHANICAL-HYDROLOGICAL-CHEM ICAL PROCESSES PROCESSING COMPLETED ON 04-MAY-1995 .
GS940708312261.004-	SHUT-IN PRESSURE TEST DATA FROM DECEMBER 1992 TO FEBRUARY 1994 FROM SELECT WELLS AND BOREHOLES AT YUCCA MOUNTAIN, NEVADA PROCESSING COMPLETED ON 05-MAY-1995 .
TM00012562T1BA.001-	SUMMARY OF SOCIOECONOMIC DATA ANALYSES CONDUCTED IN SUPPORT OF THE RADIOLOGICAL MONITORING PROGRAM DURING FY 1989 (NOVEMBER 1989) PROCESSING COMPLETED ON 08-MAY-1995 .
TM000000SD12RP.003-	USW SD-12 BOREHOLE SAMPLE COLLECTING AND PROCESSING INFORMATION FOR THIS RECORDS/DATA SEGMENT IS FROM 600.7 TO 660.7 FEET AND IS RECORDED ON THE FOLLOWING DOCUMENTS: SHIFT DRILLING SUMMARIES, STRUCTURE PROCESSING COMPLETED ON 09-MAY-1995 .

TM00121362T1EA.001-	YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT SUMMARY OF SOCIOECONOMIC DATA ANALYSES CONDUCTED IN SUPPORT OF THE RADIOLOGICAL MONITORING PROGRAM DURING CALENDAR YEAR 1993 (JUNE 1994). PROCESSING COMPLETED ON 09-MAY-1995 .
TM000125642T1BA.00-	YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT SUMMARY OF SOCIOECONOMIC DATA ANALYSES CONDUCTED IN SUPPORT OF THE RADIOLOGICAL MONITORING PROGRAM DURING CALENDAR YEAR 1990 PROCESSING COMPLETED ON 09-MAY-1995 .
GS940808314212.003-	GHOST DANCE FAULT GRAVITY AND MAGNETIC DATA SEPT 1993. PROCESSING COMPLETED ON 09-MAY-1995 .
GS950308312211.001-	PRELIMINARY FAULT/FRACTURE PROPERTIES FOR FAST-PATHWAYS MODEL PROCESSING COMPLETED ON 10-MAY-1995 .
GS921108312331.001-	REVISED POTENTIOMETRIC SURFACE MAP OF YUCCA MOUNTAIN AND VICINITY, NEVADA, BY E.M. ERVIN, R.R. LUCKEY & D.J. BURKHARDT PROCESSING COMPLETED ON 10-MAY-1995 .
GS950108312232.001-	PRESSURE, TEMPERATURE AND MASS FLOW MEASUREMENTS FROM NRG-7A BOREHOLE AIR INJECTION TESTING BETWEEN 7/13/94 AND 9/10/94. PROCESSING COMPLETED ON 11-MAY-1995 .
TM00012562T1BA.003-	YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT SUMMARY OF SOCIOECONOMIC DATA ANALYSES CONDUCTED IN SUPPORT OF THE RADIOLOGICAL MONITORING PROGRAM DURING FY 1990 (DECEMBER 1990) PROCESSING COMPLETED ON 12-MAY-1995 .
TM00012562T1BA.006-	YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT SUMMARY OF SOCIOECONOMIC DATA ANALYSES CONDUCTED IN SUPPORT OF THE RADIOLOGICAL MONITORING PROGRAM

	DURING CALENDAR YEAR 1991 (APRIL 1992) PROCESSING COMPLETED ON 12-MAY-1995 .
GS910808312212.001-	GEOHYDROLOGIC DATA COLLECTED FROM SHALLOW NEUTRON-ACCESS BOREHOLES AND RESULTANT, PRELIMINARY GEOHYDROLOGIC EVALUATIONS, YUCCA MOUNTAIN AREA, NYE COUNTY, NEVADA, BY DANIEL O. BLOUT, DALE P. HAMMERMEIS PROCESSING COMPLETED ON 12-MAY-1995 .
GS950331174102.001-	GLOBAL POSITIONING SYSTEM PROFILE: YUCCA MOUNTAIN TO SIERRA NEVADA, J.C. SAVAGE PROCESSING COMPLETED ON 15-MAY-1995 .
GS940308314222.001-	FRACTURE DATA FOR PAVEMENT ARP-1, 12/17-22/93, 2/8-12/94, 2/28/94, AND 3/1/94. PROCESSING COMPLETED ON 16-MAY-1995 .
TM00121361T1EC.001-	YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT SOCIOECONOMIC MONITORING PROGRAM QUARTERLY EMPLOYMENT DATA REPORT, OCTOBER 1994 THROUGH DECEMBER 1994. PROCESSING COMPLETED ON 16-MAY-1995 .
GS950108312232.002-	PRESSURE, TEMPERATURE AND MASS FLOW MEASUREMENTS FROM NRG-6 BOREHOLE AIR INJECTION TESTING BETWEEN 10/11/94 AND 11/04/94. PROCESSING COMPLETED ON 16-MAY-1995 .
GS950308312244.001-	AIR-PERMEABILITY TESTING PROGRAM - ESF, ALCOVE 1; SINGLE HOLE INJECTION TESTING, DATA COLLECTED BETWEEN 8/9/94 AND 11/14/94. PROCESSING COMPLETED ON 17-MAY-1995 .
TM0000000SD9RS.003-	USW SD-9 SHIFT DRILLING SUMMARIES, STRUCTURAL LOGS, AND LITHOLOGIC LOGS FROM APPROX. 1665' TO 2030.6' PROCESSING COMPLETED ON 18-MAY-1995 .

TM0000000SD9RS.002-	USW SD-9 SHIFT DRILLING SUMMARIES, STRUCTURAL LOGS, AND LITHOLOGIC LOGS FROM APPROX. 1450' T5O 1690.6. PROCESSING COMPLETED ON 19-MAY-1995 .
GS941108319211.002-	LEAD ISOTOPE RATIOS AND ISOTOPE DILUTION DATA FOR URANIUM, THORIUM, AND LEAD, APRIL TO JULY 1994. PROCESSING COMPLETED ON 25-MAY-1995 .

10. The following data transfers were generated during this report period:

YMP-95-276.0	A digital version of the Geophysical Logs and Core Measurements from Over 40 Boreholes was prepared for Peter Merkle (SNL) on May 3.
YMP-95-361.0	One 3.5" diskette containing the data for UZ-16 submitted to the TDB by Bud Thompson (SAIC) was provided to Falah Thamir (USGS) on May 17.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. The on-line access to the TDB databases located in the GENISES system will be ready for distribution by June 30, 1995. The application is part of the CD-ROM Data Distribution system. It provides the user with browse capability from the GENISES file server with the ability to copy data from the CD-ROM.

2. Processing of submittal data will continue.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 REGULATORY

WBS 1.2.5.3.6 GEOGRAPHIC INFORMATION STUDY AND EVALUATION SYSTEM (GENISES)

SA OE536B4 GIS DATABASE, SITE ATLAS, ARCVIEW AND GIS DATA CATALOG

REPORT PERIOD: May 1 - May 31, 1995

REPORT DATE: June 7, 1995

RESPONSIBLE INDIVIDUAL: S. Ross

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. Fifty additional copies of the 1994 Site Atlas were delivered to DOE Document Control on May 22, bringing the total copies delivered to 200; there were 77 persons on the original distribution.

2. Preparation of the 1995 second quarter GIS Data Catalog (June 30 version) began. 190 copies will be delivered to the Project Office.

3. Compilation of Arc/Info coverage metadata into standardized formats continues in support of the Federal Spatial Data Transfer Standard and the Data Dictionary System.

4. Support for the Preliminary Transportation Strategy Study 2 began. EG&G is producing manuscript map overlays for use by TRW, MK, SAIC and DRI. Maps are being produced for 112 quadrangles. Final data input will be coordinated through EG&G as well as final map products for the publication of Study 2.

5. Susan Ross and Matt Walo met with Phil Gehner, TRW, Bill Jacobs, SAIC, and Dave Rhode, DRI on May 18 regarding the integration of archeological data into the Preliminary Transportation Strategy Study 2.

6. Elaine Ezra and Jim Beckett met with John Carlson and John Raines (SAIC) on May 25 to discuss data they have collected that needs to be processed for GIS integration. These data will be used to support socioeconomic studies.

7. A copy of the March 31, 1995, GIS Data Catalog was provided to Allison Inglett (SAIC) on May 10.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. Processing and verification of GIS data continues in support of the second quarterly update of the GIS Data Catalog and the 1995 Site Atlas.

2. Preparation and transmittal of Arcview data transfers.

3. Data entry efforts continue to implement the Spatial Data Transfer Standards (SDTS)

4. FY 1995 Site Atlas will be initiated.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 REGULATORY

WBS 1.2.5.3.6 GENISES

SA OE536C95 GIS, MAPPING AND ANALYSIS SUPPORT

REPORT PERIOD: May 1, 1995 - May 31, 1995

REPORT DATE: June 7, 1995

RESPONSIBLE INDIVIDUAL: Jeff Donovan

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. GIS map products were generated to support project participants and are detailed in the "Deliverables" section of this report.

2. The following photo products were generated:

   NR95041905 Five mylar copies of the 1990 1:6,000 scale hypsography of sheet 15 were provided to Warren Day (USGS) on May 2.

   NR95050401 One copy each of all orthophoto and hypsography figures in the 1994 Site Atlas were provided to Larry Anna (USGS) on May 5.

   NR95042404 Five mylar copies each of the 1990 1:6,000 scale orthophoto with hypsography were provided to Warren Day (USGS) on May 5.

   NR95050216 Five 34.5"x39" color prints of EG&G Negative #92I456L were provided to Ronald McDonald (M&O) on May 8.

   NR95050501 One mylar copy of the 1990 1:6,000 scale hypsography for sheet #9, and two copies each from sheets #9, 10 and 16 with both orthophoto and hypsography were prepared for Chris Potter (USGS) on May 11.

   NR95042707 One copy each of the 1990 1:12,000 orthophotos with hypsography sheets #17, 18, 23 and 24 were provided to Kean Finnegan (LANL) on May 12.

NR95051001 One contact print of EG&G Negative #7389-201 was provided to Carma Hernandez (SAIC) on May 16.

NR95050404 One 24"x24" print of EG&G Negative #6301-069, one 20"x24" print of EG&G Negative #90I0682L, and one contact print of the following were prepared for Joe Whelan (USGS) on May 17:

Perf 7242 - Frames 5-17, 70-84, 93-104, 117-123
Perf 7135 - Frames 39-58, 74-77, 107-114, 139-170
Perf 7146 - Frames 24-44, 93-103

NR95050810 One mylar copy each of the 1990 1:6,000 scale orthophoto sheets 16, 17 and 18 for orthophoto, hypsography and orthophoto with hypsography was prepared for Bob Dickerson (SAIC) on May 22.

NR95051105 Five mylar copies of the 1990 1:6,000 scale orthophotos with hypsography were prepared for Warren Day (USGS) on May 25.

NR95051502 One 20"x24" color print of EG&G Negative #90I0682L was prepared for Dave Beck (USGS) on May 25.

3. The following digital data transfers were provided:

YMP-95-127.0 Two QIC tapes containing Arc/Info EXPORT files of surficial deposits, 1:24,000 scale hypsography were provided to Jim Nelson (USGS) on May 2.

YMP-95-244.0 A 3.5" diskette of the densities from the geophysical logs for borehole G-2 for depths between 400-900 feet was provided to Tom Moyer (USGS) on May 3.

4. The following miscellaneous products were generated:

YMP-95-362.0 A chart was prepared showing the 107 15' and 7.5' USGS topographic quadrangles used for the phase II transportation studies, and the steps to track progress in completing the processing of the quadrangles.

YMP-95-376.0 A data report of approximate distances (in feet) of the proposed ESF Ramp through land ownership boundaries was prepared for Charlie Germack (SAIC) on May 24.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. Continued level-of-effort.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 REGULATORY

WBS 1.2.5.3.6 GENISES

SA OE536E95 COMPUTER SUPPORT

REPORT PERIOD: May 1, 1995 - May 31, 1995

REPORT DATE: June 7, 1995

RESPONSIBLE INDIVIDUAL: TBD

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD: None.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD: None

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 REGULATORY

WBS 1.2.5.3.6 GENISES

SA OE536G95 CAPITAL EQUIPMENT

REPORT PERIOD: May 1, 1995 - May 31, 1995

REPORT DATE: June 7, 1995

RESPONSIBLE INDIVIDUAL: Elaine Ezra

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD: None.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD: None.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 REGULATORY

WBS 1.2.5.3.6 GENISES

SA OE536D95 PROJECT MANAGEMENT

REPORT PERIOD: May 1, 1995 - May 31, 1995

REPORT DATE: June 7, 1995

RESPONSIBLE INDIVIDUAL: Elaine Ezra

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

Reporting/Tracking/Planning

1. EG&G/EM RSL April Progress report was compiled and submitted to YMSCO (NV-95-328).

2. March PACS input was compiled (ATP-95- 059) and submitted to Robert Spiro (M&O).

Meetings/Briefings/Tours:

1. Elaine Ezra, Jim Beckett, Dave Brickey and Susan Ross attended meeting on May 3 with the Southwest Research Institute, Center for Nuclear Waste Regulatory Analyses, and DOE YMPO regarding an informal technical exchange.

2. Don Schutt and Nat Hodgson (TRW) toured the DOE's Remote Sensing Laboratory operated by EG&G Energy Measurements, on May 11. The tour was set up for TRW fact-finding purposes related to issues concerning assimilation of EG&G's YMP work scope.

3. Jim Beckett, Dave Jefferis and Sue Weber traveled to Houston, Texas on May 16 to visit Petrochemical Open Software Corporation (POSC) to review the geophysical data model and its application to YMP.

4. Jim Beckett and Chris Berlien attended the Software Advisory Group (SAG) meetings on May 17-18.

5. Elaine Ezra and Jean Younker (TRW) met with Dale Foust (TRW) to discuss assimilation issues on May 23.

6. Ed McGuinn, Larry Green and Lee Bice (TRW, Vienna) visited on May 25 to discuss the Project's GIS capabilities and RSL's on-going support to the transportation studies.

7. Walt White (YMSCO), Ken Powers (DOE/NV), Peter Zavattaro (EG&G/EM) and Dale Foust, Don Schutt and Nat Hodgson (TRW) met on May 26 to discuss issues related to TRW's assimilation of EG&G/EM's YMP work scope. Further discussions are required before a decision can be reached.

Training/Conferences:

1. Dave Brickey, Jeff Donovan, Sheri Geherty, Jerry Sommerfeld and Matt Walo attended the Environmental Systems Research Institute (ESRI) User's Conference during the week of May 22-26 in Palm Springs, California.

Employee Actions: None.

ES&H:

1. A monthly safety meeting was conducted and safety checks completed for Suite 1010 and ESD offices on the second floor at the Bank of America facility.

2. Maria Gonzales attended a Close-out Audit ES&H meeting on May 15.

Quality Assurance:

1. A matrix describing where the requirements of QARD Supplement I are met in EG&G YLPs or internal procedures was provided to YMSCO (letter Ezra to Spence, dated May 3, 1995).

2. EG&G YLP-SI.2Q-EGG, "Software Qualification" (Draft A) comments were resolved. Draft B is under development to include resolved comments.

3. EG&G YLP-SI.3Q-EGG, "Configuration Management System" (Draft A) is being formatted for review in Procedures, Plans and Documents.

4. EG&G/EM Instruction 21-33C1-001-002, "Installation and Checkout" and EG&G/EM Instruction 21-33C1-001-003 "Software Library", were developed and approved.

5. The monthly internal audit of the EG&G/EM, YMP and SAIC Controlled Documents was completed with no discrepancies.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN:

The M&O transition needs to be resolved.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD: None.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 SITE INVESTIGATIONS

WBS 1.2.5.3.7 SPECIAL STUDIES: TRACERS, FLUIDS AND MATERIALS

SA OE394A TRACERS, FLUIDS AND MATERIALS

REPORT PERIOD: May 1, 1995 - May 31, 1995

REPORT DATE: June 7, 1995

RESPONSIBLE INDIVIDUAL: Jim Beckett

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. Jim Beckett, Sue Weber and Chris Berlien attended Tracers, Fluids and Materials (TFM) Training (YAP-2.8Q, Rev.) on May 1.

2. Maria Gonzales attended TFM training on May 5.

3. The YMP TFM Reporting and Management Procedures, YMP-2.8 was approved in early May 1995. The new procedure impose numerous requirements on the storage and retrieval of data from the TFM on-line database. Modifications to the database and the on-line application are complete. The application is currently in beta test phase and expected on line by June 30, 1995. The procedure only affects data provided after the approval of the procedure. All data provided prior to this procedure will have to be reformatted and input into the new data files.

4. The Determination of Importance (DIE) Process Effectiveness Team has met weekly during the month of May. The team continues to provide suggestions to the existing TFM process.

5. The following TFM data were received and processed during this period:

   DIE BAA000000-0171 - TFM Borehole Security Work
   Received by the TDB on 09-may-1995

   DIE BAA000000-0171 - TFM Surface Based Testing (SBT) Pad and Road Construction Work.
   Received by the TDB on 09-may-1995.

Report of Spills -	Seismic Catalog for the Southern Great Basin Seismic Network Received by the TDB on 30-may-1995.
Report of Spills -	Record of Spill Release Forms Received by the TDB on 08-may-1995.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN:

1. The installation of the communications software required to access GENISES (TCPIP) is being installed on the YMP communications backbone. The installers estimated it will take one year to complete the installation. Access to the TFM database will not be possible without this software.

2. The transfer of the Los Alamos TFM database into GENISES is still on hold. It will be complete and an acceptance letter provided to YMP after verification of the data by the M&O.

3. The reformatting of the existing data in the TFM database will require extensive interpretation to allow an accurate transfer. All of these will have to be reverified. This is an extensive effort and will require an estimated 90 days to complete.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. A plan will be created for the transition of the existing data to the new files. This plan will be completed by June 1, 1995.

2. The on-line application for the TFM database is currently in the testing phase of its lifecycle. The TFM application will be made available to all requesters by June 30, 1995.

3. TFM data will continue to be processed.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.12 RECORDS MANAGEMENT

SA OEC23A95 RECORDS MANAGEMENT

REPORT PERIOD: May 1, 1995 - May 31, 1995

REPORT DATE: June 7, 1995

RESPONSIBLE INDIVIDUAL: J. Wiggins

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. Sixty 1993 NQR packages have been prepared, scanned and processed into the YMP Records Processing Center.

2. Fifty-one QARs were processed into the YMP Records Processing Center.

3. Maintenance was provided for 65 YMP and EG&G/EM Controlled Documents.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD: None.

STATUS OF DELIVERABLES FOR EG&G/EM RSL SUPPORT TO YMP
May 1, 1995 through May 31, 1995

GIS MAP SUPPORT

Description	Requested by/ Organization	Date Sent	Size	No. of Copies
YMP-95-203.0 Existing and Planned Trenches	Reynolds/WCFS	5/1/95	Full	1
YMP-95-024.0 Preliminary Geologic Map of YM, Nevada	Nelson/USGS	5/2/95	Full	3
YMP-95-011.1 Site Boundaries, Scale 1:50,000	Von Seggern/UNR	5/4/95	Full	1
YMP-95-060.0 Land Ownership and Withdrawals, Scale 1:500,000	Von Seggern/UNR	5/4/95	Full	1
YMP-95-061.0 Major Faults, Scale 1:50,000	Von Seggern/UNR	5/4/95	Full	1
YMP-95-062.0 Faults, Scale 1:50,000	Von Seggern/UNR	5/4/95	Full	1
YMP-95-093.0 Preliminary Geologic Map of Yucca Mountain, Nevada, Scale 1:50,000	Von Seggern/UNR	5/4/95	Full	1
YMP-95-255.0 Subset of 1990, 1:12,000 Orthophoto Sheet #21 (by EG&G/EM) with Merged Lineaments (by USGS)	Day/USGS	5/4/95	Page	1
YMP-95-277.0 1:25,000, Proposed Tiling Maps	Gehner/TRW	5/5/95	Full	3
YMP-95-267.0 YMP and NTS Land Withdrawals and Memorandums of Understanding	Raines/M&O	5/8/95	Page	4

YMP-95-247.0 Selected Boreholes, Detail of C-Well Complex and Drill Pads	Henning/WCFS	5/9/95	Full	8
YMP-95-319.0 Existing Boreholes with Geologic Structure	Sullivan/YMSCO	5/9/95	Page	1
YMP-95-320.0 Existing Boreholes with Geologic Structure - Legend Page	Sullivan/YMSCO	5/9/95	Page	1
YMP-95-246.0 Selected Boreholes, C-Well Complex and Drill Pads	Henning/WCFS	5/9/95	Full	8
YMP-95-045.4 Proposed Rail Routes through Nellis Air Force Range	Gehner/TRW	5/9/95	Full Page	1 12
YMP-95-279.0 Meteorological Stations near Yucca Mountain	Ambos/SAIC	5/10/95	Page	6
YMP-95-279.0 Regional Meteorological Stations	Ambos/SAIC	5/10/95	Page	6
YMP-95-233.0 Land Ownership in YMP Affected Areas of Local Government in Nevada	Raines/M&O	5/10/95	Page	1
YMP-95-232.0 YMSCP Affected Areas of Local Government	Raines/M&O	5/10/95	Page	1
Transportation Study Map: YMP-95-262.0 Stump Spring, NV YMP-95-263.0 Amargosa Flat, NV YMP-95-264.0 Mount Schader, NV YMP-95-268.0 Ash Meadows, NV-CA YMP-95-269.0 Mt. Stirling, NV YMP-95-270.0 Pahrump, NV YMP-95-271.0 Mountain Springs, NV YMP-95-272.0 Shenandoah Peak, NV YMP-95-273.0 Goodsprings, NV YMP-95-274.0 Clark Mountain, NV YMP-95-275.0 Roach Lake, NV	Gehner/TRW	5/10/95	Full	14

YMP-94-023.3 Surface Based Testing Activities with Geologic Structure, Sheet 10	Hansen/EG&G/EM	5/10/95	Full	2
YMP-94-025.3 Surface Based Testing Activities with Geologic Structure, Sheet 15	Hansen/EG&G/EM	5/10/95	Full	2
YMP-94-026.3 Surface Based Testing Activities with Geologic Structure, Sheet 16	Hansen/EG&G/EM	5/10/95	Full	2
YMP-94-023.3 Surface Based Testing Activities w/Geologic Structure, Sheet 10	Pierce/M&O	5/11/95	Full	1
YMP-94-025.3 Surface Based Testing Activities w/Geologic Structure, Sheet 15	Pierce/M&O	5/11/95	Full	1
YMP-94-026.3 Surface Based Testing Activities w/Geologic Structure, Sheet 16	Pierce/M&O	5/11/95	Full	1
YMP-95-203.1 Existing and Planned Trenches	Walo/EG&G/EM	5/12/95	Full	2
YMP-95-203.0 Existing and Planned Trenches	Walo/EG&G/EM	5/12/95	Full	2
YMP-94-337.0 Approved Roads	Hughes/EG&G/EM	5/12/95	Page Full	50 2
YMP-94-337.0 Approved Roads Map	Jacobs/SAIC	5/12/95	Full	10
YMP-95-075.0 Flood Inundation Boundaries	Bousema/SAIC	5/12/95	Page	1
YMP-95-081.0 Selected Regional Features	Bousema/SAIC	5/12/95	Page	1
YMP-95-082.0 Selected Site Features	Bousema/SAIC	5/12/95	Page	1

YMP-95-046.0 Plate 5: Rail Corridors, LV Route Detail	Gehner/TRW	5/15/95	Page	1
YMP-95-053.1 Heavy Haul Route	Gehner/TRW	5/15/95	Page	1
YMP-95-044.1 Plate 3: Rail Corridors, Northern Route	Gehner/TRW	5/16/95	Full Page	2 2
YMP-95-045.1 Plate 4: Rail Corridors, Las Vegas and Southern Route	Gehner/TRW	5/16/95	Full Page	2 2
YMP-94-472.0	Hennessy/USGS	5/15/95	Page	1
YMP-94-479.0	Hennessy/USGS	5/15/95	Page	1
YMP-94-480.0	Hennessy/USGS	5/15/95	Page	1
YMP-94-481.0	Hennessy/USGS	5/15/95	Page	1
YMP-94-482.0	Hennessy/USGS	5/15/95	Page	1
YMP-94-483.0	Hennessy/USGS	5/15/95	Page	1
YMP-94-484.0	Hennessy/USGS	5/15/95	Page	1
YMP-94-485.0	Hennessy/USGS	5/15/95	Page	1
YMP-94-486.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-045.3	Hennessy/USGS	5/15/95	Page	1
YMP-95-138.0	Hennessy/USGS	5/15/95	Page	1
YMP-94-147.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-158.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-159.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-160.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-161.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-162.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-165.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-183.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-184.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-185.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-186.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-187.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-190.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-191.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-192.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-193.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-194.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-195.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-196.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-197.0	Hennessy/USGS	5/15/95	Page	1

YMP-95-198.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-199.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-200.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-202.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-203.1	Hennessy/USGS	5/15/95	Page	1
YMP-95-206.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-208.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-209.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-210.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-213.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-217.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-218.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-220.0	Hennessy/USGS	5/15/95	Page	1
YMP-95-369.0 Transportation Study Map: Amargosa Flat, NV	Gehner/TRW	5/17/95	Full	1
YMP-95-278.1 Map of Regional Meteorological Stations	Ambos/SAIC	5/17/95	Page	6
YMP-95-279.1 Map of Meteorological Stations near Yucca Mountain	Ambos/SAIC	5/17/95	Page	6
YMP-95-265.0 Existing Boreholes with Geologic Features	Deklever/M&O	5/17/95	Full	1
YMP-95-040.0 Existing and Planned Boreholes	Deklever/M&O	5/17/95	Full	1
YMP-94-274.0 Existing Boreholes and Trenches with Geologic Structure	Gromny/WCFS	5/18/95	Full	1
YMP-94-284.0 Planned Boreholes and Trenches with Geologic Structure	Gromny/WCFS	5/18/95	Full	1
Transportation Study Maps YMP-95-280.0 Carico Lake, NV YMP-95-281.0 Cortez, NV YMP-95-282.0 Horse Creek Valley, NV YMP-95-283.0 Mineral Hill, NV YMP-95-284.0 Hall Creek, NV	Gehner/TRW	5/18/95	Full	39

YMP-95-285.0 Walti Hot Springs, NV
YMP-95-286.0 Roberts Creek Mountain, NV
YMP-95-287.0 Mt. Callaghan, NV
YMP-95-288.0 Ackerman Canyon, NV
YMP-95-289.0 Bartine Ranch, NV
YMP-95-290.0 Austin, NV
YMP-95-291.0 Spenser Hot Springs, NV
YMP-95-292.0 Hickison Summit, NV
YMP-95-293.0 Millett Ranch, NV
YMP-95-294.0 Wildcat Peak, NV
YMP-95-295.0 Dianas Punch Bowl, NV
YMP-95-296.0 San Antonio Ranch, NV
YMP-95-297.0 Baxter Springs, NV
YMP-95-298.0 Carvers NE, NV
YMP-95-299.0 Jet Spring, NV
YMP-95-300.0 Northumberland Pass, NV
YMP-95-301.0 Box Spring, NV
YMP-95-302.0 Doblsin Summit, NV
YMP-95-303.0 Caravers SE, NV
YMP-95-304.0 Pine Creek Ranch, NV
YMP-95-305.0 Mosquito Creek, NV
YMP-95-306.0 Pablo Canyon Ranch
YMP-95-307.0 Round Mt., NV
YMP-95-308.0 Corcoran Canyon, NV
YMP-95-309.0 Barley Creek, NV
YMP-95-310.0 Peavine Ranch, NV
YMP-95-311.0 Seylar Peak, NV
YMP-95-312.0 Manhattan, NV
YMP-95-313.0 Belmont West, NV
YMP-95-314.0 Belmont East, NV
YMP-95-315.0 Elkhorn Canyon, NV
YMP-95-316.0 Big Ten Peak West, NV
YMP-95-317.0 Antelope Spring, NV
YMP-95-318.0 Big Ten Peak East, NV

YMP-95-321.0 Flood Prone Zones Fortymile Wash Area	Smith/SAIC	5/19/95	Full	2
YMP-94-296.1 Existing and Planned Boreholes	Gromny/WCFS	5/19/95	Full	1
YMP-94-040.0 Planned Volcanic Boreholes	Gromny/WCFS	5/19/95	Page	1

YMP-95-138.0 7.5 and 15 Minute Map Index for Use with Preliminary Transportation Study	Gehner/TRW	5/19/95	Full	4
YMP-95-100.0 Existing and Planned Boreholes	Landeros/REECo	5/24/95	Full	1
YMP-95-014.1 Preliminary Surfical Deposits Map	Lundstrom/USGS	5/24/95	Full	8
YMP-95-044.1 Plate 3: Rail Corridors, Northern Route	Gehner/TRW	5/25/95	Page	6
YMP-95-045.1 Plate 5: Rail Corridors, Southern Route	Gehner/TRW	5/25/95	Page	6
YMP-95-371.0 Geologic Cross-Sections	Henning/WCFS	5/25/95	Page	1
YMP-95-150.0 Surface Based Testing Activities with Geologic Structure, Sheet 15	Gromny/WCFS	5/25/95	Full	1
YMP-95-151.0 Surface Based Testing Activities with Geologic Structure, Sheet 16	Gromny/WCFS	5/25/95	Full	1
YMP-95-061.0 Major Faults	Inglett/SAIC	5/22/95	Page	1
YMP-95-220.0 Selected Boreholes	Inglett/SAIC	5/22/95	Page	1
YMP-95-234.0 Site Area Map	Inglett/SAIC	5/22/95	Page	1
YMP-95-242.1 Figure 1-2. Restricted Access Federal Lands Adjacent to the YMP	Raines/SAIC	5/25/95	Page	1
YMP-95-252.1 Figure 1-1. YM Site Relative to Nevada Counties	Raines/SAIC	5/25/95	Page	1

YMP-95-233.1 Figure 2-1. Land Ownership in YMP Affected Areas of Local Government in Nevada	Raines/SAIC	5/25/95	Page	1
YMP-95-267.1 Figure 1-3. YMP and NTS Land Withdrawals and Memorandums of Understanding	Raines/SAIC	5/25/95	Page	1
YMP-95-232.1 Figure 1-4. YM Site Characterization Project: Affected Areas of Local Government	Raines/SAIC	5/25/95	Page	1
Transportation Study Maps	Gehner/TRW	5/26/95	Full	1

YMP-95-378.0 Cresent Valley, NV
YMP-95-379.0 Beowawe, NV
YMP-95-353.0 Stinking Spring, NV
YMP-95-354.0 Kawich Peak, NV
YMP-95-355.0 Reveille Peak, NV
YMP-95-356.0 Warm Springs, NV
YMP-95-357.0 Reveille, NV
YMP-95-358.0 Belted Peak, NV
YMP-95-359.0 White Blotch Springs, NV
YMP-95-360.0 Tempiute Mountain, NV
YMP-95-324.0 Stone Cabin Ranch NE, NV
YMP-95-325.0 Stone Cabin Ranch SE, NV
YMP-95-326.0 Stone Cabin Ranch SW, NV
YMP-95-327.0 Black Top, NV
YMP-95-328.0 Honest John Well, NV
YMP-95-329.0 Quinn Canyon Springs, NV
YMP-95-330.0 McClutchen Spring, NV
YMP-95-331.0 Worthington Peak SW, NV
YMP-95-332.0 Worthington Peak, NV
YMP-95-333.0 Murphy Gap NW, NV
YMP-95-334.0 Wadsworth Ranch, NV
YMP-95-335.0 Water Gap West, NV
YMP-95-336.0 Water Gap East, NV
YMP-95-337.0 Timber Mt. Pass West, NV
YMP-95-338.0 Timber Mt. Pass East, NV
YMP-95-339.0 Silver King Mt. SW, NV
YMP-95-340.0 Weepah Spring, NV
YMP-95-341.0 Deadman Spring, NV
YMP-95-342.0 Deadman Spring, NE, NV

YMP-95-343.0 Ely Spring, NV
YMP-95-344.0 Wheatgrass Spring, NV
YMP-95-345.0 Deadman Spring, SE, NV
YMP-95-346.0 The Bluffs
YMP-95-347.0 Bennett Pass
YMP-95-348.0 Panaca, NV
YMP-95-349.0 Chief Mt., NV
YMP-95-350.0 Indian Cove, NV
YMP-95-351.0 Caliente, NV
YMP-95-352.0 Eccles, NV

TOTAL MAPS 305

TOTAL NEW MAPS 121

Lawrence Livermore National Laboratory

LLYMP9505102
May 23, 1995

WBS: 1.2.9

L. Dale Foust
Technical Project Officer
CRWMS-M&O
101 Convention Center Drive, M/S 423
Las Vegas, NV 89109

Subject: Lawrence Livermore National Laboratory (LLNL) Monthly Status Report

Dear Dale:

I am pleased to submit the LLNL monthly report under our status as a CRWMS-M&O teammate.

The report has much the same format as previous reports to the Yucca Mountain Site Characterization Office (YMSCO), except that financial information required in Participant Monthly Reports has not been included. LLNL financial data were reported directly to YMSCO again this month because we have not yet transitioned into the M&O accounting system.

If you require further information, please contact James Blink at (702) 794-7157.

Sincerely yours,

for Willis L. Clarke
LLNL-CRWMS Manager

WLC/JAB/cjp

Enclosure

cc/enc: See Attached Distribution List
LLNL-CRWMS LRC

Recycled

ENCLOSURE 4

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

April 1995

EXECUTIVE SUMMARY

WBS 1.2.1.5, Special Studies

1) J. Blink, ACD Project Engineer for Thermal Integration, prepared a white paper on thermal loading for the YMSCO Project Manager. The white paper provided background and a succinct problem definition.

WBS 1.2.2.1, Waste Package Coordination and Planning

1) R. Van Konynenburg of Lawrence Livermore National Laboratory coordinated an LLNL review of the draft Los Alamos National Laboratory report by C. Bowman and F. Venneri, entitled "Underground Supercriticality from Plutonium and Other Fissile Material".

WBS 1.2.2.4.1, Spent Fuel

1) Two semi-static scoping dissolution tests at Pacific Northwest Laboratory (PNL) under Lawrence Livermore National Laboratory sponsorship were terminated. These tests of partially oxidized specimens of Turkey Point PWR spent fuel in J-13 well water were started in 1986 and last sampled in June 1990. Water chemistry and radionuclide analyses of the test solutions were completed. A preliminary evaluation of the results suggests that they are reasonably consistent with those from the first four years of the study, which were reported in 1990. The x-ray diffraction results, for some black powder that was not originally present in the fuel specimens, indicate the presence of UO_2 and U_4O_{9+x}, but no U_3O_8 or other uranium-bearing phases. The scanning electron microscope results showed that the powder consisted almost entirely of individual grains 10 to 30 μm in size. One of the specimens contained a few particles composed, in part, of U, Ca, and Si. It is clear that oxidation followed by long exposure to J-13 well water so weakened the grain boundaries of these spent fuel specimens that they can now be easily fragmented into individual grains. However, it would be premature to assume that similar behavior might be possible under repository conditions. For one thing, the oxidation was rather severe: exposure to air at 250°C for 45 and 116 hours, respectively, for the two specimens. Whether unoxidized fuel, or fuel oxidized at lower temperatures, would show a similar weakening of grain boundaries after long-term exposure to water has not yet been established.

2) Two irradiated PWR fuels, ATM-103 and ATM-106, are being tested at Argonne National Laboratory under Lawrence Livermore National Laboratory sponsorship, in three types of unsaturated tests (high drip rate, low drip rate, and vapor). The fuel in the tests has undergone 31 months of reaction at 90°C. The leachate was sampled and a fuel

fragment was removed. The most significant result was that fuel alteration was evident in all tests. The main difference was the magnitude of the alteration. For both high-drip rate tests, the fuel was entirely covered with a light-yellow to white mat which was about 500 μm thick. For the ATM-103 fuel, needle-like extensions which may be uranophane and/or boltwoodite were visible at the edges of the mat. For both low-drip rate tests, the coloration of the alteration products was darker, and there was evidence of three to five different morphological species on the surfaces. The presence of a harder darker under-layer was evident. The estimated thickness of the coatings was 50 μm. For the vapor tests, a light-colored coating was evident on the bottom of the fuel fragments in some sections. This was a very thin coating, and its thickness could not be estimated. The pH of the leachate ranged from 7.1 for the high-drip rate tests to 7.9 for the vapor tests; this compares to 8.25 for the EJ-13 water dripped on the samples..

3) The UO_2 drip tests at Argonne National Laboratory under Lawrence Livermore National Laboratory sponsorship were sampled for the 9-10 year test interval. All three samples display a top surface that is partially covered by yellow, green, and white secondary alteration phases. Solution aliquots were collected for cation, acid strip uranium, unacidified solution uranium, 25 nm filtered uranium, anion, carbon, and pH analyses.

4) Static $UO_3 \cdot H_2O$ solubility experiments were performed at Lawrence Livermore National Laboratory (LLNL) in air- and argon-saturated pure water. The sample vials contained excess $UO_3 \cdot H_2O$. They were shaken periodically and centrifuged before the liquid phase was sampled for uranium solubility measurements. The uranium concentrations in both vials rose rapidly and both reached about 1000 ppm U in approximately two days. Also, the pH dropped to about 4.6 in both cells. These results are consistent with earlier flowthrough measurements at LLNL. However, in contrast, published data indicate that $UO_3 \cdot H_2O$ has a low solubility and makes the solution slightly basic. Nuclear magnetic resonance spectroscopy indicates that impurities are bound methyl species at less than one half weight percent which doesn't account for the observed acidity.

5) Quantitative x-ray diffraction analyses of oxidized spent fuel samples from the drybath ovens at Pacific Northwest Laboratory under Lawrence Livermore National Laboratory sponsorship have confirmed the formation of an x-ray amorphous intermediate phase between cubic $UO_{2.4}$ (U_4O_9 crystal structure) and U_3O_8. Samples having an oxygen to metal ratio of ~2.50 (determined by weight gain measurements) were found to consist of ~35% $UO_{2.4}$ and 65% amorphous phase, with no detectable U_3O_8. Experiments to determine the accompanying density changes of the spent fuel during oxidation are being considered.

WBS 1.2.2.5.1, Metallic Barriers

1) Thermogravimetric apparatus oxidation tests were conducted at Lawrence Livermore National Laboratory at 65°C and in the 50-90% relative humidity *RH* range for 1020 carbon steel, to determine the effects of alternate wetting and drying of the sample surface.

The purpose of the experiment was to determine if oxide generated during an initial high humidity cycle produces hygroscopic surface conditions such that continued weight gain would persist when the humidity is lowered to 50% *RH*. Results showed that lowering the humidity to 50% *RH* resulted in negligible weight gain. When the humidity was returned to 90% *RH*, high humidity weight gain behavior resumed.

2) An engineering design review was held at Lawrence Livermore National Laboratory for the long-term corrosion tests. As a result, sulfuric acid will be used to produce the acidic environments instead of hydrochloric acid. Sulfuric acid is more relevant to the repository environment. In addition, the corrosion coupons will be placed in a horizontal orientation to simulate repository conditions. A nearly vertical exposure was planned prior to this point. Drawings were completed for two types of galvanic coupons. The first type will be a corrosion allowance material coupled to the underlying corrosion resistant material. The second coupon type will be a copper-nickel outer material coupled to the underlying corrosion resistant materials. Test vessels were priced, and a preliminary design of the specimen racks was completed.

WBS 1.2.3.10.1, Characterization of Thermal Effects on the Altered Zone

1) Experiments at Lawrence Livermore National Laboratory are evaluating the effect (on water composition and secondary mineral development) of water-rock interaction on vitric and vitrophyric rocks that occur in the near-vicinity of the repository. The experiments will determine the rates of reactions, the controls on the solid phases that form and which could influence radionuclide transport, and the effect of reactions on water chemistry. In support of the experimental studies, efforts are underway to update available data on precipitation and dissolution kinetics, from literature sources. Plug flow reactor experiments to measure the impact of water-rock interaction effects (such as recrystallization, precipitation and dissolution) on porosity and permeability are being developed. These experiments support efforts to establish the capability to evaluate the impact of coupled hydrological-geochemical processes on thermal response of the repository block, and on water flux and composition entering the EBS/Near-Field Environment. Static experiments in support of these studies, which are being conducted under fully saturated conditions at 90, 150 and 250°C, are continuing. These experiments focus on a range of lithologies, as a means of describing the magnitude of variation among lithologic units that may be expected for the limiting case of slow flow under saturated conditions. Experimental measurements of precipitation rates are being conducted to evaluate the kinetics of changes in the altered zone regions where refluxing may occur.

WBS 1.2.3.12.1, Characterize Chemical and Mineralogical Changes in the Post-emplacement Environment

1) Studies at Lawrence Livermore National Laboratory of the effect of changes in relative humidity on rocks that occur within the vicinity of the repository horizon are continuing. These studies will evaluate the rates of reaction, the extent and mechanism of reaction, and the impact on water chemistry. Results to date demonstrate that dramatic alteration of the material occurred within four months of the start of the experiments. Alteration was evident at relative humidities as low as 70%, consistent with literature reports in which the

rate of glass alteration decreases significantly at relative humidities of less than 70%. The samples are undergoing preliminary analysis, to determine the cause of their disintegration.

WBS 1.2.3.12.2, Hydrologic Properties of the Waste Package Environment

1) Over the past several months Lawrence Livermore National Laboratory (LLNL) has accelerated its modeling efforts to develop short-term *in situ* heater tests that provide for:

1) Early diagnoses for Technical Site Suitability of the significance of gas-phase diffusion and buoyant gas-phase convection on thermal-hydrological behavior.
2) Preliminary understanding of the importance of heterogeneity in gas- and liquid-phase pathways on vapor flow and condensate generated under sub-boiling and above-boiling conditions.
3) Increased confidence in understanding the significance of these sub-boiling and above-boiling processes in heterogeneous systems in time for the 2001 License Application (LA).
4) Resolution of the thermal-hydrological hypotheses concerning extended-dry high-areal mass loading (AML) or "locally hot" low-AML thermal designs in time for the LA.

In considering *in situ* heater tests that meet these objectives, LLNL is also considering the possibility that some of these tests could continue beyond 2001 and thus become the longer-term heater tests that are required for the 2008 License Update. For each of the four different heating geometries (plate, single drift, single drift with wing heaters, and toroidal), a sensitivity analysis was conducted of heater test size (i.e., heated area or heated footprint) to determine the heater test size that is large enough to diagnose which of these three principal thermal hydrologic regimes dominates thermal-hydrological behavior. For intermediate bulk permeability k_b (10 millidarcy - 10 darcy, called "Open Non-Buoyant Regime"), the gas pressure increase is too small to increase the boiling point very much and buoyant gas phase convection is also insignificant. For lower k_b (the "Closed Regime"), the boiling point increases, throttling dry-out due to boiling and eliminating the heat pipe effect. For higher k_b (the "Open Buoyant Regime"), there is substantial buoyant convection. The Plate Heater Test and Toroidal Heater Test must cover at least 500 m^2. For tests smaller than this size, the temperature distribution calculated for the 10-darcy case was virtually indistinguishable from the 280 millidarcy case. However, the "Closed" and "Open, Non-buoyant" thermal-hydrological behavior were observable for heated areas less than 500 m^2. For the Single Drift Heater Test and Single-Drift, Winged Heater Test, the key consideration is that the heating duration be sufficiently long to correspond to a heated footprint that covers at least 500 m^2 in order to diagnose the difference between "Open, Non-buoyant" and "Open, Buoyant" thermal-hydrological behavior.

2) The Equivalent Continuum Model (ECM) used in most studies of repository-heat-driven flow is valid when there is local capillary pressure equilibrium between the matrix and fractures. If the vaporization flux of water in the matrix is sufficiently high, the resulting condensate flux may be sufficiently large that it exceeds the critical flux for fracture-matrix disequilibrium. The condensate will then flow quickly down fractures. High vaporization flux densities can be expected to occur at early times in the heating

period when thermal flux surface densities in the rock around the drift are high. At later times, the radius of the zone of vaporization will be large enough that thermal flux densities through the zone will be so slow that the fracture and matrix will be in equilibrium and "condensate shedding" will stop unless the matrix eventually becomes saturated. In order to test these observations, Lawrence Livermore National Laboratory has modeled condensate generation and drainage for a three dimensional system with a parallel set of discrete fractures orthogonal to the drift wall using the NUFT code. The model has over 7000 elements and runs in 10-20 hours on the IBM Rise 6000. The initial case has an Areal Mass Loading (AML) of 40 MTU/acre, a Lineal Mass Loading (LML) of 1.25 MTU/m, 26-yr-old oldest-fuel-first spent nuclear fuel, and a bulk permeability of 280 millidarcy. Preliminary results indicate extensive drainage of condensate at early times ($\leq$ 100 yr) and matrix-fracture equilibrium at later times. As expected, the discrete fracture model predicts less condensate buildup than the ECM. Thus, the ECM is conservative in predicting the amount of condensate buildup.

DELIVERABLES

LLNL Deliverables Met

(April 1995)

Milestone	WBS 1.2.	Planned Date	Completion Date	Description
MOL153	3.4.2.1	4/30/95	4/24/95	Status on Code Maintenance
MOL115	3.12.1	5/31/95	4/30/95	Respond to Study Plan Comments
MOL255	3.12.4	4/17/95	4/20/95	MOL243 Status (Small Block Tests)
MOL139	3.12.5	5/01/95	4/25/95	MOL126 Status (Computer Mdlg Modules)
MOL137	5.4.2	4/30/95	4/26/95	YMIM Enhancement for Preliminary TSS
MOL271	11.1	4/17/95	4/05/95	Quarterly Report #2

LLNL Delayed Deliverables

(April 1995)

Milestone	WBS 1.2.	Planned Date	Projected Date	Description	Comment
MOL206	3.12.1	4/07/95	6/20/95	Evaluation of the Thermodynamic Databases	Note 1
MOL257	3.12.4	4/07/95	5/2/95	MOL237 Status (Activity Plan for ESF Mtl Tests)	Completed 5/02/95
MOL265	3.12.4	4/30/95	5/01/95	Complete SP Review Process	Completed 5/01/95

Note 1: The delay of this deliverable was verbally acknowledged by the WBS Manager. A letter is in preparation.

LLNL Deliverables Scheduled for the Next Reporting Period

(May 1995)

Milestone	WBS 1.2.	Planned Date	Description	Comment
MOL240	2.5.1	5/30/95	Status Rpt on TGA Testing	
MOL235	3.12.5	5/15/95	Respond to Study Plan Comments	

ISSUES AND CONCERNS

Although the AMSP requested additional funding for the Large Block Test at the mid-year review, there has been no indication of approval. If funds are not provided at the required level, the start-up date of February 1996 will slip, and the LBT results may not be available to support TSS and ESF test design.

TECHNICAL SUMMARY

1.2.1. SYSTEMS ENGINEERING

1.2.1.5 Special Studies

J. Blink, ACD Project Engineer for Thermal Integration, prepared a white paper on thermal loading for the YMSCO Project Manager. The white paper provided background and a succinct problem definition.

1.2.2. WASTE PACKAGE

1.2.2.1 Waste Package Coordination and Planning

S. Hanauer, the Scientific Advisor to OCRWM Director Daniel Dreyfus, visited LLNL on April 3-5 to discuss progress and plans in several technical areas, including the waste package container and other metallic internal components. The role of the thermal aspect of repository design was extensively discussed, since this aspect dominates many considerations in the waste package performance. One of S. Hanauer's conclusions from the meeting was the important need for materials research.

R. Van Konynenburg coordinated a review of the draft report by C. Bowman and F. Venneri, Los Alamos National Laboratory, entitled 'Underground Supercriticality from Plutonium and Other Fissile Material".

1.2.2.4 Waste Form

1.2.2.4.1 Spent Fuel

Spent Fuel Dissolution

The ultimate objective of this activity is to generate analytical data on the dissolution rate of the UO_2 matrix of spent fuel for use in performance assessment modeling and for direct use in licensing. As part of this task, the flow-through tests on uranium oxides are designed to measure the dissolution rates of the oxides and to determine the rate dependence on several parameters, such as solution pH, temperature, oxygen fugacity, flow rate, and solution anions, particularly carbonate species. These tests are not intended to simulate the repository conditions but rather to provide parametric rate constant information.

Semi-Static Dissolution

Two semi-static scoping dissolution tests at Pacific Northwest Laboratory (PNL) of partially oxidized specimens of Turkey Point PWR spent fuel in J-13 well water, which were started in 1986 and last sampled in June 1990, were terminated in February. Water chemistry and radionuclide analyses of the test solutions were completed in March. A preliminary evaluation of the results suggests that they are reasonably consistent with those from the first four years of the study, which were reported by C. Wilson of PNL at the 1990 symposium on the Scientific Basis for Nuclear Waste Management.

After decanting the test solutions from the fuel specimens, which consisted of particles 1 to 3 mm in size, the fuel particles were allowed to dry under ambient hot-cell conditions. The dried fuel particles were transferred to a plastic weight boat, to allow selection of specimens for scanning electron microscopy (SEM) examination, and then to a glass storage vial. At this point, it was noticed that the storage vials contained some black powder that was not originally present in the fuel specimens. Some of the powder was collected for analysis by x-ray diffraction (XRD) and SEM.

The XRD results indicate the presence of UO_2 and U_4O_{9+x} but no U_3O_8 or other uranium-bearing phases. The SEM results showed that the powder consisted almost entirely of individual grains 10 to 30 μm in size. One of the specimens contained a few particles composed, in part, of U, Ca, and Si as shown by energy dispersive x-ray spectrometry. These could be particles of uranophane which is a phase that was identified by C. Wilson in the Series-3 Tests of spent fuel in J-13 well water.

Efforts are in progress to prepare millimeter-size particles of the dried spent fuel specimens for cross-sectional ceramography and direct observation by SEM. However, the specimen preparation will be difficult because of the friable nature of the particles.

It is clear that oxidation followed by long exposure to J-13 well water so weakened the grain boundaries of these spent fuel specimens that they can now be easily fragmented into individual grains. However, it would be premature to assume that similar behavior might be possible under repository conditions. For one thing, the oxidation was rather severe: exposure to air at 250°C for 45 and 116 hours, respectively, for the two specimens. Whether unoxidized fuel, or fuel oxidized at lower temperatures, would show a similar weakening of grain boundaries after long-term exposure to water has not yet been established.

Flow-Through Dissolution

Installation of the liquid waste tank associated with the hot cells in PNL Bldg. 325 has been completed. However, the tank must pass an acceptance test, which was scheduled for April but has not been conducted. Flow-through tests on oxidized (U_4O_{9+x}) and unoxidized ATM-104 PWR spent fuel specimens will be started as soon as the acceptance test of the waste tank for the hot cells has been completed.

D-20-43, Unsaturated Dissolution Tests with Spent Fuel

Spent fuel is being tested under unsaturated conditions at 90°C to evaluate its long-term performance in the potential repository at Yucca Mountain. The tests monitor the leach/dissolution behavior of the spent fuel, in particular, the dissolution rate of the fuel matrix, the release rate of individual radionuclides, the form in which the radionuclides are released, and the mode of reaction.

Two irradiated PWR fuels, ATM-103 and ATM-106, are being tested at Argonne National Laboratory (ANL) in three types of unsaturated tests. The surrogate water, EJ-13, came from well J-13 and was equilibrated with volcanic tuff for approximately 80 days at 90°C. The fuel in the tests has undergone 31 months of reaction at 90°C by the end of April.

Effort this month was devoted to leachate sampling of the seven tests and removal of a fuel fragment from each test. The most significant result was that fuel alteration was evident in all tests, high-drip rate, low-drip rate, and vapor. The main difference was the magnitude of the alteration. For both high-drip rate tests, the fuel was entirely covered with a light-yellow to white mat which was visually estimated to be up to 500 μm thick. (the thickness was estimated from holes in the mat created when forceps were used to remove fragments from the Zircaloy fuel holders). For the ATM-103 fuel, needle-like extensions were visible at the edges of the mat. If one assumes that the composition of the mats is similar to that seen in unirradiated UO_2 drip tests after eight years of testing, then they may be composed of uranophane and/or boltwoodite. This identification needs to be confirmed when the spent fuel fragments are analyzed.

For both low-drip rate tests, the coloration of the alteration products was darker than that in the high-drip rate tests and there was evidence of three to five different morphological species on the surfaces. Under areas which had come in contact with the forceps, the presence of a harder, darker under-layer, was evident. The estimated thickness of these coatings was 50 μm. Again, the fuel fragments have to be analyzed to determine which alteration products are present.

For the vapor tests, a light-colored coating was evident on the bottom of the fuel fragments in some sections. This was a very thin coating, and its thickness could not be estimated. The leachate from the tests was submitted for pH, carbon, anion, alpha and gamma analysis, and cation analysis. The pH ranged from 7.1 for the high-drip rate tests to 7.9 for the vapor tests; this compares to 8.25 for the EJ-13.

D-20-43, Unsaturated Dissolution Tests with UO_2

The objective of this project is to evaluate the reaction of UO_2 pellets after exposure to dripping EJ-13 water at 90°C using the Unsaturated Test Method. More specifically, these test are designed to examine the dissolution behavior of UO_2, formation of alteration phases, release rates and mechanisms of uranium release, and serve as a pilot study for similar tests with spent nuclear fuel.

The UO_2 drip tests at ANL were sampled for the 9-10 year test interval. All three samples display a top surface that is partially covered by yellow, green, and white secondary alteration phases. Solution aliquots were collected for cation, acid strip uranium, unacidified solution uranium, 25 nm filtered uranium, anion, carbon, and pH analyses. Results from these analyses will be reported as they become available.

D-20-53(a), Flow-Through Dissolution Testing of UO_2

The objective of this activity is to generate analytical data on the dissolution rate of the UO_2 matrix of spent fuel for use in performance assessment modeling and for direct use in licensing. As part of this task, the flow-through tests on uranium oxides are designed to measure the dissolution rates of the oxides and to determine the rate dependence on several parameters, such as solution pH, temperature, oxygen fugacity, flow rate and solution anions, particularly carbonate species. These tests are not intended to simulate the repository conditions but rather to provide basic rate constant information.

The $UO_3 \cdot H_2O$ was analyzed at LLNL with Nuclear Magnetic Resonance (NMR) spectroscopy in an effort to understand the acidity of the $UO_3 \cdot H_2O$ in water. Published data indicate the $UO_3 \cdot H_2O$ has a low solubility and makes the solution slightly basic. The NMR spectra show that impurities are not free-acetate from the synthetic starting material, but bound methyl species at less than one-half weight percent. This result does not account for the observed aqueous acidity.

Static $UO_3 \cdot H_2O$ solubility experiments were performed in air- and argon-saturated pure water. The sample vials contained excess $UO_3 \cdot H_2O$. They were shaken periodically and centrifuged before the liquid phase was sampled for uranium solubility measurements. The uranium concentrations in both vials rose rapidly. They both reached about 1000 ppm U in approximately two days. Also, the pH dropped to about 4.6 in both cells. These results are consistent with the flowthrough measurements.

Spent Fuel Oxidation

Thermogravimetric Apparatus (TGA) Oxidation

Work has been progressing on preparing both TGA systems at PNL for resumption of operations. Weight was added to the tare sides of both Sartorius balances to equalize the loads. Afterwards, the balances were user-calibrated following the procedure outlined by the manufacturer. This calibration was independently checked using various calibrated standard weights. Agreement of the Sartorius balances with the reported weights was very good. A vacuum was pulled on both systems. TGA#2 had a very noticeable leak in either the flow controller or circulating pump. A couple of days later, the flow controller malfunctioned, sticking open at a flow of -700 cc/min. A new controller was ordered to correct the problem.

The new sample temperature thermocouples have been installed. Unfortunately, the fabrication shop made them 3/4" shorter than required. After reviewing several possible options, it was decided to replace the thermocouples with new, longer, calibrated thermocouples. The calibration was completed at the end of April and the new thermocouples will be installed in early May. When the installation is complete, TGA#1 will be ready to begin testing with a spent fuel sample. The installation of the new thermocouples and the new flow controller are the last items on the Readiness Review.

PNL attempted to mask XRD slides with subsamples from 1-19-93-105-4, 12-2-93-105-6, and 1-28-91-105-7 using the quantitative analysis method of adding Al_2O_3. Because of static problems with the plastic weight boats, it was very difficult to get good transfer of the fuel onto the slides. PNL will run these slides and should be able to determine phases present, but the relative quantity data will not be accurate. Larger subsamples will be taken, and alternatives to the plastic weighing boats will be considered.

The next fuel samples have been chosen and packaged and are awaiting transfer from PNL Bldg. 327. A large fragment was broken into smaller pieces of ~200 mg each. This should help eliminate some of the problems with lack of reproducibility. These will be the next samples run.

Dry Bath Oxidation Tests

Quantitative x-ray diffraction (XRD) analyses of oxidized spent fuel samples from the drybath ovens have confirmed the formation of an x-ray amorphous intermediate phase between cubic $UO_{2.4}$ (U_4O_9 crystal structure) and U_3O_8. Samples having an oxygen to metal ratio of ~2.50 (determined by weight gain measurements) were found to consist of ~35% $UO_{2.4}$ and 65% amorphous phase, with no detectable U_3O_8. Experiments to determine the accompanying density changes of the spent fuel during oxidation are being considered.

Following last month's report of electron-beam-induced decomposition of highly oxidized spent fuel during examination by transmission electron microscopy (TEM), the question was raised whether the TEM samples had reverted to UO_2 or to $UO_{2.4}$. To restate, the beam-induced decomposition yielded a fluoride structure similar to UO_2 or $UO_{2.4}$. As the lattice parameters of these two phases differ by less than 1%, they are not simply distinguished by electron diffraction. The decomposition reaction is apparently an artifact of sample preparation or of examining thin samples under high vacuum conditions with the intense electron beam of the TEM. Alternative sample preparation methods offering a better chance of observing the as-oxidized structure of the spent fuel are being pursued.

1.2.2.4.2 Borosilicate Glass

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

The N2 unsaturated dissolution tests on actinide- and technetium-doped Defense Waste Production Facility (SRL 165) glass have been ongoing for approximately 111 months. They were last sampled on 12/19/94, and are next scheduled for sampling on 6/19/95. Some results of analyses from the December sampling have been received; others are expected shortly. These will be verified and added to the database as they become available.

The N3 unsaturated tests, performed on actinide- and technetium-doped West Valley ATM-10 glass, were last sampled on 1/12/95. They have been ongoing for 93 months, and are next scheduled for sampling on 7/13/95. High-resolution alpha spectroscopy data from solution samples, sequentially filtered solution, and test vessel acid strip solution from the January sampling have been received and are undergoing verification. Other solution and colloid analyses are still ongoing.

D-20-70, Parametric Studies of WVDP and DWPF Glass

Tests on a variety of glasses exposed to 60 and 95% relative humidity *RH* at 70°C continue. No test terminations have been done for several years and none are planned for this year.

D-20-31, Studies of Glass Surface Layers and Precipitation.

Sixteen tests continue, with some in progress approximately 8 years. Within the past six months, all of these tests have been sampled, and the data are being compiled.

It has been agreed that these tests can be upgraded to quality-affecting, which will require an amendment to the existing Activity Plan and revision of the Test Plan.

1.2.2.5 Waste Package Materials Testing and Modeling

1.2.2.5.1 Metallic Barriers

The purpose of the metallic barrier task is to characterize the behavior and determine the corrosion rates and corrosion mechanisms of metallic barriers, including the interaction with the surrounding environment. Tests and modeling are performed to determine this behavior. Conceptual models of corrosion processes are developed for use in evaluating waste package performance. This task provides considerable input on materials properties to the waste package and repository design tasks and to the performance assessment task.

Task Management and Quality Assurance (PACS OL251JCE)

D. McCright and G. Henshall attended the NWTRB meeting held April 19 & 20 in Las Vegas. D. McCright gave a presentation on the "Current Status of Corrosion Research and Modeling". The talk covered the activities discussed in the revised Metallic Barrier Scientific Investigation Plan and how these plans are being implemented.

D. Jones (UNR), D. McCright, W. Clarke (LLNL), and D. Stahl (B&W) attended the seminar on Microbial Activity at Yucca Mountain, which was held April 10-12 in Lafayette, California. The seminar was organized by the Introduced Materials Task (formerly called the Man-Made Materials Task, WBS 1.2.3.12.5), but covered many aspects of microbial activity that could adversely affect the performance of container materials in Yucca Mountain.

Degradation Mode Surveys (PACS OL251LGI)

An informal review of the partial preliminary draft of Iowa State University's efforts on Monel 400 class Ni-Cu alloys is in progress.

Thermogravimetric Analysis (TGA), (PACS OL251LGM, Activity E-20-47)

Tests were conducted at 65°C and in the 50-90% relative humidity *RH* range for 1020 carbon steel, to determine the effects of alternate wetting and drying of the sample surface. The purpose of the experiment was to determine if oxide generated during an initial high humidity cycle produces hygroscopic surface conditions such that continued weight gain would persist when the humidity was lowered to 50% *RH*. Results showed that lowering the humidity to 50% *RH* resulted in negligible weight gain. When the humidity was returned to 90% *RH*, weight gain behavior paralleled that observed prior to lowering the humidity.

Microbiologically-Induced Corrosion (MIC), (PACS OL251LGN, Activity E-20-60)
A contract with Professor D. Jones, Chemical and Metallurgical Engineering Department, University of Nevada-Reno, was sent to the Regents of the University of Nevada for approval on April 21, 1995.

Long Term Corrosion Tests

An engineering design review was held on April 25 and resulted in the following action items:

1) A mixer, housed in each vessel, will be added to the Programmable Logic Controller to verify its continued operation during the course of the test.
2) Sulfuric acid will be used to acidifiy the acidic environments instead of hydrochloric acid. Sulfuric acid is more relevant to the repository environment.
3) The expected room temperature in the facility will require a 10 ton air conditioner unit be installed for an estimated cost of $16-18k.
4) The computer control system for the test-vessels should be placed in an enclosure that isolates the controls from the lab environment.
5) The corrosion coupons will be placed in a horizontal orientation to simulate repository conditions. A nearly vertical exposure was planned prior to this point. S. Edson has re-designed coupon-racks for horizontal coupon exposure.

K. Hernandez has completed drawings for two types of galvanic coupons. The first type will be a corrosion allowance material coupled to the underlying corrosion resistant material. The corrosion allowance material will have a conical hold drilled through its thickness. At the base of the hole will be a 6 mm (1/4") diameter hole to serve as the interface between the two materials. The coupled assembly will be Teflon-coated on the bottom and on all surfaces except that with the conical hole exposed to the test environments. This will simulate the outer container being breached. Effects on the underlying corrosion resistant material will be investigated. The second type coupon will be a copper-nickel outer material coupled to the underlying corrosion resistant materials. Details of the assembly are the same as the first type of galvanic coupon.

S. Edson has obtained preliminary pricing information for the test vessels. A range of materials for the differing environments has been investigated by E. Dalder and S. Edson. Candidate material choices include: (1) Teflon, Tefzel, or polyvinylidene fluoride ("PVDF") tanks for the acidic and basic solutions; and (2) vinyl-ester resin-bonded fiberglass for the tanks for the neutral (J-13 H_2O and J-13 H_2O plus impurities) solutions. See Ref. 1 for more details.

S. Edson has completed a preliminary design of the specimen racks. The present design will minimize dripping of condensate on coupons suspended in the vapor. A horizontal weight loss and crevice coupon exposure will enhance the aggressive corrosion conditions in the vapor phase, as well as encouraging pit-growth in the vertical direction. Baseline and alternate material-choices for racks, as functions of the corroding environments, are:

Corrosive Environment	Base Line	Alternate
J-13 H_2O	Type 316 stainless steel	None
J-13 H_2O plus added impurities	Type 316 stainless steel	None
J-13 H_2O plus added impurities acidified to pH=2 with H_2SO_4	Haynes Alloy C-276	Type 316 stainless steel plus a teflon coating[+]
J-13 H_2O plus added impurities made basic to pH=12 with $Ca(OH)_2$	Haynes Alloy C-276	Type 316 stainless steel plus a teflon coating[+]

[+] Applied by General Magnaplate Co. or another source.

The final choices of material will depend on vendor-supplied information on cost and availability. Requests for "planning quotations" are being forwarded to possible vendors.

J. Estill presented a paper, "Integrated Corrosion Facility for Long-Term Testing of Candidate Materials for High-Level Radioactive Waste Containment," at the 6th Annual IHLRWM Conference in Las Vegas.

Fracture-Mechanics Crack-Growth Tests (PACS OL251LGO, Activity E-20-55)
The purposes of this activity are (1) to determine the susceptibility of candidate waste container materials for the Yucca Mountain Program to stress corrosion cracking (SCC) and (2) to provide an experimental data base for predictive models for SCC in the environment. Research activities deal with fracture mechanics crack-growth-rate determinations on Types 304L and 316L stainless steels, Incoloy 825, Titanium Grade 12, Hastelloy C-4, and Hastelloy C-22. Crack growth rate (CGR) tests using standard compact tension (CT) fracture mechanics specimens have been conducted on Types 304L and 316L stainless steels and Incoloy 825 in the earlier phase of the program. Additional tests were initiated on Ti Grade 12, Hastelloy C-4, Hastelloy C-22, and on a new heat of Incoloy 825 in FY94.

Crack growth rate tests are performed for standard specimens under a cyclic load with triangular loading waveform (loading time of 2-9990 s and unloading time of 1s) and various load ratios, in a simulated J-13 well water environment at 93° C. The simulated J-13 well water was prepared from deionized high-purity water and reagent-grade-purity salts. The pH value of the feed water is in a range of 6-8. The specimens have been fatigue-cracked in air at room temperature for a precrack length of 1.9 mm to introduce a sharp starter crack before crack growth rate tests. Tests have been completed for Titanium Grade 12 (Specimen No. T16-01) under a load ratio of R=0.5, and maximum stress intensity of 26-41 $MPa \cdot m^{1/2}$. The results indicated that environmental acceleration of crack growth may not present for the test conditions considered for the Titanium Grade 12 and that the observed crack growth is due to the mechanical cyclic loading.

Crack growth rate tests have begun for Titanium Grade 12 (Specimen No. T16-01), Hastelloy C-22 (Specimen No. 227-01) and Hastelloy C-4 (Specimen No. 245-02) under load ratio of R=0.7.

Dr. A. Roy (B&W) has been assigned to LLNL to work with LLNL staff members. He has prepared a preliminary proposal for in-house fracture-mechanics crack-growth testing, had it reviewed, and is developing a test-matrix, costs, and a schedule.

Pitting Corrosion Model Development (PACS OL251LGK, Activity E-20-80)

Measurements of pit depth distributions invariably show that pits grow to have a wide range of depths, possibly indicating a probabilistic aspect to pit growth. Therefore, the modeling efforts to date have focused on the possible stochastic aspects of stable pit growth. However, many theories treat pit growth deterministically, typically as a problem in diffusion [2]. Further, diffusion theories and a variety of phenomenological observations (e.g. [2], suggest that pit depth and growth rate are correlated; deep pits grow more slowly than shallow ones. Thus, as pits deepen, their rate of growth decreases. Equation (1) is often used to phenomenologically describe the deterministic increase in pit depth as a function of time (for constant environmental conditions):

$$d = A\, t^{p} \qquad (1)$$

where d is pit depth, t is exposure time, and A and p are constants. Typically, $p < 1$ with values near 0.5 being most common. Equation (1) is not ideal for modeling purposes because the use of exposure time as a variable in the model precludes easy treatment of changing environmental conditions. However, it is worthwhile to explore the use of this equation in combination with the concept of permanent pit growth cessation. Such an approach may provide a means to easily explore models incorporating both the deterministic and probabilistic aspects of pit growth, and potentially improve the capability to simulate the evolution of the distribution in pit depths.

To test this modeling concept, a new version of the Pit Initiation and Growth Stochastic (PIGS) model was written. Pit growth in the new model is controlled by the stochastic growth subroutine used previously, but a growth probability of $\gamma = 1$ is input to provide for continuous "aging" of each stable pit. This pit growth subroutine, as described in previous monthly reports, allows for the permanent cessation of growth during any time step. The probability of cessation, η, is input at run time. The depth of each stable pit is then computed from Eq. (1) at the end of the simulation. Finally, the decay in pit initiation rate with exposure time employed in many previous versions was not included in the new code, but will be added to future versions.

A preliminary set of calculations was performed using the new code with $p = 0.5$. Figure 1 shows that the distribution in pit depths is initially skewed toward large depths, as expected from Eq. (1) when most or all of the stable pits are still growing. For a longer exposure of 200 time steps, Fig. 2, the distribution exhibits many more stable pits than at

50 steps since there is no decay in the pit initiation rate for these simulations. Following 200 steps, approximately half of the stable pits have permanently ceased growing and the distribution is nearly symmetrical. Finally, for an exposure of 400 time steps, Fig. 3, about 2/3 of the pits have permanently ceased their growth and the distribution is significantly skewed toward small pit depths. The total number of pits has increased compared to the 200-step standpoint of stochastic models for pitting corrosion.

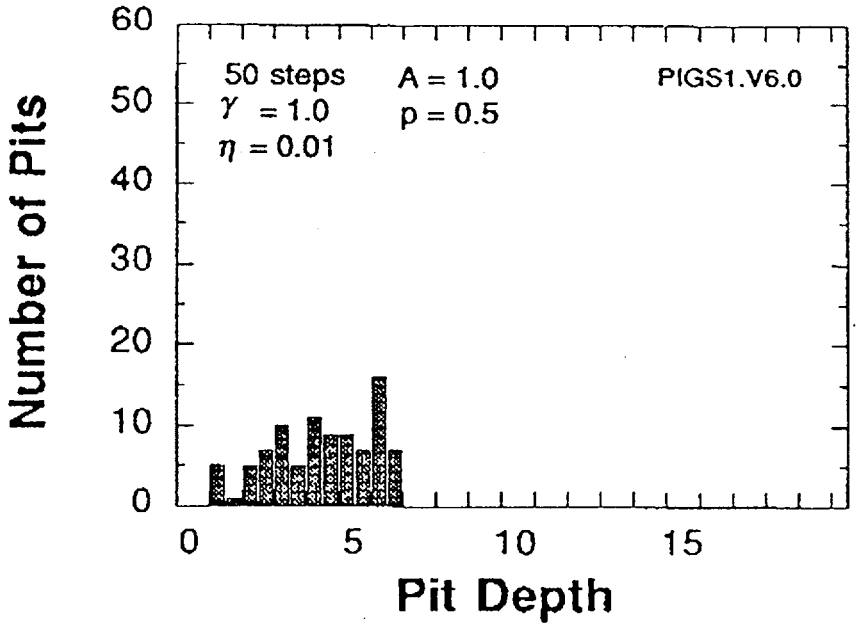

Figure 1. Computed distribution in pit depths for the relatively short exposure of 50 time steps.

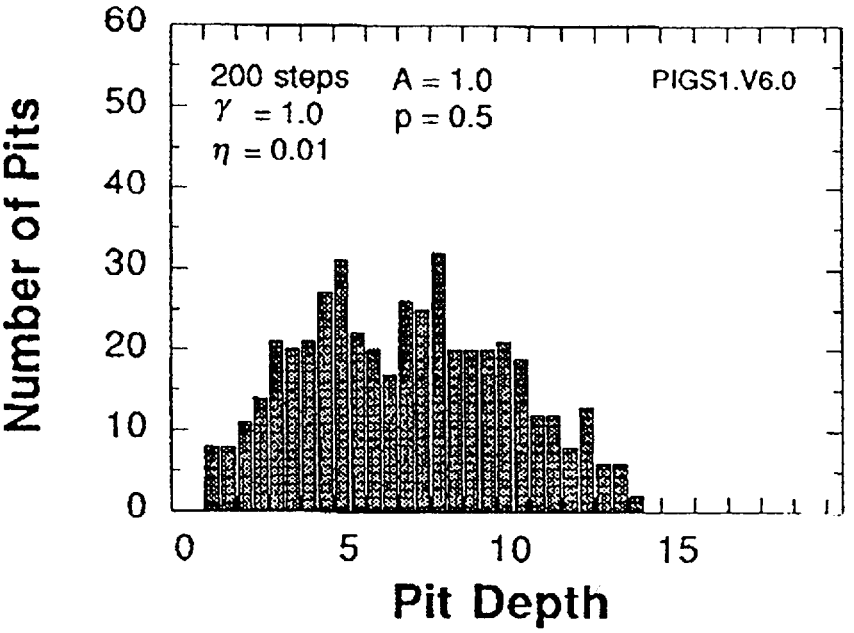

Figure 2. Computed distribution in pit depths for the intermediate exposure of 200 time steps.

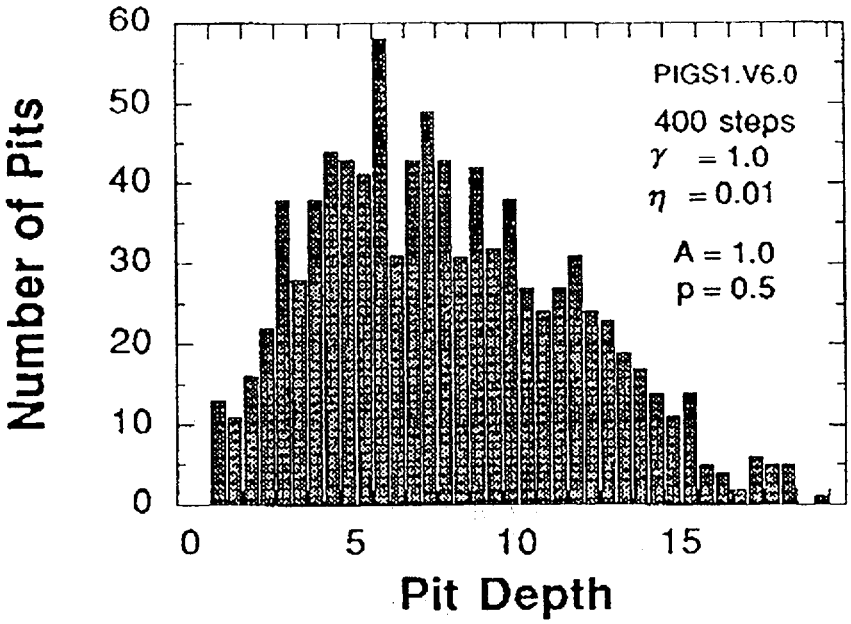

Figure 3. Computed distribution in pit depths for the relatively long exposure of 400 time steps.

The most significant information gained at the recent Nuclear Waste Technical Review Board meeting was the importance placed on these modeling efforts in relation to subsystem and total system performance assessment (PA). The PA community needs more accurate estimates of waste package degradation modes, including the uncertainty and variability in the percent of waste packages degraded over time. There is also a desire to have "process model" calculations of pit depth distributions, not just the time required for initial penetration of the containers. Calculation of this distribution would be useful for defining the area available for advective/diffusive release of radionuclides from the container. The stochastic pitting models being developed potentially can meet these needs, though more effort, particularly experimental validation, is necessary. A plan to develop these experiments and information is being developed in conjunction with Drs. A. Roy (B&W) and D. Jones (UNR).

References for 1.2.2.5.1

1. E. Dalder, "Corrosion-Resistant Plastics for Test Cells for Five Year Corrosion Test", LLNL Internet Memo, (4/26/95).

2. A. Hoch, et al., "A Modeling and Experimental Study for Long-Term Prediction of Localized Corrosion in Carbon Steel Overpacks for High-Level Radioactive Waste," in MRS Symposium on the Scientific Basis for Nuclear Waste Management XIII, in press (1995)

1.2.2.5.2 Basket

Work is progressing on establishing test environments and test procedures that will simulate bounding conditions for the different candidate basket materials.

1.2.3 SITE INVESTIGATIONS

1.2.3.2 Geology

1.2.3.2.1.2.1 Natural Analog of Hydrothermal Systems in Tuff

This WBS element is not funded in FY95. The Study Plan will be deleted from the technical baseline, and its objective will be incorporated into Study Plans 8.3.4.2.4.1 and 8.3.1.20.1.1.

1.2.3.2.8.3.6 Probabilistic Seismic Hazards Analysis

As part of DOE's Seismic Topical Report II writing team, Q. Hossain assisted in drafting the report on Seismic Design Criteria and Methodology. The draft report is now being circulated within the M&O for review comments.

1.2.3.10 Altered Zone Characterization

The purpose of the Altered Zone study (8.3.1.20.1.1) is to evaluate:

1) the effect of coupled thermal-hydrological-geochemical-geomechanical processes on the thermal evolution of the repository;
2) the effect of the coupled processes on the composition of water that may enter the near-field environment; and
3) determine how these coupled processes may influence the development of secondary minerals in the vicinity of the repository that will affect the source term.

1.2.3.10.1 Characterization Techniques for the Altered Zone

Experiments are evaluating the effect (on water composition and secondary mineral development) of water-rock interaction on vitric and vitrophyric rocks that occur in the near-vicinity of the repository. The experiments will determine the rates of reactions, the controls on the solid phases that form and which could influence radionuclide transport, and the effect of reactions on water chemistry. In support of the experimental studies, efforts are underway to update available data on precipitation and dissolution kinetics, from literature sources. Experiments to measure the impact of water-rock interaction effects (such as recrystallization, precipitation and dissolution) on porosity and permeability are being developed. These experiments support efforts to establish the capability to evaluate the impact of coupled hydrological-geochemical processes on thermal response of the repository block, and on water flux and composition entering the EBS/Near-Field Environment. The experimental apparatus to be used in these studies is a plug flow reactor, with flow controllers and temperature control. The system is undergoing testing. Experiments in support of these studies, which are being conducted under static, fully saturated conditions, at 90, 150 and 250°C, are continuing. These experiments focus on a range of lithologies, as a means of describing the magnitude of variation among lithologic units that may be expected for the limiting case of slow flow under saturated conditions. Experimental measurements of precipitation rates are being

conducted to evaluate the kinetics of changes in the altered zone regions where refluxing may occur. Initial experiments to test the system and evaluate precipitation kinetics of cristobalite have been started. These results demonstrate that a pH buffer will be required in order to assure that pH is not a variable in the system.

Reconnaissance computations reported previously are being refined. Initial refinements will include computations with shorter time steps to evaluate details of variations observed at the repository edges, changes in reaction chemistry and kinetics to account for more complex phase chemistry, and different relationships for porosity-permeability couples. These computations will be conducted in collaboration with Los Alamos National Laboratory personnel.

The codes to conduct the coupled simulations of fine scale processes, which were previously reported are being used to design the experiments in the plug flow reactor. Initial results obtained on the silica system appear to be consistent with theoretical considerations, and are being refined to include sensitivity analyses.

Experiments and code activities will continue. New simulations, some of which will be completed in collaboration with LANL, will be conducted to refine bounding conditions and expected processes.

1.2.3.12 Waste Package Environment Testing and Modeling

1.2.3.12.1 Characterize Chemical and Mineralogical Changes in the Post Emplacement Environment

The purpose of this task is to bound the composition of water that may contact waste containers, identify the secondary mineralogy that may develop during rock-water interaction that will control the evolution of the source term, and evaluate how minteral growth may influence flow of vapor and water during repository evolution.

Numerical analysis and modeling of rock-water interaction. This activity includes work on the New Zealand process analog site, which is being used to

1) develop conceptual and analytical models of dissolution and precipitation kinetics relevant for Yucca Mountain conditions by resolving conflicts that exist between laboratory-based and field-based measurements of dissolution rates;
2) test relevant thermodynamic data and modeling techniques by simulating rock-water interaction in hydrothermal systems relevant to Yucca Mountain;
3) develop techniques and strategies for using natural systems to accomplish necessary code and model testing; and
4) define the envelope of uncertainty that bounds simulations and projections of geochemical processes.

Work on the New Zealand site, which was temporarily stalled due to changes in DOE procurement policies during the contract renewal process, has been started up again.

Examination of samples in natural pools that were emplaced to prototype *in situ* dissolution studies is underway. Plans for measurement of the naturally occurring actinide-series isotopes in geothermal rocks and fluids as a function of temperature, lithology, water chemistry and colloid content to evaluate the transport of radionuclides in repository-type environments are continuing to be developed.

Studies of the effect of changes in relative humidity on rocks that occur within the vicinity of the repository horizon are continuing. These studies will evaluate the rates of reaction, the extent and mechanism of reaction, and the impact on water chemistry. Results to date demonstrate that dramatic alteration of the material occurred within four months of the start of the experiments. Alteration was evident at relative humidities as low as 70%, consistent with literature reports in which the rate of glass alteration decreases significantly at relative humidities of less than 70%. The samples are undergoing preliminary analysis, to determine the cause of their disintegration.

To evaluate discrepancies between measurements, a field-based study was started to evaluate the mechanisms and controls on silica precipitation in concrete-lined drain fields.

1.2.3.12.2 Hydrologic Properties of the Waste Package Environment

In Situ Test Design

Over the past several months LLNL has accelerated its modeling efforts to develop short-term *in situ* heater tests that provide for:

1) Early diagnoses of the significance of gas-phase diffusion and buoyant gas-phase convection on thermal-hydrological behavior for Technical Site Suitability (TSS).
2) Preliminary understanding of the importance of heterogeneity in gas- and liquid-phase pathways on vapor flow and condensate generated under sub-boiling and above-boiling conditions.
3) Increased confidence in understanding the significance of these sub-boiling and above-boiling processes in heterogeneous systems in time for the 2001 License Application (LA).
4) Resolution of the thermal-hydrological hypotheses concerning extended-dry high-AML or "locally hot" low-AML thermal designs in time for the LA.

In considering *in situ* heater tests that meet these objectives, LLNL is also evaluating the possibility that some of these tests could continue beyond 2001 and thus become the longer-term heater tests that are required for the 2008 License Update.

This modeling effort has analyzed four basic types of *in situ* heater tests, including:

1) Plate Heater Test - a uniformly-heated disk-shaped area is approximated with the use of heaters in closely-spaced, small-diameter horizontal boreholes.
2) Single-Drift Heater Test- a row of heaters is located on the center of the floor of a drift with dimensions equal to or less than the size of an actual emplacement drift.
3) Single-Drift, Winged Heater Test - the single-drift heater test with the addition of two arrays of heaters (called wing heaters) in closely-spaced, small-diameter horizontal boreholes that effectively provide a uniform areal (planar) heat load.

Coalescence of the boiling zones between neighboring drifts can be effectively represented in an accelerated fashion using this heating geometry.

4) Toroidal Heater Test - is heated around the perimeter of a disk with a given radius. The toroidal shape is employed in order to drive vapor flow into the center of the test. The inward flow of vapor may be augmented by maintaining a negative pressure in the center of the test.

The Toroidal Heater Test was developed by J. Farrell of TRW. This configuration may be approximated by placing 8 individual heaters (acting as point-heat sources) in a circle.

Calculations have been conducted for all of these geometries, with recent emphasis on the Single-Drift, Winged Heater Test and the Toroidal Heater Test. Bulk permeability k_b values of 0.01, 0.28, 10, and 84 darcy (1 darcy ~ $10^{-12}m^2$) have been considered. With respect to k_b, there are three distinct regimes of thermal-hydrological behavior as manifested by the temperature and gas-phase pressure distributions. Starting with the intermediate-k_b regime (called the "Open Non-Buoyant Regime") which occurs over the range 10 millidarcy < k_b < 10 darcy, the permeability is large enough to result in a gas-phase pressure buildup in the boiling zone that is too small to result in a significant increase in the saturation temperature (T_{sat}, which is equivalent to the actual boiling temperature). While k_b is large enough to result in a small gas-phase pressure rise, it is not large enough to facilitate significant buoyant gas-phase convection. If refluxing is substantial enough to result in the heat-pipe effect, temperatures in the refluxing zone will be close to the nominal boiling point of 96°C.

The low-k_b regime (called the "Closed Regime") occurs for $k_b \leq 10$ millidarcy and is associated with throttled dry-out due to boiling. For this range, k_b is small enough to result in a gas-phase pressure buildup in the boiling zone that is large enough to significantly increase T_{sat} and thereby throttle the rate of dry-out due to boiling. Because of the relatively steep gas-phase pressure gradients in the boiling zone, the flat temperature distribution associated with the heat-pipe effect (where T ≈ 96°C) never develops.

The high-k_b regime (called the "Open Buoyant Regime") occurs for $k_b > 10$ darcy. For this range, k_b is large enough to facilitate substantial buoyant gas-phase convection that dominates heat-driven moisture movement (particularly for sub-boiling conditions) and, if sufficiently large, can substantially influence heat flow.

For each of the four different heating geometries, a sensitivity analysis was conducted of heater test size (i.e., heated area or heated footprint) to determine the heater test size that is large enough to diagnose which of these three principal regimes dominates thermal-hydrological behavior. For the Plate Heater Test and Toroidal Heater Test, the minimum heated footprint must cover at least 500 m^2. For tests smaller than this size, the temperature distribution calculated for the 10-darcy case was virtually indistinguishable from the 280 millidarcy case. However, the "Closed" and "Open Non-Buoyant" thermal-hydrological behaviors were observable for heated areas less than 500 m^2.

For the Single Drift Heater Test and Single-Drift, Winged Heater Test, the key consideration is that the heated footprint covers at least 500 m^2 in order to diagnose the difference between "Open Non-Buoyant" and "Open Buoyant" thermal-hydrological behavior.

Analysis of Nonisothermal, Nonequilibrium Fracture-Matrix Flow

The Equivalent Continuum Model (ECM) used in most studies of repository-heat-driven flow is valid when there is local capillary pressure equilibrium between the matrix and fractures. If the vaporization flux of water in the matrix is sufficiently high, the resulting condensate flux may be sufficiently large that it exceeds the critical flux for fracture-matrix disequilibrium as predicted by Nitao and others (1993). The condensate will then flow quickly down fractures. High vaporization flux densities can be expected to occur at early times in the heating period when thermal flux surface densities in the rock around the drift are high. At later times, the radius of the zone of vaporization will be large enough that thermal flux densities through the zone will be so slow that the fracture and matrix will be in equilibrium and "condensate shedding" will stop unless the matrix eventually becomes saturated.

In order to test these observations, LLNL has modeled condensate generation and drainage for a three dimensional system with a parallel set of discrete fractures orthogonal to the drift wall, using the NUFT code. The model has over 7000 elements and runs in 10-20 hours on the IBM Rise 6000. The initial case has an Areal Mass Loading (AML) of 40 MTU/acre, a Lineal Mass Loading (LML) of 1.25 MTU/m, 26-yr-old oldest-fuel-first (OFF) spent nuclear fuel, and a bulk permeability of 280 millidarcy.

Preliminary results indicate extensive drainage of condensate at early times ($t \leq 100$ yr) and matrix-fracture equilibrium at later times. As expected, the discrete fracture model predicts less condensate buildup as compared to the ECM. Thus, the ECM is conservative in predicting the amount of condensate buildup. Future simulations are planned that will vary fracture and matrix parameters including heterogeneous fracture permeabilities. Analytic dual porosity models will be implemented which will allow three dimensional calculations.

References for 1.2.3.12.2

3. J. Nitao, T. Buscheck, D. Chesnut, Implications of Episodic Nonequilibrium Fracture-Matrix Flow on Repository Performance, Nuc. Tech., **104**, 3, p. 385-401, 1993.

1.2.3.12.3 Mechanical Attributes of the Waste Package Environment

The objective of this task is to characterize the geomechanical response of the rock in the near-field to the changing conditions expected to occur over the lifetime of the repository. This includes providing data from laboratory, field and modeling investigations that can be used to support Technical Site Suitability and a high level finding for rock properties.

Particular emphasis is on coupled processes and behavior at elevated temperatures and at long times. Work conducted on this task during February, March and April is discussed this month.

Management & Integration

A 5 yr draft planning package for this task was completed and submitted to S. Nelson (M&O). The draft included descriptions of PACS summary accounts and deliverables for the next five fiscal years.

S. Blair served on the pre and post-closure rock characteristics panels and presented a poster describing work on the small block tests at the Technical Program Review meeting held in February.

A summary discussion was prepared regarding the contribution from work on this task to the Waste Package design efforts; the summary was submitted to S. Nelson (M&O) and M. Smith (YMSCO).

S. Blair visited the Geological Survey of Japan (March 13-18) to discuss experimental techniques used in testing of fractured rock at elevated temperature. He also visited the Steven Laboratory, Delft, The Netherlands (April 6) to discuss statistical modeling of fractures in rock and concrete, and attended the Second International Conference on the Mechanics of Jointed and Faulted Rock (MJFR-2) in Vienna, Austria (April 9-14) where he presented a talk describing geomechanics studies conducted on this task.

Laboratory Testing

A series of laboratory compression tests is being conducted on irradiated and non-irradiated core samples to determine if radiation affects mechanical properties. To ensure that appropriate quality controls are used in the collection of the data a technical implementation procedure (TIP) has been prepared and is being reviewed. Thirty core samples of Topopah Spring Tuff from the Fran Ridge site have been prepared and are currently being irradiated using a Cobalt 60 radiation source. A hydraulic press suitable for the compression testing has been installed. Several load cells and displacement transducers appropriate for the tests have been located and are being calibrated. Testing is planned to begin in early May, 1995.

Heaters were designed and fabrication is underway for rock mass testing.

Modeling

The purpose of the modeling task is to evaluate several different constitutive thermal-mechanical models for applicability in simulation of geomechanical behavior in the near-field, and to develop coupled models for rock behavior at elevated temperature. Current efforts are oriented toward the Large Block Test (LBT), and a time-dependent finite

difference method is being used. The code being used (FLAC) is capable of treating both mechanical and thermally induced stresses and deformations. It is a two-dimensional code in which materials are represented by arbitrarily-shaped, quadrilateral zones. It is based on a Lagrangian scheme and is capable of using several built-in material models, including the ubiquitous joint model that has previously been used to simulate thermal-mechanical behavior in tuff.

During April, revisions were made tothe input modules for thermal mechanical simulations to accommodate the revised LBT test conditions, and to be compatible with the simulations being conducted for hydrological analysis of the LBT. The input model was formulated assuming elastic behavior for the rock mass, values of bulk density determined from laboratory measurements of cores, and bulk and shear moduli determined from laboratory velocity measurements. This is a two-dimensional model and assumes plane strain, equivalent to assuming a large thickness in the third dimension. The model assumes dry conditions and is being used to find the displacements and stresses resulting from heating under these conditions. Thermal boundary conditions are adiabatic boundary conditions for the sides of the block, isothermal conditions of 60°C on the top of the block, and 20°C at the ground surface around the block, together with fixed isothermal boundaries at the far edges of the model 34 m from the block and at a depth of about 25 m below the block. The loading is gravitational loading plus atmospheric pressure at the surface, and achieves stress equilibrium prior to heating. The heating program in the model uses the same parameters as the hydrologic model, i.e. heating using 1500 W for about 75 days followed by a period of reducing the heating at a rate of 16.7 W/day for 18 days, and then a slower reduction of heating at a rate of about 1.7 W/day for 87 days. The hydrologic model predicts that using this thermal input, the block will reach thermal equlibrium in 200 days. Thermal-mechanical calculations are currently underway using an elastic constitutive model to verify the model behavior. After these preliminary calculations are completed, the ubiquitous joint and Mohr-Coulomb constitutive models will be used in the future to represent the rock mass.

Support of the Large Block Test

Planning and status meetings were held for the LBT. Instrument design and locations were refined.

LLNL PROJECT STATUS REPORT EXTERNAL DISTRIBUTION
April 1995

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QA: N/A.

April 3, 1995

LA-EES-13-04-95-001

Mr. Wesley E. Barnes, Project Manager
Yucca Mountain Site Characterization Office
U. S. Department of Energy
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Dear Mr. Barnes:

Los Alamos Monthly Highlights Report for February 1995: Highlights of Activity, Variance Analysis Report, and PACS Monthly Cost/FTE Report (SCPB: N/A)

Attached is the Los Alamos Monthly Highlights Report for February 1995, which includes the Highlights of the Monthly Activity Report, Variance Analysis Report, and PACS Monthly Cost/FTE Report.

This report is an internal document describing our technical work; however, it has not received formal technical or policy review by Los Alamos or the YMP. Data presented in this document constitute predecisional information, should not be referenced, and are not intended for release from the U.S. Department of Energy as referenceable information.

The Variance Analysis Report identifies cost and/or schedule variances, analyzes those variances as to cause, and establishes any corrective action necessary.

The PACS Monthly Cost/FTE Report presents a monthly summary of Los Alamos' effort on the YMP. This report provides monthly totals of cost, labor person-hours, subcontractor person-hours, outstanding commitments, and accruals, all at the third level of the WBS. In addition, updated annual budget, approved funds, and annual cost values are provided.

If you have changes to our distribution list, please call Susan Klein at (505) 667-0916.

Sincerely,

for

Julie A. Canepa

JAC/SHK/cmv

Attachment: a/s

528
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cc: Hurtt
cc: Cook
cc: AMA
cc: Spence
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w/o

RECD IN YMP 4/10/95

Los Alamos Highlights for February 1995

WBS 1.2.3.1.1 Site Management. Staff represented the Test Coordination Office (TCO) at weekly surface-based testing meetings and M&O work scope consolidation meetings.

In preparation for fielding the LIDAR system at the Yucca Mountain site, staff continue to procure the appropriate field permits.

WBS 1.2.3.2.1.1.1 Transport Pathways. Staff was testing a modified method of processing thin-sections that will retain their integrity when they are soaked in radionuclide-bearing solutions. This method will allow more precise examination of the association of Am, Pu, and Np with specific minerals. Staff will then perform microautoradiography studies which will provide 3-D mineralogical sorption data for Performance Assessment models and scanning electron microscope (SEM) analyses on thin section samples from Pu microautoradiography studies. Staff initially have two objectives: (1) to identify specific alteration compositions associated with enhanced Pu retention, with subsequent microsampling for microdiffractometry, if necessary; and (2) to investigate the possible utility of SEM analysis of Ag abundance as a measure of alpha-track concentrations in the emulsion in order to quantify the amounts of Pu concentrated on individual minerals. These results will extend the results already obtained with microautoradiography to very specific identification of discrete phases responsible for radionuclide retardation and to more reproducible results for comparison with quantitative sorption data. To date, the SEM analyses of thin sections representing samples used in Pu microautoradiography studies show that veined Fe alteration in orthopyroxenes of the Prow Pass Member provides sites for Pu retention. Staff will complete further SEM studies before the orthopyroxenes are subsampled for microdiffractometry to identify the mineral form of this Fe alteration.

In calcite precipitation studies, analysis by SEM has confirmed that some grains intergrown with calcite above the repository horizon in core USW UZ-16 (at 640 ft depth) are kaolinite. Comparison of the SEM data with analyses by microdiffractometry indicates that sulfur occurring with the kaolinite is noncrystalline. Sulfur has also been identified within roots of plants at the surface of Yucca Mountain; decay of root materials and aqueous transport may be a source of the small amounts of amorphous sulfur associated with the vein calcites.

Using SEM, staff was examining samples in which zeolites coexist with calcite. The results will be included in a paper titled "Multiple Episodes of Zeolite Deposition in Fractured Silicic Tuff" (in preparation for the proceedings volume of the 8th International Symposium on Water-Rock Interaction in August in Vladivostok, Russia). Using the electron microprobe, B. Carlos and P. Snow were analyzing heulandites from fractures in several drill cores to determine if there is a systematic variation in composition either between drill holes or between different morphologies in the same drill hole. This work was being conducted to obtain information on the relative ages and timing of mineral deposition in fractures. The tabular crystals examined have Sr-rich cores and Mg-rich rims; the prismatic crystals are Mg-rich.

XRD analyses were completed on 11 background dust samples collected by R. Raymond and S. Chipera in December 1994. Although these samples were collected from natural dust traps in varied geologic terrain, the mineralogy was fairly uniform, showing that the samples were composed mainly of smectite, quartz, feldspar, mica, zeolite, hornblende, and an amorphous component with trace amounts of chlorite, kaolinite, calcite, and hematite. Long count times were used on several of the samples to determine if erionite was present, but none was detected.

X-ray diffraction analyses for the presence of erionite have been completed on ten samples from State-of-Nevada drill core UE-25 ONC#1 samples. Although these samples were analyzed using extremely long count times to reduce detection limits to < 350 ppm, no erionite was detected in

any of the samples, once again emphasizing the sporadic nature of the erionite distribution at Yucca Mountain. The samples were found to be composed mainly of clinoptilolite, with varying minor amounts of mordenite, smectite, opal-CT, feldspar, and quartz.

Meetings. D. Vaniman attended the Pre-Closure Rock Characteristics Technical Program Review planning meeting in Las Vegas on 8 February. At the Pre-Closure Rock Characteristics panel at the TPR, 13-17 February, Vaniman contributed information on the importance of erionite, a known carcinogen, in evaluation of the site, and D. Bish outlined data required for the Technical Basis Report. Staff also presented two poster presentations, one on the health effects and distribution of erionite and another on energetics of hydration/dehydration of clinoptilolite as a function of composition.

WBS 1.2.3.2.1.1.2 Alteration History. Schon Levy met with Frances Singer, SAIC, to share technical expertise applicable to USGS breccia studies at Fran Ridge. Based on the nature of breccia matrix alteration, most of the Fran Ridge samples from the Topopah Spring Tuff appear to be examples of breccias formed around the time that post-depositional devitrification occurred. At the integration meeting of rock characteristics and mineralogy/petrology programs held the following day, breccia studies were identified by the USGS participants as an area in which they would like interaction with the Los Alamos Alteration History task. Los Alamos staff agreed to a field trip to examine breccia localities around Yucca Mountain and Busted Butte. Levy also agreed to review a USGS milestone report on the formation of silica within Yucca Mountain.

W. Carey submitted an abstract titled "Partial and Molar Enthalpy of Hydration in Clinoptilolite" to the annual meeting of the Clays and Clay Minerals Society, which will be held 3-8 June in Baltimore, Maryland. Carey also completed installing an experimental system that allows calorimetric and thermogravimetric data to be collected simultaneously in an independently

controlled atmosphere of measured water-vapor pressure. This system will facilitate the collection of hydration data for zeolites and clays, such as amount of water as a function of temperature and pressure and heat effects.

A report titled "Ion Exchange and Dehydration Experimental Studies of Clinoptilolite: Implications to Zeolite Dating," by Giday WoldeGabriel was published. Results presented in this paper are ongoing research to document the significance of apparent ages calculated for Yucca Mountain clinoptilolites. The hypothesis that young apparent ages of clinoptilolite from the unsaturated zone are the result of argon loss, rather than indicating recent and pervasive geochemical alteration, will be studied. Preliminary results suggest that water plays a vital role in stabilizing the clinoptilolite framework structure and in retaining argon. A regular decrease in radiogenic argon contents was noted in clinoptilolite heated to various temperatures under unsaturated conditions for 16 hours; comparable losses were not observed in samples heated under saturated conditions at 100°C for more than five months. Cation exchange of zeolites with saturated salt solutions generally had little effect on the argon content. Cesium- and sodium-exchanged samples experienced a gain and loss, respectively, of radiogenic argon for reasons that are not fully understood. This work is part of the staff's effort to achieve the highest level of confidence in addressing both site suitability and licensing criteria in relation to the nature and rates of Quaternary geochemical processes.

Calculation errors were identified in one part of milestone 3377, which was submitted to YMSCO in September 1994. A revised version will be distributed to all recipients of the original manuscript. The milestone has not been published and none of the affected information has been used in other YMP activities.

WBS 1.2.3.2.5 Volcanism. "Status of Volcanism Studies for the Yucca Mountain Site Characterization Project," a 380-page report summarizing the last several years of volcanism studies, was published.

Probability Studies. Bruce Crowe gave a presentation at the First Workshop on the Application of Expert Judgment for Probabilistic Volcanic Hazard Assessment (PVHA) covering the methods, major technical issues, and application of simulation techniques to define uncertainty and run sensitivity studies for PVHA. Frank Perry presented a summary of the status of data gathered under this task.

Field Studies. Staff began final revisions of a geologic map of the Lathrop Wells volcanic center that is being compiled on 1:12,000 orthophotographic base maps.

Geochronology Studies. U-Th disequilibrium mineral isochrons were completed for one sample from Sleeping Butte (Little Black Peak) and three samples from Lathrop Wells. These results indicated different ages for eruptive events at Lathrop Wells.

WBS 1.2.3.2.6.1.4 Fault Scarp Study. Staff completed more than half the field studies and sampling of appropriate geomorphic surfaces for cosmogenic dating of Quaternary landforms at Yucca Mountain and vicinity. Staff also determined the type and amount of rock material that must be acquired from fine-grained rocks for cosmogenic age determinations. This sampling strategy will provide the maximum quantity and variety of information possible for each site sampled. Staff continues to develop techniques to determine how best to cosmogenically date the tuffs and basalts that compose the landforms. The contract with University of Pennsylvania for cosmogenic beryllium analysis was in place, and researchers there were preparing to begin these studies.

WBS 1.2.3.3.1.2.2 Water-Movement Tracer Test. The HydroGeoChem subcontract was ended because all work on this activity is now being conducted by Los Alamos employees.

Staff conducted a field trip to Yucca Mountain with US Bureau of Reclamation staff at the ESF to review sampling criteria for the chlorine-36 activity and to collect rainwater samples from USGS rainfall gauges. This work is part of a preliminary effort to evaluate the variability of chloride-to-bromide ratios in atmospheric fallout and to provide data for estimating the chloride accession rate at Yucca Mountain. The ratio is needed to correct chlorine-36-based water residence times for dilution by chloride released from the rock during sample collection or processing. The accession rate is a parameter in the chloride mass balance method of estimating infiltration rates.

Staff began developing a procedure to determine the chloride-to-bromide ratio and chlorine-36 content of Yucca Mountain tuffs. These values also must be known in order to correct chlorine-36-based water residence times for any dilution by chloride released from the rock during sample collection or processing. Without this correction, the calculated ages will be older than the true ages.

Five samples from UZ-16 and UZ-14 were processed for chlorine-36 analysis using a prototype method called "sequential leaching;" normally, chloride is extracted from the rock by a single batch extraction using a 1:1 rock/water ratio. For many samples, this technique results in an extremely dilute solution which is time-consuming to process for chlorine-36 because of the necessity to preconcentrate it. In contrast, the sequential leaching method uses the same volume of water to contact several aliquots of the sample, thereby effectively increasing the rock/water ratio and, hence, resulting in a less dilute solution. Preliminary results are promising, and adopting this approach may save considerable person-hours in processing low-chloride samples from the welded tuff units. The five samples will be submitted for chlorine-36 analysis in March.

Staff began developing a procedure to measure the chloride content of carbonate minerals, a prerequisite to measuring their chlorine-36 content. This type of procedure would provide for testing the feasibility of using chlorine-36 to estimate the ages of these minerals in soil calcrete horizons and fracture fill. Age estimates would provide another constraint on interpreting the influence of these features on hydrologic flowpaths and rates.

WBS 1.2.3.3.1.2.5 Diffusion Tests in the ESF. Staff continued to revise the study plan for Diffusion Tests in the ESF. This revision will satisfy milestone 4090. In discussions with the TCO in Las Vegas on 7 February, staff worked toward establishing a time period in which alcoves appropriate for the diffusion tests may become available. The study plan work scope states that the first three-month test will be conducted in TSW2; however, the first alcove in TSW2 is #6, which is not scheduled to be available until March 1996. Alcoves #3, 4, and 5, which are in TSW1 are scheduled to be available in September 1995, November 1995, and January 1996, respectively. Staff may recommend starting diffusion tests in alcoves 3, 4, or 5 to ensure that data from the tests are available for the Site Suitability evaluation.

WBS 1.2.3.3.1.3.1. Reactive Tracer Testing. ***LiBr.*** Staff continue to analyze data from several LiBr column experiments completed in December 1994. Analysis of the effects of kinetics and nonlinear sorption on the transport behavior of Li will be completed in March or April.

Fluorescent Microsphere Testing. Using flow cytometry, staff analyzed the diluted polystyrene microsphere dispersions that were prepared in January. The analysis indicated that the microspheres retained their fluorescent dye signal after more than six-weeks. More concentrated dispersions that were over a year old were also analyzed, and these microspheres were fluorescing enough so that they could still be quantified. In light of these results, staff rethought their earlier hypotheses about dye leaching from the microspheres and decided to reanalyze some

earlier ground-water samples, which contained microspheres originally believed to have lost their fluorescent signal. Staff determined that the microspheres in the earlier samples had, in fact, retained their signal. While the precise reason for not previously detecting a signal in these microspheres is not apparent, staff learned that greater care is required when configuring the flow cytometer and handling samples. It is also helpful to look at a small sample of the ground-water under an epifluorescence microscope to confirm the presence of microspheres. In March, staff plan to reanalyze some samples from a field-scale tracer experiment conducted in August 1994 at the Raymond Quarry fractured granite site (Raymond, CA). They had previously detected no microspheres in these samples, in spite of approximately 80 percent recovery of nonsorbing solute tracers. Staff also plan to use microspheres in a field experiment at Raymond Quarry in April 1995.

WBS 1.2.3.4.1.1. Ground-Water Chemistry Model. Staff continued to quantify the conceptual models for controls on ground-water chemistry in Yucca Mountain. Staff has evaluated information from the literature on the climatic history of Yucca Mountain over the past million years in a preliminary fashion. This information is important to understanding the chemistry of unsaturated and saturated zone waters at Yucca Mountain. For example, the chloride concentrations of these waters are essentially a direct function of the infiltration rates at points of recharge. Variations in the infiltration rate are in turn primarily a function of the rate of evapotranspiration at the point of recharge, and the rate of evapotranspiration is a function of the local climate. Because the chloride concentrations of unsaturated zone waters entering the near-field of a repository are critical to waste package corrosion rates and only a limited number of unsaturated waters are/will be available for analysis, a general model for the origin of variations in chloride concentrations is required. While, ultimately, information regarding variations in the paleoinfiltration rate over Yucca Mountain will be developed by the hydrology and climatology programs at the USGS, staff has outlined the above approach to provide bounding water

composition data to the sorption and solubility tasks and for providing preliminary input to the transport/sensitivity models in development at LANL.

In collaboration with retardation sensitivity analysis task members, staff has defined a preliminary set of chemical relations and equations that should be included in the FEHM transport calculation to couple flow and transport. The initial relations to be included are concentration of solutes in precipitation (i.e., rain and snow) by evapotranspiration, saturation of soil zone waters with calcite, and saturation of soil zone waters with opal-A. As additional chemical relations (e.g., pH control through hydrolysis reactions) are defined, they will be incorporated into the calculations.

Staff began laboratory experiments involving water/rock interactions.

WBS 1.2.3.4.1.2.1 Batch Sorption. Staff completed a study of Np-237 sorption onto calcite in water from the well J-13 (under atmospheric conditions). These experiments involved: 1) pre-treating crushed natural calcite with J-13 water, 2) adding a Np solution in J-13 water to the pretreated solid phase, 3) separating the phases, and 4) determining the Np concentration in each phase.

Previously, staff reported that calcite is a strong sorber for Np in waters from the well J-13, which is only significant if the J-13 water is saturated with respect to calcite. Staff completed Np sorption experiments onto calcite while monitoring the Ca concentration of the J-13 well water to determine whether calcite was dissolving in J-13 water during experiments. This new data corroborates the previously reported data, and within experimental error, no change in the Ca concentration was observed in the J-13 water (being contacted with calcite) as a function of time. Staff, therefore, conclude that: 1) calcite can sorb Np strongly, 2) the sorption of Np onto calcite depends on Np concentration (i.e., it follows a non-linear isotherm model), and 3) within the time-frame of these sorption

experiments, no calcite is being dissolved in the J-13 water. Staff plans to perform additional calculations with EQ3 to determine if J-13 is saturated with respect to calcite, monitor the Ca concentration in J-13 during the sorption step, and perform sorption experiments of longer duration.

WBS 1.2.3.4.1.2.2. Biological Sorption and Transport. Staff in collaboration with University of Nevada at Las Vegas, New Mexico Institute of Technology in Socorro, University of Oklahoma at Norman, and University of Tennessee at Knoxville prepared for the second sample collection from the ESF in the Bow Ridge Fault to determine the numbers, metabolic activity, identity, and diversity of the indigenous microbial population of Yucca Mountain.

Staff continue to prepare for unsaturated flow experiments, in which they plan to measure the transport of chelated (with siderophore) versus unchelated actinide elements through tuff.

WBS 1.2.3.4.1.3 Speciation. Staff computed Np speciation and mineral saturation for J-13 water at constant concentrations of 0.0005 and 0.001 moles/kg for the pH range 3-10 using EQ3/6. In one set of calculations, staff fixed carbonate concentration, and in a second set, they allowed it to vary in equilibrium with a fixed CO_2 fugacity (balanced for electrical charge by sodium concentration) For the first set of calculations (fixed carbonate concentration), staff compared results from the composite data set (DATA0.COM.R22a) supplied with the version 7.2a PC release of EQ3/6, a composite neptunium (V)-carbonate complexation data set derived from recent evaluations of solubility and spectroscopic data (Tait et al.), and an alternative data set (DATA0.ALT.R1b) supplied by LLNL. For the second set of calculations (fixed CO_2 fugacity), staff used the composite data set DATA0.COM.R22a.

Staff are currently evaluating the activity models built into EQ3/6 with respect to extrapolation techniques for speciation constants from solubility and spectroscopic data (particularly the

specific interaction theory [SIT] model). These calculations include sodium-carbonate, perchlorate, and chloride solutions of varying ionic strength (0-5 molal) with minor neptunium and carbonate concentrations, as appropriate. Staff are comparing sodium and carbonate ion activities between b-dot, Davies, and Pitzer modeling results and Np(V)-carbonate-complex calculated beta constants with SIT model extrapolations. These studies will provide a basis for evaluation of model uncertainties, applicability limits, and consistency of the coupled experimental and modeling approach.

Solubility. Staff set up the selenium solubility and speciation experiments and prepared synthetic J-13 well water (minus the magnesium and calcium components) in order to have a well-defined system of known ion concentrations and ionic strength. They will run first experiments at room temperature at pH values of 7, 8.5, and 11. Staff will analyze the non-radioactive solutions using hydride-generation atomic absorption spectroscopy for speciation and solubility determinations.

WBS 1.2.3.4.1.4.1 Transport. Staff completed studies of the transport of Np as a function of flow velocity through Yucca Mountain solid tuff (under saturated conditions) using columns made of zeolitic solid tuff (G4-1533) They passed tritiated water (to determine the flow parameters in the column) and Np-237 solutions through the solid rock column using water similar to the ground-water obtained from the Paleozoic aquifer (well UE-25 p#1). Dispersion is significant in this zeolitic tuff. Batch sorption experiments performed with zeolitic tuffs and high-carbonate waters (like UE-25 p#1) yielded minimal sorption of Np onto these tuffs. The transport data for Np-237 indicates that a Kd model to describe retardation will correctly predict the appearance of the tracer and conservatively predict Np retardation. Staff also completed the fabrication of a system to obtain water samples from the vicinity of Yucca Mountain in order to measure the colloid concentration in Yucca Mountain ground-waters.

WBS 1.2.3.4.1.5.1 Retardation Sensitivity Analysis. ***Fracture Flow Modeling.*** Staff focused on applying the dual porosity/dual permeability (dpdp) conceptual model of FEHM to a saturated/unsaturated flow problem described by Ho in a paper titled "Assessing Alternative Conceptual Models of Fracture Flow" to be presented at TOUGH Workshop '95, Lawrence Berkeley Laboratory, Berkeley, CA, 20-22 March. The problem described by Ho tests the ability of the code to model conditions in which flow can take place both in fractures and in the matrix material where very highly saturated regions are in contact with regions of very low saturation. Although the simulations demonstrated conditions in which flow in fractures could occur, they exposed a small problem with the way relative permeabilities were computed at very high saturation (see Code Development/Optimization below). Staff has corrected the problem and are currently running tests with the new formulation. After they complete verification of Ho's test problem, staff will apply the dual permeability model to new Antler Ridge cross sections of the Yucca Mountain geologic model. Then using the model, they will study the movement of Carbon-14 in both the liquid and vapor phases in order to use Carbon-14 and Chlorine-36 measurements in calibrating the Yucca Mountain flow model.

Np Site Scale Transport Model. Staff completed a detailed outline of milestone 3468, titled "Summary Report: Site Scale Integrated Transport Model."

Modeling of Np Laboratory Experiments. Using the computer code SORBEQ to determine the best fit parameter values, staff processed the Np column sorption experimental data on zeolitic tuffs received from the Batch Sorption (WBS 1.2.3.4.1.2.1) and Transport (1.2.3.4.1.4.1) tasks. Staff identified kinetic effects as somewhat important at the laboratory scale, although for the reaction rates measured in the columns, these effects may be negligible in the field. Thus, staff deemed detailed understanding of the kinetic effects as not important to modeling the field behavior of Np except to add confidence that the list of factors controlling transport is complete.

Staff also began simulating the results of Np rock beaker diffusion tests in the Yucca Mountain tuffs, using FEHM to simulate diffusion through the tuff.

Grid Generation. Staff worked with USGS to produce a 3D regional scale model of the saturated zone. Claudia Faunt and John Czarneki have built a geologic framework model using Stratamodel software, and LANL staff is converting their Stratamodel to an input grid for flow calculations using FEHM.

Staff have imported the LBL/USGS site scale model into Stratamodel and are generating grids for flow and transport calculations. Paralleling this effort, staff imported USGS YMP2.0, the most recent USGS Lynx model of Yucca Mountain structure, into grid generation software. After baselining the fluid flow solutions against the results of the LBL/USGS site scale hydrologic model, staff will use the grids generated from the Lynx model for transport calculations.

In collaboration with Susan Altman (SNL), staff are developing optimized grids for SNL's calculations involving stochastic distributions of material properties.

Finally, staff can now generate grids with nodes that possess multiple values of rock properties. When the FEHM development to handle these grids is completed, much truer representation of the medium will be possible at material interfaces, such as contacts between hydrostratigraphic units and interfaces between faults and the bulk rock.

Support for P-Tunnel/Calico Hills Project. Staff constructed a site-scale stratigraphic model, which included the traces of the ESF, the North Ramp Extension, and the proposed Calico Hills Drift and surface shaft. The model also included the trace of the Ghost Dance Fault in a simplified fashion so that intersections of drifts and the fault, drifts and different strata, and the

fault and different strata, which are visible in various cross sections and in three-dimensional representations of the model, might be predicted.

Code Development/Optimization. Staff continued tests on a new factorization procedure to condense the 4n by 4n linear system produced from the dpdp formulation to a more dense 2n by 2n system with some promising results. However, they did not obtain a general formulation that performs well in a simulation with both fractures and matrix material very active. They are pursuing an alternative method, which may reduce the time for the dual permeability solution to a point where a three-dimensional, site scale, dual permeability model is practical.

Staff have used the van Genuchten capillary pressure and relative permeability models extensively for Yucca Mountain vadose zone flow calculations. These functions lack computational efficiency. Thermal simulations now routinely being performed use excessive computer time because of vaporization and condensation effects, which focus simulations in the low and high saturation regions. Staff added several smoothing techniques to FEHM to increase efficiency while retaining the correct physical behavior. Staff implemented two linear extrapolations and one cubic fit for low saturations, as well as a linear fit for high saturations. Initial tests indicated markedly improved computational efficiency.

Software Documentation and QA. Staff updated the FEHM Models and Methods Summary and the Users Manual.

WBS 1.2.3.9.7 Special Studies: ESF Coordination. Staff provided multiple-shift field coordination and PI support for ESF North Ramp and Alcove tests. They continued planning the Phase 3 ESF tests, which included participation in the development of a thermal test consolidation white paper prepared by SNL.

Using the mapping gantry, staff began geologic mapping and consolidated sampling activities. They identified the tentative location in the North Ramp to construct Alcove #2.

Staff continued assembling Field Document Records Center files for activities conducted in the starter tunnel and Alcove #1, which includes the maintenance of an administrative database that identifies sample locations and their corresponding photoidentifiers.

Staff generate administrative test management progress reports to assure that test requirements are met and issues are identified. On a weekly basis, ESF TCO staff sit on both the Field Change Control Board and the Baseline Change Control Board (level III).

Staff continue to support ESF test coordination site characterization activities in response to Project programmatic requirements.

WBS 1.2.3.11.3 Geophysics: ESF Support, Subsurface Geophysical Testing. Staff initiated a second series of deployment of the borehole color video and caliper logging tools with the necessary support equipment in the RBT hole in Alcove #1. Based on the experience gained during the logging operation, staff are finalizing LLNL technical procedures. LLNL began the procurement process to obtain a gamma ray logging system for ESF testing activities.

WBS 1.2.5.6 Site Suitability Evaluation. Staff evaluated material to be used in the Technical Basis Report for Surficial Processes and were revising other materials for possible inclusion in a later draft of the document.

WBS 1.2.61.1/.2/.3 ESF Management, Planning, and Technical Assessments; QA and Safety Analysis; Test Management; and IDCS. Staff has participated in discussions with the DOE and the design team to merge planned future design packages like 8A into that of the existing 2C.

They provided design input to support field changes related to the North Ramp Alcove #2 construction and developed a revised ESFDR Appendix B Section, in which common facility design requirements are presented to provide consistency with ESF Test Planning packages. The Draft ESFDR Appendix B Section revision for all ESF Tests based on the Program Plan has completed internal technical review, and staff are preparing for a formal technical review.

Management staff completed the hiring action to refill a staff position. Staff attended the weekly design and construction meetings and routinely observed ESF field testing activities. They reviewed design input related to north portal construction, Title II Design Packages, test plan records development, and test-related field change requests for QA and safety concerns.

Staff supported the development of weekly and monthly administrative management reports for testing activities, facilitated job package record development, and provided field test coordination and administrative support for ESF North Ramp construction.

Staff will continue planning document development and field test coordination of the Fran Ridge Engineered Barrier test activity and the ESF tests with construction activities.

Staff actively pursued integration and review of data flow requirements that are implemented and controlled by test planning records and Project procedures. They initiated and supported the review of field record submissions and facilitated data transfers to the construction and test organizations.

WBS 1.2.11.2/.3/.5 Quality Assurance. Staff continued conversations with YMP-QAD to determine a tentative schedule for the transition of audit functions to the DOE. They are testing a version of forms for procedures, which was placed on the server. The Q management team met twice to discuss the procurement process and minor personnel issues. Staff held a Q meeting on 7

February, at which they conducted a self-assessment and established team and individual goals for FY95. They also streamlined the monthly reporting process (to the QAPL).

They deleted Procedure QP-03.24 and issued Procedure QP-18.2 (Surveys) for review.

Approximately 30 personnel attended a YMP orientation class. The QAPL also completed the annual evaluation of the Orientation Plan. The next class will be held in August.

There are currently 11 open internal corrective action reports (CARs). Three of these are awaiting verification. Four DOE CARs (YM-94-078; YM-94-079; YM-94-081; YM-94-082) were closed. The one remaining open CAR (YM-94-083) is in verification.

The Software Management Coordinator continued to upgrade network hardware. Staff installed and evaluated TCP/IP software. They installed Telnet software on several machines, thus providing direct access to DOE Las Vegas RTN, QSL, CARlog, and IRIS databases. They evaluated three possible SES codes and found them not to be SES.

Publications:

WoldeGabriel, G., "Ion Exchange and Dehydration Experimental Studies of Clinoptilolite: Implications to Zeolite Dating," Los Alamos National Laboratory report LA-12894-MS (February 1995).

Crowe B., F. Perry, J. Geissman, L. McFadden, S. Wells, M. Murrell, J. Poths, G. A. Valentine, L. Bowker, and K. Finnegan, "Status of Volcanism Studies for the Yucca Mountain Site Characterization Project," Los Alamos National Laboratory report LA-12908-MS, (1995).

Carlos B., "Field Guide to Fracture-lining Minerals at Yucca Mountain, Nevada," Los Alamos National Laboratory report LA-12803-MS.

Yucca Mountain Site Characterization Project
Variance Analysis Report
Status Thru: FEBRUARY 1995

PARTICIPANT: LANL PEM: SIMMONS WBS: 1.2.3.4.1.3.1

WBS TITLE: Dissolved Species Concentration Limits

P&S ACCOUNT: 0A34131

FY 1994 Cumulative to Date									FY 1994 at Completion					
BCWS	BCWP	ACWP	SV	SV%	SPI	CV	CV%	CPI	BAC	EAC	VAC	VAC%	IEAC	TCPI
424	415	572	-9	-2.1	97.9	-157	-37.8	72.6	975	973	2	0.2	1343	139.7

Analysis

Cumulative Cost Variance:

The cost variance on this account is primarily due to the payment of an FY94 invoice for optical cables being charged against the account this FY. This was an unanticipated cost since it was assumed the cost had been covered in FY94. In addition there are some incorrect charges against the account which will be corrected and charged to the proper account. No schedule impact is expected for this account.

Cumulative Schedule Variance:

(Not reportable)

Variance At Complete:

(Not reportable)

Julie A. Canyz
P&S ACCOUNT MANAGER DATE

Julie A. Canyz 3/17/95
TPO DATE

Yucca Mountain Site Characterization Project
Variance Analysis Report
Status Thru: FEBRUARY 1995

PARTICIPANT: LANL PEM: SIMMONS WBS: 1.2.3.4.1

WBS TITLE: Ground Water Chemistry Model

P&S ACCOUNT: 0A3411

FY 1994 Cumulative to Date									FY 1994 at Completion					
BCWS	BCWP	ACWP	SV	SV%	SPI	CV	CV%	CPI	BAC	EAC	VAC	VAC%	IEAC	TCPI
130	110	7	-20	-15.4	84.6	103	93.6	1571.4	371	300	71	19.1	24	89.1

Analysis

Cumulative Cost Variance:

The cost variance shown for this account is due to delays in placing the contract for the work and response time in the LANL billing and accounting systems. The contract was placed in late January. There is about $75,000 in the billing and accounting process which will be charged to the account soon. No schedule impact is anticipitated since the work is being replanned to maintain the current schedule.

Cumulative Schedule Variance:

(Not reportable)

Variance At Complete:

This variance is expected to be reduced as the invoices for work done are processed.

P&S ACCOUNT MANAGER DATE

TPO DATE 3/16/95

Yucca Mountain Site Characterization Project
Variance Analysis Report
Status Thru: FEBRUARY 1995

PARTICIPANT: LANL PEM: PATTERSON WBS: 1.2.3.3.1.2.6

WBS TITLE: Gaseous-Phase Movement in Unsaturated Zone

P&S ACCOUNT: 0A33126

FY 1994 Cumulative to Date									FY 1994 at Completion					
BCWS	BCWP	ACWP	SV	SV%	SPI	CV	CV%	CPI	BAC	EAC	VAC	VAC%	IEAC	TCPI
112	113	215	1	0.9	100.9	-102	-90.3	52.6	274	278	-4	-1.5	521	255.6

Analysis

Cumulative Cost Variance:

The change in the test plan for doing work earlier than planned continues to cause the variance on this account. The preparation for testing at the site in the spring and summer has utilized resources earlier than was reflected in the original cost plan. It is expected that the early utilization of these resources will result in a reduced effort later in the schedule.

Cumulative Schedule Variance:

(Not reportable)

Variance At Complete:

(not reportable)

Julie A. Canepa
P&S ACCOUNT MANAGER DATE

Julie A. Canepa 3/16/95
TPO DATE

Yucca Mountain Site Characterization Project
Variance Analysis Report
Status Thru: FEBRUARY 1995

PARTICIPANT: LANL PEM: NESBIT WBS: 1.2.3.9.7

WBS TITLE: ESF and SB Test Coordination

P&S ACCOUNT: 0A397

FY 1994 Cumulative to Date									FY 1994 at Completion					
BCWS	BCWP	ACWP	SV	SV%	SPI	CV	CV%	CPI	BAC	EAC	VAC	VAC%	IEAC	TCPI
571	571	327	0	0	100	244	42.7	174.6	1397	1302	95	6.8	800	84.7

Analysis

Cumulative Cost Variance:

Delays in hiring TCO staff and TBM operations are the major contributor to the cumulative cost variance for this account. Extended work week plans have been implemented to expedite the work . The effect of this effort is reflected in the beginning of a correction in the variance from last reporting period.

Cumulative Schedule Variance:

(Not reportable)

Variance At Complete:

(not reportable)

Julie A. Canepa
P&S ACCOUNT MANAGER DATE

Julie A. Canepa 3/16/95
TPO DATE

Yucca Mountain Site Characterization Project
Variance Analysis Report
Status Thru: FEBRUARY 1995

PARTICIPANT: LANL PEM: KOZAI WBS: 1.2.9.2.2

WBS TITLE: PARTICIPANT PROJECT CONTROL

P&S ACCOUNT: 0A922

FY 1994 Cumulative to Date									FY 1994 at Completion					
BCWS	BCWP	ACWP	SV	SV%	SPI	CV	CV%	CPI	BAC	EAC	VAC	VAC%	IEAC	TCPI
207	207	369	0	0	100	-162	-78.3	56.1	500	500	0	0	891	223.7

Analysis

Cumulative Cost Variance:

The cost variance on this account is due to costs incorrectly charged to this effort. This variance will be corrected by making the appropriate adjustments between accounts.

Cumulative Schedule Variance:

(Not reportable)

Variance At Complete:

(Not reportable)

Julie A. Canez
P&S ACCOUNT MANAGER DATE

Julie A. Canez 3/16/95
TPO DATE

Los Alamos
NATIONAL LABORATORY

Earth and Environmental Sciences Division
EES-13 — Nuclear Waste Management R&D
Mail Stop J521, Los Alamos, New Mexico 87545
Phone (505) 667-9768, Fax (505) 667-1934

WBS: 1.2.9.1
QA: N/A.

I-370348

May 8, 1995

LA-EES-13-05-95-001

Mr. Wesley E. Barnes, Project Manager
Yucca Mountain Site Characterization Office
U. S. Department of Energy
P.O. Box 98608
Las Vegas, NV 89109-8608

Dear Mr. Barnes:

Los Alamos Monthly Highlights Report for MARCH 1995: Highlights of Activity, Variance Analysis Report, and PACS Monthly Cost/FTE Report (SCPB: N/A)

Attached is the Los Alamos Monthly Highlights Report forMarch 1995, which includes the Highlights of the Monthly Activity Report, Variance Analysis Report, PACS Monthly Cost/FTE Report, and Milestone Status Report.

This report is an internal document describing our technical work; however, it has not received formal technical or policy review by Los Alamos or the YMP. Data presented in this document constitute predecisional information, should not be referenced, and are not intended for release from the U.S. Department of Energy as referenceable information.

The Variance Analysis Report identifies cost and/or schedule variances, analyzes those variances as to cause, and establishes any corrective action necessary.

The PACS Monthly Cost/FTE Report presents a monthly summary of Los Alamos' effort on the YMP. This report provides monthly totals of cost, labor person-hours, subcontractor person-hours, outstanding commitments, and accruals, all at the third level of the WBS. In addition, updated annual budget, approved funds, and annual cost values are provided.

If you have changes to our distribution list, please call Susan Klein at (505) 667-0916.

Sincerely,

for
Julie A. Canepa

JAC/SHK/cmv

Attachment: a/s

DIVISION BROCOUM
CC: HORTON
CC: COOK / IORIO
CC: ADAMS / JONES-S
CC: SPENCE / WILLIAMS-D
CC: CRAUN
CC: DIXON
CC: DYER
CC: [redacted]

REC'D ... YMP
5/19/95

ENCLOSURE 6

Cy w/att:
W. L. Clarke, LLNL, Livermore, CA
L. Costin, SNL, Albuquerque, NM
R. L. Craun, YMSCO, Las Vegas, NV
W.R. Dixon, YMSCO, Las Vegas, NV
J.R. Dyer, YMSCO, Las Vegas, NV
L.D. Foust, M&O/TRW, Las Vegas, NV
A.V. Gil, YMSCO, Las Vegas, NV
L.R. Hayes, USGS, Denver, CO
V.F. Iorii, YMSCO, Las Vegas, NV
S.B. Jones, YMSCO, Las Vegas, NV
M.M. Martin, M&O/TRW, Las Vegas, NV
M.D. Voegele, SAIC, Las Vegas, NV
D.R. Williams, YMSCO, Las Vegas, NV
N.Z. Elkins, EES-13/LV, MS J900/527
G.Y. Bussod, EES-13, MS J521
S.H. Klein, EES-13, MS J521
A.R. Pratt, EES-13, MS J521
A.L. Thompson, EES-13/LV, MS J900/527

RPC File (S. Martinez), MS M321
LA-EES-13 File, MS J521

Los Alamos Highlights for March 1995

WBS 1.2.1 Systems Engineering. Schön Levy attended a workshop on the decision process for characterizing the Calico Hills Geologic Unit. The group rated previously identified tests for Calico Hills characterization (including mineralogy-petrology activities) for strength of linkage to repository-performance failure modes.

WBS 1.2.3.1.1 Site Management. Staff represented the Test Coordination Office (TCO) at weekly surface-based testing meetings and M&O work scope consolidation meetings.

WBS 1.2.3.2.1.1.1 Transport Pathways. David Vaniman examined available portions of core USW SD-7 at the Sample Management Facility (SMF) on 1-2 March. He selected portions of the potential erionite-bearing zone, both above and below the lower vitrophyre of the Topopah Spring Tuff, to examine for erionite by X-ray diffraction (XRD). Vaniman also selected 22 samples from this zone in USW SD-7; they were received at Los Alamos on 20 March. Staff began XRD analysis soon thereafter but were delayed temporarily by instrument problems. Erionite is a known carcinogen, and XRD analysis is capable of detecting very small amounts of this mineral (typically 250 ppm). In addition, in contrast to optical or SEM methods of examination, XRD analysis provides an unambiguous identification if erionite exists above the detection limits. This analysis will permit timely release of core samples to researchers and will determine the distribution range of this hazardous mineral for Preclosure site suitability evaluations. Results of the analysis of the suspect SD-7 samples will be reported to SMF as soon as they are available so that erionite-free SD-7 core samples may be released to investigators.

A report titled "Mineralogic Variation in Drill Core UE-25 UZ#16, Yucca Mountain, Nevada" by S.J. Chipera et al. was published. This report summarized both the fracture and matrix mineralogy of samples from the surface to 24 m beneath the water table. Among the results presented, the discovery of the zeolite stellerite in both the tuff matrix and in fractures of the potential repository horizon is a significant deviation from previous mineralogic models of the potential host rock. Data obtained by XRD on fracture-lining minerals in UE-25 UZ#16 was submitted to the technical database.

A paper titled "Multiple Episodes of Zeolite Deposition in Fractured Silicic Tuff" by B. Carlos et. al. was prepared for the proceedings of the 8th International Symposium on Water-Rock Interaction in Vladivostok, Russia (August 1995).

A paper titled "Multireflection RIR and Intensity Normalizations for Quantitative Analyses: Applications to Feldspars and Zeolites" by S. Chipera and D. Bish was published in *Powder Diffraction*. The RIR (reference intensity ratio) method for quantitative mineralogic analysis of YMP samples was discussed. This paper described in detail the use of intensity regions with several reflections, averaging of

nonparallel reflections, and use of variable RIR values to obtain optimal precision and accuracy in quantitative determinations of feldspar and zeolite abundances.

Calcite specimens were selected and prepared for Np sorption experiments. The calcite samples were from the unsaturated zone in drill cores USW UZ-14 and USW NRG-6; further samples from the saturated zone may be prepared. Previous experiments with pure calcite samples indicated possible Kd values of about 100 ml/g; experiments with calcites from Yucca Mountain will allow a test of whether such a distribution coefficient may be applicable to the site. Understanding of this type of Np retardation, which may be attributable to co-precipitation, is important because calcite appears to be particularly associated with the most recent transport pathways through the site.

WBS 1.2.3.2.1.1.2 Alteration History. Schön Levy visited the North Ramp ESF tunnel to examine the exposures of the Bow Ridge fault; she observed no calcite in the fault zone proper. Staff collected calcite from a small fault in the pre-Rainier tuffs a few meters to the west of the Bow Ridge fault, and retrieved from the Sample Management Facility a sample of calcite from fractured Tiva Canyon tuff collected east of the fault by the USBR wall-mapping crew. They sent the two calcite samples, along with calcite from within and near the Bow Ridge fault in Trench 14 above the ESF fault intersection and a calcite concretion from tuffaceous fracture filling in the ESF box cut, to Professor David Norman of New Mexico Institute of Mining and Technology for characterization of fluid inclusion volatiles. The data will provide a comparison of calcite volatile compositions within ~50 m of the ground surface at Exile Hill and will become a part of a database for identifying the sources of calcite-depositing waters. Staff was examining additional samples from the ESF for textural and mineralogic analysis of silica phases.

Giday WoldeGabriel, David Bish, and Schön Levy continued to design experiments to obtain information on the kinetics of argon diffusion in clinoptilolite as a function of temperature and water vapor pressure. They plan to maintain samples of Morrison Formation (NM) clinoptilolite in steam-saturated atmospheres at several temperatures. They chose Morrison clinoptilolite in preference to Yucca Mountain clinoptilolites because it is older and therefore contains more radiogenic argon; this will increase the reliability of any detected changes in argon content and isotopic composition resulting from the heating experiments.

WBS 1.2.3.2.1.2.2 Kinetics and Thermodynamics of Mineral Evolution at Yucca Mountain.
Analcime and Clinoptilolite Solubility. Solubilities of the Mont St. Hilaire analcime were evaluated at 125 and 90∞C, approached from supersaturated conditions, at Penn State University. Reversed solubility data for this analcime are now available between 90 and 300∞C. Batch low-temperature solubility experiments on the Mont St. Hilaire analcime were still running at Yale University.

Penn State completed an extended run at 125∞C in which changes in clinoptilolite solution composition were tracked to a steady state.

Conceptual Model of Mineral Evolution. In support of the clinoptilolite to analcime modeling activity, staff evaluated past LLNL experiments to assess the effects of heating of Topopah Spring Tuff on the water chemistry. This information is needed to model more accurately conditions (such as silica activity and cation abundances) that will affect the stability of clinoptilolite as the result of emplacement of a repository.

QA Activities. A QA audit was carried out the week of 13 March at Penn State and Yale. Staff at both universities were taking the appropriate steps to correct deficiencies.

WBS 1.2.3.2.5 Volcanism. A revised version of "Status of Volcanism Studies for the Yucca Mountain Site Characterization Project" was published.

Staff prepared and submitted responses to comments by the NRC on Study Plan 8.3.1.8.1.2, "Physical Processes of Magmatism and Effects on the Potential Repository," to DOE.

Probability Studies. Staff met with representatives of Geomatrix in San Francisco. The group discussed homogeneous and nonhomogeneous Poisson models of the spatial distribution of volcanic events in preparation for the upcoming expert judgment panel meeting in Las Vegas. A major point of interest between both groups was the similarity in the use of seismic source zones for probabilistic seismic hazard assessment and the use of spatial and structural distribution models for probabilistic volcanic hazard assessment.

Staff led a field trip to the Crater Flat area for members of the Geomatrix-sponsored Expert Judgment panel. Bruce Crowe gave a presentation on the use of homogeneous Poisson distributions for spatial and structural models of the location of Pliocene and Quaternary volcanic events in the Yucca Mountain region.

Geochronology Studies. Staff obtained $^{40}Ar/^{39}Ar$ results from the New Mexico Bureau of Mines for samples from Red Cone, Little Cones, Little Black Peak and the 3.7 million year basalt cycle in Crater Flat.

Geochemistry Studies. Staff completed X-ray fluorescence analyses for 14 samples from Little Cones, Hidden Cone, and Makani Cone and from basaltic ash from Lathrop Wells and Solitario Canyon Fault trench #8.

WBS 1.2.3.3.1.2.5 Diffusion Tests in the ESF. Staff revised the Study Plan for Diffusion Tests in the ESF and submitted it for the review process.

WBS 1.2.3.3.1.3.1. Reactive Tracer Testing. *LiBr.* Staff completed analyses of Li and Br in the samples from several LiBr column experiments completed in December 1994. The experimenters' objective was to investigate the effects of kinetics and nonlinear sorption on the transport behavior of Li. They expect to complete a draft milestone report on this subject in April.

Input to Test Planning Package/Job Package. Staff completed milestone 4029, "Criteria Letter for Contractor Support." This letter spells out contractor support (REECO) necessary for the C-wells reactive tracer tests in addition to support already requested by the USGS for hydraulic and conservative tracer testing.

Preparation for Field Testing. Staff initiated procurement of fluorescent polystyrene microspheres and LiBr for field tracer testing activities at the C-wells. They scheduled tracer tests to commence later in FY 1995 (tentatively by July or August). In addition to the C-wells tracer tests, staff plans to participate in a smaller-scale field tracer test at Raymond Quarry, California, in May in a cooperative effort with LBL, USGS, and AECL (Atomic Energy of Canada, Ltd).

Pre-Test Predictions of Solute Transport. Staff collected data for milestone 4077. Stratigraphic information from each of the three C-wells (i.e., elevations of stratigraphic boundaries in each well) was entered into data files that will be used to generate a three-dimensional representation of the saturated zone at the C-wells in a flow and species transport code (e.g., FEHMN). They also entered data from vertical deviation logs of each well into data files, which will be used to correctly "map" the wells into the three-dimensional representation of the C-wells saturated zone, accounting for the fact that the distances between the wells at depth are not necessarily the same as the distances at the surface. They have conducted preliminary analyses to address the issues of (1) tracer distribution in the saturated zone near a well after pulse injection into a packed-off interval for a convergent tracer test, (2) tracer travel times and dispersion in convergent tracer tests given an initial tracer distribution, and (3) travel times and dispersion in recirculating tracer tests.

WBS 1.2.3.4.1.1. Ground-Water Chemistry Model. Staff visited the Yucca Mountain site to view the fractures, mineral coatings, and rock textures in the exploratory tunnel. This trip also included field visits to Busted Butte to view "silica mounds" in the upper Paintbrush nonwelded tuff unit and a visit to the wash north of Whale Back Ridge to view a recently exhumed exposure of the Ghost Dance Fault. The fault at this location contained white-colored crumbly gouge/secondary minerals.

Work is proceeding on quantification of the conceptual models for controls on ground-water chemistry in Yucca Mountain. A. Meijer discussed the definition of a preliminary set of chemical relations and equations that should be included in the FEHM transport calculation to couple flow and transport with Retardation Sensitivity Analysis staff. The initial relations to be included are concentration of solutes in precipitation (i.e., rain and snow) by evapotranspiration, saturation of soil zone waters with calcite and saturation of soil zone waters with opal-A. In the future, additional chemical relations (e.g., pH control through hydrolysis reactions) will be incorporated into the calculations as they become available.

WBS 1.2.3.4.1.2.1 Batch Sorption. Staff completed a study of Np-237 sorption onto clinoptilolite (under atmospheric conditions) in a sodium bicarbonate water (similar to the water from the well J-13) as a function of ionic strength. These experiments involved 1) pretreating crushed clinoptilolite with solutions varying in ionic strength, 2) adding a Np solution to the pretreated solid phase, 3) separating the phases, and 4) determining the Np concentration in each phase. Staff varied the ionic strength of the waters used for sorption by preparing a sodium bicarbonate water (similar to the water from the well J-13) and adding sodium perchlorate to the water. The concentration of the added sodium perchlorate varied from 0 to 0.1 M. The data indicated that the sorption of Np onto clinoptilolite decreases with increasing ionic strength. The major conclusions from this study were 1) the mechanism of Np sorption involves ion exchange or the formation of an outer sphere surface complex and 2) previous observations indicating that the sorption of Np onto zeolitic tuffs is higher in J-13 water than in the Paleozoic water (UE-25 p#1) could be the result of the difference in ionic strength of the two waters.

WBS 1.2.3.4.1.2.2. Biological Sorption and Transport. Staff collected samples from the Bow Ridge Fault (6 March) to determine the numbers, metabolic activity, identity, and diversity of the indigenous population of Yucca Mountain. Four subcontracted universities were performing the majority of the microbial analysis.

WBS 1.2.3.4.1.3 Speciation/Solubility. Speciation. ***Geochemical Modeling.*** Modeling of Np and Pu solubility experimental results suggested that the solutions, even after reaching quasi-steady-state conditions, might still be supersaturated with respect to NpO_2 and PuO_2, respectively. The Np solubility experiments, in particular, tend to trend to lower dissolved Np over the entire duration of the experiment. In the past, staff have suggested that this may be due to the addition of NaOH to the experiments to adjust pH, thereby increasing the [Na+] concentration and hence affecting the solubility product. This trend could also be due to the precipitation of NpO_2, although its absence would not rule out NpO_2 precipitation. If NpO_2 precipitation were causing the decreasing dissolved Np concentrations, it is likely that the rate of decrease of Np with time would be greater at higher temperature. The longer time data for Np has been fit as a linear function of time. Data taken at times longer than 30, 1, and 15 days were used for the 25, 60, and 90∞ C experiments, respectively. At times shorter than these, there was obvious nonlinearity in the concentration-time curves.

Staff determined the slopes of the longer-time data for each of the experiments, and there was no obvious trend as a function of temperature. They did find that, with the exception of the 60∞ C, pH 7 data, all experiments showed decreasing Np concentration with time for the long-time data, however, for many sets of results this trend is only marginally statistically significant. There was, however, a significant and consistent trend in slope with pH. This suggests that the slopes observed are due to the addition of NaOH to control pH.

Staff also completed a series of calculations for speciation of simple fluids as a function of ionic strength, using the activity models available in EQ3/6 (B-dot, Davies, and Pitzer). Simple fluids included Na-Cl, Na-CO_3, and Na-HCO_3. Small amounts of Np, Ca and CO_2 were included, where possible, because of database constraints. From this data set, the range of applicability and overlaps of the models and consistency with models used to extrapolate speciation data to zero ionic strength (the SIT model) will be explained. Generally, from zero to moderate ionic strengths, the B-dot model agrees well with the SIT model within the experimental uncertainties. Subtle differences indicate that the B-dot model captures solution behavior better, but for individual extrapolations, the experimental uncertainties do not warrant such precision.

Solubility. Staff at set up selenium solubility and speciation experiments. They prepared synthetic J-13 well water (minus the magnesium and calcium components) in order to have a well-defined system of known ion concentrations and ionic strength and they started the first experiments, which will run at room temperature at pH values of 7, 8.5, and 11. The non-radioactive solutions using hydride-generation atomic absorption spectroscopy for speciation and solubility determinations will be analyzed.

As an outcome of SOLWOG group meetings, a "Radionuclide-Ligand Priority Matrix" for Yucca Mountain was prepared. This matrix indicates that some of the nuclear waste chemical elements that were routinely listed in the "radionuclide category" (cation) should actually be considered as ligands. Thus, one can envision "double-trouble" synergism whereby a radioactive(*) actinide is complexed by a radioactive fission product (e.g., *Pu-*SeO_4) and may become more or less mobile in the groundwater environment. Consequently, an adjustment or a different approach may be required when dealing with such a scenario.

Thus far, selenium solubility and speciation literature searches and laboratory experiments have provided some interesting results:

(1) Selenium is important in geologic nuclear waste disposal because of its high solubility, low sorption behavior, and subsequent appearance in performance assessment calculations at long delay times.

three times in Berkeley. On 13 March, they successfully addressed emotional, philosophical and technical differences, which led to a "no surprises" agreement and the promise of better cooperation and understanding between the two parties. On 20 March, they successfully dealt with the differences between LBL and LANL concerning the emphasis on flow versus transport and the design of the P-tunnel Tests for input into the FY95 Test Plan for P-tunnel.

As a result, LBL and Los Alamos delivered milestone 3433 on 31 March (on schedule). This milestone is crucial, because it feeds directly into the TPP for P-tunnel delivered by the TCO/ESF office in Las Vegas, the TPP being a major document to be used in the planning and completion of the FY95 tests in P-tunnel.

WBS 1.2.5.3.5 Technical Database Input. Staff entered into the ATDT and submitted six record packages to the Los Alamos RPC. Staff prepared and submitted three additional record packages to the Los Alamos RPC. Staff initiated three TDB submissions to Genesis, the YMSCO database.

WBS 1.2.9 Technical Project Office Management. The TPO signed a Memorandum of Understanding with TRW to become an M&O teammate. Staff began developing the Memorandum Purchase Order Agreement.

WBS 1.2.11.3 QA Verification. ***Audits & Surveys.*** Staff issued audit reports AR-EES-1/PSU-95-01 and AR-EES-1/YU-95-02. Five deficiencies were fixed at Penn State University. Eleven deficiencies resulted in two corrective action reports issued for Yale University. Minor documentation problems in notebooks caused most of the deficiencies. These were the first formal audits of these new groups, and both did very well. An audit plan was issued for EES-1 (LA-AR-EES-1-95-003) mineralogy/petrology activities in Los Alamos. Staff initiated a survey to evaluate training in the Los Alamos Chemical Sciences and Technology Division.

Verifications. There are currently 10 open internal corrective action reports (CARs). One of these is awaiting verification. DOE CAR YM-94-083 was closed. Staff currently have no open DOE CARs. They are developing an audit questionnaire to solicit process improvement. They revised the audit schedule. A. Burningham (TCO) was assisting the M&O in responding to a CAR on field change requests.

WBS 1.2.11.5 QA Engineering. ***Software.*** The Software Management Coordinator continued to upgrade network hardware. He has upgraded memory for data, training, and software computers. On 9 March, staff held a CCB meeting to close activity on GZSOLVE and discuss SES codes. Staff distributed the two new software procedures (which replace a guidebook and four procedures) for formal review. In addition, B. Gundlach was **involved** in evaluating the proposed QARD software revisions.

YMP PLANNING AND CONTROL SYSTEM (PACS)

Participant:	LANL		MONTHLY COST/FTE REPORT				Fiscal Month/Year Mar FY1995	
Date Prepared:	17-Apr-95						Page 1	
							Fiscal Year 1995	
WBS Element	Actual Costs	Participant Hours	Subcon Hours	Purchase/Subcon Commitments	Accrued Costs*	Approved Budget	Approved Funds	Cumulative Costs
1.2.1	3.9	0.0	0.0	0.0	0.0	100.0	75.0	13.0
1.2.3	1,575.9	7,488.8	3,158.0	895.2	0.0	12,764.0	7,223.0	6,904.5
1.2.5	261.3	1,540.1	199.1	81.3	0.0	1,544.0	1,158.0	604.1
1.2.6	167.6	1,613.6	0.0	108.8	0.0	2,423.0	2,000.0	482.3
1.2.9	37.1	272.3	322.0	130.0	0.0	1,103.0	828.0	441.0
1.2.11	148.3	184.0	939.1	490.4	0.0	1,300.0	975.0	555.6
1.2.12	39.5	9.2	0.0	230.4	0.0	477.0	280.0	200.7
1.2.13	4.8	0.0	37.0	21.7	0.0	111.0	85.0	19.4
1.2.15	50.7	187.7	324.3	63.4	0.0	483.0	255.0	225.4
Totals	2,289.1	11,295.7	4,979.5	2,021.2	0.0	20,305.0	12,879.0	9,446.0

(2) Stable selenium isotopes exist in nature and several radioactive isotopes are generated as fission products in nuclear reactors. Only ^{79}Se has a long enough half-life (6.5×10^4 years, b-decay) to be of radiological concern in nuclear waste.

(3) In human beings, non-radioactive Se is an essential nutrient at low concentrations but is extremely toxic at higher concentrations and should be handled with appropriate caution in the laboratory.

(4) Considering that selenium-79 is both radioactive and toxic and that it may complex with other radionuclides, this constitutes a RCRA-controlled mixed waste situation.

(5) Selenium exists in oxidation states -II, 0, +IV, and +VI; with +IV (selenite; SeO_3^{2-}) and +VI selenate (SeO_4^{2-}) ions most likely in natural ground-waters. Selenite predominates in acidic, slightly reducing waters, whereas selenate has been shown to be the predominant species in near-neutral, slightly oxidizing conditions (J-13).

(6) Dissolution of solid sodium selenate decahydrate ($Na_2SeO_4 \cdot 10H_2O$) in synthetic J-13 well water (minus the magnesium and calcium cation components) yields solutions that are greater than 4.5 Moles per Liter at room temperature and pH 7. This is essentially a high ionic strength selenate brine!

(7) Selenium is not a sparingly soluble radionuclide when no cations of consequence are present; however, when complexing or precipitating cations are present, the selenium solubility-limiting-solid would no longer be sodium selenate, but the resultant cation-ligand salt. Somewhat lower solubility limits could be expected.

Meetings. Members of the solubility group gave the following presentations at the most recent national meeting of the American Chemical Society (ACS):

"Multinuclear NMR, EXAFS, and x-ray Diffraction Studies of Hexavalent Actinide Carbonate Complexes"; D.L. Clark, S.D. Conradson, S.A. Ekberg, N. Hess, M.P. Neu, P.D. Palmer, C.D. Tait, N.M. Edelstein, and N. Kaltsoyannis, 209th ACS National Meeting, Nucl. Chem. & Tech. Div.

"Spectroscopic and Structural Studies of Environmentally Relevant Neptunium(V) and Plutonium(V) Complexes"; D.L. Clark, S.D. Conradson, N. Hess, M.P. Neu, P.D. Palmer, C.D. Tait, 209th ACS National Meeting, Nucl. Chem. & Tech. Div.

"Carbonate and Hydrolysis Complexation Studies of Actinyl Ions: Toward Understanding the Environmental Behavior of U, Np, and Pu"; D.L. Clark, S.A. Ekberg, M.P. Neu, P.D. Palmer, and C.D. Tait, 209th ACS National Meeting, Div. of Geochem.

WBS 1.2.3.4.1.4.1 Radionuclide Transport. Staff completed 18 crushed-rock column experiments on the elution of Pu(V) through crushed-rock columns as a function of tuff type, water type, and flow velocity, using zeolitic, vitric, and devitrified tuffs and J-13 and synthetic UE-25 p# 1 well water. Tritiated water was eluted through columns to determine the hydrologic parameters of the columns. This was followed by elution of a Pu-239 solution through the columns.

The major conclusions of this study were 1) The sorption of Pu-239 onto tuffs is kinetically slow. Interpretation of the elution data obtained for Pu-239 transport through tuffs by batch sorption study staff will require information on the kinetics of sorption and desorption. 2) Elution of Pu-239 (prior to the elution of the tritiated water) was not observed, and therefore, formation of Pu polymers that can travel faster than the average water molecule did not take place.

WBS 1.2.3.4.1.5.2 Laboratory Data. In support of the P-tunnel Project, staff (1) completed the FY95 input for the Test Planning Package, milestone 3433, "Test Plan FY95 For P-Tunnel Field Tests of Flow and Transport" and (2) submitted a revised version of the P-Tunnel and Calico Hills outyear plan. Both activities were crucial to resolving some major discrepancies between LBL and LANL in the perceived goals of the field tests.

Staff received diffraction results from S. Levy **on** the QA P-tunnel samples collected in December 1994. They found that all samples were zeolitized to various degrees, but several were confirmed to be nominally "vitric".

G. Bussod received preliminary results on the hydrologic properties of two P-tunnel samples collected in December 1994 from J. Wang. The permeabilities of both samples were surprisingly high.

On 17 March, staff submitted a list of radionuclide and analog tracers proposed by Ines Triay for the P-tunnel tests to the TCO/ESF office (Allan Mitchell in Las Vegas).

On 20 March, LBL successfully tested their packer design in P-tunnel.

Meetings. At a 15 February meeting, Ardyth Simmons, Steve Nelson, Joe Wang, and Gilles Bussod proposed that outyear funding and test planning issues between LBL and Los Alamos could be best resolved by a direct communication between the parties, and Bussod offered to meet with Wang and Neville Cook at LBL on a weekly to bi-weekly basis. Cook, Wang, Tom Dey, and Bussod have since met

Yucca Mountain Site Characterization Project
Variance Analysis Report
Status Thru: MARCH 1995

PARTICIPANT: LANL **PEM:** SIMMONS **WBS:** 1.2.3.2.1.2.2

WBS TITLE: KINETICS AND THERMODYNAMICS OF MINERAL EVOLUTION

P&S ACCOUNT: 0A32122

FY 1995 Cumulative to Date									FY 1995 at Completion					
BCWS	BCWP	ACWP	SV	SV%	SPI	CV	CV%	CPI	BAC	EAC	VAC	VAC%	IEAC	TCPI
193	193	63	0	0	100	130	67.4	306.3	377	304	73	19.4	123	76.3

Analysis

Cumulative Cost Variance:

The cost variance shown for this account is due to the lag in billing for work performed by two subcontractors working under this account and the reporting of these costs in the LANL accounting system. This variance will be corrected as these costs are reported.

Cumulative Schedule Variance:

(Not reportable)

Variance At Complete:

This variance will be corrected as the subcontractor invoices are processed and the costs are reported in the LANL accounting system.

Karen C. West for J. Canepa 4/25/95
P&S ACCOUNT MANAGER DATE

Karen C. West for J. Canepa 4/25/95
TPO DATE

Yucca Mountain Site Characterization Project
Variance Analysis Report
Status Thru: MARCH 1995

PARTICIPANT: LANL PEM: SIMMONS WBS: 1.2.3.4.1.4.2

WBS TITLE: DIFFUSION

P&S ACCOUNT: 0A34142

FY 1995 Cumulative to Date									FY 1995 at Completion					
BCWS	BCWP	ACWP	SV	SV%	SPI	CV	CV%	CPI	BAC	EAC	VAC	VAC%	IEAC	TCPI
0	234	0	234	0	0	234	100	0.0	250	250	0	0	891	6.4

Analysis

Cumulative Cost Variance:

This variance is due to delays in billing costs for this capital equipment item. The variance will be corrected when the cost is billed and reported in the accounting system.

Cumulative Schedule Variance:

(Not reportable)

Variance At Complete:

(Not reportable)

H.L.West for J.R.Canepa 4/25/95
P&S ACCOUNT MANAGER DATE

H.L.West for J.R.Canepa 4/25/95
TPO DATE

Yucca Mountain Site Characterization Project
Variance Analysis Report
Status Thru: MARCH 1995

PARTICIPANT: LANL **PEM: NESBIT** **WBS: 1.2.3.9.7**

WBS TITLE: ESF and SB Test Coordination

P&S ACCOUNT: 0A397

FY 1995 Cumulative to Date									FY 1995 at Completion					
BCWS	BCWP	ACWP	SV	SV%	SPI	CV	CV%	CPI	BAC	EAC	VAC	VAC%	IEAC	TCPI
689	692	447	3	0.4	100.4	245	35.4	154.8	1397	1395	2	0.1	902	74.4

Analysis

Cumulative Cost Variance:

Delays in hiring TCO staff and TBM operations are the major contributors to the cumulative cost variance for this account. Extended work week plans have been implemented to expedite the work . The effects of this effort are reflected in the trend of the correction in the variance from the last two reporting periods.

Cumulative Schedule Variance:

(Not reportable)

Variance At Complete:

(not reportable)

H.A. West for J.R. Canepa 4/25/95
P&S ACCOUNT MANAGER DATE

H.A. West for J.R. Canepa 4/25/95
TPO DATE

Yucca Mountain Site Characterization Project
Variance Analysis Report
Status Thru: MARCH 1995

PARTICIPANT: LANL **PEM:** PATTERSON **WBS:** 1.2.3.3.1.2.6

WBS TITLE: Gaseous-Phase Movement in Unsaturated Zone

P&S ACCOUNT: 0A33126

FY 1995 Cumulative to Date									FY 1995 at Completion					
BCWS	BCWP	ACWP	SV	SV%	SPI	CV	CV%	CPI	BAC	EAC	VAC	VAC%	IEAC	TCPI
136	140	298	4	2.9	102.9	-158	-112.9	47	274	334	-60	-21.9	583	372.2

Analysis

Cumulative Cost Variance:

The change in the test plan for doing work earlier than planned continues to cause the variance on this account. The preparation for testing at the site in the spring and summer has utilized resources earlier than was reflected in the original cost plan. It is expected that the early utilization of these resources will result in a reduced effort later in the schedule.

Cumulative Schedule Variance:

(Not reportable)

Variance At Complete:

This variance is expected to be reduced by completion of work earlier than was scheduled in the test plan.

P&S ACCOUNT MANAGER 4/25/95 DATE TPO 4/25/95 DATE

Cy w/att:
G. Bovarddson, LBL, Berkeley, CA
W.L. Clarke, LLNL, Livermore, CA
L. Costin, SNL, Albuquerque, NM
R.L. Craun, YMSCO, Las Vegas, NV
W.R. Dixon, YMSCO, Las Vegas, NV
J.R. Dyer, YMSCO, Las Vegas, NV
L.D. Foust, M&O/TRW, Las Vegas, NV
A.V. Gil, YMSCO, Las Vegas, NV
L.R. Hayes, USGS, Denver, CO
V.F. Iorii, YMSCO, Las Vegas, NV
S.B. Jones, YMSCO, Las Vegas, NV
M.M. Martin, M&O/TRW, Las Vegas, NV
M.D. Voegele, SAIC, Las Vegas, NV
D.R. Williams, YMSCO, Las Vegas, NV
G.Y. Bussod, EES-13, MS J521
N.Z. Elkins, EES-13/LV, MS J900/527
S.H. Klein, EES-13, MS J521
A.R. Pratt, EES-13, MS J521
A.L. Thompson, EES-13/LV, MS J900/527

RPC File (S. Martinez), MS M321
LA-EES-13 File, MS J521

ENCLOSURE 1