WBS: 9.3.7
QA: N/A

# Civilian Radioactive Waste Management System
# Management & Operating Contractor

## Monthly Summary Report

## July 1994

Prepared for:

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

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Under Contract Number
DE-AC01-91RW00134

# EXECUTIVE SUMMARY

## General Managers's Summary

During the month of July 1994, the Management and Operating (M&O) contractor assisted in a DOE performance audit of the Exploratory Studies Facility (ESF) Design Packages, continued progress in the Tunnel Boring Machine (TBM) assembly, conducted GA-9 Legal-Weight Truck (LWT) durability testing, and directed the Operational Readiness Review (ORR) identification of potential hold points. Of key importance was the withdrawal of the ESF Design Package 2C and resolution of the ORR potential hold points, possibly causing a delay in the startup on the TBM operations. The M&O also participated at the Nuclear Waste Technical Review Board meeting conducted in Denver, CO. Areas addressed were the Proposed Program Approach, Radionuclide Mobilization and Migration Overview, Ground Water Transport of Radionuclides, and Transportation of Spent Nuclear Fuel. The briefing was well received by the board and technical staff.

## Highlights for this reporting period are as follows:

- Supported the performance-based DOE audit of ESF Package 2C. Package 2C was withdrawn from the M&O Configuration Control Board (CCB) process primarily due to the identification of 15 potential Corrective Action Reports (CARs). Re-examination of the design control process and the package will be conducted. The actual schedule for release will be determined after reviewing open CARs and their impact on the package's products.

- The readiness review team conducted a review of Yucca Mountain and the Las Vegas offices for start of construction of the ESF using the TBM. The team completed the review of 85 attributes out of 118 identified in the Implementation Plan for 23 separate core requirements; however, all activities considered essential for initial checkout and testing of the TBM were reviewed. A report is being prepared for review by the Readiness Review Board identifying 37 open item reports of which 24 pertain to the initial checkout and testing phases of TBM operations.

- Assembly of the TBM has progressed significantly and is nearing completion including final adjustments, welding of the cutterhead, installation of the roof shield, and testing of the hydraulic and electrical control systems activities. Movement of the TBM was interrupted by breakage of several transport roller components. Replacement and repair of the damaged transport rollers was completed, and an 8-inch hydraulic ram was obtained to facilitate moving the machine forward in the first week of August 1994. In the Starter Tunnel, the concrete runway from the assembly area to the tunnel portal was completed, and assembly and placement of forms for the concrete gripper walls in the Starter Tunnel began.

- Completed the Value Engineering study report on the power distribution for the North Portal from the Canyon substation. An alternative that will save approximately $7.1M over the baseline was recommended. YMSCO and the design organization are evaluating this recommendation.

- The GA-9 LWT Trailer Durability Test commenced on July 11, 1994, at Allied Signal Automotive Proving Ground. The 30,000 equivalent miles (900 actual miles) hold point was reached on July 19, 1994. No major incidents have occurred during this test period.

- Completed the review and validation of the first draft of the 1994 Spent Fuel Discharge Projections data set. Comparison of 1994 projections to 1993 projections revealed variances in the total predicted spent-fuel discharge for some individual reactors and the total predicted spent-fuel discharge as being greater than the 1993 projection. The magnitudes of these differences do not seem to be related to the magnitude of changes in the assumption for burnup and capacity factors. Since the third draft of the RW-859 is being modified, the spent fuel projection will have to be redone.

**The following are identified as concerns:**

- Based on the results of the performance-based DOE audit, YMP-94-01, the M&O withdrew the ESF Design Package 2C. Corrective actions are in progress to re-examine the Design Control Process and address the overall concerns expressed during the audit. Based on Package 2C results and findings, the August 8, 1994, startup of the Tunnel Boring Machine will most likely not meet this scheduled milestone.

## Performance Measurement Cost and Schedule Variance

WASTE MANAGEMENT SYSTEM
FY 1994
M/E JULY
CRWMS M&O PMS DATA ($000)

Actuals Thru 7/31/1994

| WBS | TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| 1.2 | YMP | 4,468 | 4,940 | 4,825 | 472 | 116 | 46,703 | 44,004 | 45,509 | (2,699) | (1,505) | 57,336 | 58,900 | (1,564) |
| 3.0 | MRS PROJECT | 2,389 | 2,662 | 1,804 | 273 | 858 | 22,863 | 21,519 | 20,112 | (1,344) | 1,407 | 29,881 | 29,712 | 169 |
| 9.1 | PROGRAM QUALITY | 262 | 262 | 260 | 0 | 2 | 2,774 | 2,774 | 2,776 | 0 | (2) | 3,631 | 3,629 | 2 |
| 9.2 | SYS INTEG & COMP | 1,109 | 995 | 816 | (114) | 179 | 9,297 | 8,993 | 8,722 | (304) | 271 | 12,341 | 12,291 | 50 |
| 9.3.2 & 9.3.3 | STRATEGIC PLNG & INTNTL | 151 | 150 | 95 | (1) | 55 | 1,552 | 1,552 | 1,345 | 0 | 207 | 1,917 | 1,747 | 170 |
| 9.3.5 | PROGRAM CONTROL & ADMIN | 123 | 125 | 110 | 2 | 15 | 1,331 | 1,228 | 999 | (103) | 229 | 1,661 | 1,604 | 57 |
| 9.3.6 | INFORMATION MGMT | 1,481 | 1,481 | 1,179 | 0 | 302 | 10,630 | 10,630 | 10,223 | 0 | 407 | 16,470 | 15,751 | 719 |
| 9.3.7 | LEASE TERM. LIABILITY | | | | | | | | | | | 4,473 | 4,473 | 0 |
| | TOTAL PROGRAM | 9,983 | 10,615 | 9,089 | 632 | 1,527 | 95,150 | 90,700 | 89,686 | (4,450) | 1,014 | 127,710 | 128,107 | (397) |

### WBS 1.2 Yucca Mountain Site Characterization Project (YMP)

The current period schedule variance of $472K/11% reflects recovery of variances in Regulatory and ESF. All other variances are within tolerance.

### WBS 3.0 Monitored Retrievable Storage (MRS)

The current period schedule variance of $273K/11% is due primarily to late tasking of the effort being performed by Sandia National Labs (SNL) in support of the Transportation Systems Casks. Additional resources have been added at SNL, and they are expected to complete all assigned tasks, with the exception of Burnup Credit by fiscal year end.

The current period cost variance of $858K/32% is due primarily to accrual/billing lags for work performed by labs and subcontractors and MRS activities that have been less than expected due to refocusing of the program toward MPCs.

### WBS 9.1 Program Quality Assurance

All variances are within tolerance.

### WBS 9.2 Systems Integration and Compliance (SI&C)

The current period cost variance of $179K/18% is primarily due to the cancellation of a follow-on stakeholder workshop planned in July 1994 (due to the expense of the February 1994 workshop), a reversal of the June Winston & Strawn accrual, and assigning Regulatory and Compliance staff members to higher priority Las Vegas tasks.

The current period schedule variance of ($114K/10%) is primarily due to a customer decision to delay the QAP-3-1 delivery of Revision 2 of the CRWMS requirements document. Revisions of other System Requirements Documents slipped as a result of the delay. Revision 2 of the System Requirements Documents will slip approximately 2 months. Since there is no near-term schedule dependence on this revision, there is no impact. Work and funding for the revision to the System Requirements Documents is being deferred to FY95. A Technical Direction Letter to this effect is forthcoming.

### WBS 9.3.2/3 Strategic Planning and International Waste Management

The current period cost variance of $55K/37% and the cumulative cost variance of $207K/13% is due to a decision by the client not to pursue a technical support contract with LLNL and reduced labor costs due to a special assignment of staff to work Las Vegas effort in support of a suitability approach briefing for RW-1. No program impact and corrective actions are required. The LLNL activity has been deleted from the forecast.

### WBS 9.3.5 Program Control and Administration

The cumulative cost variance of $229K/19% is due to an underrun in three primary areas: 1) Program and Schedule Performance Analysis resulting from a Program Summary Level Network not being available; 2) not performing the documenting of the S/W procedure for the LAN; and 3) a reduced level-of-effort support for PACs Operations. In addition, the staff build-up was slower than planned over the course of the fiscal year. A Technical Direction Letter is in process to change the workscope from documenting Software Procedure for the LAN to writing the cost and schedule estimating guidelines.

### WBS 9.3.6 Information Management

The current period cost variance of $302K/20% is due to the delay in booking of ITR and Management and InfoSTREAMS ODC. The actual costs will be reflected in future months.

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# 1. INTRODUCTION

## 1.1 PURPOSE AND SCOPE

This Management and Operating (M&O) Contractor's Monthly Summary Report has been prepared to provide both the M&O and Office of Civilian Waste Management (OCRWM) managers with activity and cost updates. This document is a compilation of reports that addresses both the M&O Management and Contract Work Breakdown Structure (CWBS) (direct) elements.

## 1.2 ORGANIZATION OF THE MONTHLY SUMMARY REPORT

Section 1, Introduction, describes the purpose and scope of the M&O Monthly Summary Report and the Program Management Analyses Criteria.

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-Budget and Reporting (B&R) activities).

Section 3, M&O CWBS Monthly Summary Report, provides detailed summary reports from each of the following CWBS areas: Yucca Mountain Site Characterization Project (YMP), Monitored Retrievable Storage (MRS), Transportation System (TRANS), Waste Acceptance (WA), Quality Assurance (QA), Systems Integration and Compliance (SI&C), Strategic Planning (SP), International Programs (IP), Program Control and Administration (PC&A), and Information Resources Management (IRM). Each CWBS area reports the individual B&R progress by describing progress during the reporting period; identifying deliverables, publications, and presentations; presenting planned work for next month and major near-term milestones; and documenting any issues and concerns. B&R Cost and Schedule data charts, where applicable, accompany each applicable B&R paragraph to support variance analysis descriptions.

Appendix A contains M&O Cost/Obligation Variance, Performance Measurements Data, and Staffing Levels Charts for YMP, MRS, TRANS, WA, QA, SI&C, and Program Management (PM) elements of the CWBS.

Appendix B, FY94 M&O Major Deliverable Status, identifies all major M&O deliverables as defined in the Work Authorization Directives (WADs). It further distinguishes which items have been delivered either early, on-time, or late, and/or have a Baseline Change Request (BCR) number.

Appendix C, M&O Monthly Progress/Update Summary, provides monthly financial reporting data representing the revised B&R values, cumulative totals, and variances.

## 1.3 PROGRAM MANAGEMENT ANALYSIS CRITERIA

Variance analysis thresholds have been established at both the B&R and the WAD level. The thresholds are: 1) $\pm 10\%$ and \$25K for the current month cost and schedule variance; and 2) $\pm 10\%$ for the cumulative cost and schedule and at complete variance.

The data is provided in two formats at the B&R level: 1) Cost Performance Reports (CPRs) showing cost and schedule discrete and level-of-effort work for FY94 newly funded work, FY93 deferred work to be performed in FY94, and carryover commitments from prior years to be expended in FY94; and 2) cost graphs reflecting the sum of all costs to be expended in FY94 and incremental funding status. Appendix A summarizes this same data rolled-up to the WAD level.

Lease termination is now shown as a separate budget line item only on the total program CPR chart and is integrated into the budget on the CPR graph.

Cost graphs now depict FY94 funding, previously funded values (for carryover Commitments/Deferred Work from FY93), and a Total Funding line with the two funding sources combined.

Appendix C, the Monthly Progress/Update Summary Report, summarizes the B&R/WAD cumulative Budgeted Cost of Work Scheduled (BCWS), and the corresponding cumulative Financial Information System actuals.

Changes to the baseline this month are a result of MODs A037 and A038. MOD A037 reobligated FY93 funds to 1.2.06. MOD A038 deobligated unearned FY94 1st Quarter Award Fee from all B&Rs and reobligated it to 1.2.06.

Rounding differences of up to \$2K may occur between the Variance Explanations and corresponding charts due to the rounding method used.

The monthend July charts and graphs continue to reflect a comprehensive bottoms-up forecast of the FY94 Deferred and Commitment efforts that are on contract. Minor amounts of potential deferrable work to FY95 are also in the forecast. The total program negative variance at complete is a result of additional effort for Exploratory Studies Facility Subsurface Design personnel working unbudgeted overtime in support of new DOE-requested tasks.

To either mitigate or reduce this Variance at Completion, a WAD change is near completion to fund new tasks.

Please note that in the Budget and Forecast, MOD A038, has been adjusted in WBS 3.0 and 9.0 areas. The adjustment for the deobligated and reobligated (A037 and A038) in 1.2's B&Rs will occur in M/E August performance measurement data.

# 2. M&O MANAGEMENT STAFF ACTIVITIES

## 2.1 CONTRACTS AND SUBCONTRACTS

- Received DOE approval of all remaining FY93 teammate definitization packages. The DOE contracting officer advised that DOE's review of FY94 teammate packages should be completed on or about August 22, 1994.

- Completed draft copies of the SAIC teaming agreement, single source justification, Request for Proposal (RFP) with the Statement of Work (SOW) and other attachments, and the model subcontract format. Provided copies for comment to DOE Headquarters and YMSCO.

- Received SAIC staffing plan and SOW from the Contracting Officer's Technical Representative (COTR) in Las Vegas to be used in the RFP. The staffing plan and SOW have been reviewed and approved by M&O management in Las Vegas.

- Awarded contract to Carpenter Seller & Associates for Architectural/Engineering services for Wyandotte building in Las Vegas.

- A 3-year option agreement for the letter-of-credit was approved by the Contracting Officer. The agreement extends the period of performance for banking services through July 1997.

## 2.2 FINANCE AND ADMINISTRATION

- Supported DOE Headquarters Accounting Office in auditing M&O 1993 commitments.

- Met with DOE Headquarters Accounting Office for clarification on Phase II of the Management Analysis Reporting System (MARS) implementation.

## 2.3 HUMAN RESOURCES

- Facilitated the Project Management Organization (PMO) offsite held from June 29, 1994 - July 1, 1994, in Las Vegas. The offsite focused on identification of responsibilities for the office managers, integrators, and cross-functional strategic planning and technical integration group.

- Kicked off a training needs analysis of the Contracts/Subcontracts and Systems Engineering organizations. This analysis is designed to determine the baseline training requirements for all M&O employees. The information will then be entered into the new training database.

- Facilitated the System Engineering offsite in Denver at which Duke, MKE, Fluor Daniel, and TRW presented their company approach to system engineering. In general, there is considerable synergy in the system engineering approaches of these four companies.

- Facilitated a joint DOE/M&O off-site for Waste Acceptance, Storage and Transportation on July 18-19, 1994. Mission and strategies were articulated and discussed.

## 2.4 INFORMATION MANAGEMENT SERVICES

- The Vienna Videoconference Center (VCC) was used for 46.55 hours in July 1994 and involved approximately 224 Vienna participants.

## 2.5 MANAGEMENT SYSTEMS

- Submitted proposed WAD revisions for IRM to remove $719K and for Strategic Planning and International Programs to add $340K for repository impacts of plutonium waste.

- Completed the Conceptual Draft Award Fee Period 5 Performance Evaluation Plan. This plan is a significant departure from previous plans in that it contains fewer, high priority, results oriented criteria and measures.

# 3. M&O CWBS MONTHLY PROGRESS/UPDATE REPORT

## 3.1 YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT

### 3.1.1 Systems Engineering: B&R 01-02-01 WBS 1.2.1

**MANAGER:** R. G. Vawter/T. C. Geer

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

#### 3.1.1.1 Progress During Report Period:

- Completed evaluations for Surface-Based Testing (SBT) packages for NRG-6 and NRG-7/7A.

- Distributed the draft Tunnel Boring Machine (TBM) Safety Analysis for review by YMSCO and participants. Conducted a TBM System Safety Analysis comment resolution meeting with affected participants. The risk evaluation criteria used was adopted from the Exploratory Studies Facility (ESF) preliminary Safety Analysis Report (SAR). This change caused a major rewrite in the analysis resulting in a schedule slip of approximately 2 weeks.

- Completed the Value Engineering (VE) study report on the power distribution for the North Portal from the Canyon substation. An alternative that will save approximately $7.1M over the baseline was recommended. Yucca Mountain Site Characterization Office (YMSCO) and the design organization will evaluate this recommendation.

- Completed the Site Design and Test Requirements Document, Revision 1 (YMP/CM-0021), and received final Change Control Board (CCB) approval on July 27, 1994.

- Completed Quality Affecting Procedure (QAP)-3-12, Revision 4. This QAP became effective on July 29, 1994.

- Completed Determination of Importance Evaluation (DIE) for ESF Package 1D 90% Design Review.

#### 3.1.1.2 Deliverables, Publications, and Presentations:

- Delivered the VE Quarterly Report for the 3rd quarter of FY94 to YMSCO.

#### 3.1.1.3 Planned Work for Next Month/Major Near-Term Milestones:

- Continue resolution of ESF Integrated Data and Control System (IDCS) 50% Design Review comments, continue review of IDCS requirements analysis, and begin generation of the DIE for the 90% Design Review.

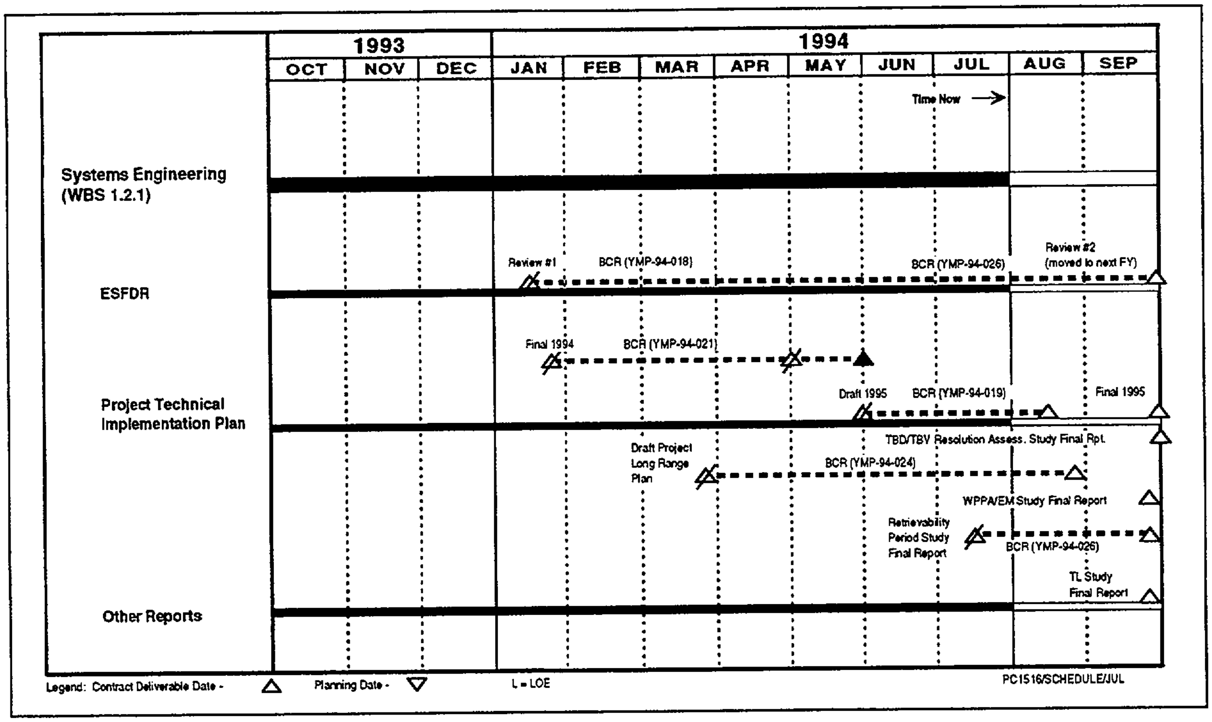
- Continue development of DIEs for:
  - ESF Package 1D (resolution of 90% Design Review comments)
  - ESF IDCS
  - ESF Package 8A
  - Borehole UZ-7a drilling/testing
  - Borehole UZ-16 testing
  - Borehole NRG-6 instrumentation
  - Borehole NRG-7/7A instrumentation use of sulfaset and exemption for air tracer for SBT.
- Evaluate procurement for the TBM and Surface and Subsurface communication specifications.
- Continue evaluation of project procedures AP-5.21Q, AP-5.32Q, YAP-2.3Q (pending), and associated line procedures for implementation of Waste Isolation Evaluation(WIE)/Test Interface Evaluation (TIE)/DIE consolidation process, including full implementation of Tracers, Fluids, and Materials (TFMs) Management Plan.
- Support Assistant Manager, Suitability and Licensing, in resolution of Corrective Action Reports (CARs) associated with TFMs.
- Complete a draft detailed functional analysis and concept of operations for both the repository and engineered barrier.

### 3.1.1.4 Variance Explanation:

- All variances are within tolerance.

### 3.1.1.5 Issues and Concerns:

- None




[NOTE: 1) ESFDR - Review 1 is being slipped to incorporate added tasks assigned to this Work Breakdown Structure (WBS) element. There is no impact other than to hard ESF requirements not being tied down that could, in turn, lead to revisions later on. Review 2 is moved to the next fiscal year.

2) Project Technical Implementation Plan on hold due to reassignment of Resources to Proposed Program Approach (PPA) activities.

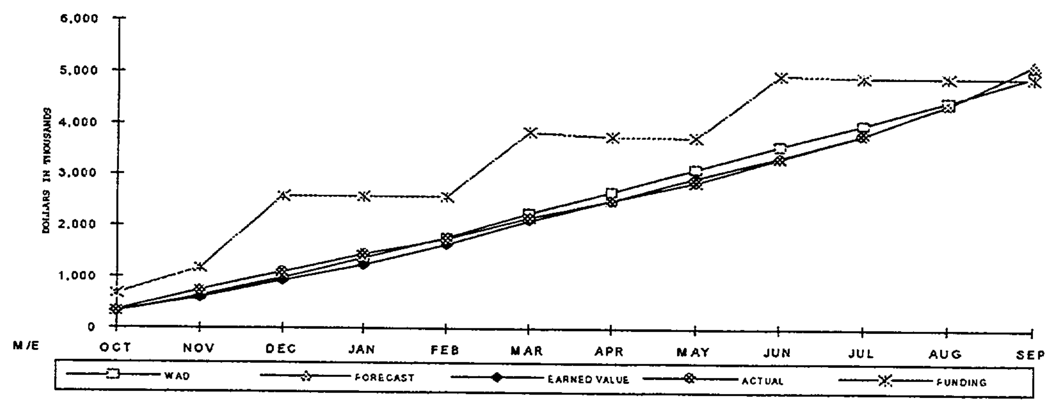
3) Draft Project Long-Range Plan - on hold due to reassignment of Resources to PPA activities.

4) A Baseline Change Request (BCR) was approved extending the delivery date of the Draft Project Long-Range Plan. This change was generated from the focused Advanced Conceptual Design (ACD) restructuring.]

Figure 3-1. MGDS - Systems Engineering Activity Schedule

Actuals Thru 7/31/1994

**DB-01-02-01 SYSTEMS ENGINEERING**




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 319 | 312 | 342 | 403 | 398 | 473 | 421 | 448 | 456 | 429 | 451 | 505 |
| | FORECAST | 340 | 400 | 366 | 345 | 293 | 418 | 337 | 359 | 473 | 464 | 603 | 774 |
| | EARNED VALUE | 316 | 277 | 331 | 311 | 399 | 475 | 384 | 448 | 414 | 448 | | |
| | MONTH ACTUAL | 340 | 400 | 366 | 345 | 293 | 418 | 337 | 359 | 473 | 464 | | |
| | VAR/SCH | (3) | (35) | (11) | (92) | 1 | 2 | (37) | 0 | (42) | 19 | | |
| | VAR/COST | (24) | (123) | (35) | (34) | 106 | 57 | 47 | 89 | (59) | (16) | | |
| CUM | WAD | 319 | 631 | 973 | 1,376 | 1,774 | 2,247 | 2,668 | 3,116 | 3,572 | 4,001 | 4,452 | 4,957 |
| | FORECAST | 340 | 740 | 1,106 | 1,451 | 1,744 | 2,162 | 2,499 | 2,858 | 3,331 | 3,795 | 4,398 | 5,172 |
| | EARNED VALUE | 316 | 593 | 924 | 1,235 | 1,634 | 2,109 | 2,493 | 2,941 | 3,355 | 3,803 | | |
| | ACTUAL | 340 | 740 | 1,106 | 1,451 | 1,744 | 2,162 | 2,499 | 2,858 | 3,331 | 3,795 | | |
| | VAR/SCH | (3) | (38) | (49) | (141) | (140) | (138) | (175) | (175) | (217) | (198) | | |
| | VAR/COST | (24) | (147) | (182) | (216) | (110) | (53) | (6) | 83 | 24 | 8 | | |
| FUNDING | FY94 FUNDING | 337 | 849 | 2,248 | 2,248 | 2,248 | 3,513 | 3,513 | 3,513 | 4,719 | 4,681 | 4,681 | 4,681 |
| | PREV. FUNDED | 330 | 330 | 330 | 330 | 330 | 330 | 243 | 228 | 228 | 228 | 228 | 228 |
| | TOTAL FUNDING | 667 | 1,179 | 2,578 | 2,578 | 2,578 | 3,843 | 3,756 | 3,741 | 4,947 | 4,909 | 4,909 | 4,909 |

**DB-01-02-01 SYSTEMS ENGINEERING**

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY'94 Discrete | 167 | 186 | 170 | 19 | 16 | 1,699 | 1,501 | 1,732 | (198) | (231) | 2,102 | 2,190 | (88) |
| FY'94 LOE | 238 | 238 | 295 | 0 | (57) | 2,086 | 2,086 | 1,946 | 0 | 140 | 2,594 | 2,811 | (217) |
| Subtotal FY'94 | 405 | 424 | 465 | 19 | (41) | 3,785 | 3,587 | 3,678 | (198) | (91) | 4,696 | 5,001 | (305) |
| Deferred (FY'93 to FY'94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | ~0 | 1 | 0 | (1) | 0 | 1 | (1) |
| Deferred (FY'93 to FY'94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | (1) | 0 | 1 | (1) |
| Carryover Commitments (FY'93 to FY'94) | 24 | 24 | 0 | 0 | 24 | 215 | 215 | 114 | 0 | 101 | 259 | 168 | 91 |
| TOTAL | 429 | 448 | 465 | 19 | (17) | 4,000 | 3,802 | 3,793 | (198) | 9 | 4,955 | 5,170 | (215) |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-2. MGDS - Systems Engineering Cost and Schedule Summary

### 3.1.2 Waste Package: B&R 01-02-02 WBS 1.2.2

**MANAGER:** A. M. Segrest/R. L. Fish

**OBJECTIVE(S):** Develop a licensable Waste Package/Engineered Barrier System (EBS) that meets regulatory requirements with sufficient margin for uncertainty as well as any additional requirements of the waste management system.

#### 3.1.2.1 Progress During Report Period:

- Completed drawings for the following Advanced Conceptual Designs (ACDs):

  - 21-PWR/40-BWR Interlaced Plate Design
  - 12-PWR/24-BWR Interlaced Plate Design
  - 12-PWR/24-BWR Tube Design
  - 21-PWR/40-BWR MPC-Disposal Container
  - 12-PWR/24-BWR MPC-Disposal Container.

  These drawings will be used in the "Initial Summary Report for Repository/Waste Package ADS Report."

- Completed verification of Fluid Dynamics Analysis Package simulation of waste package in-drift thermal behavior (without fluid flow) by comparison with analytic solution. The case using fluid motion (convective cooling) is in progress.

#### 3.1.2.2 Deliverables, Publications, and Presentations:

- Prepared a paper concerning thermal loading impacts on material performance for presentation to the Material Research Society.

#### 3.1.2.3 Planned Work for Next Month/Major Near-Term Milestones:

- Prepare for and participate in the ACD Initial Design Review.

- Complete review of the waste package portion of the Advanced Conceptual Design Initial Report, August 31, 1994.

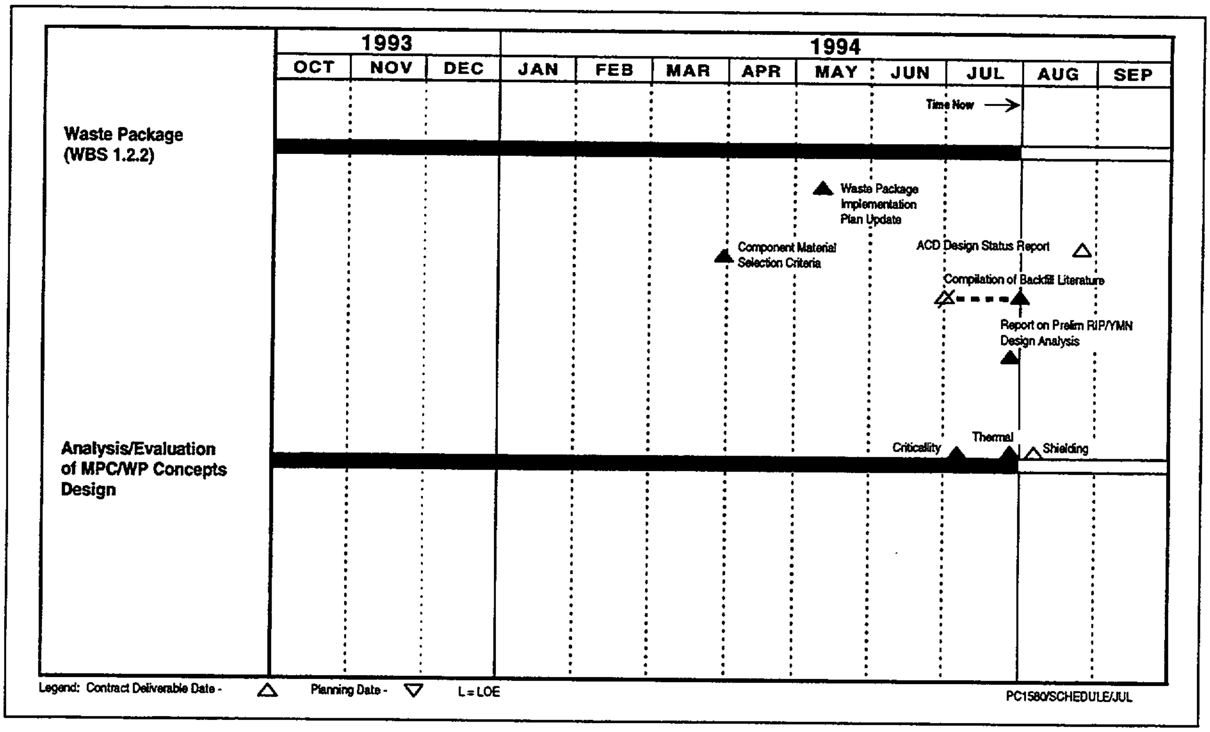
#### 3.1.2.4 Variance Explanation:

- The current period schedule variance of ($55K/29%) is the result of an unplanned effort in waste package design to support accelerated ACD. Schedule variance will continue to improve with additional Babcock & Wilcox (B&W) home office support waste package design rather than in scheduled subcontracted effort. No schedule variance is anticipated by fiscal year-end.

- The current period cost variance of $96K/39% is due to Other Direct Costs (ODC), Automated Data Processing Equipment (ADPE), and B&W travel cost budgets being straight-lined whereas actual costs are not booking accordingly. Impact is a temporary underrun; however, these costs will be incurred by year-end. Expect variance at completion to be within tolerance.

### 3.1.2.5 Issues and Concerns:

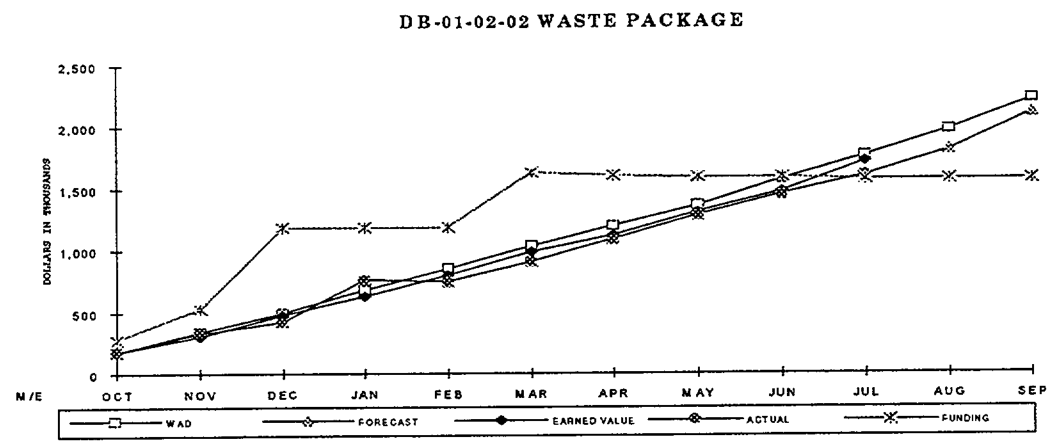
- None.




[Note: Compilation of Backfill Literature - Preliminary planning indicated that this document be delivered in early July. Upon further detailed review, this document will not be completed until late July.]

Figure 3-3. MGDS - Waste Package Activity Schedule

Actuals Thru 7/31/1994




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 177 | 165 | 151 | 188 | 172 | 179 | 166 | 165 | 212 | 190 | 205 | 245 |
| | FORECAST | 174 | 155 | 94 | 340 | (16) | 162 | 177 | 196 | 171 | 149 | 205 | 298 |
| | EARNED VALUE | 174 | 131 | 172 | 152 | 172 | 185 | 134 | 187 | 166 | 245 | | |
| | MONTH ACTUAL | 174 | 155 | 94 | 340 | (16) | 162 | 177 | 196 | 171 | 149 | | |
| | VAR/SCH | (3) | (34) | 21 | (36) | 0 | 6 | (32) | 22 | (46) | 55 | | |
| | VAR/COST | 0 | (24) | 78 | (188) | 188 | 23 | (43) | (9) | (5) | 96 | | |
| CUM | WAD | 177 | 342 | 493 | 681 | 853 | 1,032 | 1,198 | 1,363 | 1,575 | 1,765 | 1,970 | 2,215 |
| | FORECAST | 174 | 329 | 423 | 763 | 747 | 909 | 1,086 | 1,282 | 1,453 | 1,602 | 1,807 | 2,105 |
| | EARNED VALUE | 174 | 305 | 477 | 629 | 801 | 986 | 1,120 | 1,307 | 1,473 | 1,718 | | |
| | ACTUAL | 174 | 329 | 423 | 763 | 747 | 909 | 1,086 | 1,282 | 1,453 | 1,602 | | |
| | VAR/SCH | (3) | (37) | (16) | (52) | (52) | (46) | (78) | (56) | (102) | (47) | | |
| | VAR/COST | 0 | (24) | 54 | (134) | 54 | 77 | 34 | 25 | 20 | 116 | | |
| FUNDING | FY94 FUNDING | 144 | 399 | 1,053 | 1,053 | 1,053 | 1,496 | 1,496 | 1,496 | 1,496 | 1,478 | 1,478 | 1,478 |
| | PREV. FUNDED | 133 | 133 | 133 | 133 | 133 | 133 | 108 | 94 | 94 | 94 | 94 | 94 |
| | TOTAL FUNDING | 277 | 532 | 1,186 | 1,186 | 1,186 | 1,629 | 1,604 | 1,590 | 1,590 | 1,572 | 1,572 | 1,572 |

## DB-01-02-02 WASTE PACKAGE

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY'94 Discrete | 126 | 181 | 83 | 55 | 98 | 1,041 | 993 | 878 | (48) | 115 | 1,334 | 1,209 | 125 |
| FY'94 LOE | 57 | 57 | 67 | 0 | (10) | 633 | 633 | 663 | 0 | (30) | 771 | 788 | (17) |
| Subtotal FY'94 | 183 | 238 | 150 | 55 | 88 | 1,674 | 1,626 | 1,541 | (48) | 85 | 2,105 | 1,997 | 108 |
| Deferred (FY'93 to FY'94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY'93 to FY'94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY'93 to FY'94) | 7 | 7 | 0 | 0 | 7 | 91 | 91 | 59 | 0 | 32 | 110 | 106 | 4 |
| TOTAL | 190 | 245 | 150 | 55 | 95 | 1,765 | 1,717 | 1,600 | (48) | 117 | 2,215 | 2,103 | 112 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-4. MGDS - Waste Package Cost and Schedule Summary

### 3.1.3 Site Investigations: B&R 01-02-03 WBS 1.2.3

**MANAGER:** C. T. Statton

**OBJECTIVE(S):** Provide planning and integration support to YMSCO for near-term and long-term site characterization activities. Provide site investigation test coordination. Carry out evaluations of test-to-test and construction/operations-to-test interference. Support development of a three-dimensional site model.

#### 3.1.3.1 Progress During Report Period:

- Completed collection of input on the location and configuration of the planned borehole USW SRG-3 thus allowing for preparation of the Consolidated Work Scope (CWS) and development of the Test Planning Package and Job Package for this activity.

- Conducted a review of the existing Test Interference Database Information Tracking System (TIDBITS) in response to the changes in procedure NLP-3-16. Initiated an update of the TIDBITS to address a CAR and bring TIDBITS into full compliance with NLP-3-16.

#### 3.1.3.2 Deliverables, Publications, and Presentations:

- Delivered TIEs for the drilling and testing of planned borehole USW SD-7 and NRG7/7a to YMSCO.

- Delivered letters of TIE exemption for wet drilling outside of the Test Interference and Waste Isolation Evaluation Zones and for reaming of boreholes USW NRG-6 and NRG-7/7a to YMSCO.

- Delivered 3-D Modeling Status Report for the 3rd quarter of FY94 to YMSCO.

#### 3.1.3.3 Planned Work for Next Month/Major Near-Term Milestones:

- Finalize the draft Technical Implementation Plan for Site Investigations.

- Complete an update of the Long-Range Plan for Site Investigations, including draft worksheets for Level 2 Milestones.

- Complete TIEs for Site Investigations testing and ESF construction, as required by the Determination of Importance Group.

- Finalize CWS for borehole USW UZ-7a and for the ESF ramp borehole USW SRG-3. Finalize data input for the planning of the remaining ESF ramp boreholes: UE-25, SRG-2, and SRG-1. Initiate workscope consolidation activities for the first FY95 deep borehole.

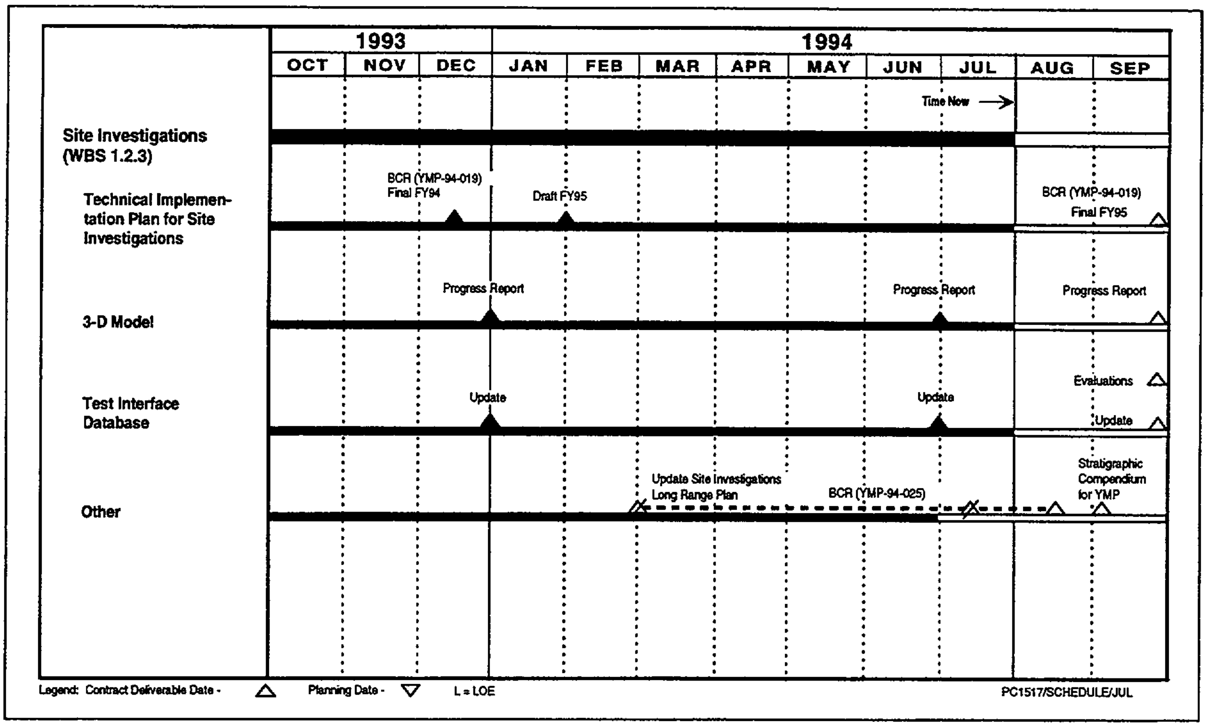
- Complete revision of the Catalog of Planned Boreholes.
- Develop response to three CARs involving TIEs.
- Carry out review of Stratigraphic Compendium.

**3.1.3.4 Variance Explanation:**

- The cumulative schedule variance of ($552K/19%) is due to: 1) the time-phasing of FY95 and time-planning and the development of the Proposed Program Approach (PPA) that has affected long-range planning (the PPA is being evaluated to determine its impact on FY95 and outyear activities--it is anticipated that much of the schedule variance will be eliminated as the implications of the PPA are understood and implemented); 2) the transfer of tracers, fluids, and material workscopes to another YMP participant. A modification is in process to incorporate this change into the WAD.
- The current period cost variance of $32K/11% reflects travel and relocation costs not being incurred as originally planned. The cumulative cost variance of ($398K/17%) is the result of the following two components: 1) With the new YMSCO structure and responsibilities, support to YMSCO WBS managers in Scientific Programs has increased beyond that originally planned. This has included preparation of technical syntheses to support design and planning activities (e.g., technical assessment of ESF seismic design inputs). 2) Required efforts in Surface-Based Test Coordination are greater than planned. As managing the preparation of Test Planning Packages and Job Packages becomes an M&O responsibility, this situation is likely to persist. The variance will be managed either through identification of additional funding or deferment of some lower priority planned activities.

**3.1.3.5 Issues and Concerns:**

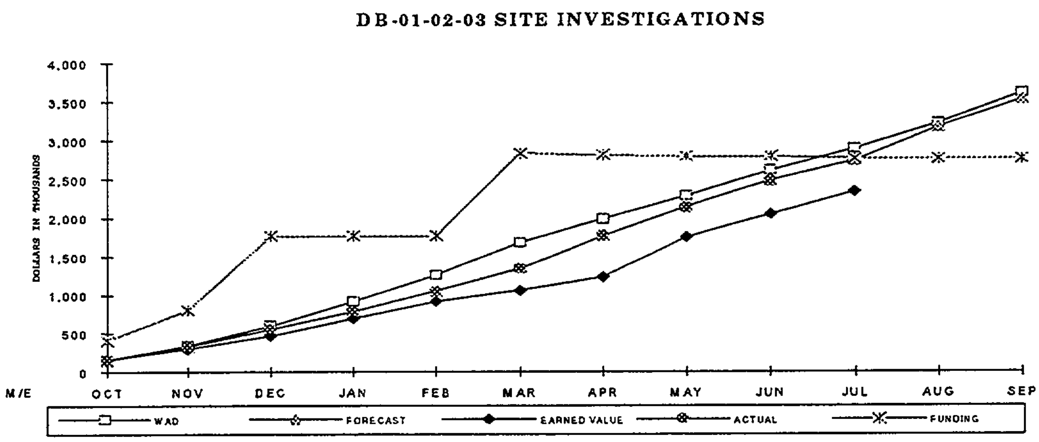
- None.




[NOTE: Update Site Investigations Long-Range Plan - Completion has been delayed due to reassignment of resources to PPA activities.]

Figure 3-5. MGDS - Site Investigations Activity Schedule

Actuals Thru 7/31/1994




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 156 | 182 | 258 | 320 | 345 | 421 | 304 | 302 | 323 | 284 | 322 | 387 |
| | FORECAST | 145 | 175 | 235 | 231 | 266 | 296 | 421 | 373 | 339 | 262 | 422 | 362 |
| | EARNED VALUE | 156 | 136 | 172 | 228 | 225 | 143 | 175 | 516 | 298 | 294 | | |
| | MONTH ACTUAL | 145 | 175 | 235 | 231 | 266 | 296 | 421 | 373 | 339 | 262 | | |
| | VAR/SCH | 0 | (46) | (86) | (92) | (120) | (278) | (129) | 214 | (25) | 10 | | |
| | VAR/COST | 11 | (39) | (63) | (3) | (41) | (153) | (246) | 143 | (41) | 32 | | |
| CUM | WAD | 156 | 338 | 596 | 916 | 1,261 | 1,682 | 1,986 | 2,288 | 2,611 | 2,895 | 3,217 | 3,604 |
| | FORECAST | 145 | 320 | 555 | 786 | 1,052 | 1,348 | 1,769 | 2,142 | 2,481 | 2,743 | 3,165 | 3,527 |
| | EARNED VALUE | 156 | 292 | 464 | 692 | 917 | 1,060 | 1,235 | 1,751 | 2,049 | 2,343 | | |
| | ACTUAL | 145 | 320 | 555 | 786 | 1,052 | 1,348 | 1,769 | 2,142 | 2,481 | 2,743 | | |
| | VAR/SCH | 0 | (46) | (132) | (224) | (344) | (622) | (751) | (537) | (562) | (552) | | |
| | VAR/COST | 11 | (28) | (91) | (94) | (135) | (288) | (534) | (391) | (432) | (400) | | |
| FUNDING | FY94 FUNDING | 266 | 666 | 1,633 | 1,633 | 1,633 | 2,702 | 2,702 | 2,702 | 2,702 | 2,672 | 2,672 | 2,672 |
| | PREV. FUNDED | 134 | 134 | 134 | 134 | 134 | 134 | 107 | 90 | 90 | 90 | 90 | 90 |
| | TOTAL FUNDING | 400 | 800 | 1,767 | 1,767 | 1,767 | 2,836 | 2,809 | 2,792 | 2,792 | 2,762 | 2,762 | 2,762 |

## DB-01-02-03 SITE INVESTIGATIONS

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EARNED | | VARIANCE | | | EARNED | | VARIANCE | | | | |
| | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | FCST | VAC |
| FY94 Discrete | 236 | 246 | 169 | 10 | 77 | 2,400 | 1,849 | 1,711 | (551) | 138 | 2,986 | 2,369 | 617 |
| FY94 LOE | 42 | 42 | 94 | 0 | (52) | 412 | 412 | 1,022 | 0 | (610) | 518 | 1,145 | (627) |
| Subtotal FY94 | 278 | 288 | 263 | 10 | 25 | 2,812 | 2,261 | 2,733 | (551) | (472) | 3,504 | 3,514 | (10) |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY93 to FY94) | 6 | 6 | 0 | 0 | 6 | 84 | 84 | 11 | 0 | 73 | 101 | 13 | 88 |
| TOTAL | 284 | 294 | 263 | 10 | 31 | 2,896 | 2,345 | 2,744 | (551) | (399) | 3,605 | 3,527 | 78 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-6. MGDS - Site Investigations Cost and Schedule Summary

## 3.1.4 Repository: B&R 01-02-04 WBS 1.2.4

**MANAGER:** A. M. Segrest/H. Z. Dokuzoguz

**OBJECTIVE(S):** Provide services to design and develop a licensable repository facility (surface and subsurface).

### 3.1.4.1 Progress During Report Period:

- Participated in the Design Integration Workshop for the ACD at Lawrence Livermore National Laboratory (LLNL). This workshop was held to discuss the integration and issues related to the ACD for Repository, Waste Package, and related testing, data collection, performance analyses, licensing, and other tasks. In attendance were members from YMSCO, DOE-HQ, and various participants.

- Performed QA review of repository horizon selection analysis that establishes the current location of the primary area in the three-dimensional space within Yucca Mountain. The results of the analyses will be used to support the Initial ACD Summary Report.

- Provided assistance to the TBM Readiness Review by compiling information for the TBM implementation plan.

### 3.1.4.2 Deliverables, Publications, and Presentations:

- Submitted a revision of the Repository Engineering Plan for FY94 to YMSCO for review and approval. This submittal completes the Level III milestone and FY94 Work Authorization Directive (WAD) deliverable.

- Submitted a report titled "Repository Retrievability Concepts and Operations Study" to YMSCO for final approval. This submittal will fulfill the criteria for a Level III deliverable for FY94.

### 3.1.4.3 Planned Work for Next Month/Major Near-Term Milestones:

- Continue assembling text and figures from Waste Package Development, Repository Surface and Subsurface Design Groups, for the Initial ACD Summary Report.

### 3.1.4.4 Variance Explanation:

- The current period schedule variance of ($33K/16%) is a result of the redefinition of Repository Design tasks. No milestones are expected to slip this fiscal year.

The current period cost variance of ($128K/75%) reflects a reorganization in the Repository PMO and the acceleration of the ACD design that has resulted in additional charges within WBS 1.2.4. These charges are identified as part of the unfunded tasks that are to be funded by Vienna M&O. The cumulative cost variance of ($277K/14%) is the result of $80K of Subsurface Excavations work for which a change request is in process, the additional PMO charges, and the acceleration of the ACD design.

The at-completion variance of ($422K/17%) is the result of $275K of identified unfunded tasks for accelerated ACD and additional Project Management Organization (PMO) support. These tasks are being funded by Vienna M&O. There is also $80K of Subsurface Excavations work that is in the process of being funded through a change request.

### 3.1.4.5 Issues and Concerns:

- None.

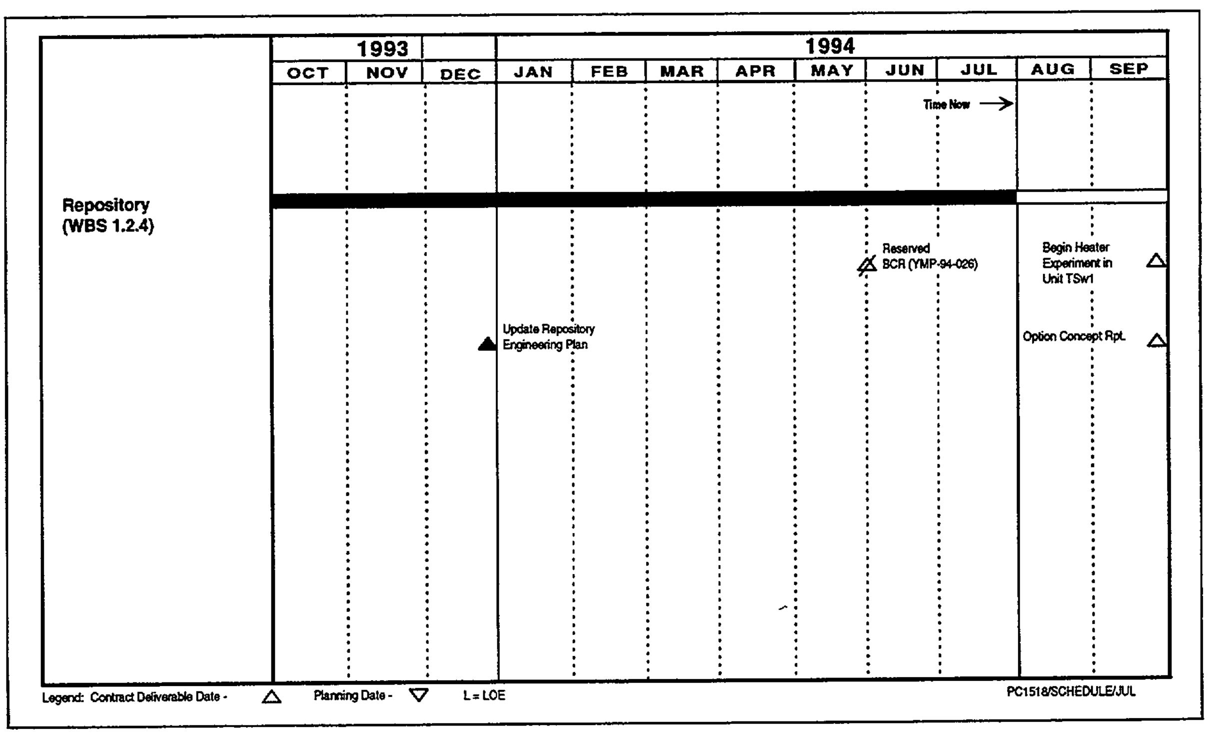
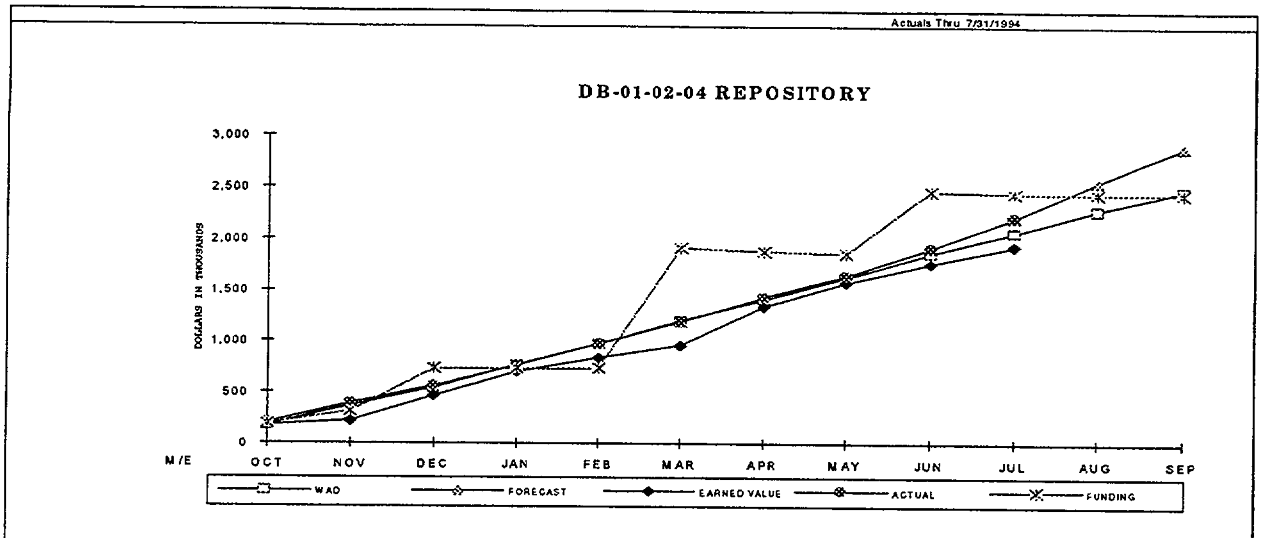



Figure 3-7. MGDS - Repository Activity Schedule




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 174 | 190 | 179 | 224 | 201 | 231 | 214 | 215 | 235 | 202 | 216 | 192 |
| | FORECAST | 195 | 193 | 175 | 197 | 211 | 219 | 245 | 213 | 265 | 297 | 344 | 342 |
| | EARNED VALUE | 174 | 39 | 251 | 235 | 136 | 122 | 385 | 233 | 189 | 169 | | |
| | MONTH ACTUAL | 195 | 193 | 175 | 197 | 211 | 219 | 245 | 213 | 265 | 297 | | |
| | VAR/SCH | 0 | (151) | 72 | 11 | (65) | (109) | 171 | 18 | (46) | (33) | | |
| | VAR/COST | (21) | (154) | 76 | 38 | (75) | (97) | 140 | 20 | (76) | (128) | | |
| CUM | WAD | 174 | 364 | 543 | 767 | 968 | 1,199 | 1,413 | 1,628 | 1,863 | 2,065 | 2,281 | 2,473 |
| | FORECAST | 195 | 388 | 563 | 760 | 971 | 1,190 | 1,435 | 1,648 | 1,913 | 2,210 | 2,554 | 2,896 |
| | EARNED VALUE | 174 | 213 | 464 | 699 | 835 | 957 | 1,342 | 1,575 | 1,764 | 1,933 | | |
| | ACTUAL | 195 | 388 | 563 | 760 | 971 | 1,190 | 1,435 | 1,648 | 1,913 | 2,210 | | |
| | VAR/SCH | 0 | (151) | (79) | (68) | (133) | (242) | (71) | (53) | (99) | (132) | | |
| | VAR/COST | (21) | (175) | (99) | (61) | (136) | (233) | (93) | (73) | (149) | (277) | | |
| FUNDING | FY94 FUNDING | 86 | 209 | 632 | 632 | 632 | 1,814 | 1,814 | 1,814 | 2,419 | 2,401 | 2,401 | 2,401 |
| | PREV. FUNDED | 100 | 100 | 100 | 100 | 100 | 100 | 68 | 46 | 46 | 46 | 46 | 46 |
| | TOTAL FUNDING | 186 | 309 | 732 | 732 | 732 | 1,914 | 1,882 | 1,860 | 2,465 | 2,447 | 2,447 | 2,447 |

## DB-01-02-04 REPOSITORY

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY'94 Discrete | 158 | 125 | 214 | (33) | (89) | 1,557 | 1,436 | 1,557 | (131) | (121) | 1,865 | 2,122 | (257) |
| FY'94 LOE | 43 | 43 | 83 | 0 | (40) | 448 | 448 | 531 | 0 | (83) | 554 | 637 | (83) |
| Subtotal FY'94 | 201 | 168 | 297 | (33) | (129) | 2,015 | 1,884 | 2,088 | (131) | (204) | 2,419 | 2,759 | (340) |
| Deferred (FY'93 to FY'94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 75 | 0 | (75) | 0 | 75 | (75) |
| Deferred (FY'93 to FY'94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 75 | 0 | (75) | 0 | 75 | (75) |
| Carryover Commitments (FY'93 to FY'94) | 1 | 1 | 0 | 0 | 1 | 49 | 49 | 46 | 0 | 3 | 54 | 61 | (7) |
| TOTAL | 202 | 169 | 297 | (33) | (128) | 2,064 | 1,933 | 2,209 | (131) | (276) | 2,473 | 2,895 | (422) |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-8. MGDS - Repository Cost and Schedule Summary

**3.1.5 Regulatory:** B&R 01-02-05 WBS 1.2.5

**MANAGER:** J. L. Younker

**OBJECTIVE(S):** Assure site-related compliance with the Nuclear Regulatory Commission (NRC) agreements, requirements, and policies. Evaluate the performance of the natural and engineered barriers and determine the adequacy of the developed system in terms of compliance with established criteria. Manage technical data produced by site characterization, design development, and performance assessment activities to ensure a traceable, consistent use of available data. Establish the criteria for the issue resolution topical report and license application preparations for the purpose of finalizing positions on various scientific and regulatory concerns.

### 3.1.5.1 Progress During Report Period:

- Provided RW-1 with a response to a DOE request for a brief one-page overview of probabilistic risk assessment. The request originated from a videoconference held on July 8, 1994, in which RW-1 was given a summary of performance assessment activities from all Yucca Mountain Project Participants.

- Completed the WIE on the site preparation activities of borehole UZ-7A.

- Completed WIEs for wet drilling of proposed seismic shotholes and for reaming of an existing borehole NRG-7/7A.

- Forwarded a records package for Study Plan 8.3.1.5.1.1 titled "Characterization of Modern Regional Precipitation" to YMSCO for signature and approval.

### 3.1.5.2 Deliverables, Publications, and Presentations:

- Delivered the 3rd quarter status report on Site Characterization Analysis (SCA) comments to YMSCO.

- Delivered the Quarterly Interactions Summary Report for the 3rd quarter of FY94 to YMSCO.

- Delivered the Regulatory Interactions Quarterly Milestone Report to YMSCO.

- Delivered the Progress Report 10 to YMSCO on July 25, 1994.

- Presented a briefing titled "Significance of Radionuclide Transport Processes to Performance Assessment: The Affect of Time and Alternate Thermal Management Strategies" to the Nuclear Waste Technical Review Board in Denver, Colorado. Several discussions revolved around the incorporation of thermal dependencies in the analyses and the differences between the SNL and M&O assumptions used in Total System Performance Analysis (TSPA) 1993.

- Delivered the FY94 3rd quarter Technical Data Catalog Supplement to YMSCO/TDM. This supplement will be sent to the NRC in accordance with the DOE/NRC Site Specific Agreement.

### 3.1.5.3 Planned Work for Next Month/Major Near-Term Milestones:

- Complete compilation of Regulatory Compliance Plan (RCP), Revision 1.
- Continue work on Federal Register Package for 10 CFR 960 Rulemaking.
- Complete the development of the technical data hierarchy.
- Continue WIE activities in support of ESF design activities.

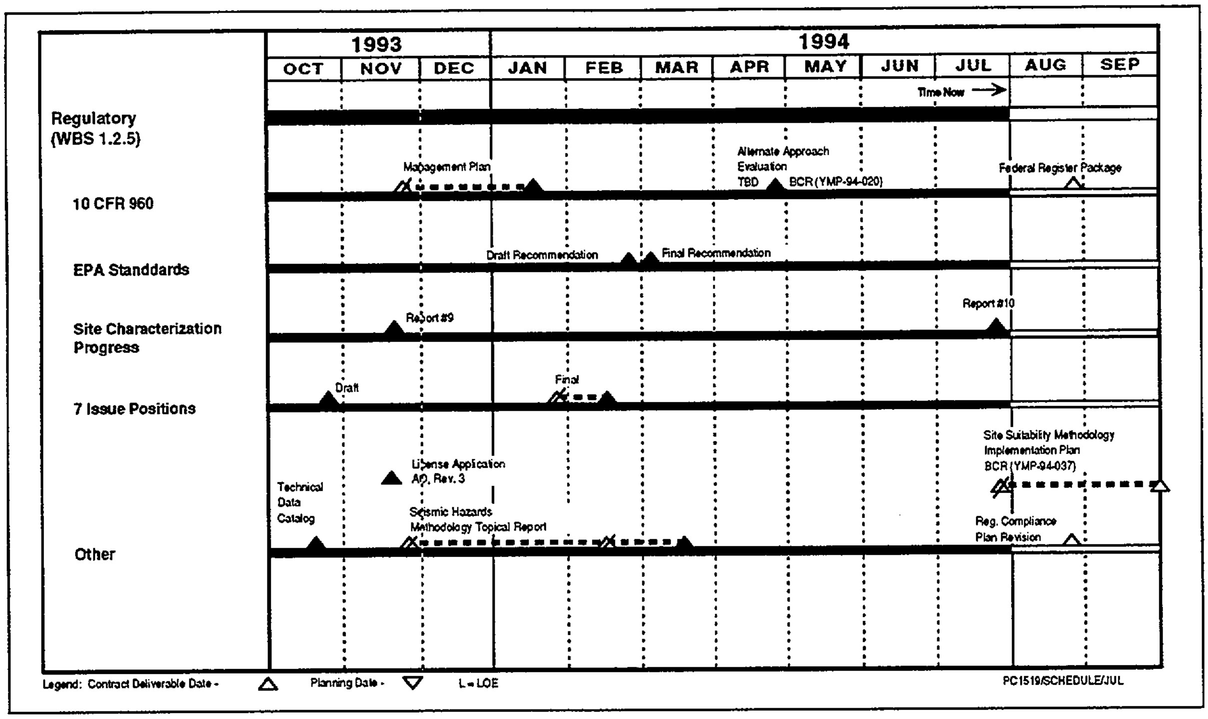
### 3.1.5.4 Variance Explanation:

- The current period schedule variance of $318K/33% reflects the recovery of earlier delays in the Ground Water Travel Time issue resolution and the annotated outline Revision 4. No impact; no corrective action required.

  The current period cost variance of $258K/20% reflects efficient use of time to recover from earlier schedule delays.

### 3.1.5.5 Issues and Concerns:

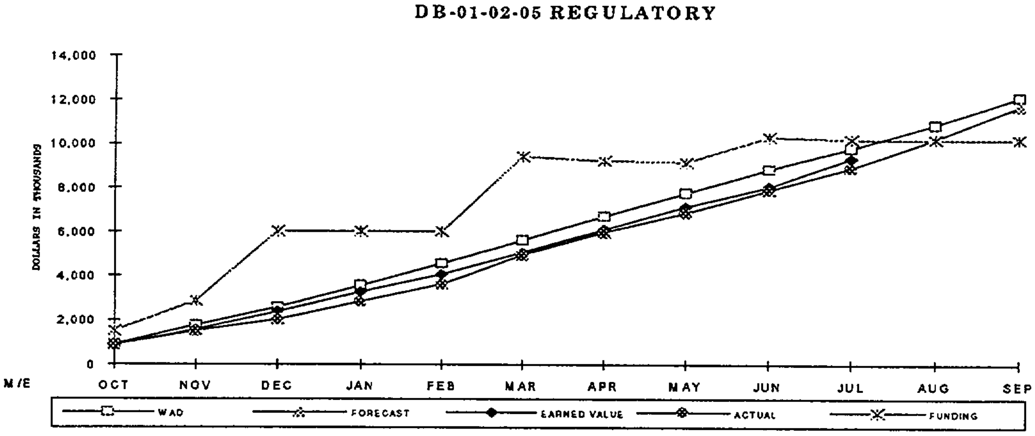
- None.




[NOTE: A BCR to change the delivery date for the Site Suitability Methodology Implementation Plan was submitted. YMSCO has reduced the priority of this plan.]

Figure 3-9. MGDS - Regulatory Activity Schedule

Actuals Thru 7/31/1994




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 888 | 881 | 804 | 986 | 997 | 1,089 | 1,077 | 1,054 | 1,087 | 965 | 1,075 | 1,254 |
| | FORECAST | 866 | 632 | 535 | 789 | 786 | 1,349 | 1,038 | 878 | 1,026 | 1,025 | 1,342 | 1,487 |
| | EARNED VALUE | 868 | 692 | 812 | 884 | 824 | 994 | 1,054 | 1,020 | 912 | 1,283 | | |
| | MONTH ACTUAL | 866 | 632 | 535 | 789 | 786 | 1,349 | 1,038 | 878 | 1,026 | 1,025 | | |
| | VAR/SCH | (20) | (189) | 8 | (102) | (173) | (95) | (23) | (34) | (175) | 318 | | |
| | VAR/COST | 2 | 60 | 277 | 95 | 38 | (355) | 16 | 142 | (114) | 258 | | |
| CUM | WAD | 888 | 1,769 | 2,573 | 3,559 | 4,556 | 5,645 | 6,722 | 7,776 | 8,863 | 9,828 | 10,903 | 12,157 |
| | FORECAST | 866 | 1,498 | 2,033 | 2,822 | 3,608 | 4,957 | 5,995 | 6,873 | 7,899 | 8,924 | 10,266 | 11,753 |
| | EARNED VALUE | 868 | 1,560 | 2,372 | 3,256 | 4,080 | 5,074 | 6,128 | 7,148 | 8,060 | 9,343 | | |
| | ACTUAL | 866 | 1,498 | 2,033 | 2,822 | 3,608 | 4,957 | 5,995 | 6,873 | 7,899 | 8,924 | | |
| | VAR/SCH | (20) | (209) | (201) | (303) | (476) | (571) | (594) | (628) | (803) | (485) | | |
| | VAR/COST | 2 | 62 | 339 | 434 | 472 | 117 | 133 | 275 | 161 | 419 | | |
| FUNDING | FY94 FUNDING | 813 | 2,163 | 5,334 | 5,334 | 5,334 | 8,749 | 8,749 | 8,749 | 9,906 | 9,810 | 9,810 | 9,810 |
| | PREV. FUNDED | 689 | 689 | 689 | 689 | 689 | 689 | 504 | 425 | 425 | 425 | 425 | 425 |
| | TOTAL FUNDING | 1,502 | 2,852 | 6,023 | 6,023 | 6,023 | 9,438 | 9,253 | 9,174 | 10,331 | 10,235 | 10,235 | 10,235 |

**DB-01-02-05 REGULATORY**
FY94 CRWMS M&O PMS DATA ($000)
M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY'94 Discrete | 577 | 867 | 583 | 290 | 284 | 5,838 | 5,325 | 4,810 | (513) | 515 | 7,186 | 6,545 | 641 |
| FY'94 LOE | 365 | 393 | 360 | 28 | 33 | 3,598 | 3,626 | 3,689 | 28 | (63) | 4,510 | 4,769 | (259) |
| Subtotal FY'94 | 942 | 1,260 | 943 | 318 | 317 | 9,436 | 8,951 | 8,499 | (485) | 452 | 11,696 | 11,314 | 382 |
| Deferred (FY'93 to FY'94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 113 | 0 | (113) | 0 | 113 | (113) |
| Deferred (FY'93 to FY'94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 113 | 0 | (113) | 0 | 113 | (113) |
| Carryover Commitments (FY'93 to FY'94) | 23 | 23 | 82 | 0 | (59) | 391 | 391 | 312 | 0 | 79 | 461 | 324 | 137 |
| TOTAL | 965 | 1,283 | 1,025 | 318 | 258 | 9,827 | 9,342 | 8,924 | (485) | 418 | 12,157 | 11,751 | 406 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:
- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-10. MGDS - Regulatory Cost and Schedule Summary

### 3.1.6 Exploratory Studies Facility: B&R 01-02-06 WBS 1.2.6

**MANAGER:** A. M. Segrest/C. J. Nesbitt

**OBJECTIVE(S):** Design and develop an Exploratory Studies Facility (ESF) to support in situ site characterization. Facility to be developed considering licensing requirements for repository. Support DOE in the management of ESF participants including Architect/Engineer, Constructor, and test support personnel to achieve an integrated approach to ESF development. Provide ESF construction management support.

#### 3.1.6.1 Progress During Report Period:

- Completed incorporation of the 90% Design Review comments for ESF Design Package 2C. All comments were closed out. The DIEs and Basis for Design (BFD) were approved by the Subsurface Design Manager. Also completed M&O verification of the design package. Prepared the package for a DOE audit scheduled on July 25-29, 1994.

- Assembly of the TBM has progressed significantly and is nearing completion including final adjustments, welding of the cutterhead, installation of the roof shield and rock bolts, and testing of the hydraulic and electrical control systems activities. Movement of the TBM was interrupted by breakage of several transport roller components. Replacement and repair of the damaged transport rollers was completed and an 8 inch hydraulic ram was obtained to facilitate moving the machine forward in the first week of August 1994. In the Starter Tunnel, the concrete runway from the assembly area to the tunnel portal was completed and assembly and placement of forms for the concrete gripper walls in the Starter Tunnel began.

- Developed a 90-Day schedule of critical start-up items for the TBM. This schedule was delivered to YMSCO for implementation.

- Finalized development of input to FY95 participant planning guidance. Defined criteria for preliminary FY95 ESF Level III Milestones. Conducted three In-Process Reviews of participant planning for FY95-96.

- Prepared cost impact analysis for reduction in scope of the IDCS. Supported the development of a baseline change request and cost impact analysis for implementation of Design Package 2C and submitted it to the YMSCO Change Control Board (CCB) where it was approved.

- Completed incorporation of comments and distribution of report titled "Use of Surplus Diesel Locomotives in the Excavation and Operation of the North Ramp of the ESF."

- Developed briefings titled "DOE Perspective of the Exploratory Studies Facility (ESF) 90% Design Review - Package 1D Title II Opening Remarks" and "DOE Role in the Design Review Process" for presentation by YMSCO Design Lead for Engineering and Field Operations (EFO) at the 90% Design Review Meeting for Package 1D held on July 26, 1994.

### 3.1.6.2 Deliverables, Publications, and Presentations:

- Transmitted Package 1D 90% Design Review documents to the reviewers on July 11, 1994. The design review meeting was conducted for Package 1D in Las Vegas on July 26, 1994. The package received 47 mandatory and 75 non-mandatory comments.

- Released the change request to the Booster Pump Facility revisions for construction on July 20, 1994.

### 3.1.6.3 Planned Work for Next Month/Major Near-Term Milestones:

- Continue working on Package 8A deliverables for the 50% Design Review.

### 3.1.6.4 Variance Explanation:

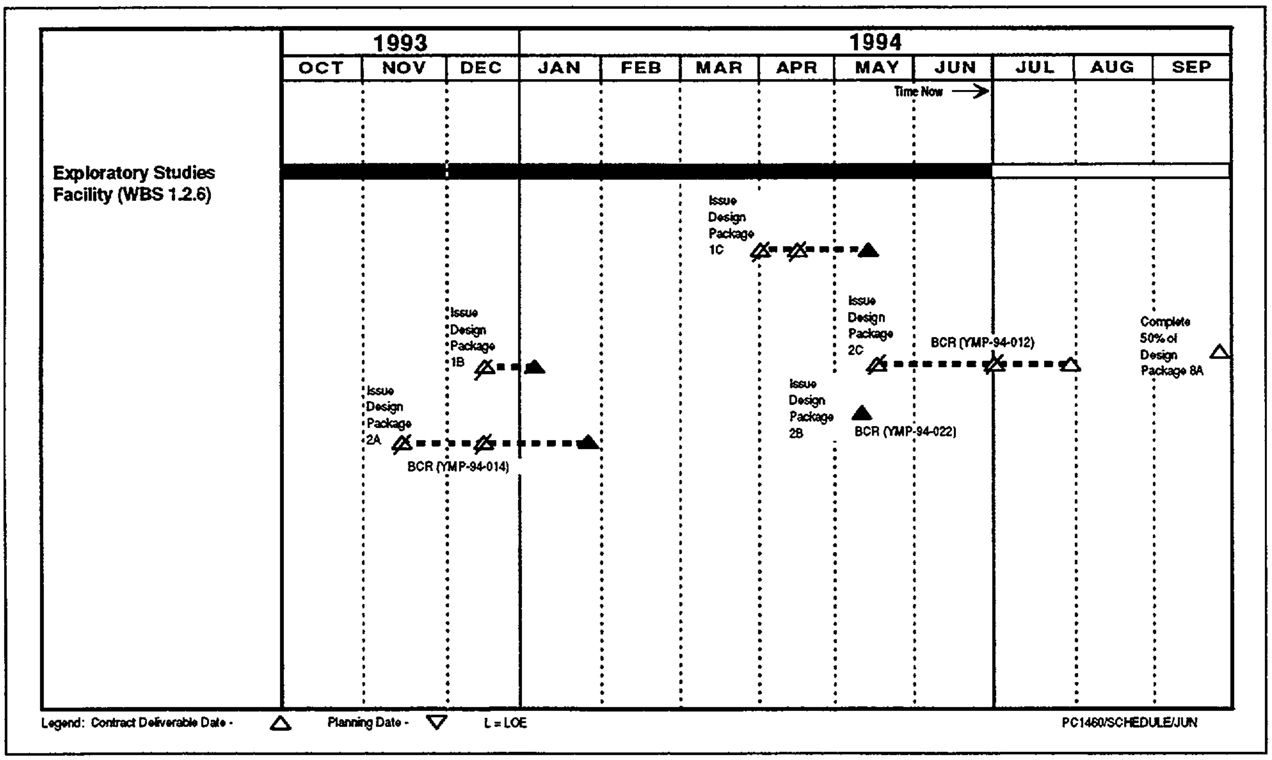
- The current period schedule variance of $103K/11% reflects the effort to recover prior behind-schedule conditions. The cumulative schedule variance of ($1,287K/11%) is due to a change to the baseline schedule for Surface and Subsurface Design Packages. All IDS requirements are now definitized, and no schedule variances are anticipated by fiscal year-end. The remaining cumulative schedule variance is due to the Surface and Subsurface group working on tasks that have resulted in delays in Package 1C and 2C. No scheduled milestones to the revised Construction Schedule are expected to slip into FY95. A BCR to revise the schedule and resources has been approved. The baseline will be revised to reflect the revised schedule upon approval of the WAD modification.

- The cumulative cost variance of ($3,521K/34%) is the result of the following: 1) unbudgeted overtime to support the revised ESF construction schedule (the revised construction schedule resulted in design changes of Surface Design Packages); and 2) Subsurface Design personnel worked unbudgeted overtime to support various studies and investigations; and 3) the M&O has also maintained two unbudgeted construction management support staff employees. Change requests are in process for all of the above stated tasks to request additional budget and to retime-phase the appropriate Design Packages. The current period cost variance of ($165K/15%) is due to the Subsurface Design Package 8A not being correctly time-phased to the new Construction Schedule. This results in an overstated current period BCWS that results in the variance.

- The at-completion variance of ($2,909K/20%) is due to $1,750K of unfunded ESF Design tasks and $760K for the reorganization in Construction Management. These tasks are identified as part of the work to be funded by Vienna M&O.

#### 3.1.6.5 Issues and Concerns

- Based on the results of the performance-based DOE audit, YMP-94-01 M&O withdrew the ESF Design Package 2C. Corrective actions are in progress to re-examine the Design Control Process and address the overall concerns expressed during the audit. Based on Package 2C results and findings, the August 8, 1994, startup of the Tunnel Boring Machine will most likely not meet this scheduled milestone.

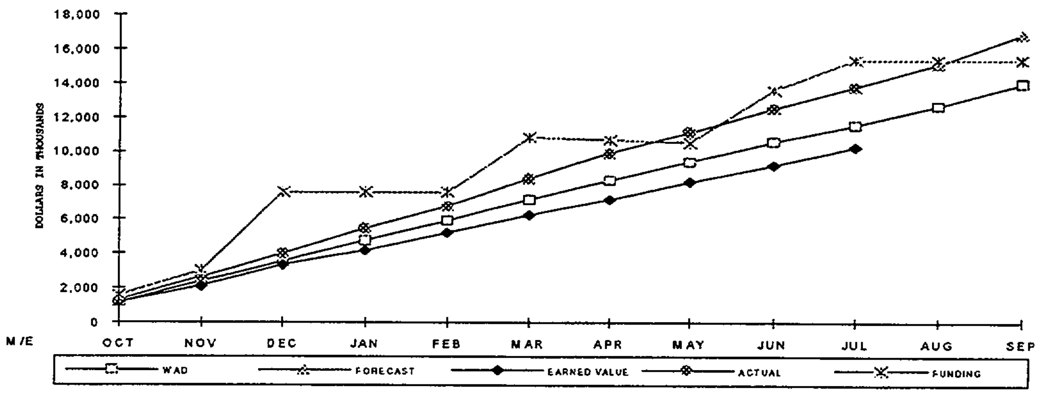



[NOTE: Package 2C was delayed from the planned date of the 1st of August due to problems revealed during the OCRWM QA audit. There will now be two releases: an initial and a final. The initial release is expected on September 6, 1994, and the final is expected on September 30, 1994.]

Figure 3-11. MGDS - ESF Activity Schedule

Actuals Thru 7/31/1994

DB-01-02-06 EXPLORATORY STUDIES FACILITY




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 1,167 | 1,194 | 1,159 | 1,230 | 1,153 | 1,248 | 1,150 | 1,113 | 1,173 | 997 | 1,117 | 1,304 |
| | FORECAST | 1,279 | 1,366 | 1,340 | 1,472 | 1,291 | 1,673 | 1,520 | 1,213 | 1,399 | 1,265 | 1,336 | 1,758 |
| | EARNED VALUE | 1,167 | 936 | 1,221 | 849 | 1,016 | 1,052 | 935 | 1,045 | 976 | 1,100 | | |
| | MONTH ACTUAL | 1,279 | 1,366 | 1,340 | 1,472 | 1,291 | 1,673 | 1,520 | 1,213 | 1,399 | 1,265 | | |
| | VAR/SCH | 0 | (258) | 62 | (381) | (137) | (196) | (215) | (68) | (197) | 103 | | |
| | VAR/COST | (112) | (430) | (119) | (623) | (275) | (621) | (585) | (168) | (423) | (165) | | |
| CUM | WAD | 1,167 | 2,361 | 3,520 | 4,750 | 5,903 | 7,151 | 8,301 | 9,414 | 10,587 | 11,584 | 12,701 | 14,005 |
| | FORECAST | 1,279 | 2,645 | 3,985 | 5,457 | 6,748 | 8,421 | 9,941 | 11,154 | 12,553 | 13,818 | 15,154 | 16,912 |
| | EARNED VALUE | 1,167 | 2,103 | 3,324 | 4,173 | 5,189 | 6,241 | 7,176 | 8,221 | 9,197 | 10,297 | | |
| | ACTUAL | 1,279 | 2,645 | 3,985 | 5,457 | 6,748 | 8,421 | 9,941 | 11,154 | 12,553 | 13,818 | | |
| | VAR/SCH | 0 | (258) | (196) | (577) | (714) | (910) | (1,125) | (1,193) | (1,390) | (1,287) | | |
| | VAR/COST | (112) | (542) | (661) | (1,284) | (1,559) | (2,180) | (2,765) | (2,933) | (3,356) | (3,521) | | |
| FUNDING | FY94 FUNDING | 895 | 2,363 | 6,926 | 6,926 | 6,926 | 10,193 | 10,193 | 10,193 | 13,288 | 14,167 | 14,167 | 14,167 |
| | PREV. FUNDED | 661 | 661 | 661 | 661 | 661 | 661 | 486 | 346 | 346 | 1,234 | 1,234 | 1,234 |
| | TOTAL FUNDING | 1,556 | 3,024 | 7,587 | 7,587 | 7,587 | 10,854 | 10,679 | 10,539 | 13,634 | 15,401 | 15,401 | 15,401 |

**DB-01-02-06 EXPLORATORY STUDIES FACILITY**

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY'94 Discrete | 446 | 549 | 445 | 103 | 104 | 5,325 | 4,038 | 5,668 | (1,287) | (1,630) | 6,392 | 6,823 | (431) |
| FY'94 LOE | 541 | 541 | 798 | 0 | (257) | 5,888 | 5,888 | 7,781 | 0 | (1,893) | 7,198 | 9,657 | (2,459) |
| Subtotal FY'94 | 987 | 1,090 | 1,243 | 103 | (153) | 11,213 | 9,926 | 13,449 | (1,287) | (3,523) | 13,590 | 16,480 | (2,890) |
| Deferred (FY'93 to FY'94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY'93 to FY'94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY'93 to FY'94) | 10 | 10 | 22 | 0 | (12) | 370 | 370 | 371 | 0 | (1) | 414 | 433 | (19) |
| TOTAL | 997 | 1,100 | 1,265 | 103 | (165) | 11,583 | 10,296 | 13,820 | (1,287) | (3,524) | 14,004 | 16,913 | (2,909) |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:
- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-12. MGDS - ESF Cost and Schedule Summary

### 3.1.7 Test Facilities: B&R 01-02-07 WBS 1.2.7

**MANAGER:** R. G. Vawter

**OBJECTIVE(S):** Provide support services to the YMP Site Manager. Provide field interface and coordination with the Safety and Health Program and field site management for the M&O support staff.

#### 3.1.7.1 Progress During Report Period:

- Assisted the DOE Site Manager by compiling and distributing Site Manager's Biweekly Activities Report to the YMP Manager, drafting the weekly activity reports, monthly NORSOC report, biweekly Job Package Cost Reports, and supporting on-site tours and orientation.

#### 3.1.7.2 Deliverables, Publications, and Presentations:

- Submitted the draft FY95 Technical Implementation Plan to YMSCO.

#### 3.1.7.3 Planned Work for Next Month/Major Near-Term Milestones:

- Draft reports for DOE Site Manager.

- Process badge requests as required.

#### 3.1.7.4 Variance Explanation:

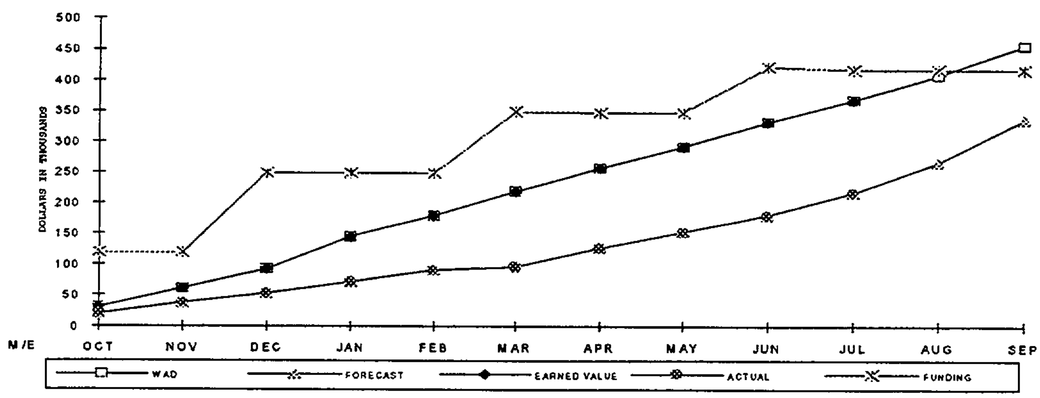
- The cumulative cost variance of $151K/41% and the at-completion variance of $119K/26% are due to administrative staffing delays, less effort than planned by site facilities manager through this fiscal year, and FY93 carryover budget being straight-lined and not booking in accordance with the budgeted plan.

#### 3.1.7.5 Issues and Concerns

- None.

Actuals Thru 7/31/1994

**DB-01-02-07 TEST FACILITIES**




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 30 | 31 | 31 | 53 | 34 | 40 | 38 | 35 | 40 | **36** | 40 | 49 |
| | FORECAST | 20 | 17 | 15 | 19 | 20 | 5 | 31 | 26 | 27 | **37** | 49 | 70 |
| | EARNED VALUE | 30 | 31 | 31 | 53 | 34 | 40 | 38 | 35 | 40 | **36** | | |
| | MONTH ACTUAL | 20 | 17 | 15 | 19 | 20 | 5 | 31 | 26 | 27 | **37** | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** | | |
| | VAR/COST | 10 | 14 | 16 | 34 | 14 | 35 | 7 | 9 | 13 | **(1)** | | |
| CUM | WAD | 30 | 61 | 92 | 145 | 179 | 219 | 257 | 292 | 332 | **368** | 408 | 457 |
| | FORECAST | 20 | 37 | 52 | 71 | 91 | 96 | 127 | 153 | 180 | **217** | 266 | 336 |
| | EARNED VALUE | 30 | 61 | 92 | 145 | 179 | 219 | 257 | 292 | 332 | **368** | | |
| | ACTUAL | 20 | 37 | 52 | 71 | 91 | 96 | 127 | 153 | 180 | **217** | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** | | |
| | VAR/COST | 10 | 24 | 40 | 74 | 88 | 123 | 130 | 139 | 152 | **151** | | |
| FUNDING | FY94 FUNDING | 70 | 70 | 200 | 200 | 200 | 300 | 300 | 300 | 374 | **370** | 370 | 370 |
| | PREV. FUNDED | 49 | 49 | 49 | 49 | 49 | 49 | 48 | 48 | 48 | **48** | 48 | 48 |
| | TOTAL FUNDING | 119 | 119 | 249 | 249 | 249 | 349 | 348 | 348 | 422 | **418** | 418 | 418 |

**DB-01-02-07 TEST FACILITIES**
FY94 CRWMS M&O PMS DATA ($000)
M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY'94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY'94 LOE | 31 | 31 | 37 | 0 | (6) | 324 | 324 | 217 | 0 | 107 | 400 | 296 | 104 |
| Subtotal FY94 | 31 | 31 | 37 | 0 | (6) | 324 | 324 | 217 | 0 | 107 | 400 | 296 | 104 |
| Deferred (FY'93 to FY'94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY'93 to FY'94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY'93 to FY'94) | 5 | 5 | 0 | 0 | 5 | 44 | 44 | 1 | 0 | 43 | 57 | 42 | 15 |
| TOTAL | 36 | 36 | 37 | 0 | (1) | 368 | 368 | 218 | 0 | 150 | 457 | 338 | 119 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:
- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-13. MGDS - Test Facilities Cost and Schedule Summary

### 3.1.8 Project Management: B&R 01-02-09 WBS 1.2.9

**MANAGER:** L. D. Foust/D. B. Abel

**OBJECTIVE(S):** Provide overall Technical Project Office (TPO) management, prepare budgets and schedules, perform project control requirements, provide technical direction, and provide direct support to the project office for cost, schedule, and budget activities. Conduct performance measurement, change control, and plans and procedures development.

#### 3.1.8.1 Progress During Report Period:

- Provided assistance at the Project Monthly Management Meeting wherein the participants provided their year-end close-out forecasts. Major areas covered were commitments carried into FY95, status of FY94 deliverables, FTE forecasts for remainder of FY94, and updated estimates-to-complete.

- Assisted in the project management review of the AM top-down FY95 workscope, cost estimate, and the draft Long-Range Plan. This data was included in the FY95 Participants Planning Guidance.

- Issued the Participants Planning Guidance package to the major participants. The package included workscope to be priced, expected deliverables, Planning and Control System (PACS) specific guidance, instructions for preparing basis of estimates, and Proposed Program Approach (PPA) descriptive materials. The participants are to plan their FY95 and upload it, with the July status, on or before August 11, 1994.

- Coordinated the preparation of the Yucca Mountain submittal of the OMB Phase I Budget request. OCRWM provided on-site support for preparation and review of the budget request.

- Rewrote AP.536 (YAP-5.7Q), Planning, Budgeting, and Work Authorization procedure. Coordinated the review of the procedure and conducted comment resolution.

- Developed transition plan for the implementation of the Level 3 Project Change Control Board. The plan was developed to ensure a consistent level of support during the transition period.

#### 3.1.8.2 Deliverables, Publications, and Presentations:

- None this reporting period.

#### 3.1.8.3 Planned Work for Next Month/Major Near-Term Milestones:

- Continue supporting the FY95 budget formulation rebaselining efforts and the development of the FY96 OMB request.

- Initiate development of FY95 schedule integration.

### 3.1.8.4 Variance Explanation:

- The cumulative cost variance of $794K/14% is the result of delays in staffing of: 1) project control division support, 2) CCB, 3) and Project Planning Division (PPD) (awaiting receipt of work to be performed for OCRWM), and the associated relocation costs. Expect this element to underrun at completion.

### 3.1.8.5 Issues and Concerns

- None.

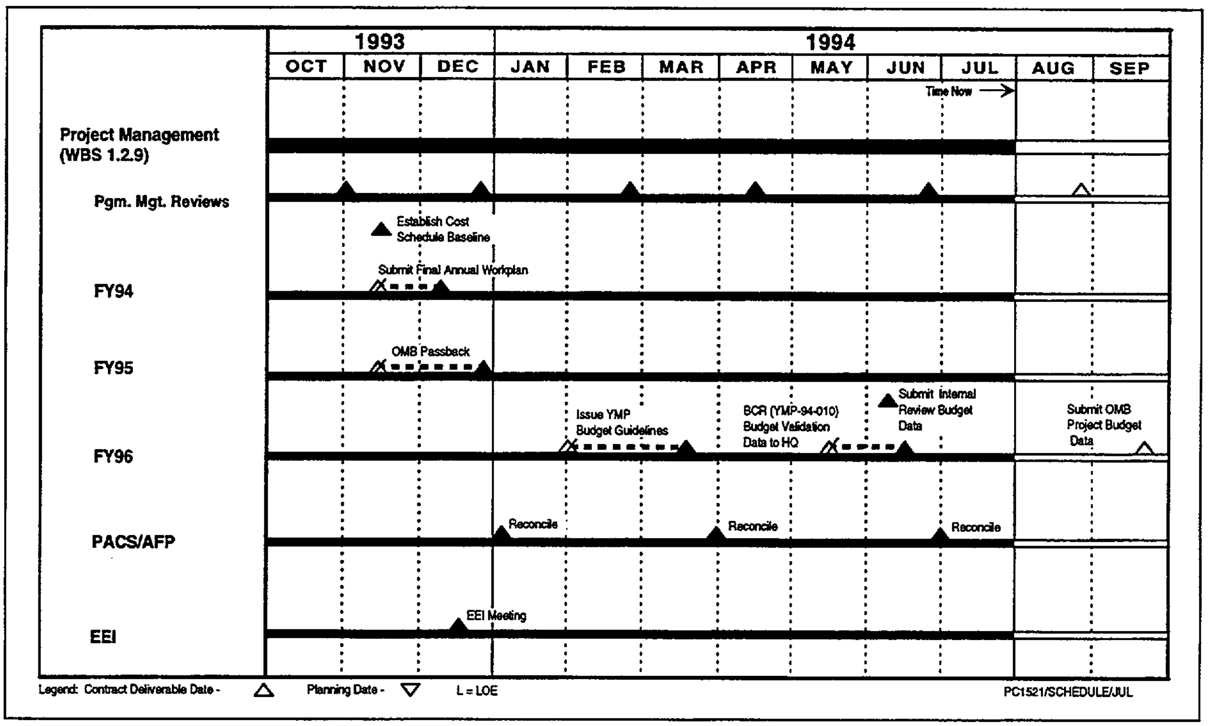
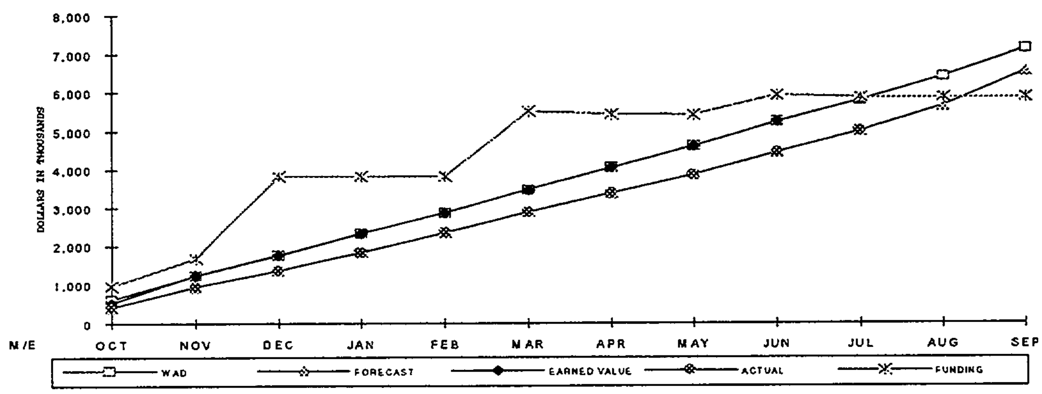



Figure 3-14. MGDS - Project Management Activity Schedule

Actuals Thru 7/31/1994

## DB-01-02-09 PROJECT MANAGEMENT




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 606 | 631 | 518 | 573 | 539 | 607 | 576 | 561 | 625 | 557 | 612 | 717 |
| | FORECAST | 406 | 529 | 440 | 458 | 514 | 536 | 493 | 490 | 568 | 565 | 640 | 897 |
| | EARNED VALUE | 525 | 715 | 519 | 574 | 534 | 607 | 576 | 561 | 625 | 557 | | |
| | MONTH ACTUAL | 406 | 529 | 440 | 458 | 514 | 536 | 493 | 490 | 568 | 565 | | |
| | VAR/SCH | (81) | 84 | 1 | 1 | (5) | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 119 | 186 | 79 | 116 | 20 | 71 | 83 | 71 | 57 | (8) | | |
| CUM | WAD | 606 | 1,237 | 1,755 | 2,328 | 2,867 | 3,474 | 4,050 | 4,611 | 5,236 | 5,793 | 6,405 | 7,122 |
| | FORECAST | 406 | 935 | 1,375 | 1,833 | 2,347 | 2,883 | 3,376 | 3,866 | 4,434 | 4,999 | 5,639 | 6,536 |
| | EARNED VALUE | 525 | 1,240 | 1,759 | 2,333 | 2,867 | 3,474 | 4,050 | 4,611 | 5,236 | 5,793 | | |
| | ACTUAL | 406 | 935 | 1,375 | 1,833 | 2,347 | 2,883 | 3,376 | 3,866 | 4,434 | 4,999 | | |
| | VAR/SCH | (81) | 3 | 4 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 119 | 305 | 384 | 500 | 520 | 591 | 674 | 745 | 802 | 794 | | |
| FUNDING | FY94 FUNDING | 477 | 1,212 | 3,357 | 3,357 | 3,357 | 5,036 | 5,036 | 5,036 | 5,536 | 5,480 | 5,480 | 5,480 |
| | PREV. FUNDED | 476 | 476 | 476 | 476 | 476 | 476 | 386 | 384 | 384 | 384 | 384 | 384 |
| | TOTAL FUNDING | 953 | 1,688 | 3,833 | 3,833 | 3,833 | 5,512 | 5,422 | 5,420 | 5,920 | 5,864 | 5,864 | 5,864 |

## DB-01-02-09 PROJECT MANAGEMENT

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY'94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY'94 LOE | 536 | 536 | 452 | 0 | 84 | 5,443 | 5,443 | 4,414 | 0 | 1,029 | 6,715 | 5,802 | 913 |
| Subtotal FY'94 | 536 | 536 | 452 | 0 | 84 | 5,443 | 5,443 | 4,414 | 0 | 1,029 | 6,715 | 5,802 | 913 |
| Deferred (FY'93 to FY'94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY'93 to FY'94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY'93 to FY'94) | 20 | 20 | 113 | 0 | (93) | 350 | 350 | 583 | 0 | (233) | 407 | 733 | (326) |
| TOTAL | 556 | 556 | 565 | 0 | (9) | 5,793 | 5,793 | 4,997 | 0 | 796 | 7,122 | 6,535 | 587 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-15. MGDS - Project Management Cost and Schedule Summary

## 3.1.9 Quality Assurance: B&R 01-02-16 WBS 1.2.11

**MANAGER:** R. P. Ruth

**OBJECTIVE(S):** Provide overall Quality Assurance (QA) support for M&O activities in Nevada.

### 3.1.9.1 Progress During Report Period:

- Performed reviews of Package 2C, which consists of 151 drawings, 29 specifications, 26 analyses; and the 90% review of Package 1D, which consists of 72 drawings, 38 specifications, 9 analyses, and 3 inputs.

- Participated in the evaluation and design verification of quality affecting documents in Package 2C.

### 3.1.9.2 Deliverables, Publications, and Presentations:

- Submitted the final QAP-16-1, Revision 2, procedure to YMSCO for review.

### 3.1.9.3 Planned Work for Next Month/Major Near-Term Milestones:

- Conduct surveillance 94-NSS-019, Level III Change Control Process, Criteria 3.

### 3.1.9.4 Variance Explanation:

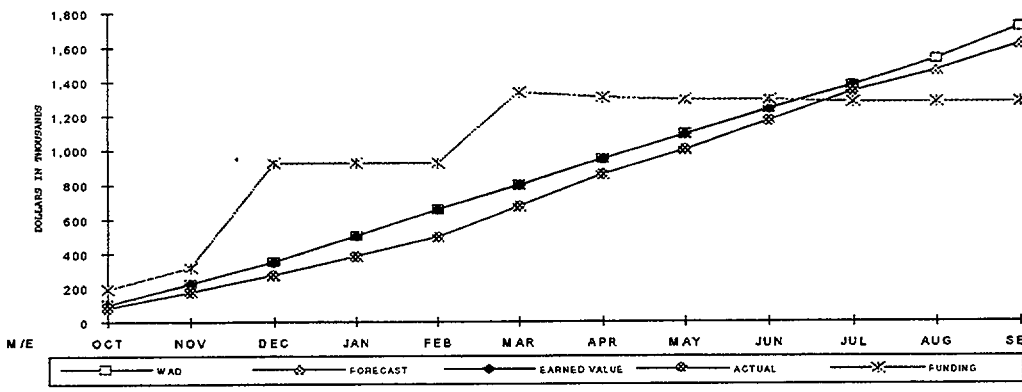
- The current period cost variance of ($33K/24%) is due to relocation costs booking in July that were planned in prior months.

### 3.1.9.5 Issues and Concerns:

- None.

Actuals Thru 7/31/1994

## DB-01-02-16 QUALITY ASSURANCE




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 101 | 121 | 131 | 153 | 152 | 139 | 149 | 143 | 150 | 139 | 153 | 184 |
| | FORECAST | 80 | 96 | 97 | 113 | 111 | 178 | 182 | 141 | 172 | 172 | 120 | 155 |
| | EARNED VALUE | 99 | 122 | 131 | 153 | 152 | 139 | 149 | 143 | 150 | 139 | | |
| | MONTH ACTUAL | 80 | 96 | 97 | 113 | 111 | 178 | 182 | 141 | 172 | 172 | | |
| | VAR/SCH | (2) | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 19 | 26 | 34 | 40 | 41 | (39) | (33) | 2 | (22) | (33) | | |
| CUM | WAD | 101 | 222 | 353 | 506 | 658 | 797 | 946 | 1,089 | 1,239 | 1,378 | 1,531 | 1,715 |
| | FORECAST | 80 | 176 | 273 | 386 | 497 | 675 | 857 | 998 | 1,170 | 1,342 | 1,462 | 1,617 |
| | EARNED VALUE | 99 | 221 | 352 | 505 | 657 | 796 | 945 | 1,088 | 1,238 | 1,377 | | |
| | ACTUAL | 80 | 176 | 273 | 386 | 497 | 675 | 857 | 998 | 1,170 | 1,342 | | |
| | VAR/SCH | (2) | (1) | (1) | (1) | (1) | (1) | (1) | (1) | (1) | (1) | | |
| | VAR/COST | 19 | 45 | 79 | 119 | 160 | 121 | 88 | 90 | 68 | 35 | | |
| FUNDING | FY94 FUNDING | 91 | 221 | 825 | 825 | 825 | 1,238 | 1,238 | 1,238 | 1,238 | 1,224 | 1,224 | 1,224 |
| | PREV. FUNDED | 99 | 99 | 99 | 99 | 99 | 99 | 69 | 55 | 55 | 55 | 55 | 55 |
| | TOTAL FUNDING | 190 | 320 | 924 | 924 | 924 | 1,337 | 1,307 | 1,293 | 1,293 | 1,279 | 1,279 | 1,279 |

## DB-01-02-16 QUALITY ASSURANCE

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY'94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY'94 LOE | 136 | 136 | 162 | 0 | (26) | 1,323 | 1,323 | 1,216 | 0 | 107 | 1,650 | 1,488 | 162 |
| Subtotal FY'94 | 136 | 136 | 162 | 0 | (26) | 1,323 | 1,323 | 1,216 | 0 | 107 | 1,650 | 1,488 | 162 |
| Deferred (FY'93 to FY'94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY'93 to FY'94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY'93 to FY'94) | 3 | 3 | 11 | 0 | (8) | 54 | 54 | 126 | 0 | (72) | 63 | 129 | (66) |
| TOTAL | 139 | 139 | 173 | 0 | (34) | 1,377 | 1,377 | 1,342 | 0 | 35 | 1,713 | 1,617 | 96 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-16. MGDS - Quality Assurance Cost and Schedule Summary

### 3.1.10 Information Management: B&R 01-02-17 WBS 1.2.12

**MANAGER:** J. W. Frank

**OBJECTIVE(S):** Provide overall Information Resource Management, Records Management, Document and Drawing Management Services, and Publications Support for the M&O contract at the YMP site in Las Vegas, Nevada.

#### 3.1.10.1 Progress During Report Period:

- Assisted in the OCRWM performance-based audit of the M&O Design Package 2C by arranging preparations for the audit in ESF and, during the audit, responding to requests for retrieval of records and copies of controlled documents.

- Conducted the implementation of I-RIS (Interim Records Indexing System) on July 5, 1994.

#### 3.1.10.2 Deliverables, Publications, and Presentations:

- None during this reporting period.

#### 3.1.10.3 Planned Work for Next Month/Major Near-Term Milestones:

- Provide information management support as required.

#### 3.1.10.4 Variance Explanation:

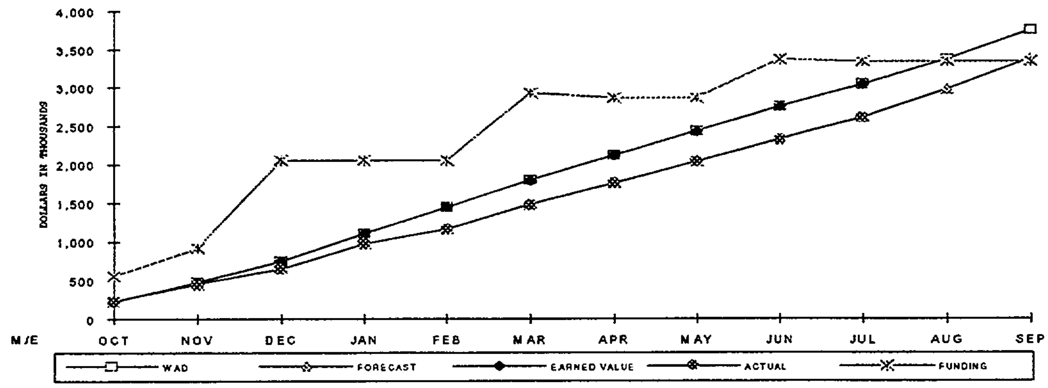
- The cumulative cost variance of $433K/14% is due to a reorganization in Records Management that has resulted in less labor support required than originally planned, less travel than planned, and carryover costs not being booked. An underrun of $370K is anticipated at year end. No impacts are expected to the FY94 Information Management schedule.

#### 3.1.10.5 Issues and Concerns:

- None.

Actuals Thru 7/31/1994

DB-01-02-17 INFORMATION MANAGEMENT




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 233 | 241 | 277 | 356 | 340 | 350 | 323 | 311 | 320 | 289 | 327 | 378 |
| | FORECAST | 229 | 220 | 206 | 321 | 188 | 317 | 279 | 275 | 288 | 283 | 364 | 403 |
| | EARNED VALUE | 221 | 254 | 277 | 356 | 338 | 350 | 323 | 311 | 320 | 289 | | |
| | MONTH ACTUAL | 229 | 220 | 206 | 321 | 188 | 317 | 279 | 275 | 288 | 283 | | |
| | VAR/SCH | (12) | 13 | 0 | 0 | (2) | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | (8) | 34 | 71 | 35 | 150 | 33 | 44 | 36 | 32 | 6 | | |
| CUM | WAD | 233 | 474 | 751 | 1,107 | 1,447 | 1,797 | 2,120 | 2,431 | 2,751 | 3,040 | 3,367 | 3,745 |
| | FORECAST | 229 | 449 | 655 | 976 | 1,164 | 1,481 | 1,760 | 2,035 | 2,323 | 2,606 | 2,970 | 3,373 |
| | EARNED VALUE | 221 | 475 | 752 | 1,108 | 1,446 | 1,796 | 2,119 | 2,430 | 2,750 | 3,039 | | |
| | ACTUAL | 229 | 449 | 655 | 976 | 1,164 | 1,481 | 1,760 | 2,035 | 2,323 | 2,606 | | |
| | VAR/SCH | (12) | 1 | 1 | 1 | (1) | (1) | (1) | (1) | (1) | (1) | | |
| | VAR/COST | (8) | 26 | 97 | 132 | 282 | 315 | 359 | 395 | 427 | 433 | | |
| FUNDING | FY94 FUNDING | 253 | 615 | 1,750 | 1,750 | 1,750 | 2,625 | 2,625 | 2,625 | 3,125 | 3,095 | 3,095 | 3,095 |
| | PREV. FUNDED | 304 | 304 | 304 | 304 | 304 | 304 | 240 | 240 | 240 | 240 | 240 | 240 |
| | TOTAL FUNDING | 557 | 919 | 2,054 | 2,054 | 2,054 | 2,929 | 2,865 | 2,865 | 3,365 | 3,335 | 3,335 | 3,335 |

## DB-01-02-17 INFORMATION MANAGEMENT

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY'94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY'94 LOE | 269 | 269 | 265 | 0 | 4 | 2,842 | 2,842 | 2,471 | 0 | 371 | 3,500 | 3,195 | 305 |
| Subtotal FY'94 | 269 | 269 | 265 | 0 | 4 | 2,842 | 2,842 | 2,471 | 0 | 371 | 3,500 | 3,195 | 305 |
| Deferred (FY'93 to FY'94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY'93 to FY'94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY'93 to FY'94) | 19 | 19 | 17 | 0 | 2 | 196 | 196 | 135 | 0 | 61 | 242 | 176 | 66 |
| TOTAL | 288 | 288 | 282 | 0 | 6 | 3,038 | 3,038 | 2,606 | 0 | 432 | 3,742 | 3,371 | 371 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-17. MGDS - Information Management Cost and Schedule Summary

### 3.1.11 Environmental, Safety and Health: B&R 01-02-13 WBS 1.2.13

**MANAGER:** C. C. Pierce

**OBJECTIVE(S):** Provide overall Environmental, Safety, and Health support to the Civilian Radioactive Waste Management System (CRWMS) M&O contract activities at the YMP site in Las Vegas, Nevada.

#### 3.1.11.1 Progress During Report Period:

- Initiated work on the Area 25 Base Camp Fire Hazard Risk Assessment at the request of the Assistant Manager, Environmental Safety and Health.
- Initiated procurement of wheeled fire extinguishers for use on the ESF pad.
- Developed air sampling and respirator use strategy with REECo and SAIC for initial TBM operations.
- Conducted an evaluation of the System Safety Analysis prepared by System Engineering.

#### 3.1.11.2 Deliverables, Publications, and Presentations:

- None the reporting period.

#### 3.1.11.3 Planned Work for Next Month/Major Near-Term Milestones:

- Continue working on the Vertical Slice Review.
- Initiate the management appraisal of Reynolds Electrical Engineering Company, Inc.

#### 3.1.11.4 Variance Explanation:

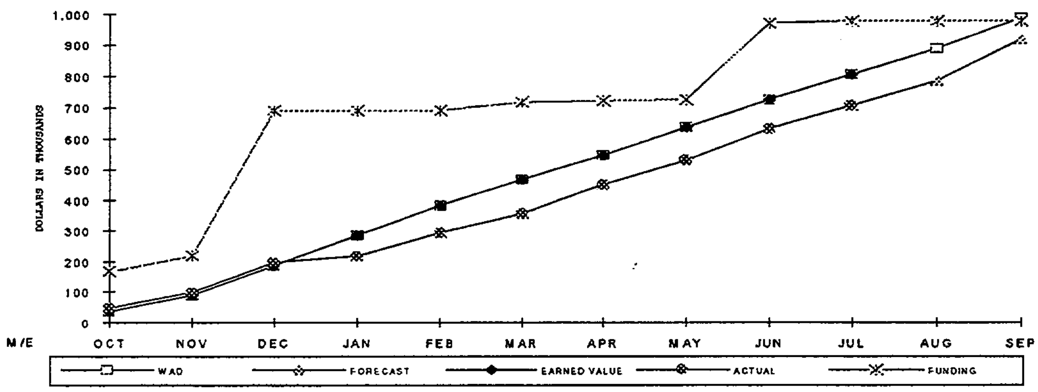
- The cumulative cost variance of $99K/12% is due to less travel taken than planned, lower relocation costs incurred than budgeted to date due to hiring local personnel, lower legal costs for Winston/Strawn than planned to date, and less ODC spent than planned. An underrun of $69K is expected at fiscal year end.

#### 3.1.11.5 Issues and Concerns

- None.

Actuals Thru 7/31/1994

## DB-01-02-13 ENVIRONMENT, SAFETY, AND HEALTH




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 36 | 53 | 98 | 99 | 97 | 86 | 78 | 90 | 89 | 80 | 84 | 98 |
| | FORECAST | 47 | 52 | 99 | 20 | 77 | 62 | 94 | 79 | 103 | 74 | 79 | 132 |
| | EARNED VALUE | 36 | 53 | 98 | 99 | 97 | 86 | 78 | 90 | 89 | 80 | | |
| | MONTH ACTUAL | 47 | 52 | 99 | 20 | 77 | 62 | 94 | 79 | 103 | 74 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | (11) | 1 | (1) | 79 | 20 | 24 | (16) | 11 | (14) | 6 | | |
| CUM | WAD | 36 | 89 | 187 | 286 | 383 | 469 | 547 | 637 | 726 | 806 | 890 | 988 |
| | FORECAST | 47 | 99 | 198 | 218 | 295 | 357 | 451 | 530 | 633 | 707 | 786 | 918 |
| | EARNED VALUE | 36 | 89 | 187 | 286 | 383 | 469 | 547 | 637 | 726 | 806 | | |
| | ACTUAL | 47 | 99 | 198 | 218 | 295 | 357 | 451 | 530 | 633 | 707 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | (11) | (10) | (11) | 68 | 88 | 112 | 96 | 107 | 93 | 99 | | |
| FUNDING | FY94 FUNDING | 185 | 236 | 708 | 708 | 708 | 734 | 734 | 734 | 979 | 971 | 971 | 971 |
| | PREV. FUNDED | (17) | (17) | (17) | (17) | (17) | (17) | (12) | (8) | (8) | 8 | 8 | 8 |
| | TOTAL FUNDING | 168 | 219 | 691 | 691 | 691 | 717 | 722 | 726 | 971 | 979 | 979 | 979 |

## DB-01-02-13 ENVIRONMENT, SAFETY, AND HEALTH

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY94 LOE | 80 | 80 | 74 | 0 | 6 | 798 | 798 | 683 | 0 | 115 | 979 | 894 | 85 |
| Subtotal FY94 | 80 | 80 | 74 | 0 | 6 | 798 | 798 | 683 | 0 | 115 | 979 | 894 | 85 |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 0 | 0 | 0 | 8 | 8 | 24 | 0 | (16) | 8 | 25 | (17) |
| TOTAL | 80 | 80 | 74 | 0 | 6 | 806 | 806 | 707 | 0 | 99 | 987 | 919 | 68 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:
- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-18. MGDS - ES&H Cost and Schedule Summary

**3.1.12 Institutional:** B&R 01-02-14 WBS 1.2.14

**MANAGER**: C. D. Van Natta

**OBJECTIVE(S):** Under the direction of the Director of Public Affairs, provide overall Public Affairs and Institutional support for the M&O contract activities at the YMP site in Las Vegas, Nevada, including integration of institutional activities, requirements, scope, scheduling, costs, budgeting, controlling, and reporting. Implement the M&O Public Affairs Plan, assist in developing and maintaining university and community college programs and contacts, provide backup support for enhancing public schools programs and interactions, and assist existing institutional/outreach programs.

### 3.1.12.1 Progress During Report Period:

- Conducted preliminary coordination with personnel from Child Haven regarding the possible 1995 Community Involvement Project.

- Coordinated a meeting for the Summer Employment Program with the University of Las Vegas, Nevada, representatives: Director of Career Services, Vice President of Research, Professor of Mechanical Engineering, Assistant Director Career Services/Programs Coordinator, and YMSCO/Institutional Affairs Specialist.

### 3.1.13.2 Deliverables, Publications, and Presentations:

- Presented Institutional's portion of the FY95 Top-Down Planning Phase II for the Office of Director of Public Affairs.

### 3.1.13.3 Planned Work for Next Month/Major Near-Term Milestones:

- Provided YMSCO with the Institutional assistance as required.

### 3.1.13.4 Variance Explanation:

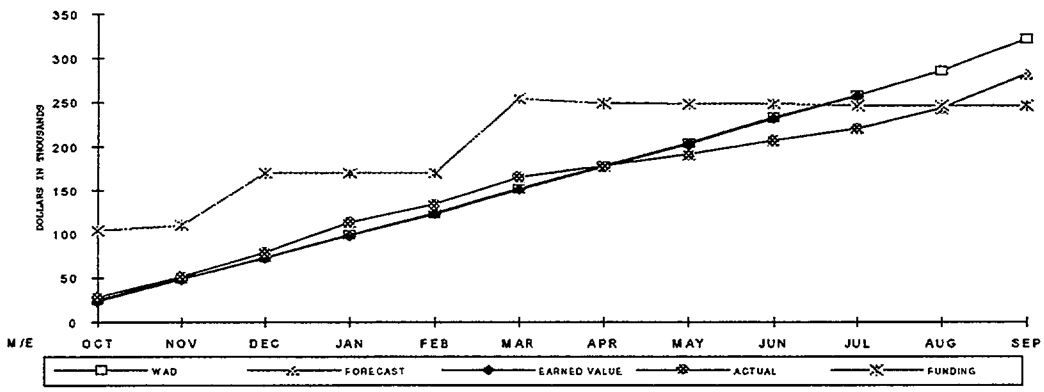
- The cumulative cost variance of $37K/15% and at-complete variance of $40K/12% reflect an employee being out on medical leave for the last 3 months and not expected to return this fiscal year. Travel has also not been taken as planned.

### 3.1.12.5 Issues and Concerns:

- None.

Actuals Thru 7/31/1994

DB-01-02-14 INSTITUTIONAL




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 25 | 24 | 24 | 26 | 25 | 28 | 26 | 26 | 29 | 25 | 28 | 36 |
| | FORECAST | 28 | 23 | 28 | 34 | 21 | 31 | 13 | 13 | 16 | 13 | 23 | 39 |
| | EARNED VALUE | 23 | 25 | 24 | 26 | 25 | 28 | 26 | 26 | 29 | 25 | | |
| | MONTH ACTUAL | 28 | 23 | 28 | 34 | 21 | 31 | 13 | 13 | 16 | 13 | | |
| | VAR/SCH | (2) | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | (5) | 2 | (4) | (8) | 4 | (3) | 13 | 13 | 13 | 12 | | |
| CUM | WAD | 25 | 49 | 73 | 99 | 124 | 152 | 178 | 204 | 233 | 258 | 286 | 322 |
| | FORECAST | 28 | 51 | 79 | 113 | 134 | 165 | 178 | 191 | 207 | 220 | 243 | 282 |
| | EARNED VALUE | 23 | 48 | 72 | 98 | 123 | 151 | 177 | 203 | 232 | 257 | | |
| | ACTUAL | 28 | 51 | 79 | 113 | 134 | 165 | 178 | 191 | 207 | 220 | | |
| | VAR/SCH | (2) | (1) | (1) | (1) | (1) | (1) | (1) | (1) | (1) | (1) | | |
| | VAR/COST | (5) | (3) | (7) | (15) | (11) | (14) | (1) | 12 | 25 | 37 | | |
| FUNDING | FY94 FUNDING | 66 | 72 | 132 | 132 | 132 | 216 | 216 | 216 | 216 | 214 | 214 | 214 |
| | PREV. FUNDED | 38 | 38 | 38 | 38 | 38 | 38 | 33 | 32 | 32 | 32 | 32 | 32 |
| | TOTAL FUNDING | 104 | 110 | 170 | 170 | 170 | 254 | 249 | 248 | 248 | 246 | 246 | 246 |

DB-01-02-14 INSTITUTIONAL

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY94 LOE | 22 | 22 | 12 | 0 | 10 | 230 | 230 | 196 | 0 | 34 | 288 | 256 | 32 |
| Subtotal FY94 | 22 | 22 | 12 | 0 | 10 | 230 | 230 | 196 | 0 | 34 | 288 | 256 | 32 |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY93 to FY94) | 3 | 3 | 1 | 0 | 2 | 28 | 28 | 23 | 0 | 5 | 34 | 26 | 8 |
| TOTAL | 25 | 25 | 13 | 0 | 12 | 258 | 258 | 219 | 0 | 39 | 322 | 282 | 40 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-19. MGDS - Institutional Cost and Schedule Summary

### 3.1.13 Support Services: B&R 01-02-15 WBS 1.2.15

**MANAGER:** D. B. Abel/ M. F. Penovich

**OBJECTIVE(S):** Provide overall Training and Support Services for the M&O activities at the YMP site in Las Vegas, Nevada.

#### 3.1.13.1 Progress During Report Period:

- Conducted 30 training classes attended by 242 M&O employees.

- Conducted the following training activities:

  - M&O Program Indoctrination
  - M&O Safety and Health
  - M&O Supervisor Safety and Health
  - Computer Security Awareness
  - M&O Project Overview
  - Ergonomics
  - Managing Personal Growth
  - TRW Business Ethics
  - QARD (DOE/RW-0333P)
  - QAP-5-1, Revision 3/QAP-5-2, Revision 1.

#### 3.1.13.2 Deliverables, Publications, and Presentations:

- Presented Design Control procedure training and QAP-3-12, Revision 4, training to Engineering Design personnel.

#### 3.1.13.3 Planned Work for Next Month/Major Near-Term Milestones:

- Present M&O training per the August 1994 M&O training calendar.

- Complete preparations to conduct M&O General Employee Training.

- Identify M&O environmental safety and health training requirements and begin lesson plan preparation.

- Continue to develop training for all M&O procedures.

- Participate in the M&O Training Department semi-annual planning meeting.

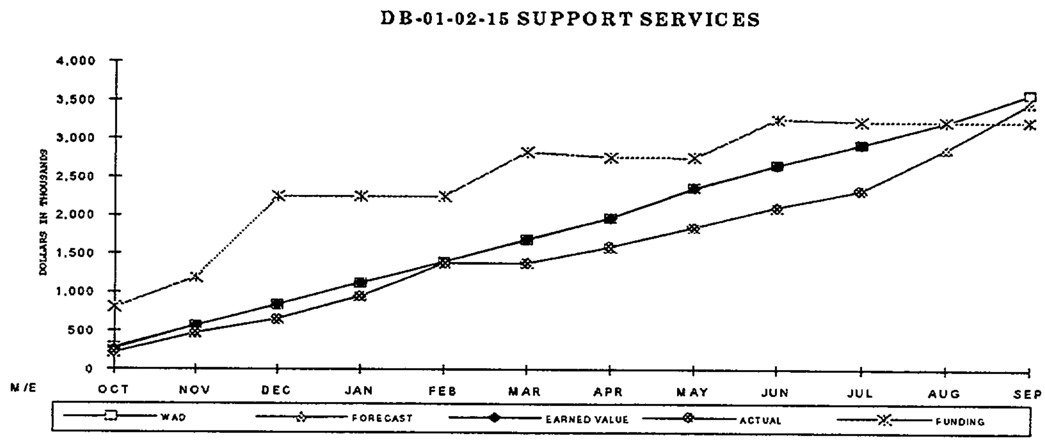
### 3.1.13.4 Variance Explanation:

- The current period cost variance of $56K/20% and the cumulative cost variance of $599K/20% is due to ODC, ADPE, furniture and facility cost budgets being straight-lined whereas actual costs are not booking accordingly. Impact is temporary underrun; however, these costs will be incurred over the fiscal year. No variance at completion is expected.

### 3.1.13.5 Issues and Concerns:

- None.

Actuals Thru 7/31/1994




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 288 | 279 | 272 | 281 | 276 | 291 | 281 | 387 | 299 | 275 | 292 | 363 |
| | FORECAST | 213 | 259 | 186 | 293 | 427 | (1) | 212 | 258 | 263 | 219 | 539 | 607 |
| | EARNED VALUE | 261 | 307 | 273 | 282 | 274 | 291 | 281 | 387 | 299 | 275 | | |
| | MONTH ACTUAL | 213 | 259 | 186 | 293 | 427 | (1) | 212 | 258 | 263 | 219 | | |
| | VAR/SCH | (27) | 28 | 1 | 1 | (2) | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 48 | 48 | 87 | (11) | (153) | 292 | 69 | 129 | 36 | 56 | | |
| CUM | WAD | 288 | 567 | 839 | 1,120 | 1,396 | 1,687 | 1,968 | 2,355 | 2,654 | 2,929 | 3,221 | 3,584 |
| | FORECAST | 213 | 472 | 658 | 951 | 1,378 | 1,377 | 1,589 | 1,847 | 2,110 | 2,329 | 2,868 | 3,475 |
| | EARNED VALUE | 261 | 568 | 841 | 1,123 | 1,397 | 1,688 | 1,969 | 2,356 | 2,655 | 2,930 | | |
| | ACTUAL | 213 | 472 | 658 | 951 | 1,378 | 1,377 | 1,589 | 1,847 | 2,110 | 2,329 | | |
| | VAR/SCH | (27) | 1 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | VAR/COST | 48 | 96 | 183 | 172 | 19 | 311 | 380 | 509 | 545 | 601 | | |
| FUNDING | FY94 FUNDING | 431 | 819 | 1,877 | 1,877 | 1,877 | 2,458 | 2,458 | 2,458 | 2,958 | 2,929 | 2,929 | 2,929 |
| | PREV. FUNDED | 371 | 371 | 371 | 371 | 371 | 371 | 304 | 299 | 299 | 299 | 299 | 299 |
| | TOTAL FUNDING | 802 | 1,190 | 2,248 | 2,248 | 2,248 | 2,829 | 2,762 | 2,757 | 3,257 | 3,228 | 3,228 | 3,228 |

## DB-01-02-15 SUPPORT SERVICES

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY94 LOE | 252 | 252 | 213 | 0 | 39 | 2,678 | 2,678 | 2,224 | 0 | 454 | 3,277 | 3,236 | 41 |
| Subtotal FY94 | 252 | 252 | 213 | 0 | 39 | 2,678 | 2,678 | 2,224 | 0 | 454 | 3,277 | 3,236 | 41 |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY93 to FY94) | 23 | 23 | 6 | 0 | 17 | 251 | 251 | 106 | 0 | 145 | 306 | 241 | 65 |
| TOTAL | 275 | 275 | 219 | 0 | 56 | 2,929 | 2,929 | 2,330 | 0 | 599 | 3,583 | 3,477 | 106 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-20. MGDS - Support Services Cost and Schedule Summary

## 3.2 MONITORED RETRIEVABLE STORAGE (MRS) PROJECT

### 3.2.1 Systems Engineering: B&R 03-01-01 WBS 3.1.1

**MANAGER:** J. B. Blandford/R. K. Crow

**OBJECTIVE(S):** Conduct systems engineering and integration activities in support of the Monitored Retrievable Storage (MRS) Project.

#### 3.2.1.1 Progress During Report Period:

- Completed QAP-3-1 review and initiated comment resolution of the Multi-Purpose Canister (MPC) Subsystem Design Requirements Document (DRD), MPC Transportation Cask Subsystem DRD, and the On-Site Transfer/On-Site Storage (OST/OSS) Segments DRD to MRS/MPC Design. Comments were submitted to respective preparers.

- Reviewed the Corrective Action Request (CAR) responses developed by Storage and Transportation (S&T) and OCRWM/CER and revised responses to To Be Verifieds (TBVs), To Be Determineds (TBDs), and Q-List CARs. Met with RW-421, MRS/MPC Design, M&O Quality Assurance (QA), and OCRWM QA to discuss MRS/MPC Design Group's QAP-2-3 classifications and related QAP-3-9 analysis.

#### 3.2.1.2 Deliverables, Publications, and Presentations:

- Delivered and briefed RW-46 on the preliminary draft MRS Project Systems Engineering Management Plan (SEMP), Revision 2.

- Briefed RW-46 System Engineering Team Leader on MRS System Engineering activities and issues for FY94-95, including the draft FY95 budget.

#### 3.2.1.3 Planned Work for Next Month/Major Near-Term Milestones:

- Complete resolution of OCRWM comments on the preliminary draft MRS Project SEMP, Revision 1.

- Complete the draft Studies, Models, and Databases, and Risk Management Plan (RMP) Appendices to the MRS Project SEMP.

- Complete S&T Q-List Package Implementing Line Procedure and submit recommended S&T Q-List to OCRWM for approval.

#### 3.2.1.4 Variance Explanation:

- The current period cost variance of ($73K/71%) is the result of additional unplanned effort required to revise the MPC System DRDs and traceability analyses in response to comments received from internal reviews. The cumulative cost variance of

($539K/47%) is primarily due to the additional unplanned effort required to revise the MPC System DRDs in response to changes in the Program-level requirements documents being prepared under WBS 3.1.7 and to changes required to respond to comments received from internal reviews.

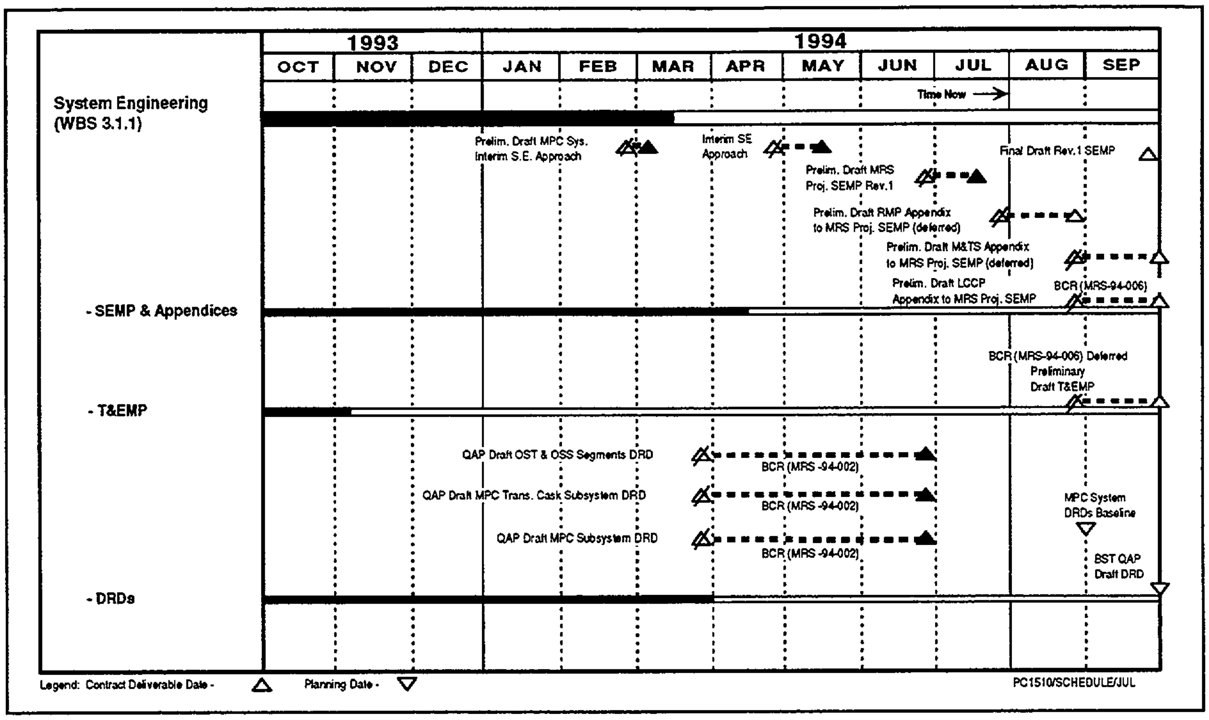
- The cumulative schedule variance of ($231K/17%) is primarily due to delays in the development of the MPC System DRDs. Delays in DRD development are the result of unplanned effort required to revise the MPC System DRDs in response to changes in the Program-level requirements documents, changes in documentation being prepared under WBS 3.1.7., and changes required to respond to comments received from internal reviews. High priority support of the Request for Proposal (RFP) development caused delays in the start of system Engineering planning documents.

- The at-complete variance of ($237K/13%) is primarily due to the additional unplanned effort required to revise the MPC System DRDs.

- With contract award not expected until March 1995, the delay in the MPC System DRDs is not expected to have any significant project impact. A Baseline Change Request (BCR) has been submitted to defer the preliminary drafts for the Life-Cycle Cost Plan and Test and Evaluation Master Plan (TEMP) to FY95. The preliminary draft MRS Project Risk Management Plan will be completed later this fiscal year with no significant project impact expected due to the delay.

#### 3.2.1.5 Issues and Concerns:

- None.

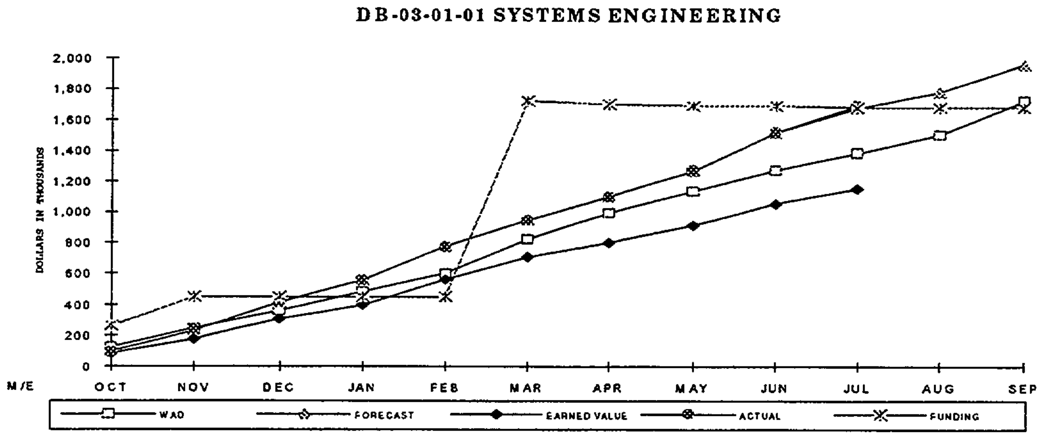



[NOTE: 1) Delays in System Engineering Management Plan (SEMP) and Appendices are the result of allocation of staff to higher priority SOW and Product Data Sheet (PDS) support. A BCR has been approved to defer the LCCP and TEMP to FY95.

2) Development of the BST DRD has been delayed due to uncertainties in the OCRWM Acquisition Strategy. A BCR has been submitted to delete the BST DRD for FY94.]

Figure 3-21. MRS - Systems Engineering Activity Schedule

Actuals Thru 7/31/1994




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 127 | 119 | 118 | 117 | 119 | 220 | 176 | 141 | 139 | 112 | 116 | 222 |
| | FORECAST | 97 | 135 | 184 | 140 | 218 | 172 | 154 | 171 | 249 | 161 | 102 | 180 |
| | EARNED VALUE | 88 | 89 | 130 | 90 | 164 | 146 | 94 | 110 | 143 | 103 | | |
| | MONTH ACTUAL | 97 | 135 | 184 | 140 | 218 | 172 | 154 | 171 | 249 | 176 | | |
| | VAR/SCH | (39) | (30) | 12 | (27) | 45 | (74) | (82) | (31) | 4 | (9) | | |
| | VAR/COST | (9) | (46) | (54) | (50) | (54) | (26) | (60) | (61) | (106) | (73) | | |
| CUM | WAD | 127 | 246 | 364 | 481 | 600 | 820 | 996 | 1,137 | 1,276 | 1,388 | 1,504 | 1,726 |
| | FORECAST | 97 | 232 | 416 | 556 | 774 | 946 | 1,100 | 1,271 | 1,520 | 1,681 | 1,783 | 1,963 |
| | EARNED VALUE | 88 | 177 | 307 | 397 | 561 | 707 | 801 | 911 | 1,054 | 1,157 | | |
| | ACTUAL | 97 | 232 | 416 | 556 | 774 | 946 | 1,100 | 1,271 | 1,520 | 1,696 | | |
| | VAR/SCH | (39) | (69) | (57) | (84) | (39) | (113) | (195) | (226) | (222) | (231) | | |
| | VAR/COST | (9) | (55) | (109) | (159) | (213) | (239) | (299) | (360) | (466) | (539) | | |
| FUNDING | FY94 FUNDING | 152 | 339 | 339 | 339 | 339 | 1,613 | 1,613 | 1,613 | 1,613 | 1,601 | 1,601 | 1,601 |
| | PREV. FUNDED | 112 | 112 | 112 | 112 | 112 | 112 | 91 | 82 | 82 | 82 | 82 | 82 |
| | TOTAL FUNDING | 264 | 451 | 451 | 451 | 451 | 1,725 | 1,704 | 1,695 | 1,695 | 1,683 | 1,683 | 1,683 |

**DB-03-01-01 SYSTEMS ENGINEERING**
FY94 CRWMS M&O PMS DATA ($000)
M/E JULY
Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 30 | 27 | 100 | (3) | (73) | 494 | 289 | 827 | (205) | (538) | 547 | 934 | (387) |
| FY94 LOE | 74 | 74 | 72 | 0 | 2 | 824 | 824 | 823 | 0 | 1 | 1,097 | 971 | 126 |
| Subtotal FY94 | 104 | 101 | 172 | (3) | (71) | 1,318 | 1,113 | 1,650 | (205) | (537) | 1,644 | 1,905 | (261) |
| Deferred (FY93 to FY94) Discrete | 8 | 2 | 4 | (6) | (2) | 36 | 11 | 15 | (25) | (4) | 41 | 36 | 5 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 |
| Subtotal Deferred | 8 | 2 | 4 | (6) | (2) | 36 | 11 | 15 | (25) | (4) | 43 | 38 | 5 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 0 | 0 | 0 | 33 | 33 | 30 | 0 | 3 | 37 | 18 | 19 |
| TOTAL | 112 | 103 | 176 | (9) | (73) | 1,387 | 1,157 | 1,696 | (230) | (538) | 1,724 | 1,961 | (237) |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast
- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-22. MRS - Systems Engineering Cost and Summary Schedule

### 3.2.2 Site Investigations: B&R 03-01-03 WBS 3.1.3

**MANAGER:** J. B. Blandford/L. Smith

**OBJECTIVE(S):** Assist DOE by providing support to the Negotiator in identifying potential hosts for the Monitored Retrievable Storage (MRS) facility. Prepare to conduct testing at the selected site.

#### 3.2.2.1 Progress During Report Period:

- No significant activities to report.

#### 3.2.2.2 Deliverables, Publications, and Presentations:

- None this reporting period.

#### 3.2.2.3 Planned Work for Next Month/Major Near-Term Milestones:

- Provide site investigation assistance to the Nuclear Waste Negotiator and potential MRS hosts, as requested.

#### 3.2.2.4 Variance Explanation:

- The current period cost variance of $45K/70%, cumulative cost variance of $172K/23%, and at-complete variance of $287K/27% are attributed to reduced travel and staff expense to match reduced effort on siting program. Charges for work with programmatic issues remain minimal. This cumulative underrun will continue at the current rate until there is an extended increase in site investigations activities. Although there are no scheduled on-site assessments for the remainder of FY94, follow-up and support to the active grant applicants, the negotiated siting process, DOE, and Outreach will continue at this minimum staffing level.

#### 3.2.2.5 Issues and Concerns

- None.

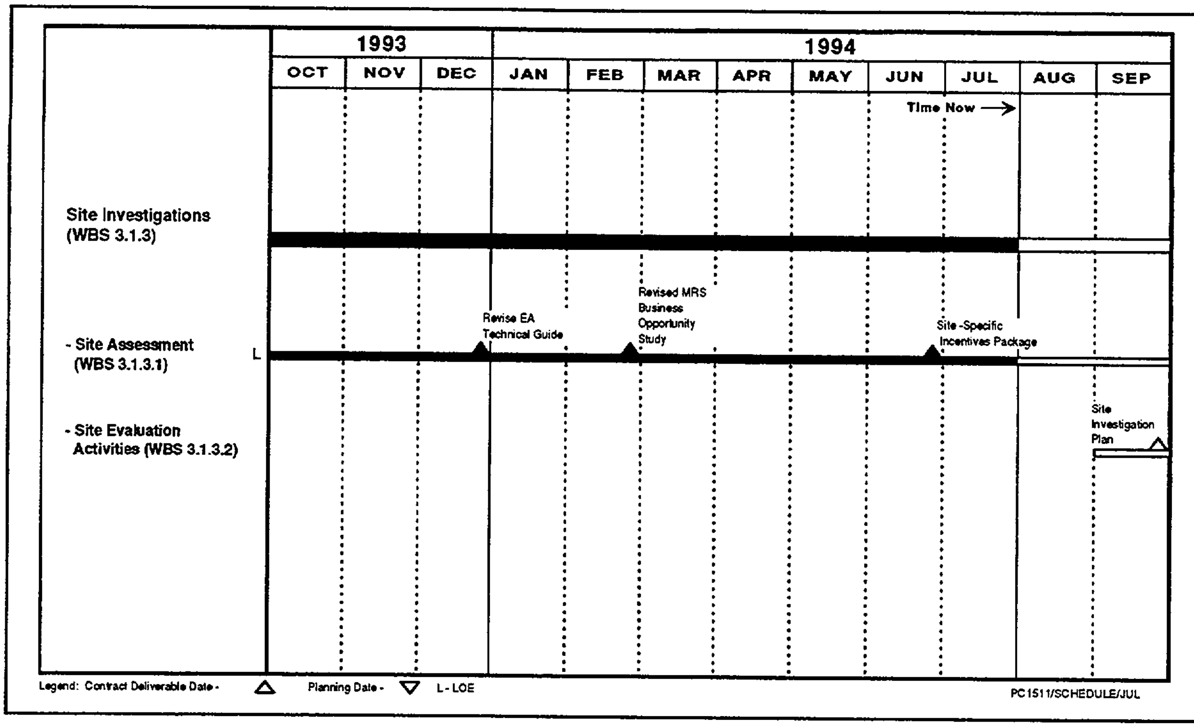
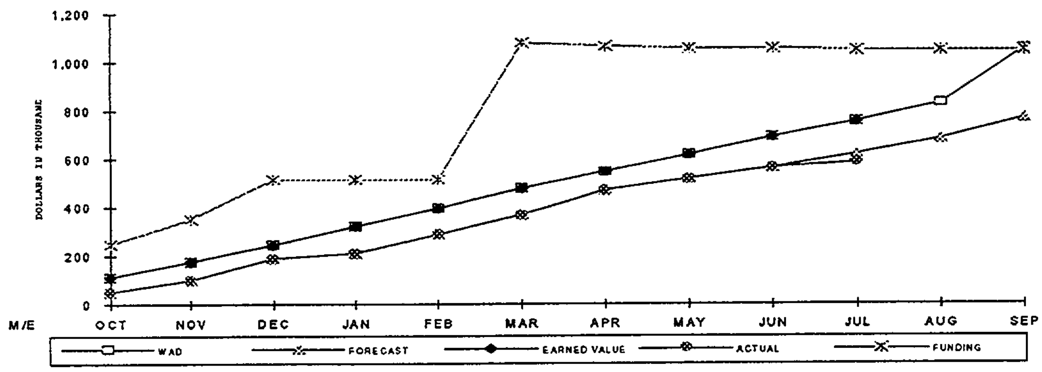



Figure 3-23. MRS - Site Investigations Activity Schedule

Actuals Thru 7/31/1994

## DB-03-01-03 SITE INVESTIGATIONS




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 112 | 65 | 68 | 76 | 74 | 82 | 70 | 69 | 74 | 65 | 74 | 225 |
| | FORECAST | 50 | 50 | 90 | 22 | 76 | 81 | 99 | 47 | 48 | 55 | 63 | 88 |
| | EARNED VALUE | 112 | 65 | 68 | 76 | 74 | 82 | 70 | 69 | 74 | 65 | | |
| | MONTH ACTUAL | 50 | 50 | 90 | 22 | 76 | 81 | 99 | 47 | 48 | 20 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 62 | 15 | (22) | 54 | (2) | 1 | (29) | 22 | 26 | 45 | | |
| CUM | WAD | 112 | 177 | 245 | 321 | 395 | 477 | 547 | 616 | 690 | 755 | 829 | 1,054 |
| | FORECAST | 50 | 100 | 190 | 212 | 288 | 369 | 468 | 515 | 563 | 618 | 681 | 769 |
| | EARNED VALUE | 112 | 177 | 245 | 321 | 395 | 477 | 547 | 616 | 690 | 755 | | |
| | ACTUAL | 50 | 100 | 190 | 212 | 288 | 369 | 468 | 515 | 563 | 583 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 62 | 77 | 55 | 109 | 107 | 108 | 79 | 101 | 127 | 172 | | |
| FUNDING | FY94 FUNDING | 72 | 175 | 339 | 339 | 339 | 904 | 904 | 904 | 904 | 895 | 895 | 895 |
| | PREV. FUNDED | 175 | 175 | 175 | 175 | 175 | 175 | 160 | 151 | 151 | 151 | 151 | 151 |
| | TOTAL FUNDING | 247 | 350 | 514 | 514 | 514 | 1,079 | 1,064 | 1,055 | 1,055 | 1,046 | 1,046 | 1,046 |

## DB-03-01-03 SITE INVESTIGATIONS

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY94 LOE | 65 | 65 | 20 | 0 | 45 | 721 | 721 | 530 | 0 | 191 | 895 | 701 | 194 |
| Subtotal FY94 | 65 | 65 | 20 | 0 | 45 | 721 | 721 | 530 | 0 | 191 | 895 | 701 | 194 |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 116 | 0 | 116 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 6 | (3) |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 119 | 6 | 113 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 0 | 0 | 0 | 35 | 35 | 51 | 0 | (16) | 40 | 60 | (20) |
| TOTAL | 65 | 65 | 20 | 0 | 45 | 756 | 756 | 581 | 0 | 175 | 1,054 | 767 | 287 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-24. MRS - Site Investigations Cost and Schedule Summary

### 3.2.3 MRS Facility: B&R-03-01-04 WBS 3.1.4

**MANAGER:** J. B. Blandford/J. B. Stringer

**OBJECTIVE(S):** Continue with MRS interface requirements and MRS System Requirements Document (SRD) input during development of the MPC. Support the MRS SRD revision and participate in reviews of MPC design documents to ensure inclusion of MRS requirements.

#### 3.2.3.1 Progress During Report Period:

- Initiated formal QAP-3-5 review of the revised MPC MRS Facility Conceptual Design Report (CDR), Volume II.C.

#### 3.2.3.2 Deliverables, Publications, and Presentations:

- None this reporting period.

#### 3.2.3.3 Planned Work for Next Month/Major Near-Term Milestones:

- Complete QAP-3-5 review of the revised MPC MRS Facility CDR, Volume II.C, and issue to OCRWM for review and comment. Issue report to Government Printing Office for printing, binding, and distribution when review and comment resolution is completed.

#### 3.2.3.4 Variance Explanation:

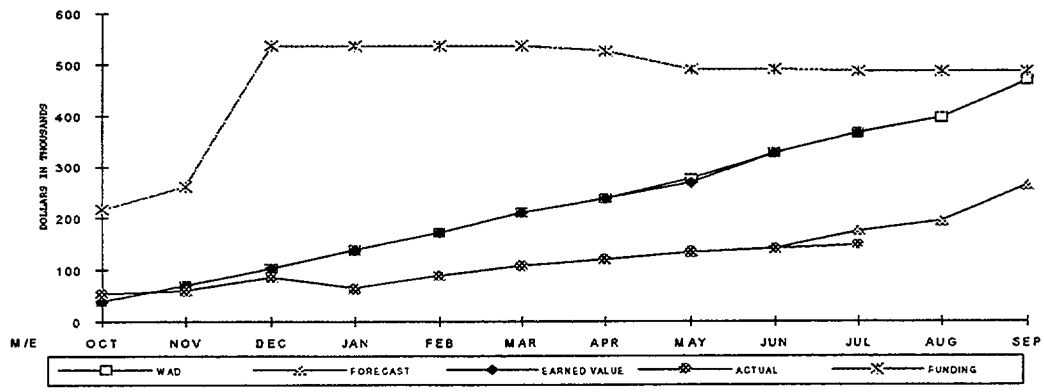
- The current period cost variance of $33K/84%, cumulative cost variance of $219K/60%, and the at-complete variance of $203K/43% are due to less than expected support required for MPC SRD development and scaling back of the MRS effort.

#### 3.2.3.5 Issues and Concerns:

- None.

Actuals Thru 7/31/1994

**DB-03-01-04 MONITORED RETRIEVABLE STORAGE FACILITY**




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 39 | 30 | 34 | 35 | 34 | 38 | 27 | 39 | 51 | 39 | 30 | 72 |
| | FORECAST | 53 | 6 | 26 | (21) | 25 | 18 | 13 | 14 | 7 | 34 | 19 | 69 |
| | EARNED VALUE | 39 | 30 | 34 | 35 | 34 | 38 | 27 | 31 | 59 | 39 | | |
| | MONTH ACTUAL | 53 | 6 | 26 | (21) | 25 | 18 | 13 | 14 | 7 | 6 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | (8) | 8 | 0 | | |
| | VAR/COST | (14) | 24 | 8 | 56 | 9 | 20 | 14 | 17 | 52 | 33 | | |
| CUM | WAD | 39 | 69 | 103 | 138 | 172 | 210 | 237 | 276 | 327 | 366 | 396 | 468 |
| | FORECAST | 53 | 59 | 85 | 64 | 89 | 107 | 120 | 134 | 141 | 175 | 194 | 263 |
| | EARNED VALUE | 39 | 69 | 103 | 138 | 172 | 210 | 237 | 268 | 327 | 366 | | |
| | ACTUAL | 53 | 59 | 85 | 64 | 89 | 107 | 120 | 134 | 141 | 147 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | (8) | 0 | 0 | | |
| | VAR/COST | (14) | 10 | 18 | 74 | 83 | 103 | 117 | 134 | 186 | 219 | | |
| FUNDING | FY94 FUNDING | 31 | 75 | 351 | 351 | 351 | 351 | 407 | 407 | 407 | 403 | 403 | 403 |
| | PREV. FUNDED | 186 | 186 | 186 | 186 | 186 | 186 | 120 | 83 | 83 | 83 | 83 | 83 |
| | TOTAL FUNDING | 217 | 261 | 537 | 537 | 537 | 537 | 527 | 490 | 490 | 486 | 486 | 486 |

**DB-03-01-04 MONITORED RETRIEVABLE STORAGE FACILITY**

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY94 LOE | 39 | 39 | 6 | 0 | 33 | 315 | 315 | 82 | 0 | 233 | 403 | 181 | 222 |
| Subtotal FY94 | 39 | 39 | 6 | 0 | 33 | 315 | 315 | 82 | 0 | 233 | 403 | 181 | 222 |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | -0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 0 | 0 | 0 | 49 | 49 | 66 | 0 | (17) | 64 | 83 | (19) |
| TOTAL | 39 | 39 | 6 | 0 | 33 | 364 | 364 | 148 | 0 | 216 | 467 | 264 | 203 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-25. MRS - Facility Cost and Schedule Summary

### 3.2.4 Regulatory: B&R 03-01-05 WBS 3.1.5

**MANAGER:** J. B. Blandford/R. G. Morgan

**OBJECTIVE(S):** Assist OCRWM in all aspects of the MRS/MPC licensing process including the development of prelicensing documents, licensing strategies, and License Application and the resolution of technical issues leading to the issuance of the MRS license or MPC Certifications; assist DOE to ensure compliance with regulatory requirements.

#### 3.2.4.1 Progress During Report Period:

- Participated in the joint writing team effort in Las Vegas and Vienna to draft the Burnup Credit Topical Report. Significant progress has been achieved in developing text and supporting data for this report.

- Supported budget activities associated in completing the Project Validation Package, the OMB process, and the Annual Work Plan for MRS Regulatory.

- Participated in the MPC certification strategy meeting with M&O licensing personnel and Winston and Strawn on July 14, 1994.

#### 3.2.4.2 Deliverables, Publications, and Presentations:

- Delivered a meeting summary for the Newport News/Nuclear Regulatory Commission (NRC) meeting held on July 13, 1994, to OCRWM. The meeting discussed licensing a proposed Newport News fuel transfer system.

#### 3.2.4.3 Planned Work for Next Month/Major Near-Term Milestones:

- Continue assisting with the development of the topical report titled "A Methodology for Using Burnup Credit in Designing Criticality Control Systems for PWR Spent Fuel Storage and Transportation Packages."

- Initiate development of the MPC Certification Plan.

#### 3.2.4.4 Variance Explanation:

- The current period cost variance of ($26K/42%) is the result of an increased effort on the Burnup Credit Topical Report. The cumulative cost variance of $149K/23% and at-complete variance of $148K/16% are primarily caused by less than expected efforts on several MPC Issue Resolution working groups. Additional effort on developing the Burnup Credit Topical Report will continue until the end of the fiscal year.

#### 3.2.4.5 Issues and Concerns:

- None.

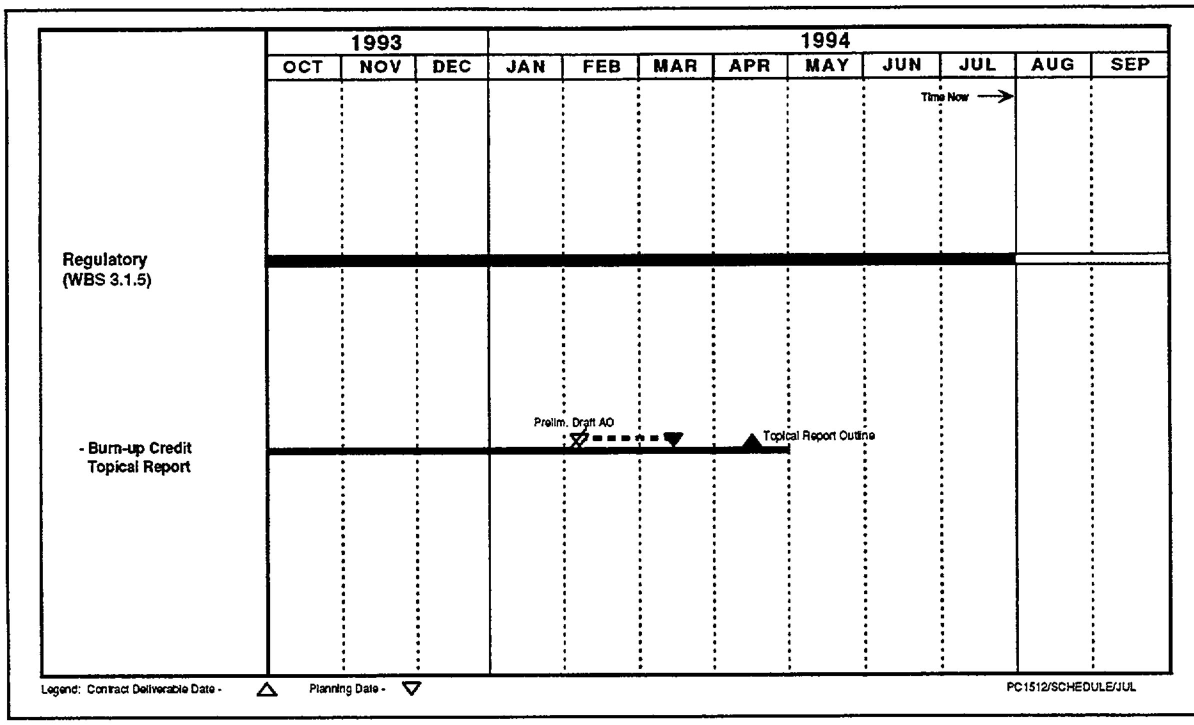
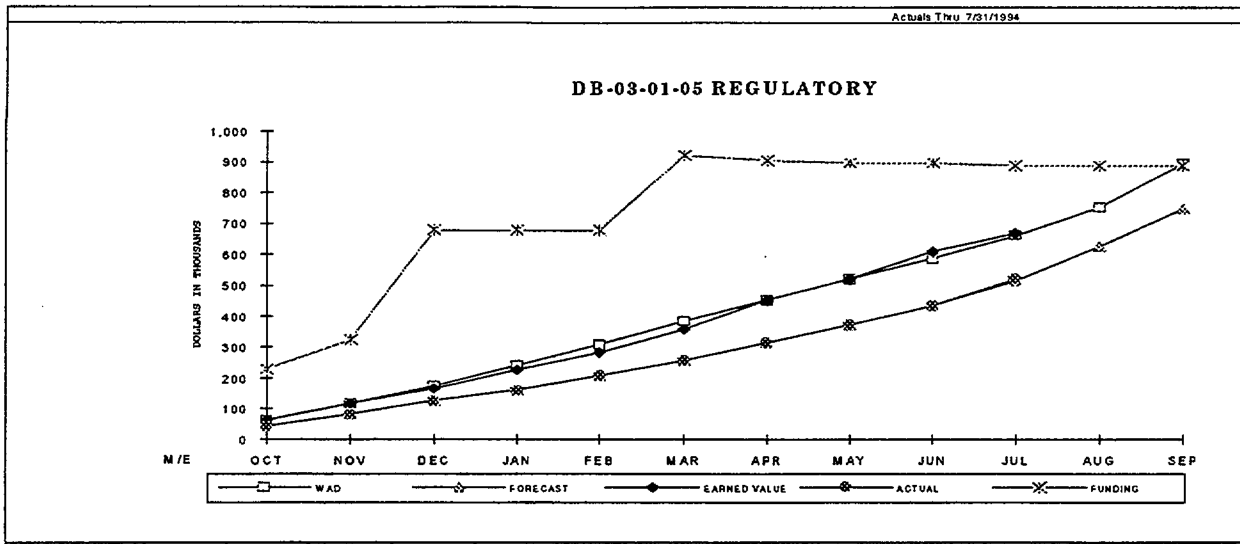



Figure 3-26. MRS - Regulatory Activity Schedule

Actuals Thru 7/31/1994




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 61 | 56 | 59 | 66 | 67 | 76 | 68 | 68 | 66 | 76 | 89 | 143 |
| | FORECAST | 44 | 39 | 44 | 35 | 46 | 50 | 58 | 57 | 62 | 80 | 113 | 120 |
| | EARNED VALUE | 63 | 55 | 49 | 60 | 56 | 76 | 94 | 68 | 89 | 60 | | |
| | MONTH ACTUAL | 44 | 39 | 44 | 35 | 46 | 50 | 58 | 57 | 62 | 86 | | |
| | VAR/SCH | 2 | (1) | (10) | (6) | (11) | 0 | 26 | 0 | 23 | (16) | | |
| | VAR/COST | 19 | 16 | 5 | 25 | 10 | 26 | 36 | 11 | 27 | (26) | | |
| CUM | WAD | 61 | 117 | 176 | 242 | 309 | 385 | 453 | 521 | 587 | 663 | 752 | 895 |
| | FORECAST | 44 | 83 | 127 | 162 | 208 | 258 | 316 | 373 | 435 | 515 | 628 | 748 |
| | EARNED VALUE | 63 | 118 | 167 | 227 | 283 | 359 | 453 | 521 | 610 | 670 | | |
| | ACTUAL | 44 | 83 | 127 | 162 | 208 | 258 | 316 | 373 | 435 | 521 | | |
| | VAR/SCH | 2 | 1 | (9) | (15) | (26) | (26) | 0 | 0 | 23 | 7 | | |
| | VAR/COST | 19 | 35 | 40 | 65 | 75 | 101 | 137 | 148 | 175 | 149 | | |
| FUNDING | FY94 FUNDING | 67 | 163 | 518 | 518 | 518 | 762 | 762 | 762 | 762 | 754 | 754 | 754 |
| | PREV. FUNDED | 161 | 161 | 161 | 161 | 161 | 161 | 143 | 136 | 136 | 136 | 136 | 136 |
| | TOTAL FUNDING | 228 | 324 | 679 | 679 | 679 | 923 | 905 | 898 | 898 | 890 | 890 | 890 |

**DB-03-01-05 REGULATORY**

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EARNED | | VARIANCE | | | EARNED | | VARIANCE | | | | |
| | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY94 LOE | 60 | 60 | 40 | 0 | 20 | 562 | 562 | 394 | 0 | 168 | 754 | 582 | 172 |
| Subtotal FY94 | 60 | 60 | 40 | 0 | 20 | 562 | 562 | 394 | 0 | 168 | 754 | 582 | 172 |
| Deferred (FY93 to FY94) Discrete | 15 | 0 | 46 | (15) | (46) | 87 | 94 | 115 | 7 | (21) | 120 | 148 | (28) |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 1 |
| Subtotal Deferred | 15 | 0 | 46 | (15) | (46) | 87 | 94 | 115 | 7 | (21) | 123 | 150 | (27) |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 0 | 0 | 0 | 14 | 14 | 10 | 0 | 4 | 18 | 15 | 3 |
| TOTAL | 75 | 60 | 86 | (15) | (26) | 663 | 670 | 519 | 7 | 151 | 895 | 747 | 148 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-27. MRS - Regulatory Cost and Schedule Summary

### 3.2.5 Engineering Development: B&R 03-01-07 WBS 3.1.7

**MANAGER:** J. B. Blandford/J. B. Stringer

**OBJECTIVE(S):** Establish the MPC and Bare Spent Nuclear Fuel (SNF) Transfer (BST) System requirements (programmatic and derived) that will be included in the Systems Requirements Documents (SRD), Design Requirements Documents (DRD), and design specifications. Resolve DOE and other comments resulting from the review and approval process of the Conceptual Design Reports (CDR). Prepare a Statement of Work (SOW) for the MPC and BST system Request for Proposals (RFPs) in accordance with QAP-4-1. Acquire, install, validate, and verify appropriate quality-affecting computer software for use in QA activities that supports reviews of vendor submittals under RFPs and development of QA design inputs for design specifications and other basis documents.

#### 3.2.5.1 Progress During Report Period:

- Incorporated OCRWM comments and issued the final version of the MPC System Evaluation Report to OCRWM.

- Prepared list of BST Design Procurement Specification Design Decisions and initiated process of obtaining recommendation approval.

- Initiated formal QAP-3-5 review of the following revised CDR sections: MPC, Transportation Cask, and Universal Test System (UTS).

#### 3.2.5.2 Deliverables, Publications, and Presentations:

- None this reporting period.

#### 3.2.5.3 Planned Work for Next Month/Major Near-Term Milestones:

- Complete revision to Volume IV of the MPC Implementation Program CDR.

- Complete QAP-3-5 review of the revised MPC, Transportation Cask, UTS, and Volume IV Sections of the CDR and issue to OCRWM for their review and comment. Issue report to Government Printing Office for printing, binding, and distribution after incorporating OCRWM comments.

- Complete final Heating-7 Verification and Validation (V&V) activities including review and approval of overall V&V report.

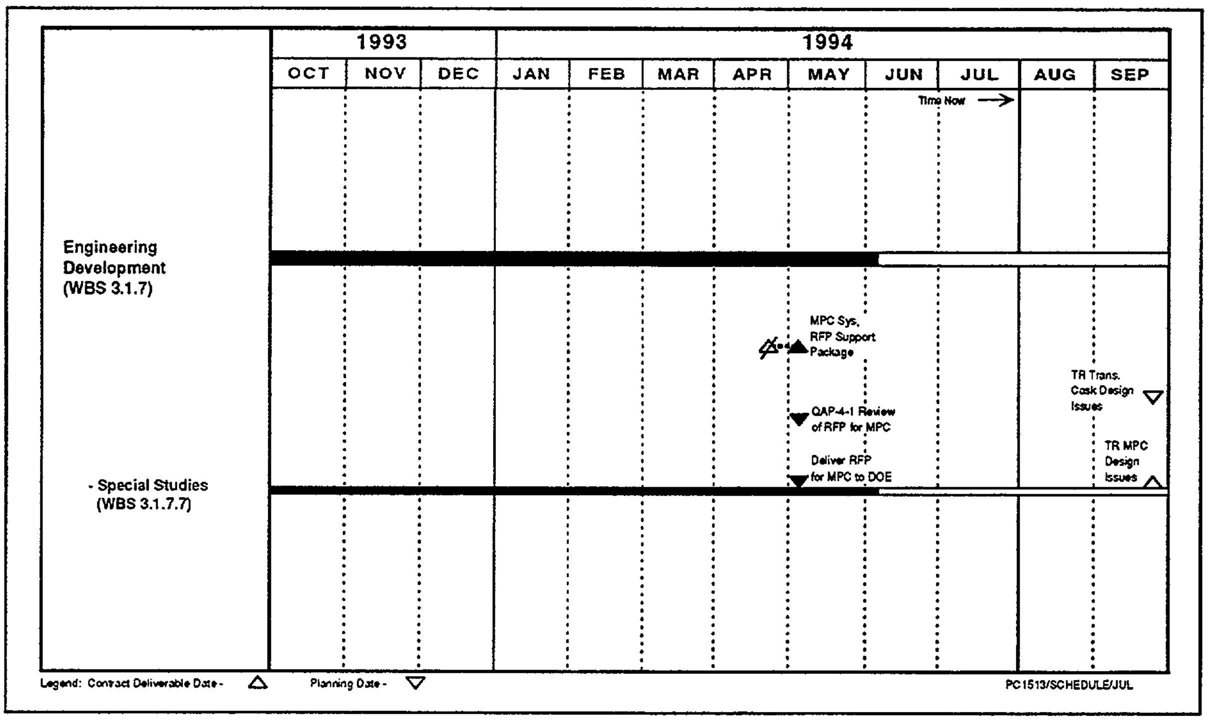
#### 3.2.5.4 Variance Explanation:

- The current period cost variance of $74K/17% is due primarily to less than planned effort on the MPC Summary Report, the CDR Revision, and Dual Purpose Multiple Element Sealed Canister (MESC) and MPC MRS studies. This goes toward offsetting the cumulative cost variance of ($631K/17%) that is the result of revisions to many documents (QAPs, Design Specifications, SRDs, and SOW) in the expedited RFP process, the specification/SOW QAP comment resolution process, and the CDR QAP comment resolution process. The MPC System SOW and the specifications supporting the issuance of the RFP were completed in May 1994.

- The cumulative schedule variance of ($402K/10%) is due to the BSTS workscope slipping to a later time frame, and to On-Site Transfer System (OSTS) and Computer Code Verification and Validation scope definition revisions. Additionally, the topical report on MPC thermal issues will not be done this year. No significant impact to the program is expected.

### 3.2.5.5 Issues and Concerns:

- None.

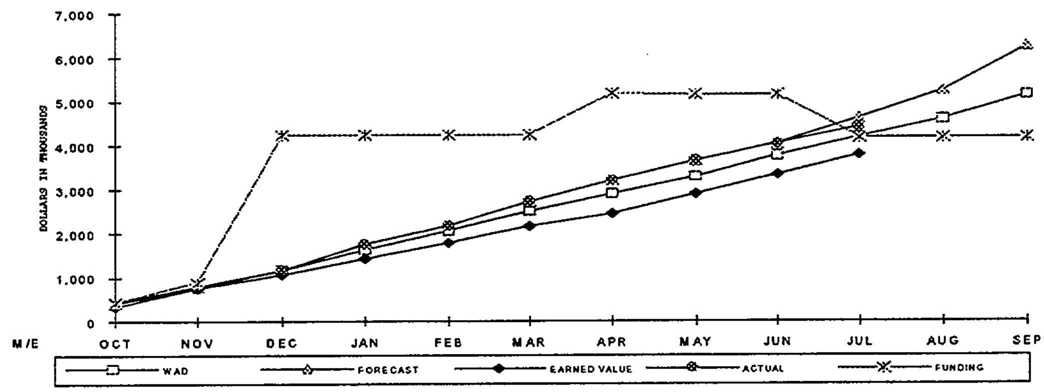



[NOTE: Engineering Development is behind schedule as a result of additional unplanned tasking of higher priority.]

Figure 3-28. MRS - Engineering Development Activity Schedule

Actuals Thru 7/31/1994

## DB-03-01-07 ENGINEERING DEVELOPMENT




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 400 | 371 | 397 | 466 | 427 | 451 | 395 | 385 | 472 | 420 | 401 | 552 |
| | FORECAST | 437 | 363 | 363 | 599 | 413 | 551 | 479 | 443 | 391 | 588 | 621 | 994 |
| | EARNED VALUE | 331 | 425 | 314 | 361 | 361 | 375 | 291 | 449 | 427 | 448 | | |
| | MONTH ACTUAL | 437 | 363 | 363 | 599 | 413 | 551 | 479 | 443 | 391 | 374 | | |
| | VAR/SCH | (69) | 54 | (83) | (105) | (66) | (76) | (104) | 64 | (45) | 28 | | |
| | VAR/COST | (106) | 62 | (49) | (238) | (52) | (176) | (188) | 6 | 36 | 74 | | |
| CUM | WAD | 400 | 771 | 1,168 | 1,634 | 2,061 | 2,512 | 2,907 | 3,292 | 3,764 | 4,184 | 4,585 | 5,137 |
| | FORECAST | 437 | 800 | 1,163 | 1,762 | 2,175 | 2,726 | 3,205 | 3,648 | 4,039 | 4,627 | 5,248 | 6,242 |
| | EARNED VALUE | 331 | 756 | 1,070 | 1,431 | 1,792 | 2,167 | 2,458 | 2,907 | 3,334 | 3,782 | | |
| | ACTUAL | 437 | 800 | 1,163 | 1,762 | 2,175 | 2,726 | 3,205 | 3,648 | 4,039 | 4,413 | | |
| | VAR/SCH | (69) | (15) | (98) | (203) | (269) | (345) | (449) | (385) | (430) | (402) | | |
| | VAR/COST | (106) | (44) | (93) | (331) | (383) | (559) | (747) | (741) | (705) | (631) | | |
| FUNDING | FY94 FUNDING | 252 | 712 | 4,066 | 4,066 | 4,066 | 4,066 | 5,033 | 5,033 | 5,034 | 4,042 | 4,042 | 4,042 |
| | PREV. FUNDED | 175 | 175 | 175 | 175 | 175 | 175 | 154 | 127 | 127 | 127 | 127 | 127 |
| | TOTAL FUNDING | 427 | 887 | 4,241 | 4,241 | 4,241 | 4,241 | 5,187 | 5,160 | 5,161 | 4,169 | 4,169 | 4,169 |

## DB-03-01-07 ENGINEERING DEVELOPMENT

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY'94 Discrete | 129 | 158 | 180 | 29 | (22) | 2,306 | 1,904 | 2,950 | (402) | (1,046) | 2,466 | 3,905 | (1,439) |
| FY'94 LOE | 290 | 290 | 196 | 0 | 94 | 1,765 | 1,765 | 1,363 | 0 | 402 | 2,544 | 2,208 | 336 |
| Subtotal FY'94 | 419 | 448 | 376 | 29 | 72 | 4,071 | 3,669 | 4,313 | (402) | (644) | 5,010 | 6,113 | (1,103) |
| Deferred (FY'93 to FY'94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY'93 to FY'94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY'93 to FY'94) | 0 | 0 | (1) | 0 | 1 | 114 | 114 | 101 | 0 | 13 | 127 | 129 | (2) |
| TOTAL | 419 | 448 | 375 | 29 | 73 | 4,185 | 3,783 | 4,414 | (402) | (631) | 5,137 | 6,242 | (1,105) |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-29. MRS - Engineering Development Cost and Schedule Summary

### 3.2.6 Project Management: B&R 03-01-09 WBS 3.1.9

**MANAGER:** J. B. Blandford/R. K. Crow

**OBJECTIVE(S):** Conduct project management and project control activities to maintain MRS Project development.

#### 3.2.6.1 Progress During Report Period:

- Developed an approach to implementing detailed intermediate Waste Acceptance, Storage and Transportation (WAST) project schedules that are networked to the project summary schedule.
- Updated the Near-Term Schedules (NTS) to incorporate activities in the cost and schedule transition schedule and the Annual Plan/Project Validation activities.
- Develop M&O Annual Plan for FY95 including labor, travel, ODC, work by others (WBO), etc.

#### 3.2.6.2 Deliverables, Publications, and Presentations:

- Delivered the OMB budget submittal to RW-40 on July 15, 1994.
- Delivered a briefing for the RW-40 off site titled "Roles, Mission, and Goals."
- Delivered the final FY96 Internal Review Board (IRB) Validation Package, incorporating RW-35 and Weston's comments, to RW-40 on July 21, 1994.
- Delivered preliminary drafts of the Project Management Plan and the Project Plan to RW-40.

#### 3.2.6.3 Planned Work for Next Month/Major Near-Term Milestones:

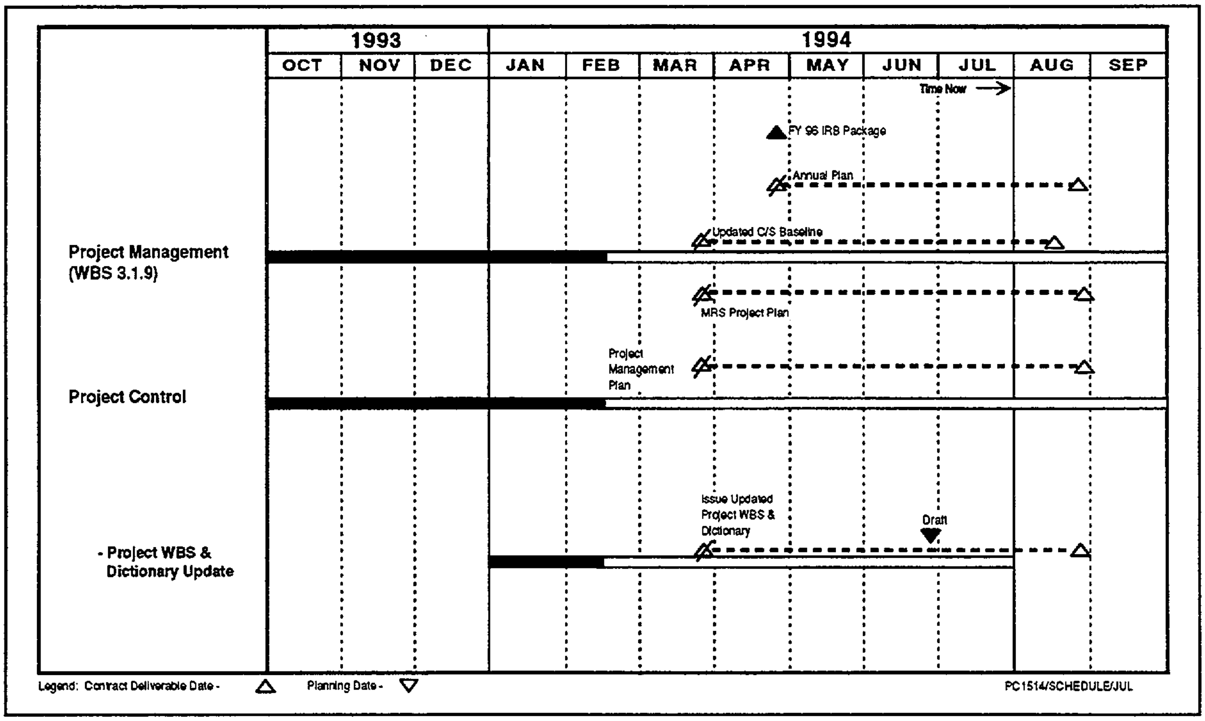
- Deliver both the final WAST Project and Program Cost and Schedule Baseline documents to OCRWM for approval. The updated documents incorporate the MPC System, the Proposed Program Approach (PPA) and deletes the MRS Facility. Changes reflect Project Milestones through Amendment 1 of the MPC RFP.
- Complete NTS by incorporating activities in the Cost and Schedule Transition Schedule and the Annual Plan/Project Validation activities.
- Prepare briefing package for the Division's Directors briefing of the RW-40 budget/Annual Workplan. This package will form the basis for the video conference for the WAST portion of the budget presentation to RW-1/2 on August 25-26, 1994.

#### 3.2.6.4 Variance Explanation:

- All variances within tolerance.

### 3.2.6.5 Issues and Concerns:

- None.

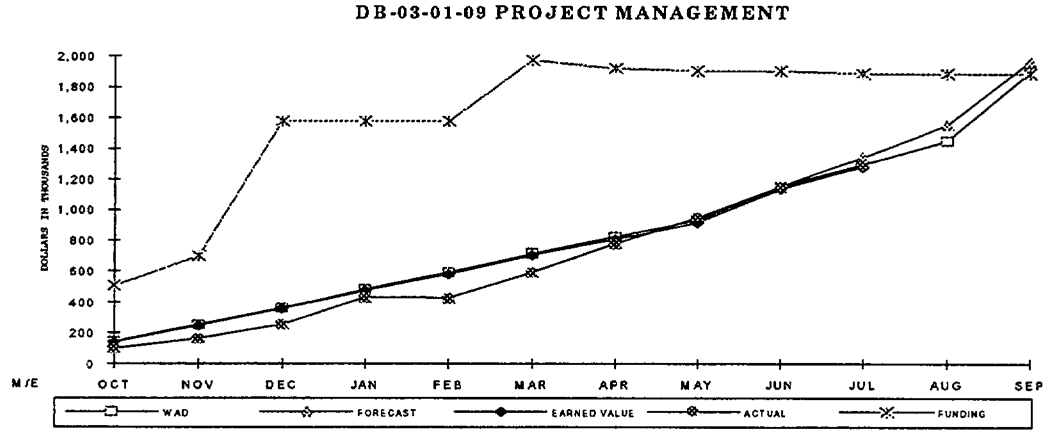



[NOTE: 1) Schedule delays in the Project Plan, the Project Management Plan, the Updated Cost and Schedule Baseline, and the Updated Project WBS and Dictionary reflect changes due to implementation of the Proposed Program Approach (PPA).

2) The Annual Plan has also been delayed. The M&O was awaiting guidance from DOE prior to preparation of the FY95 Annual Plan. The Annual Plan will be submittedd to RW-35 in August 1994.]

Figure 3-30. MRS - Project Management Activity Schedule

Actuals Thru 7/31/1994




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 144 | 110 | 110 | 118 | 110 | 123 | 110 | 109 | 220 | 144 | 156 | 443 |
| | FORECAST | 98 | 68 | 91 | 174 | (4) | 167 | 184 | 171 | 204 | 193 | 208 | 415 |
| | EARNED VALUE | 140 | 108 | 110 | 116 | 108 | 122 | 106 | 107 | 221 | 144 | | |
| | MONTH ACTUAL | 98 | 68 | 91 | 174 | (4) | 167 | 184 | 171 | 204 | 140 | | |
| | VAR/SCH | (4) | (2) | 0 | (2) | (2) | (1) | (4) | (2) | 1 | 0 | | |
| | VAR/COST | 42 | 40 | 19 | (58) | 112 | (45) | (78) | (64) | 17 | 4 | | |
| CUM | WAD | 144 | 254 | 364 | 482 | 592 | 715 | 825 | 934 | 1,154 | 1,298 | 1,454 | 1,897 |
| | FORECAST | 98 | 166 | 257 | 431 | 427 | 594 | 778 | 949 | 1,153 | 1,346 | 1,554 | 1,969 |
| | EARNED VALUE | 140 | 248 | 358 | 474 | 582 | 704 | 810 | 917 | 1,138 | 1,282 | | |
| | ACTUAL | 98 | 166 | 257 | 431 | 427 | 594 | 778 | 949 | 1,153 | 1,293 | | |
| | VAR/SCH | (4) | (6) | (6) | (8) | (10) | (11) | (15) | (17) | (16) | (16) | | |
| | VAR/COST | 42 | 82 | 101 | 43 | 155 | 110 | 32 | (32) | (15) | (11) | | |
| FUNDING | FY94 FUNDING | 113 | 305 | 1,187 | 1,187 | 1,187 | 1,584 | 1,584 | 1,584 | 1,584 | 1,567 | 1,567 | 1,567 |
| | PREV. FUNDED | 392 | 392 | 392 | 392 | 392 | 392 | 340 | 323 | 323 | 323 | 323 | 323 |
| | TOTAL FUNDING | 505 | 697 | 1,579 | 1,579 | 1,579 | 1,976 | 1,924 | 1,907 | 1,907 | 1,890 | 1,890 | 1,890 |

**DB-03-01-09 PROJECT MANAGEMENT**

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EARNED | | VARIANCE | | | EARNED | | VARIANCE | | | | |
| | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | 1 | 0 | (1) | 28 | 12 | 21 | (16) | (9) | 28 | 23 | 5 |
| FY94 LOE | 94 | 94 | 116 | 0 | (22) | 1,070 | 1,070 | 1,128 | 0 | (58) | 1,555 | 1,702 | (147) |
| Subtotal FY94 | 94 | 94 | 117 | 0 | (23) | 1,098 | 1,082 | 1,149 | (16) | (67) | 1,583 | 1,725 | (142) |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 50 | 50 | 23 | 0 | 27 | 163 | 163 | 133 | 0 | 30 | 270 | 225 | 45 |
| Subtotal Deferred | 50 | 50 | 23 | 0 | 27 | 163 | 163 | 133 | 0 | 30 | 270 | 225 | 45 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 0 | 0 | 0 | 38 | 38 | 13 | 0 | 25 | 45 | 21 | 24 |
| TOTAL | 144 | 144 | 140 | 0 | 4 | 1,299 | 1,283 | 1,295 | (16) | (12) | 1,898 | 1,971 | (73) |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-31. MRS - Project Management Cost and Schedule Summary

### 3.2.7 Quality Assurance: B&R 03-01-11 WBS 3.1.11

**MANAGER:** R. P. Ruth

**OBJECTIVE(S):** Provide QA support, audits, and surveillance to M&O organizations supporting the Monitored Retrievable Storage (MRS) Project. Conduct QA training.

#### 3.2.7.1 Progress During Report Period:

- No significant progress to report this period.

#### 3.2.7.2 Deliverables, Publications, and Presentations:

- None this reporting period.

#### 3.2.7.3 Planned Work for Next Month/Major Near-Term Milestones:

- Provide Level-of-Effort support as required.

- Continue to support MPC implementation.

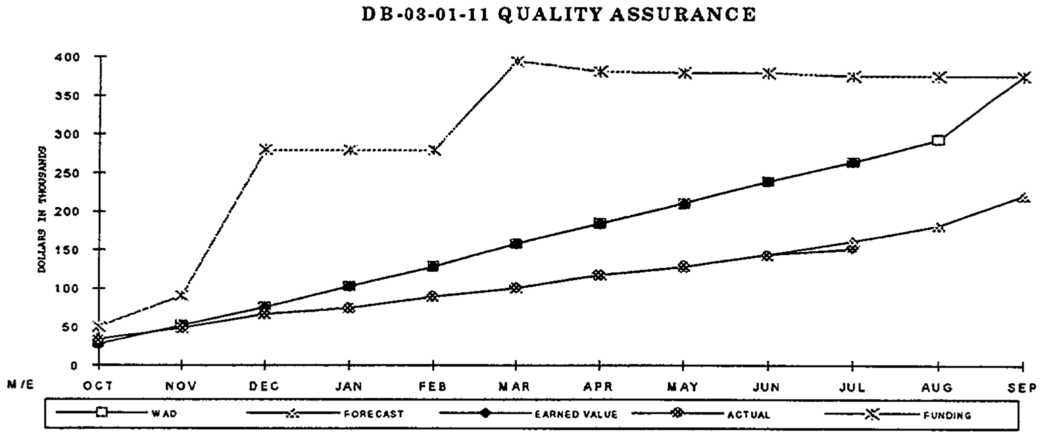
#### 3.2.7.4 Variance Explanation:

- The cumulative cost variance of $113K/43% is due to performing the required work in Charlotte with one staff person versus the two originally planned resulting in a savings to the program.

#### 3.2.7.5 Issues and Concerns:

- None.

Actuals Thru 7/31/1994




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 27 | 25 | 24 | 27 | 26 | 29 | 27 | 26 | 29 | 25 | 29 | 82 |
| | FORECAST | 34 | 15 | 18 | 8 | 15 | 11 | 17 | 11 | 15 | 18 | 20 | 39 |
| | EARNED VALUE | 27 | 25 | 24 | 27 | 26 | 29 | 27 | 26 | 29 | 25 | | |
| | MONTH ACTUAL | 34 | 15 | 18 | 8 | 15 | 11 | 17 | 11 | 15 | 8 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | (7) | 10 | 6 | 19 | 11 | 18 | 10 | 15 | 14 | 17 | | |
| CUM | WAD | 27 | 52 | 76 | 103 | 129 | 158 | 185 | 211 | 240 | 265 | 294 | 376 |
| | FORECAST | 34 | 49 | 67 | 75 | 90 | 101 | 118 | 129 | 144 | 162 | 182 | 221 |
| | EARNED VALUE | 27 | 52 | 76 | 103 | 129 | 158 | 185 | 211 | 240 | 265 | | |
| | ACTUAL | 34 | 49 | 67 | 75 | 90 | 101 | 118 | 129 | 144 | 152 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | (7) | 3 | 9 | 28 | 39 | 57 | 67 | 82 | 96 | 113 | | |
| FUNDING | FY94 FUNDING | 29 | 70 | 259 | 259 | 259 | 374 | 374 | 374 | 374 | 370 | 370 | 370 |
| | PREV. FUNDED | 21 | 21 | 21 | 21 | 21 | 21 | 8 | 6 | 6 | 6 | 6 | 6 |
| | TOTAL FUNDING | 50 | 91 | 280 | 280 | 280 | 395 | 382 | 380 | 380 | 376 | 376 | 376 |

## DB-03-01-11 QUALITY ASSURANCE

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EARNED | | VARIANCE | | | EARNED | | VARIANCE | | | | |
| | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY94 LOE | 25 | 25 | 8 | 0 | 17 | 261 | 261 | 143 | 0 | 118 | 370 | 212 | 158 |
| Subtotal FY94 | 25 | 25 | 8 | 0 | 17 | 261 | 261 | 143 | 0 | 118 | 370 | 212 | 158 |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 8 | 0 | (4) | 5 | 9 | (4) |
| TOTAL | 25 | 25 | 8 | 0 | 17 | 265 | 265 | 151 | 0 | 114 | 375 | 221 | 154 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-32. MRS - Quality Assurance Cost and Schedule Summary

### 3.2.8 Information Management: B&R 03-01-12 WBS 3.1.12

**MANAGER:** J. B. Blandford/J. B. Stringer

**OBJECTIVE(S):** Define automation needs for MRS Design in Charlotte, provide input to those needs through the Automated Data Processing Equipment (ADPE) Short-Range and Long-Range Plans, set up hardware and install software, maintain Local Area Network (LAN) system, keep inventory of hardware and software, and solve hardware and software problems as they develop.

#### 3.2.8.1 Progress During Report Period:

- Provided input for the Information Management FY95 Short-Range Plan.
- Initiated planning for transition of hardware to Vienna.

#### 3.2.8.2 Deliverables, Publications, and Presentations:

- None this reporting period.

#### 3.2.8.3 Planned Work for Next Month/Major Near-Term Milestones:

- Finalize plan for transition of equipment to Vienna.
- Continue to provide support to the MRS/MPC Design Group as required.

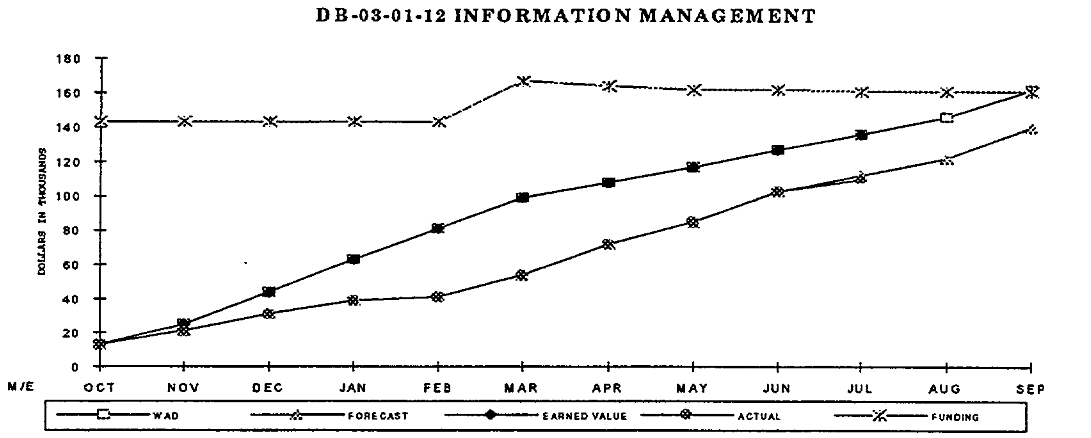
#### 3.2.8.4 Variance Explanation:

- The cumulative cost variance of $26K/19% is due to delay in invoicing of equipment ordered and carryover underrun from FY93. The hardware has been received but not yet invoiced.

#### 3.2.8.5 Issues and Concerns:

- None.

Actuals Thru 7/31/1994




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 13 | 12 | 19 | 19 | 18 | 18 | 9 | 9 | 10 | 9 | 10 | 16 |
| | FORECAST | 13 | 8 | 10 | 8 | 2 | 13 | 18 | 13 | 18 | 9 | 10 | 18 |
| | EARNED VALUE | 13 | 12 | 19 | 19 | 18 | 18 | 9 | 9 | 10 | 9 | | |
| | MONTH ACTUAL | 13 | 8 | 10 | 8 | 2 | 13 | 18 | 13 | 18 | 7 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 0 | 4 | 9 | 11 | 16 | 5 | (9) | (4) | (8) | 2 | | |
| CUM | WAD | 13 | 25 | 44 | 63 | 81 | 99 | 108 | 117 | 127 | 136 | 146 | 162 |
| | FORECAST | 13 | 21 | 31 | 39 | 41 | 54 | 72 | 85 | 103 | 112 | 122 | 140 |
| | EARNED VALUE | 13 | 25 | 44 | 63 | 81 | 99 | 108 | 117 | 127 | 136 | | |
| | ACTUAL | 13 | 21 | 31 | 39 | 41 | 54 | 72 | 85 | 103 | 110 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 0 | 4 | 13 | 24 | 40 | 45 | 36 | 32 | 24 | 26 | | |
| FUNDING | FY94 FUNDING | 105 | 105 | 105 | 105 | 105 | 129 | 129 | 129 | 129 | 128 | 128 | 128 |
| | PREV. FUNDED | 38 | 38 | 38 | 38 | 38 | 38 | 35 | 33 | 33 | 33 | 33 | 33 |
| | TOTAL FUNDING | 143 | 143 | 143 | 143 | 143 | 167 | 164 | 162 | 162 | 161 | 161 | 161 |

## DB-03-01-12 INFORMATION MANAGEMENT

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY94 LOE | 9 | 9 | 7 | 0 | 2 | 103 | 103 | 106 | 0 | (3) | 128 | 134 | (6) |
| Subtotal FY94 | 9 | 9 | 7 | 0 | 2 | 103 | 103 | 106 | 0 | (3) | 128 | 134 | (6) |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 0 | 0 | 0 | 33 | 33 | 5 | 0 | 28 | 35 | 7 | 28 |
| TOTAL | 9 | 9 | 7 | 0 | 2 | 136 | 136 | 111 | 0 | 25 | 163 | 141 | 22 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-33. MRS - Information Management Cost and Schedule Summary

### 3.2.9 Environmental, Safety and Health: B&R 03-01-13 WBS 3.1.13

**MANAGER:** J. B. Blandford/L. Smith

**OBJECTIVE(S):** Plan for the development of Environmental Assessments (EAs) for candidate MRS sites. Define requirements for collection of environmental data to support development of licensing documents. Provide support as required.

#### 3.2.9.1 Progress During Report Period:

- Attended an MPC Environmental Impact Statement (EIS) Integration group meeting. The availability of reactor-site data for the MPC EIS, availability of resource data for the MPC EIS, and the FY95 MPC EIS activities and budget was discussed.

- Developed a color graphic representing the MPC Development Schedule, including EIS and procurement milestones. The graphic will be used in OCRWM presentations and as a public information piece.

#### 3.2.9.2 Deliverables, Publications, and Presentations:

- Delivered the preliminary Environmental Evaluation (EE) of the MPC System to RW-40 on July 29, 1994.

#### 3.2.9.3 Planned Work for Next Month/Major Near-Term Milestones:

- Continue to coordinate activities and provide input to the MPC EIS as requested by the EIS Manager.

- Attend the MPC EIS Notice of Intent (NOI) "rubber room" meeting on August 2, 1994.

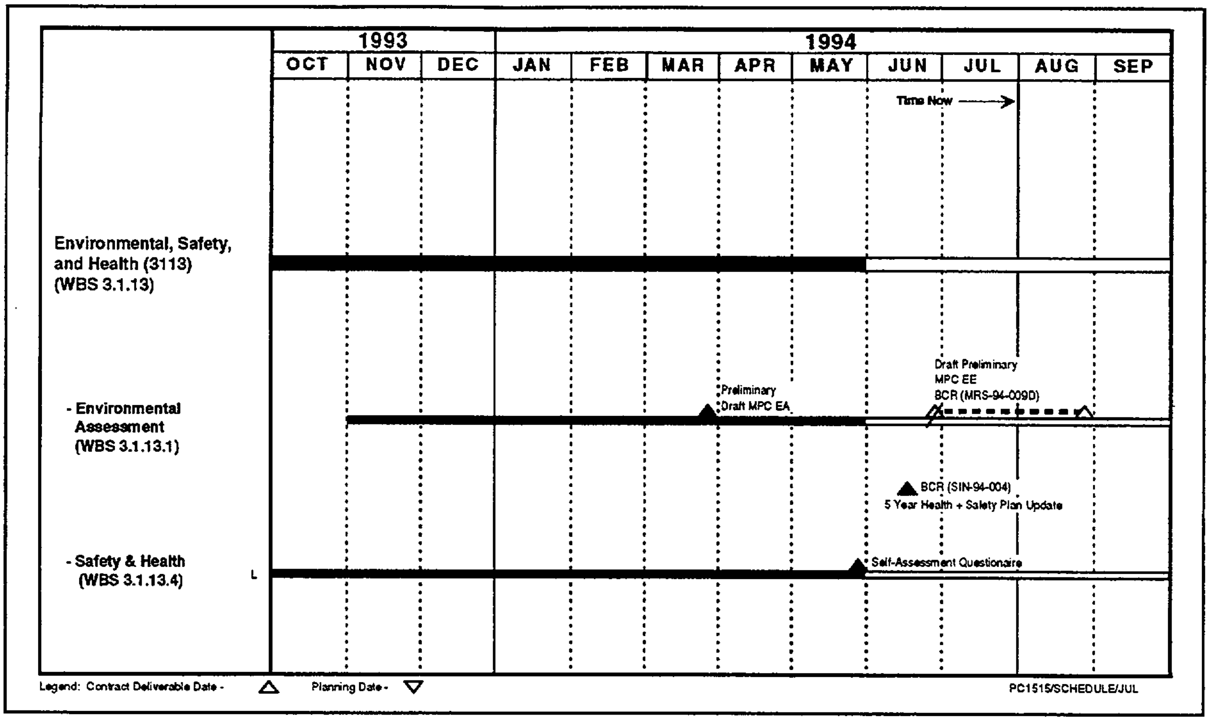
#### 3.2.9.4 Variance Explanation:

- The current period cost variance of ($27K/145%) is attributed to a redirection to support an MPC EE. The cumulative cost variance of $180K/19% is mainly due to producing the preliminary draft EA in a very efficient manner. A Work Authorization Directive (WAD) change is underway to use the underrun to deliver an MPC EE for submittal to NRC with the Certificate of Compliance.

- The current period schedule variance of ($54K/75%) and cumulative schedule variance of ($213K/19%) is due to delay in the Regulatory Compliance Plan (RCP) revision approval and to delay in receipt of WAD revision approval to redirect effort from an MPC EA to an MPC EE. No program impact is expected.

#### 3.2.9.5 Issues and Concerns:

- None.

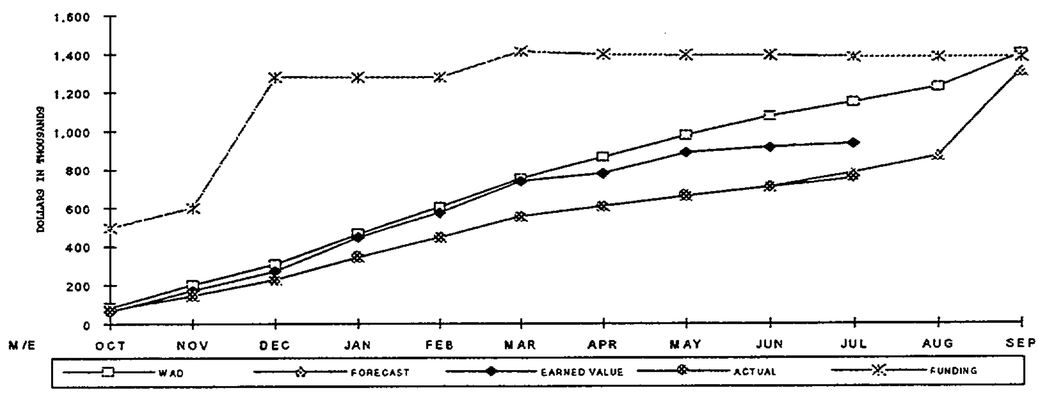



[NOTE: A BCR has been processed to redirect the anticipated work for the MPC EA to develop a draft "Preliminary Environmental Evaluation (EE) to the MPC System."]

Figure 3-34. MRS - ES&H Activity Schedule

Actuals Thru 7/31/1994

## DB-03-01-13 ENVIRONMENTAL, SAFETY, AND HEALTH




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 83 | 118 | 107 | 154 | 142 | 147 | 114 | 112 | 98 | 72 | 80 | 170 |
| | FORECAST | 69 | 77 | 82 | 116 | 102 | 108 | 54 | 53 | 48 | 74 | 88 | 438 |
| | EARNED VALUE | 63 | 109 | 99 | 176 | 126 | 165 | 40 | 108 | 30 | 18 | | |
| | MONTH ACTUAL | 69 | 77 | 82 | 116 | 102 | 108 | 54 | 53 | 48 | 45 | | |
| | VAR/SCH | (20) | (9) | (8) | 22 | (16) | 18 | (74) | (4) | (68) | (54) | | |
| | VAR/COST | (6) | 32 | 17 | 60 | 24 | 57 | (14) | 55 | (18) | (27) | | |
| CUM | WAD | 83 | 201 | 308 | 462 | 604 | 751 | 865 | 977 | 1,075 | 1,147 | 1,227 | 1,397 |
| | FORECAST | 69 | 146 | 228 | 344 | 446 | 554 | 608 | 661 | 709 | 783 | 871 | 1,309 |
| | EARNED VALUE | 63 | 172 | 271 | 447 | 573 | 738 | 778 | 886 | 916 | 934 | | |
| | ACTUAL | 69 | 146 | 228 | 344 | 446 | 554 | 608 | 661 | 709 | 754 | | |
| | VAR/SCH | (20) | (29) | (37) | (15) | (31) | (13) | (87) | (91) | (159) | (213) | | |
| | VAR/COST | (6) | 26 | 43 | 103 | 127 | 184 | 170 | 225 | 207 | 180 | | |
| FUNDING | FY94 FUNDING | 72 | 175 | 857 | 857 | 857 | 990 | 990 | 990 | 990 | 979 | 979 | 979 |
| | PREV. FUNDED | 424 | 424 | 424 | 424 | 424 | 424 | 407 | 403 | 403 | 403 | 403 | 403 |
| | TOTAL FUNDING | 496 | 599 | 1,281 | 1,281 | 1,281 | 1,414 | 1,397 | 1,393 | 1,393 | 1,382 | 1,382 | 1,382 |

## DB-03-01-13 ENVIRONMENTAL, SAFETY, AND HEALTH

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EARNED | | VARIANCE | | | EARNED | | VARIANCE | | | | |
| | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | FCST | VAC |
| FY'94 Discrete | 47 | 0 | 1 | (47) | (1) | 423 | 254 | 63 | (169) | 191 | 585 | 536 | 49 |
| FY'94 LOE | 18 | 18 | 44 | 0 | (26) | 347 | 347 | 406 | 0 | (59) | 394 | 468 | (74) |
| Subtotal FY'94 | 65 | 18 | 45 | (47) | (27) | 770 | 601 | 469 | (169) | 132 | 979 | 1,004 | (25) |
| Deferred (FY'93 to FY'94) Discrete | 7 | 0 | 0 | (7) | 0 | 321 | 277 | 264 | (44) | 13 | 352 | 269 | 83 |
| Deferred (FY'93 to FY'94) LOE | 0 | 0 | 0 | 0 | 0 | 42 | 42 | 14 | 0 | 28 | 51 | 26 | 25 |
| Subtotal Deferred | 7 | 0 | 0 | (7) | 0 | 363 | 319 | 278 | (44) | 41 | 403 | 295 | 108 |
| Carryover Commitments (FY'93 to FY'94) | 0 | 0 | 0 | 0 | 0 | 13 | 13 | 6 | 0 | 7 | 15 | 9 | 6 |
| TOTAL | 72 | 18 | 45 | (54) | (27) | 1,146 | 933 | 753 | (213) | 180 | 1,397 | 1,308 | 89 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-35. MRS - ES&H Cost and Schedule Summary

### 3.2.10 Institutional: B&R 03-01-14 WBS 3.1.14

**MANAGER:** J. B. Blandford

**OBJECTIVE(S):** Assist OCRWM in supporting public information and educational activities regarding an MRS facility as requested by potential host communities and the Office of the Nuclear Waste Negotiator (ONWN).

#### 3.2.10.1 Progress During Report Period:

- Met with Argonne National Laboratory and DOE to discuss details and M&O support role for upcoming EIS Public Scoping meetings. The M&O's logistical assistance in this effort was identified.

- Developed a preliminary concept for the MPC exhibit design and presented the designs to RW-45. The exhibit has been approved and will be developed over the next few months.

- Developed briefing booklets for the Mayor of Vale, Oregon, for use in discussions regarding the MRS concept.

#### 3.2.10.2 Deliverables, Publications, and Presentations:

- Prepared an article on the MPC RFP for OCRWM Bulletin and teammate publications.

#### 3.2.10.3 Planned Work for Next Month/Major Near-Term Milestones:

- Continue activities supporting the MPC EIS Scoping meetings.

- Initiate work associated with the design and purchase of an MPC exhibit and model.

- Provide DOE and Argonne Personnel with a tour of Calvert Cliffs and Surry Nuclear Power Stations.

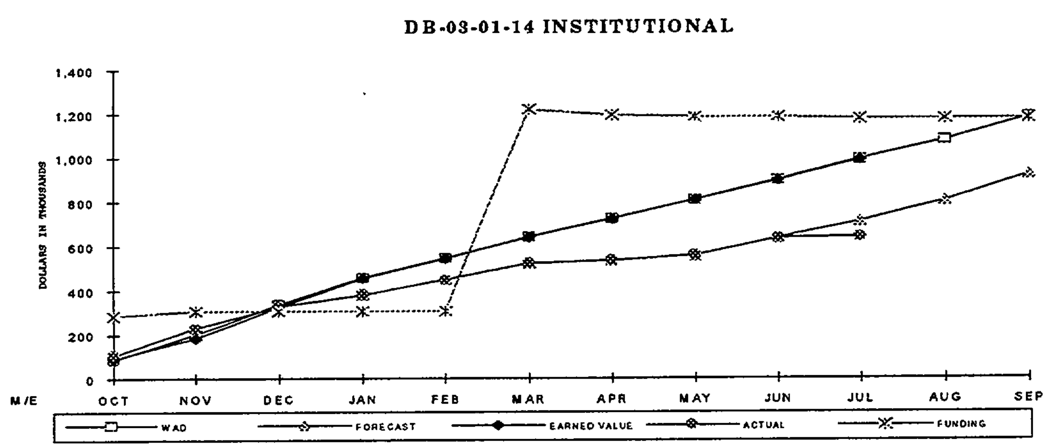
#### 3.2.10.4 Variance Explanation:

- The current period cost variance of $90K/96% and the cumulative cost variance of $350K/35% are primarily caused by refocusing MRS program activities toward MPCs costing less than expected. This decreased activity has resulted in a cost underrun that will be used to offset other costs in WBS 3.1.

#### 3.2.10.5 Issues and Concerns:

- None.

Actuals Thru 7/31/1994




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 82 | 121 | 135 | 120 | 87 | 97 | 82 | 86 | 88 | 94 | 89 | 104 |
| | FORECAST | 105 | 125 | 98 | 54 | 68 | 73 | 11 | 23 | 79 | 75 | 92 | 118 |
| | EARNED VALUE | 89 | 95 | 142 | 130 | 87 | 97 | 82 | 86 | 88 | 94 | | |
| | MONTH ACTUAL | 105 | 125 | 98 | 54 | 68 | 73 | 11 | 23 | 79 | 4 | | |
| | VAR/SCH | 7 | (26) | 7 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | (16) | (30) | 44 | 76 | 19 | 24 | 71 | 63 | 9 | 90 | | |
| CUM | WAD | 82 | 203 | 338 | 458 | 545 | 642 | 724 | 810 | 898 | 992 | 1,081 | 1,185 |
| | FORECAST | 105 | 230 | 328 | 382 | 450 | 523 | 534 | 557 | 636 | 711 | 803 | 921 |
| | EARNED VALUE | 89 | 184 | 326 | 456 | 543 | 640 | 722 | 808 | 896 | 990 | | |
| | ACTUAL | 105 | 230 | 328 | 382 | 450 | 523 | 534 | 557 | 636 | 640 | | |
| | VAR/SCH | 7 | (19) | (12) | (2) | (2) | (2) | (2) | (2) | (2) | (2) | | |
| | VAR/COST | (16) | (46) | (2) | 74 | 93 | 117 | 188 | 251 | 260 | 350 | | |
| FUNDING | FY94 FUNDING | 85 | 107 | 107 | 107 | 107 | 1,021 | 1,021 | 1,021 | 1,021 | 1,012 | 1,012 | 1,012 |
| | PREV. FUNDED | 201 | 201 | 201 | 201 | 201 | 201 | 175 | 165 | 165 | 165 | 165 | 165 |
| | TOTAL FUNDING | 286 | 308 | 308 | 308 | 308 | 1,222 | 1,196 | 1,186 | 1,186 | 1,177 | 1,177 | 1,177 |

**DB-03-01-14 INSTITUTIONAL**
FY94 CRWMS M&O PMS DATA ($000)
M/E JULY
Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EARNED | | VARIANCE | | | EARNED | | VARIANCE | | | | |
| | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | (24) | 0 | 24 | 87 | 87 | 47 | 0 | 40 | 87 | 72 | 15 |
| FY94 LOE | 94 | 94 | 28 | 0 | 66 | 766 | 766 | 495 | 0 | 271 | 950 | 713 | 237 |
| Subtotal FY94 | 94 | 94 | 4 | 0 | 90 | 853 | 853 | 542 | 0 | 311 | 1,037 | 785 | 252 |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 0 | 0 | 0 | 139 | 139 | 100 | 0 | 39 | 147 | 137 | 10 |
| TOTAL | 94 | 94 | 4 | 0 | 90 | 992 | 992 | 642 | 0 | 350 | 1,184 | 922 | 262 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:
- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-36. MRS - Institutional Cost and Schedule Summary

### 3.2.11 Support Services: B&R 03-01-15 WBS 3.1.15

**MANAGER:** J. B. Blandford/J. B. Stringer

**OBJECTIVE(S):** Provide administrative support to the MRS/MPC Design Group in Charlotte including word processing, preparation of presentation materials, filing, copying, mail distribution, making travel arrangements, and setting up meetings.

#### 3.2.11.1 Progress During Report Period:

- Submitted the MPC Design Procurement Specification records package to the Central Records Facility.

#### 3.2.11.2 Deliverables, Publications, and Presentations:

- None this reporting period.

#### 3.2.11.3 Planned Work for Next Month/Major Near-Term Milestones:

- Initiate transition of Federal Records from internal files to the Central Records Facility.

- Continue to provide administrative support to the MRS/MPC Design Group as required.

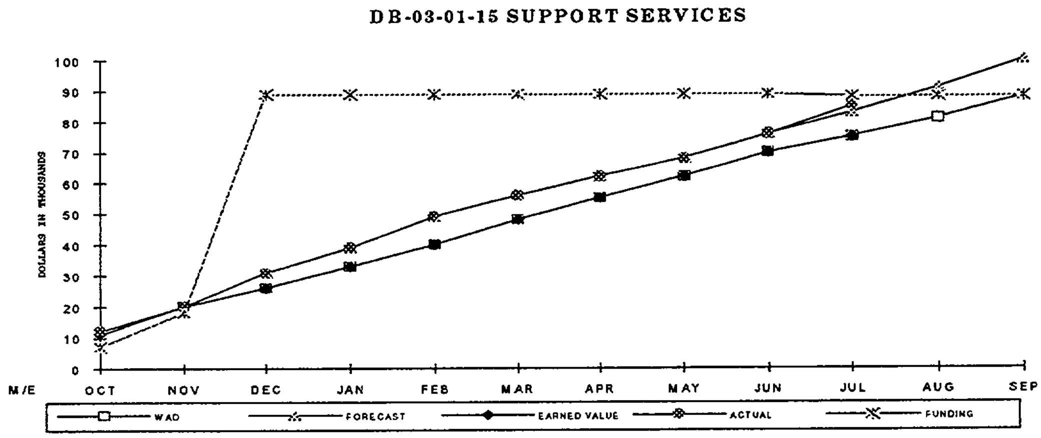
#### 3.2.11.4 Variance Explanation:

- The cumulative cost variance of ($10K/12%) is due to additional effort required to support the DPS and SOW preparation.

#### 3.2.11.5 Issues and Concerns:

- None.

Actuals Thru 7/31/1994




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 11 | 9 | 6 | 7 | 7 | 8 | 7 | 7 | 8 | 5 | 6 | 7 |
| | FORECAST | 12 | 8 | 11 | 8 | 10 | 7 | 6 | 6 | 8 | 7 | 8 | 9 |
| | EARNED VALUE | 11 | 9 | 6 | 7 | 7 | 8 | 7 | 7 | 8 | 5 | | |
| | MONTH ACTUAL | 12 | 8 | 11 | 8 | 10 | 7 | 6 | 6 | 8 | 9 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | (1) | 1 | (5) | (1) | (3) | 1 | 1 | 1 | 0 | (4) | | |
| CUM | WAD | 11 | 20 | 26 | 33 | 40 | 48 | 55 | 62 | 70 | 75 | 81 | 88 |
| | FORECAST | 12 | 20 | 31 | 39 | 49 | 56 | 62 | 68 | 76 | 83 | 91 | 100 |
| | EARNED VALUE | 11 | 20 | 26 | 33 | 40 | 48 | 55 | 62 | 70 | 75 | | |
| | ACTUAL | 12 | 20 | 31 | 39 | 49 | 56 | 62 | 68 | 76 | 85 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | (1) | 0 | (5) | (6) | (9) | (8) | (7) | (6) | (6) | (10) | | |
| FUNDING | FY94 FUNDING | 7 | 18 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 88 | 88 | 88 |
| | PREV. FUNDED | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TOTAL FUNDING | 7 | 18 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 88 | 88 | 88 |

**DB-03-01-15 SUPPORT SERVICES**

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY94 LOE | 5 | 5 | 9 | 0 | (4) | 76 | 76 | 85 | 0 | (9) | 88 | 100 | (12) |
| Subtotal FY94 | 5 | 5 | 9 | 0 | (4) | 76 | 76 | 85 | 0 | (9) | 88 | 100 | (12) |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 5 | 5 | 9 | 0 | (4) | 76 | 76 | 85 | 0 | (9) | 88 | 100 | (12) |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-37. MRS - Support Services Cost and Schedule Summary

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## 3.3 TRANSPORTATION SYSTEM

### 3.3.1 Systems Engineering: B&R 03-02-01 WBS 3.2.1

**MANAGER:** J. B. Blandford/D. Nolan/R. Kelly

**OBJECTIVE(S):** Provide overall management of M&O Transportation in the economic and systems analysis area and in systems engineering and integration tasks. Plan and manage transportation database formulations, model development, and computer code development activities.

#### 3.3.1.1 Progress During Report Period:

- Developed a technical paper identifying the geographic centroids for the regions east and west of the Mississippi River using the Transportation Geographic Information System (TGIS). This data was submitted to RW-46 and Argonne National Lab (ANL) as part of the Multi-Purpose Canister (MPC) Environmental Impact Statement (EIS) support effort.

- Met with representatives of the Harry Reid Center for Environmental Studies at the University of Nevada, Las Vegas, and RW-46 to discuss the workscope for proposed University of Nevada at Las Vegas (UNLV) data collection and to review activities for FY94.

- Met with Association of American Railroad representatives and RW-46 to discuss transportation risk assessment data analyses for rail as it relates to the OCRWM Program for transporting spent nuclear fuel. During this meeting, points of contact were identified.

- Incorporated a sample set of hydrology data received from the U.S. Geological Survey into the Transportation Geographic Information System (TGIS) database. The data for San Bernardino to Las Vegas area will be used as a sample case to match transportation data layers.

#### 3.3.1.2 Deliverables, Publications, and Presentations:

- Submitted the draft TGIS User's Manual to RW-40 for review.

- Submitted the draft Reference Transportation Data and Assumptions (RTDA) Report, Revision 2, to RW-40 for review.

- Presented a technical paper titled "OCRWM Transportation Geographic Information System" at the Institute of Nuclear Materials Management annual meeting in Naples, FL.

### 3.3.1.3 Planned Work for Next Month/Major Near-Term Milestones:

- Continue to evaluate additional data acquisitions for the TGIS. Collect cost estimates for possible acquisition of geographic data on Congressional districts for use in the TGIS database. Continue to investigate usefulness of obtaining high resolution scanned maps from U.S. Geological Survey for use in the TGIS database.

- Continue development of a data dictionary for the TGIS database.

- Meet with Sandia National Lab (SNL) to discuss the possible transfer of data from the STARBASE system at SNL to the TGIS.

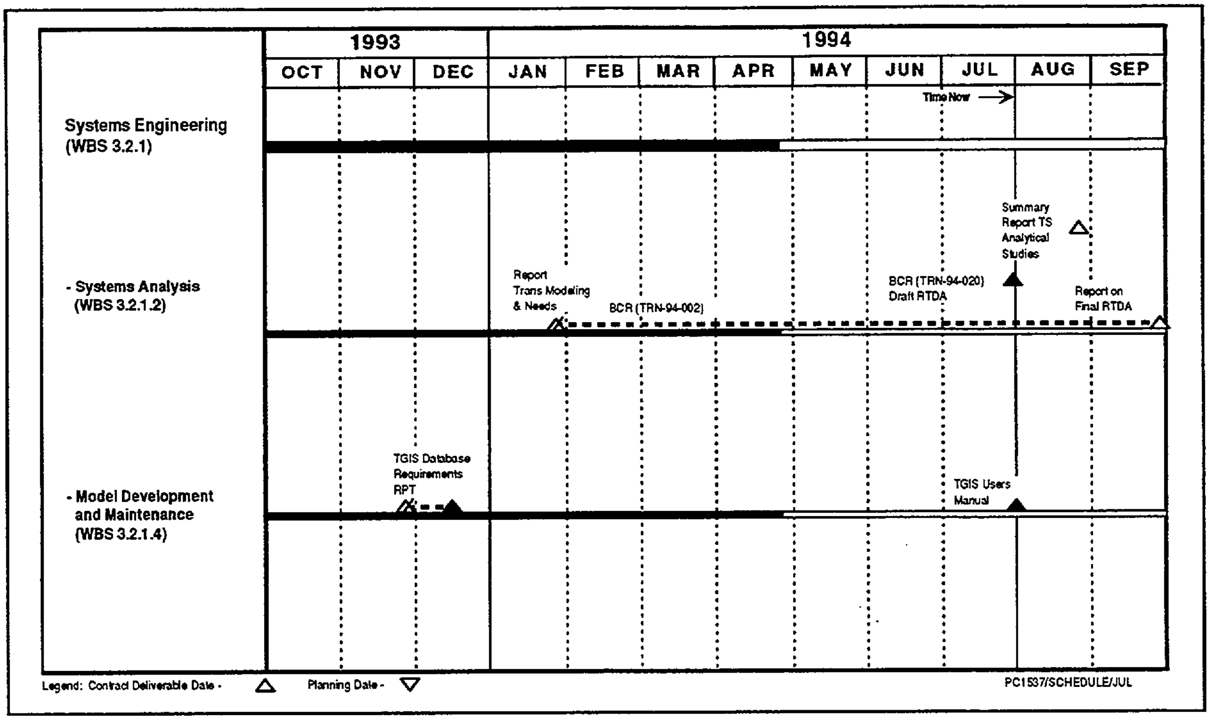
- Continue revising the data requirements by incorporating OCRWM comments into the TGIS document.

### 3.3.1.4 Variance Explanation:

- The cumulative schedule variance of ($93K/13%) is the result of reduced staffing levels during the first half of FY94 to support Analytical Studies and the re-evaluation of the Logistics Code efforts. Additional resources are now being applied to recover the Analytical Studies by fiscal year-end. A Baseline Change Request (BCR) is in process to close out the Logistics Code activities. No impact to the program is expected.

### 3.3.1.5 Issues and Concerns:

- None.



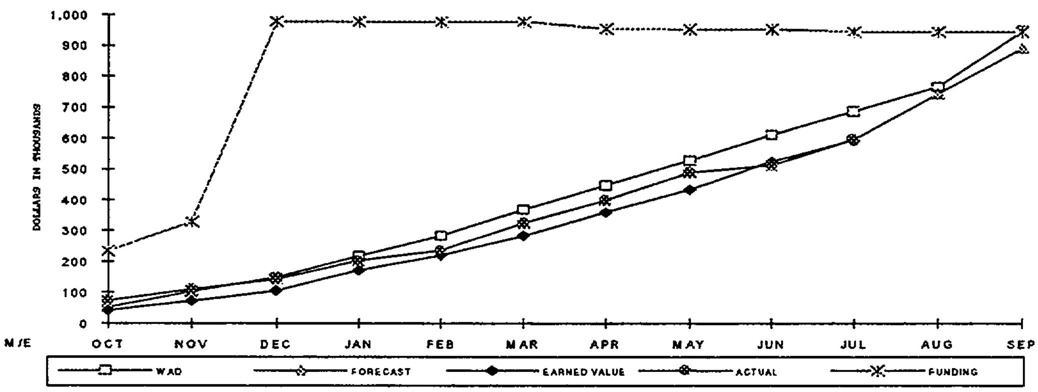

[NOTE: 1) Work priorities delayed the draft RTDA as described on BCR. Draft RTDA was delivered on July 29, 1994. Final RTDA is pushed to September 30, 1994, per BCR (TRW 94-043).

2) The TGIS User's Manual was delivered on July 22, 1994. No BCR was submitted.]

Figure 3-38. Transportation - Systems Engineering Activity Schedule

Actuals Thru 7/31/1994

DB-03-02-01 SYSTEMS ENGINEERING




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 52 | 50 | 46 | 68 | 66 | 85 | 80 | 80 | 84 | 75 | 80 | 181 |
| | FORECAST | 75 | 34 | 34 | 58 | 35 | 88 | 75 | 90 | 22 | 86 | 146 | 148 |
| | EARNED VALUE | 42 | 30 | 34 | 66 | 47 | 64 | 76 | 74 | 91 | 69 | | |
| | MONTH ACTUAL | 75 | 34 | 34 | 58 | 35 | 88 | 75 | 90 | 22 | 86 | | |
| | VAR/SCH | (10) | (20) | (12) | (2) | (19) | (21) | (4) | (6) | 7 | (6) | | |
| | VAR/COST | (33) | (4) | 0 | 8 | 12 | (24) | 1 | (16) | 69 | (17) | | |
| CUM | WAD | 52 | 102 | 148 | 216 | 282 | 367 | 447 | 527 | 611 | 686 | 766 | 947 |
| | FORECAST | 75 | 109 | 143 | 201 | 236 | 324 | 399 | 489 | 511 | 597 | 743 | 891 |
| | EARNED VALUE | 42 | 72 | 106 | 172 | 219 | 283 | 359 | 433 | 524 | 593 | | |
| | ACTUAL | 75 | 109 | 143 | 201 | 236 | 324 | 399 | 489 | 511 | 597 | | |
| | VAR/SCH | (10) | (30) | (42) | (44) | (63) | (84) | (88) | (94) | (87) | (93) | | |
| | VAR/COST | (33) | (37) | (37) | (29) | (17) | (41) | (40) | (56) | 13 | (4) | | |
| FUNDING | FY94 FUNDING | 66 | 160 | 811 | 811 | 811 | 811 | 811 | 811 | 811 | 803 | 803 | 803 |
| | PREV. FUNDED | 167 | 167 | 167 | 167 | 167 | 167 | 144 | 142 | 142 | 142 | 142 | 142 |
| | TOTAL FUNDING | 233 | 327 | 978 | 978 | 978 | 978 | 955 | 953 | 953 | 945 | 945 | 945 |

## DB-03-02-01 SYSTEMS ENGINEERING

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 41 | 36 | 36 | (5) | 0 | 380 | 290 | 257 | (90) | 33 | 556 | 472 | 84 |
| FY94 LOE | 19 | 19 | 10 | 0 | 9 | 196 | 196 | 214 | 0 | (18) | 246 | 262 | (16) |
| Subtotal FY94 | 60 | 55 | 46 | (5) | 9 | 576 | 486 | 471 | (90) | 15 | 802 | 734 | 68 |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY93 to FY94) | 15 | 15 | 40 | 0 | (25) | 109 | 109 | 126 | 0 | (17) | 143 | 155 | (12) |
| TOTAL | 75 | 70 | 86 | (5) | (16) | 685 | 595 | 597 | (90) | (2) | 945 | 889 | 56 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-39. Transportation - Systems Engineering Cost and Schedule Summary

### 3.3.2 Casks: B&R 03-02-02 WBS 3.2.2

**MANAGER:** J. B. Blandford/D. Nolan/R. Kelly

**OBJECTIVE(S):** Support development of all cask designs being sponsored by OCRWM. Conduct cask systems procurement activities including generation of a Request for Proposal (RFP) for procurement of existing Legal-Weight Truck (LWT) casks. Provide technical and contractual management support for advanced technology (General Atomics (GA)-4/9) cask system development including Final Design Report (FDR) and Safety Analysis Report (SAR). Manage Sandia National Labs (SNL) and Oakridge National Labs (ORNL) performance of analytical support for the cask development program. Lead technical development of burnup credit for use in advanced cask designs and the MPC. Support the MPC Implementation Program in development of cask acquisition documents and design specifications.

#### 3.3.2.1 Progress During Report Period:

- A review of the GA-9 SAR was completed in July and it was submitted by GA to the Nuclear Regulatory Commission (Part 71) on July 22, 1994.

- The GA-9 LWT Trailer Durability Test commenced on July 11, 1994 at Allied Signal Automotive Proving Ground (AAPG). The 30,000 equivalent miles (900 actual miles) hold point was reached on July 19, 1994. No major incidents have occurred.

- Performed a review on several Supplier Disposition Reports (SDRs) for the GA-4 cask half-scale model fabrication of the Impact Limiter Housings. Provided a technical observer to participate in the Project Review Meeting between GA and Precision Components Corporation (PCC) on July 20, 1994. Schedule delays in fabrication have extended the completion date of the model to March 1995.

- Made significant progress on the draft Stored Nuclear Fuel (SNF) Burnup Credit Topical Report. As part of this activity, the M&O is reviewing the draft SNL reports on spent fuel measurement, reactor restarts, and validation of the SCALE system Pressurized Water Reactor (PWR) isotopic composition analyses.

#### 3.3.2.2 Deliverables, Publications, and Presentations:

- Presented the status of the GA-4/9 contract to RW-40 on July 22, 1994. As a result of the presentation, the M&O is examining alternative strategies for the GA-4/9 cask program to include possible use of existing certified LWT casks.

- Made a presentation to the Nuclear Waste Technical Review Board (NWTRB) meeting July 13, 1994, on the Advanced Cask System Development Program.

#### 3.3.2.3 Planned Work for Next Month/Major Near-Term Milestones:

- Continue to provide support in drafting the Burnup Credit Topical Report.

- Complete a review of GA-4 SAR in preparation for submittal to the NRC.

- Continue to monitor all GA-4 half-scale model fabrication activities. Review GA documents received through M&O vendor data tracking system and deliver comments/recommendations to RW-40.

- Participate in a QA audit of PCC, the GA-4 half-scale model cask fabricator, as an observer.

- Continue to assist in the development of responses to MPC RFP bidder questions.

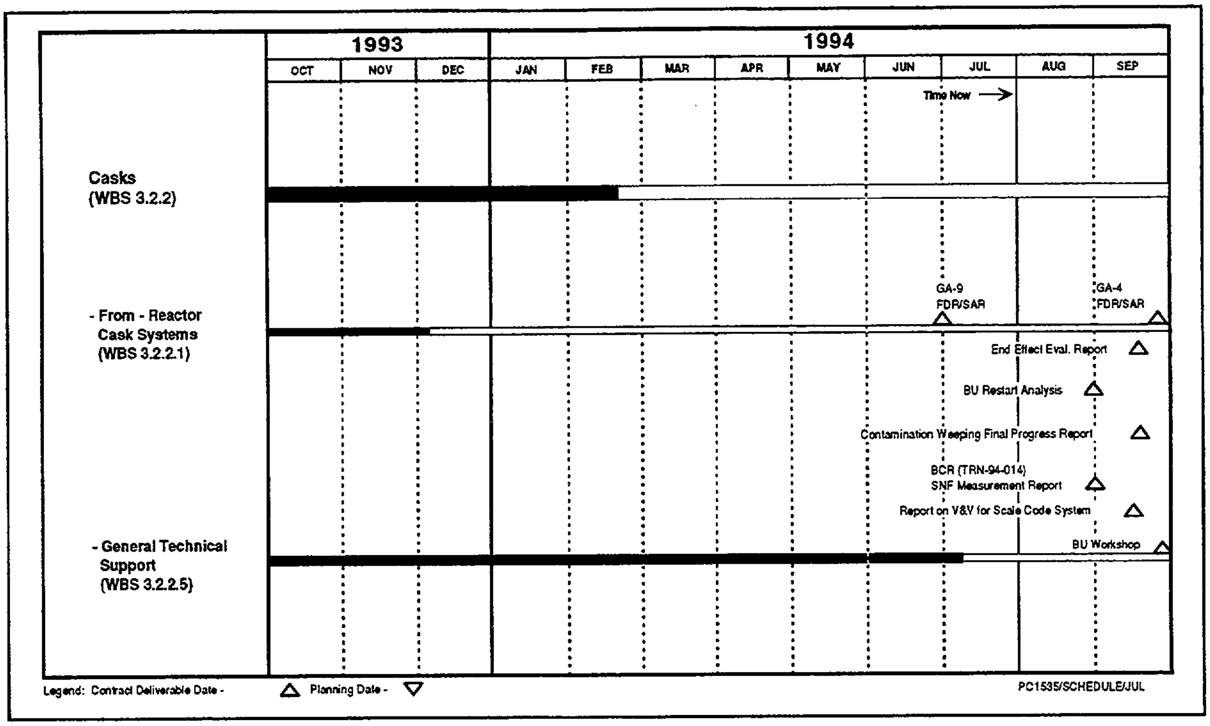
**3.3.2.4 Variance Explanation:**

- The current period schedule variance of $273K/43% is attributed to the late tasking of work being performed by SNL. Resources have been added at SNL to complete all assigned tasks except Burnup Credit by fiscal year-end.

- The current period cost variance of $563K/61% and cumulative cost variance of $619K/13% is primarily attributed to billing and accrual lags from SNL for work performed.

**3.3.2.5 Issues and Concerns:**

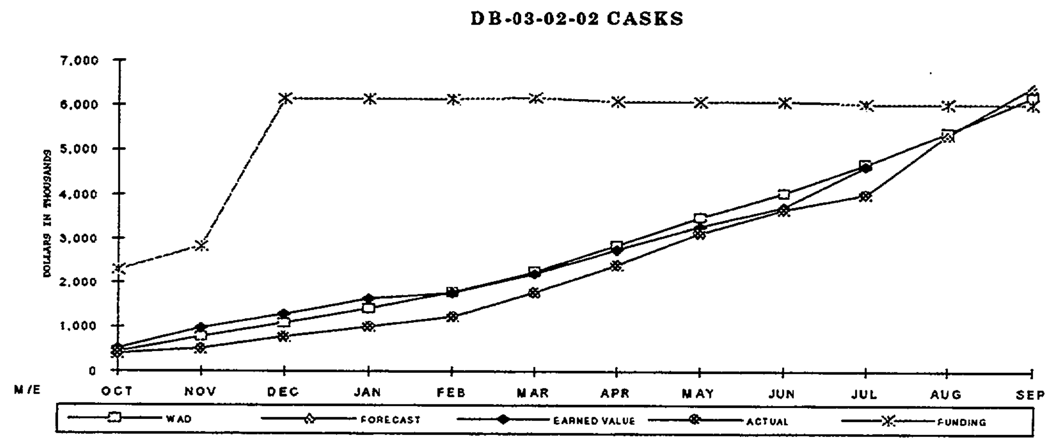
- None.




[NOTE: General Technical Support is behind because contracts (i.e., MPOs) were not in place with SNL until mid-February; also, billings from labs were late.]

Figure 3-40. Transportation - Casks Activity Schedule

Actuals Thru 7/31/1994




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 430 | 333 | 315 | 339 | 363 | 478 | 605 | 633 | 544 | **643** | 719 | 791 |
| | FORECAST | 385 | 116 | 263 | 230 | 237 | 543 | 641 | 718 | 531 | **353** | 1,321 | 1,094 |
| | EARNED VALUE | 502 | 469 | 316 | 338 | 139 | 450 | 540 | 531 | 435 | **916** | | |
| | MONTH ACTUAL | 385 | 116 | 263 | 230 | 237 | 543 | 641 | 718 | 531 | **353** | | |
| | VAR/SCH | 72 | 136 | 1 | (1) | (224) | (28) | (65) | (102) | (109) | **273** | | |
| | VAR/COST | 117 | 353 | 53 | 108 | (98) | (93) | (101) | (187) | (96) | **563** | | |
| CUM | WAD | 430 | 763 | 1,078 | 1,417 | 1,780 | 2,258 | 2,863 | 3,496 | 4,040 | **4,683** | 5,402 | 6,193 |
| | FORECAST | 385 | 501 | 764 | 994 | 1,231 | 1,774 | 2,415 | 3,133 | 3,664 | **4,017** | 5,338 | 6,432 |
| | EARNED VALUE | 502 | 971 | 1,287 | 1,625 | 1,764 | 2,214 | 2,754 | 3,285 | 3,720 | **4,636** | | |
| | ACTUAL | 385 | 501 | 764 | 994 | 1,231 | 1,774 | 2,415 | 3,133 | 3,664 | **4,017** | | |
| | VAR/SCH | 72 | 208 | 209 | 208 | (16) | (44) | (109) | (211) | (320) | **(47)** | | |
| | VAR/COST | 117 | 470 | 523 | 631 | 533 | 440 | 339 | 152 | 56 | **619** | | |
| FUNDING | FY94 FUNDING | 370 | 899 | 4,226 | 4,226 | 4,226 | 4,257 | 4,257 | 4,257 | 4,257 | **4,198** | 4,198 | 4,198 |
| | PREV. FUNDED | 1,924 | 1,924 | 1,924 | 1,924 | 1,924 | 1,924 | 1,842 | 1,835 | 1,835 | **1,835** | 1,835 | 1,835 |
| | TOTAL FUNDING | 2,294 | 2,823 | 6,150 | 6,150 | 6,150 | 6,181 | 6,099 | 6,092 | 6,092 | **6,033** | 6,033 | 6,033 |

## DB-03-02-02 CASKS

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY'94 Discrete | 307 | 586 | 161 | 279 | 425 | 1,806 | 1,754 | 1,737 | (54) | 17 | 2,461 | 2,466 | (5) |
| FY'94 LOE | 187 | 187 | 181 | 0 | 6 | 1,497 | 1,497 | 1,148 | 0 | 349 | 1,978 | 1,913 | 65 |
| Subtotal FY'94 | 494 | 773 | 342 | 279 | 431 | 3,305 | 3,251 | 2,885 | (54) | 366 | 4,439 | 4,379 | 60 |
| Deferred (FY'93 to FY'94) Discrete | 62 | 57 | 1 | (5) | 56 | 221 | 229 | 8 | 8 | 221 | 349 | 356 | (7) |
| Deferred (FY'93 to FY'94) LOE | 66 | 66 | 0 | 0 | 66 | 716 | 716 | 839 | 0 | (123) | 891 | 1,068 | (177) |
| Subtotal Deferred | 128 | 123 | 1 | (5) | 122 | 937 | 945 | 847 | 8 | 98 | 1,240 | 1,424 | (184) |
| Carryover Commitments (FY'93 to FY'94) | 21 | 21 | 10 | 0 | 11 | 441 | 441 | 285 | 0 | 156 | 512 | 629 | (117) |
| TOTAL | 643 | 917 | 353 | 274 | 564 | 4,683 | 4,637 | 4,017 | (46) | 620 | 6,191 | 6,432 | (241) |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:
- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-41. Transportation - Casks Cost and Schedule Summary

### 3.3.3 Transportation - Support Systems: B&R 03-02-04 WBS 3.2.4

**MANAGER:** J. B. Blandford/D. Nolan/R. Kelly

**OBJECTIVE(S):** Provide overall direction of the M&O contractor transportation work in the support systems area and monitor tasks at ORNL.

#### 3.3.3.1 Progress During Report Period:

- Reviewed the proposal in response to Request for Quotation (RFQ) received from Allied Signal Automotive Proving Grounds (AAPG) for over-the-road and human factors' testing and nuclear waste driver support for LWT transport system in comparison to detailed engineering estimate. Preparing a technical evaluation based on this review.

- Continued efforts to gather lessons-learned information by receiving two reports from Wastren on: 1) lessons learned from the use of transfer bells for dry loading of transport casks at Three Mile Island Unit 2; and 2) lessons learned from the spent-fuel-cask handling experience at Three Mile Island Unit 2. These reports are being reviewed for applications to the CRWMS program.

#### 3.3.3.2 Deliverables, Publications, and Presentations:

- Delivered a quarterly report on Cask System and MPC Design Activities to RW-40.

#### 3.3.3.3 Planned Work for Next Month/Major Near-Term Milestones:

- Continue the development of the Maintenance Management Plan.

- Complete the QAP-3-1 review draft of the Transportation System Operations Plan.

- Continue development of the Highway Carrier Service Requirements Document.

- Continue to develop site-specific data requirements.

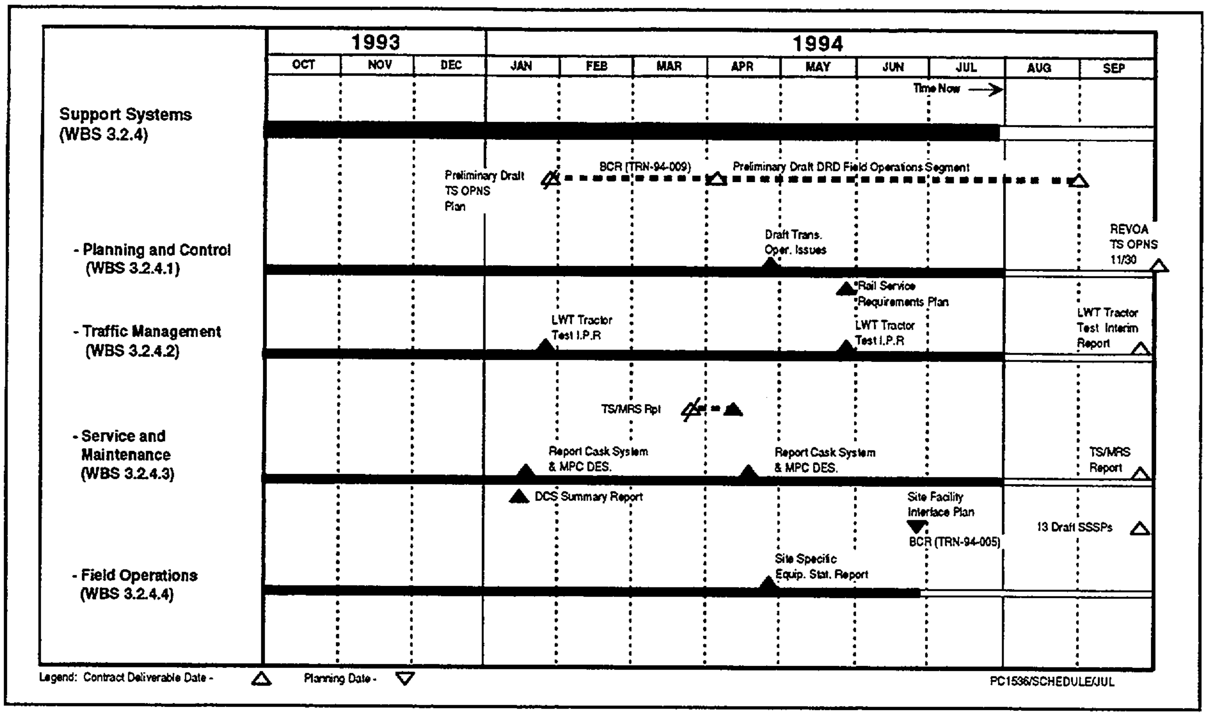
#### 3.3.3.4 Variance Explanation:

- The current period cost variance of $183K/52% and cumulative cost variance of $673K/28% are primarily the result of billing lags for work performed by the labs and subcontractors.

- The current period schedule variance of $87K/33% is a correction due to the early close-out and/or rebaselining of various tasks.

#### 3.3.3.5 Issues and Concerns:

- None.

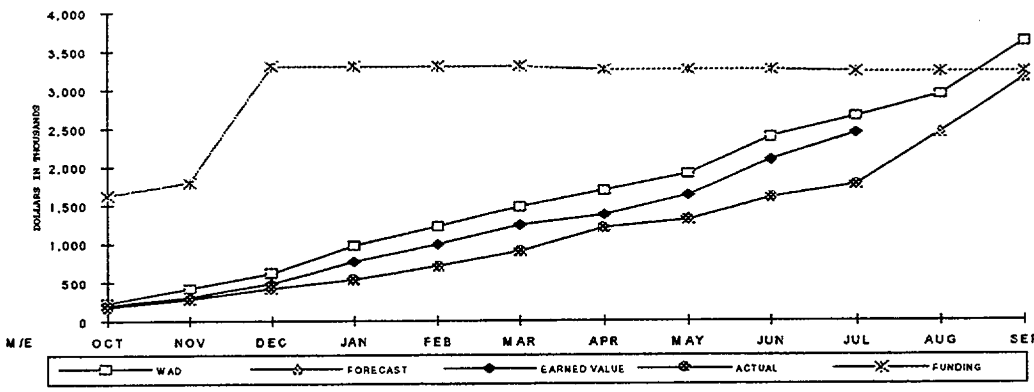



[NOTE: The entire DRD development was reorganized for the remainder of FY94. DRD development will continue throughout FY95.]

Figure 3-42. Transportation - Support Systems Activity Schedule

Actuals Thru 7/31/1994

**DB-03-02-04 SUPPORT SYSTEMS**




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 227 | 194 | 201 | 349 | 252 | 250 | 215 | 217 | 478 | 264 | 279 | 687 |
| | FORECAST | 184 | 94 | 139 | 118 | 177 | 187 | 305 | 103 | 287 | 168 | 679 | 701 |
| | EARNED VALUE | 202 | 105 | 178 | 284 | 222 | 246 | 129 | 257 | 461 | 351 | | |
| | MONTH ACTUAL | 184 | 94 | 139 | 118 | 177 | 187 | 305 | 103 | 287 | 168 | | |
| | VAR/SCH | (25) | (89) | (23) | (65) | (30) | (4) | (86) | 40 | (17) | 87 | | |
| | VAR/COST | 18 | 11 | 39 | 166 | 45 | 59 | (176) | 154 | 174 | 183 | | |
| CUM | WAD | 227 | 421 | 622 | 971 | 1,223 | 1,473 | 1,688 | 1,905 | 2,383 | 2,647 | 2,926 | 3,613 |
| | FORECAST | 184 | 278 | 417 | 535 | 712 | 899 | 1,204 | 1,307 | 1,594 | 1,762 | 2,441 | 3,142 |
| | EARNED VALUE | 202 | 307 | 485 | 769 | 991 | 1,237 | 1,366 | 1,623 | 2,084 | 2,435 | | |
| | ACTUAL | 184 | 278 | 417 | 535 | 712 | 899 | 1,204 | 1,307 | 1,594 | 1,762 | | |
| | VAR/SCH | (25) | (114) | (137) | (202) | (232) | (236) | (322) | (282) | (299) | (212) | | |
| | VAR/COST | 18 | 29 | 68 | 234 | 279 | 338 | 162 | 316 | 490 | 673 | | |
| FUNDING | FY94 FUNDING | 121 | 293 | 1,803 | 1,803 | 1,803 | 1,803 | 1,803 | 1,803 | 1,803 | 1,772 | 1,772 | 1,772 |
| | PREV. FUNDED | 1,502 | 1,502 | 1,502 | 1,502 | 1,502 | 1,502 | 1,460 | 1,454 | 1,454 | 1,454 | 1,454 | 1,454 |
| | TOTAL FUNDING | 1,623 | 1,795 | 3,305 | 3,305 | 3,305 | 3,305 | 3,263 | 3,257 | 3,257 | 3,226 | 3,226 | 3,226 |

**DB-03-02-04 SUPPORT SYSTEMS**
FY94 CRWMS M&O PMS DATA ($000)
M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EARNED | | VARIANCE | | | EARNED | | VARIANCE | | | | |
| | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | FCST | VAC |
| FY94 Discrete | 88 | 164 | 130 | 76 | 34 | 1,242 | 1,030 | 1,026 | (212) | 4 | 1,427 | 1,427 | 0 |
| FY94 LOE | 0 | 0 | 0 | 0 | 0 | 85 | 85 | 12 | 0 | 73 | 374 | 11 | 363 |
| Subtotal FY94 | 88 | 164 | 130 | 76 | 34 | 1,327 | 1,115 | 1,038 | (212) | 77 | 1,801 | 1,438 | 363 |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 11 | 1 | 11 | 10 | 124 | 124 | 41 | 0 | 83 | 228 | 168 | 60 |
| Subtotal Deferred | 0 | 11 | 1 | 11 | 10 | 124 | 124 | 41 | 0 | 83 | 228 | 168 | 60 |
| Carryover Commitments (FY93 to FY94) | 176 | 176 | 37 | 0 | 139 | 1,195 | 1,195 | 683 | 0 | 512 | 1,584 | 1,534 | 50 |
| TOTAL | 264 | 351 | 168 | 87 | 183 | 2,646 | 2,434 | 1,762 | (212) | 672 | 3,613 | 3,140 | 473 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-43. Transportation - Support Systems Cost and Schedule Summary

## 3.3.4 Regulatory: B&R 03-02-05 WBS 3.2.5

**MANAGER:** J. B. Blandford

**OBJECTIVE(S):** Monitor regulations and industry standards and assess impact on the Transportation System.

### 3.3.4.1 Progress During Report Period:

- Reviewed the ORNL/SAIC strawman on selecting routes for shipment of SNF and High-Level Waste (HLW) via highway, rail/barge, and internodal. Comments on the E. J. Bentz review of the ORNL/SAIC Routing strawmen were provided to OCRWM.

### 3.3.4.2 Deliverables, Publications, and Presentations:

- None this reporting period.

### 3.3.4.3 Planned Work for Next Month/Major Near-Term Milestones:

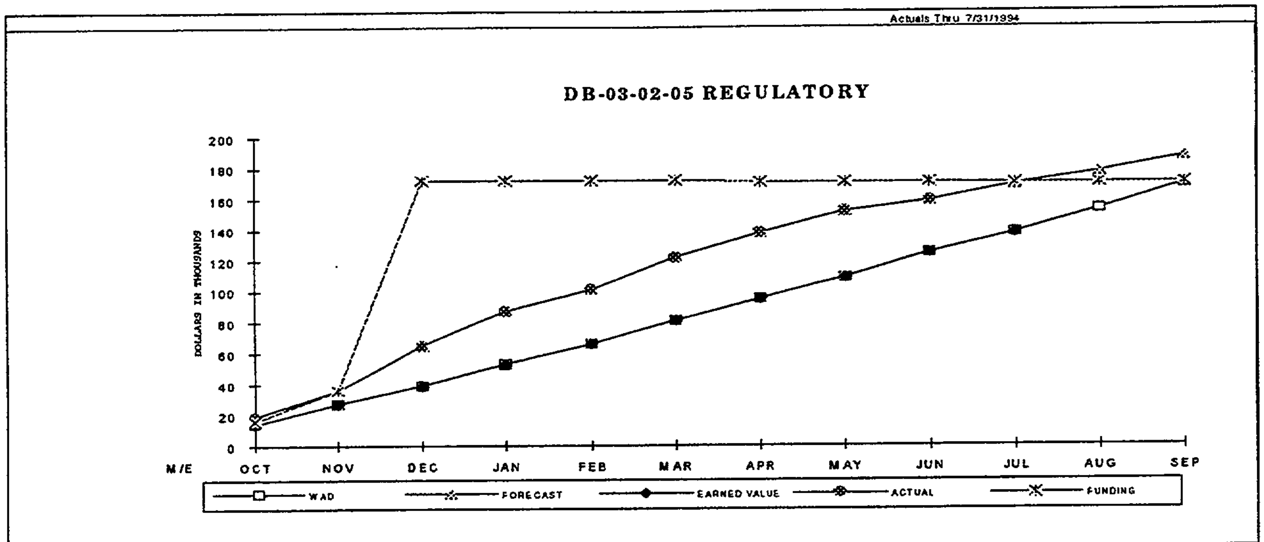
- Continue to provide regulatory assistance as required.

### 3.3.4.4 Variance Explanation:

- The cumulative cost variance of ($31K/22%) is the result of increased task activity in the first half of this fiscal year. Activities with this work element will decrease in the 4th quarter.

### 3.3.4.5 Issues and Concerns:

- None.




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 14 | 13 | 12 | 14 | 13 | 15 | 14 | 14 | 16 | 13 | 15 | 16 |
| | FORECAST | 19 | 17 | 29 | 22 | 14 | 21 | 16 | 14 | 7 | 10 | 8 | 10 |
| | EARNED VALUE | 14 | 13 | 12 | 14 | 13 | 15 | 14 | 14 | 16 | 13 | | |
| | MONTH ACTUAL | 19 | 17 | 29 | 22 | 14 | 21 | 16 | 14 | 7 | 10 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | (5) | (4) | (17) | (8) | (1) | (6) | (2) | 0 | 9 | 3 | | |
| CUM | WAD | 14 | 27 | 39 | 53 | 66 | 81 | 95 | 109 | 125 | 138 | 153 | 169 |
| | FORECAST | 19 | 36 | 65 | 87 | 101 | 122 | 138 | 152 | 159 | 169 | 177 | 187 |
| | EARNED VALUE | 14 | 27 | 39 | 53 | 66 | 81 | 95 | 109 | 125 | 138 | | |
| | ACTUAL | 19 | 36 | 65 | 87 | 101 | 122 | 138 | 152 | 159 | 169 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | (5) | (9) | (26) | (34) | (35) | (41) | (43) | (43) | (34) | (31) | | |
| FUNDING | FY94 FUNDING | 14 | 34 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 169 | 169 | 169 |
| | PREV. FUNDED | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 |
| | TOTAL FUNDING | 16 | 36 | 172 | 172 | 172 | 172 | 171 | 171 | 171 | 170 | 170 | 170 |

**DB-03-02-05 REGULATORY**
FY94 CRWMS M&O PMS DATA ($000)
M/E JULY
Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY94 LOE | 13 | 13 | 10 | 0 | 3 | 138 | 138 | 168 | 0 | (30) | 169 | 186 | (17) |
| Subtotal FY94 | 13 | 13 | 10 | 0 | 3 | 138 | 138 | 168 | 0 | (30) | 169 | 186 | (17) |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 |
| TOTAL | 13 | 13 | 10 | 0 | 3 | 139 | 139 | 169 | 0 | (30) | 170 | 187 | (17) |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:
- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-44. Transportation - Regulatory Cost and Schedule Summary

### 3.3.5 Transportation - Project Management: B&R 03-02-09 WBS 3.2.9

**MANAGER:** J. B. Blandford/D. Nolan/R. Kelly

**OBJECTIVE(S):** Implement and maintain management systems and procedures as appropriate. Provide general management liaison and coordination with OCRWM and OCRWM-related elements. Provide transportation planning and control to include budget preparation, support of management reviews, and maintenance of a formal cost and schedule control system.

#### 3.3.5.1 Progress During Report Period:

- Completed detailed cost and schedule data for the FY95 Annual Plan and the FY96 IRB Justification package for transportation. This information will be presented at the Transportation Annual Plan Budget Review to RW-1.

#### 3.3.5.2 Deliverables, Publications, and Presentations:

- Made presentations on the CRWMS Transportation Program to the NWTRB in Denver on July 13, 1994.

- Presented near and long-term goals and issues for the Transportation Department to RW-40 at the Transportation (RW-40/M&O) off-site held on July 18-19, 1994.

- Delivered the Quarterly Issue Tracking System Summary Report for the 3rd quarter FY94 to RW-40.

#### 3.3.5.3 Planned Work for Next Month/Major Near-Term Milestones:

- Prepare a presentation of the Transportation FY95 Annual Plan for RW-40 and RW-1 budget reviews.

- Prepare an outline for the Transportation portion of the MRS Project Integrated Plan.

#### 3.3.5.4 Variance Explanation:

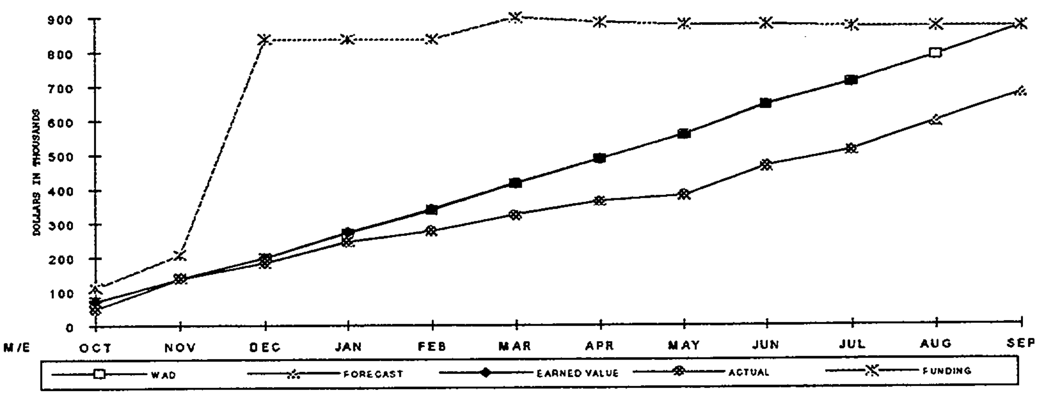
- The cumulative cost variance of $200K/28% is the result of senior personnel being temporarily assigned to the MPC effort. This activity is expected to underrun for FY94.

#### 3.3.5.5 Issues and Concerns:

- None.

Actuals Thru 7/31/1994

## DB-03-02-09 PROJECT MANAGEMENT




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 71 | 67 | 61 | 71 | 68 | 77 | 71 | 71 | 87 | 68 | 77 | 84 |
| | FORECAST | 48 | 90 | 46 | 61 | 31 | 48 | 40 | 17 | 84 | 47 | 83 | 82 |
| | EARNED VALUE | 71 | 67 | 61 | 74 | 68 | 76 | 70 | 70 | 89 | 66 | | |
| | MONTH ACTUAL | 48 | 90 | 46 | 61 | 31 | 48 | 40 | 17 | 84 | 47 | | |
| | VAR/SCH | 0 | 0 | 0 | 3 | 0 | (1) | (1) | (1) | 2 | (2) | | |
| | VAR/COST | 23 | (23) | 15 | 13 | 37 | 28 | 30 | 53 | 5 | 19 | | |
| CUM | WAD | 71 | 138 | 199 | 270 | 338 | 415 | 486 | 557 | 644 | 712 | 789 | 873 |
| | FORECAST | 48 | 138 | 184 | 245 | 276 | 324 | 364 | 381 | 465 | 512 | 595 | 677 |
| | EARNED VALUE | 71 | 138 | 199 | 273 | 341 | 417 | 487 | 557 | 646 | 712 | | |
| | ACTUAL | 48 | 138 | 184 | 245 | 276 | 324 | 364 | 381 | 465 | 512 | | |
| | VAR/SCH | 0 | 0 | 0 | 3 | 3 | 2 | 1 | 0 | 2 | 0 | | |
| | VAR/COST | 23 | 0 | 15 | 28 | 65 | 93 | 123 | 176 | 181 | 200 | | |
| FUNDING | FY94 FUNDING | 68 | 165 | 795 | 795 | 795 | 857 | 857 | 857 | 857 | 850 | 850 | 850 |
| | PREV. FUNDED | 43 | 43 | 43 | 43 | 43 | 43 | 29 | 22 | 22 | 22 | 22 | 22 |
| | TOTAL FUNDING | 111 | 208 | 838 | 838 | 838 | 900 | 886 | 879 | 879 | 872 | 872 | 872 |

## DB-03-02-09 PROJECT MANAGEMENT

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 1 | 0 | 0 | (1) | 0 | 9 | 7 | 10 | (2) | (3) | 11 | 12 | (1) |
| FY94 LOE | 66 | 66 | 44 | 0 | 22 | 685 | 685 | 474 | 0 | 211 | 839 | 647 | 192 |
| Subtotal FY94 | 67 | 66 | 44 | (1) | 22 | 694 | 692 | 484 | (2) | 208 | 850 | 659 | 191 |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY93 to FY94) | 1 | 1 | 4 | 0 | (3) | 20 | 20 | 28 | 0 | (8) | 25 | 18 | 7 |
| TOTAL | 68 | 67 | 48 | (1) | 19 | 714 | 712 | 512 | (2) | 200 | 875 | 677 | 198 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-45. Transportation - Project Management Cost and Schedule Summary

### 3.3.6 Quality Assurance: B&R 03-02-11 WBS 3.2.11

**MANAGER:** R. P. Ruth

**OBJECTIVE(S):** Develop Quality Assurance (QA) Documents for implementation of QA at the project level. Prepare for and participate in audits and surveillance of M&O organizations supporting transportation activities. Conduct QA training.

#### 3.3.6.1 Progress During Report Period:

- Level-of-effort work. No support was provided this reporting period.

#### 3.3.6.2 Deliverables, Publications, and Presentations:

- None this reporting period.

#### 3.3.6.3 Planned Work for Next Month/Major Near-Term Milestones:

- Perform QA audits as required.

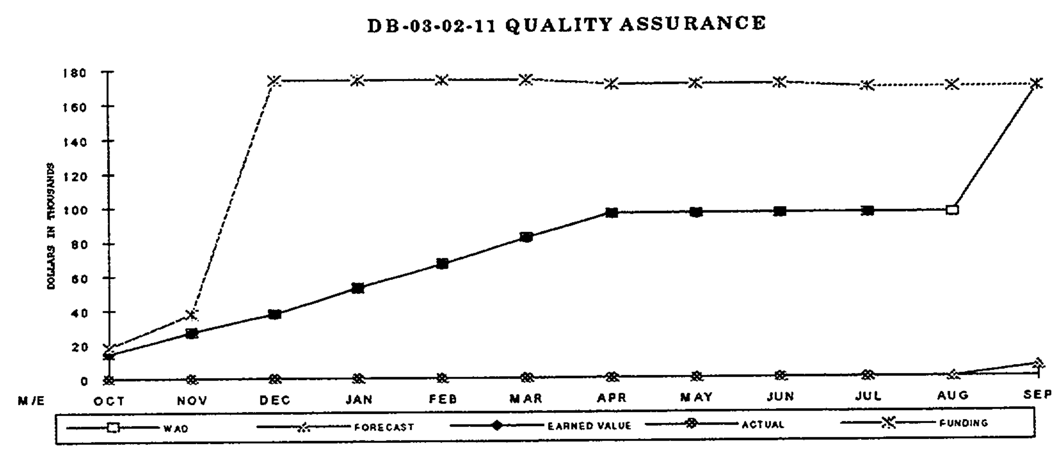
#### 3.3.6.4 Variance Explanation:

- The cumulative cost variance of $96K/100% is the result of not initiating this Level-of-Effort (LOE) support activity. This task will underrun year-end GFY94.

#### 3.3.6.5 Issues and Concerns:

- None.

Actuals Thru 7/31/1994




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 14 | 13 | 11 | 15 | 14 | 15 | 14 | 0 | 0 | 0 | 0 | 73 |
| | FORECAST | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| | EARNED VALUE | 14 | 13 | 11 | 15 | 14 | 15 | 14 | 0 | 0 | 0 | | |
| | MONTH ACTUAL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 14 | 13 | 11 | 15 | 14 | 15 | 14 | 0 | 0 | 0 | | |
| CUM | WAD | 14 | 27 | 38 | 53 | 67 | 82 | 96 | 96 | 96 | 96 | 96 | 169 |
| | FORECAST | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| | EARNED VALUE | 14 | 27 | 38 | 53 | 67 | 82 | 96 | 96 | 96 | 96 | | |
| | ACTUAL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 14 | 27 | 38 | 53 | 67 | 82 | 96 | 96 | 96 | 96 | | |
| FUNDING | FY94 FUNDING | 14 | 34 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 168 | 168 | 168 |
| | PREV. FUNDED | 4 | 4 | 4 | 4 | 4 | 4 | 1 | 1 | 1 | 1 | 1 | 1 |
| | TOTAL FUNDING | 18 | 38 | 174 | 174 | 174 | 174 | 171 | 171 | 171 | 169 | 169 | 169 |

**DB-03-02-11 QUALITY ASSURANCE**

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY94 LOE | 0 | 0 | 0 | 0 | 0 | 95 | 95 | 0 | 0 | 96 | 168 | 6 | 162 |
| Subtotal FY94 | 0 | 0 | 0 | 0 | 0 | 95 | 95 | 0 | 0 | 96 | 168 | 6 | 162 |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 |
| TOTAL | 0 | 0 | 0 | 0 | 0 | 96 | 96 | 0 | 0 | 96 | 169 | 6 | 163 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-46. Transportation - Quality Assurance Cost and Schedule Summary

### 3.3.7 Transportation - Information Management: B&R 03-02-12 WBS 3.2.12

**MANAGER:** J. B. Blandford/D. Nolan/R. Kelly

**OBJECTIVE(S):** Facilitate the organization, storage, and retrieval of information and documents.

#### 3.3.7.1 Progress During Report Period:

- Level-of-effort work. No support was provided this reporting period.

#### 3.3.7.2 Deliverables, Publications, and Presentations:

- None this reporting period.

#### 3.3.7.3 Planned Work for Next Month/Major Near-Term Milestones:

- Finalize a plan for transition of equipment to Vienna.

- Continue to provide support to the MRS/MPC Design Group as required.

#### 3.3.7.4 Variance Explanation:

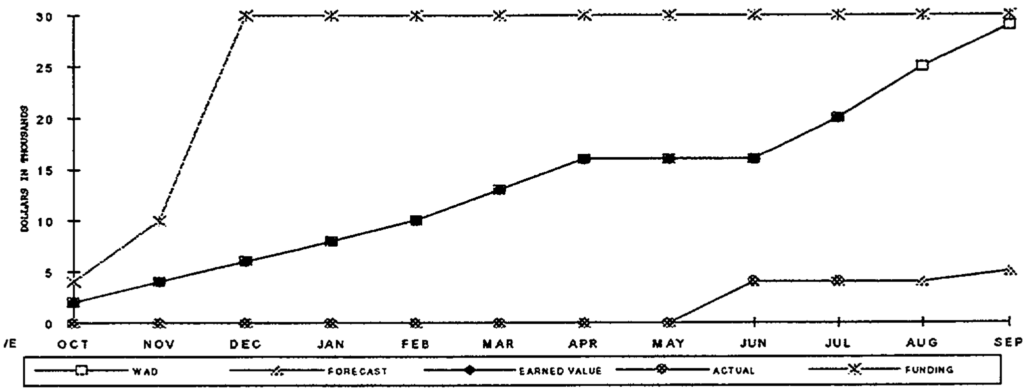
- The cumulative cost variance of $16K/80% is the result of this task not initiating this LOE activity. This task will underrun year-end FY94.

#### 3.3.7.5 Issues and Concerns:

- None.

Actuals Thru 7/31/1994

## DB-03-02-12 INFORMATION MANAGEMENT




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 0 | 0 | 4 | 5 | 4 |
| | FORECAST | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 1 |
| | EARNED VALUE | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 0 | 0 | 4 | | |
| | MONTH ACTUAL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 0 | (4) | 4 | | |
| CUM | WAD | 2 | 4 | 6 | 8 | 10 | 13 | 16 | 16 | 16 | 20 | 25 | 29 |
| | FORECAST | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 4 | 5 |
| | EARNED VALUE | 2 | 4 | 6 | 8 | 10 | 13 | 16 | 16 | 16 | 20 | | |
| | ACTUAL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 2 | 4 | 6 | 8 | 10 | 13 | 16 | 16 | 12 | 16 | | |
| FUNDING | FY94 FUNDING | 4 | 10 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| | PREV. FUNDED | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TOTAL FUNDING | 4 | 10 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |

## DB-03-02-12 INFORMATION MANAGEMENT

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EARNED | | VARIANCE | | | EARNED | | VARIANCE | | | | |
| | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY94 LOE | 4 | 4 | 0 | 0 | 4 | 21 | 21 | 4 | 0 | 17 | 30 | 5 | 25 |
| Subtotal FY94 | 4 | 4 | 0 | 0 | 4 | 21 | 21 | 4 | 0 | 17 | 30 | 5 | 25 |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 4 | 4 | 0 | 0 | 4 | 21 | 21 | 4 | 0 | 17 | 30 | 5 | 25 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-47. Transportation - Information Management Cost and Schedule Summary

### 3.3.8 Environmental, Safety and Health: B&R 03-02-13 WBS 3.2.13

**MANAGER:** J. B. Blandford/D. Nolan/R. Kelly

**OBJECTIVE(S):** Provide overall management of M&O transportation work in areas related to environmental, safety, and health issues. Support planning and preparation of the MRS Environmental Assessment (EA) and related documents (EA Technical Guide, National Transportation Impact Assessment). Manage risk assessment technical studies at Argonne National Laboratories (ANL) and Lawrence Livermore National Laboratories (LLNL), including the Transportation System Risk Assessment (TSRA). Support transportation-related studies and analyses in the areas of human factors engineering.

#### 3.3.8.1 Progress During Report Period:

- Completed a draft review of the detailed thermal analysis and inelastic mechanical analysis, Volumes 2 and 3, of the GA-4 cask design used in the Preliminary Transportation System Risk Assessment (PTSRA). Comments were forwarded to LLNL for resolution.

- Worked with ANL and SNL to assess the magnitude of the effort required to rehost the RADSF Enhancement Modules developed by ANL onto the TRANSNET public-access timeshare system at SNL. Initiated a review of the RADSF computer code (including prior technical comments on the code and its documentation) and solicited comments from SNL in preparation for an upcoming meeting with the laboratories.

- Held two meetings with ANL personnel to discuss data availability for the MPC EIS risk assessments for radiological and non-radiological impacts. These meetings were successful in developing a relationship for a technical data exchange.

#### 3.3.8.2 Deliverables, Publications, and Presentations:

- None this reporting period.

#### 3.3.8.3 Planned Work for Next Month/Major Near-Term Milestones:

- Meet with SNL and ANL personnel to discuss the installation of the RADSF modules on TRANSNET.

- Start a white paper on an overview of Phase 1 of the Preliminary Transportation System Risk Assessment on the GA-4 transportation cask being finalized by LLNL. Continue working with LLNL to resolve comments from the M&O's review of the report.

- Continue the development of the Transportation Program Risk Management Strategic Plan document based on the proposed resolution of the RW and Weston comments on the annotated outline of the document.

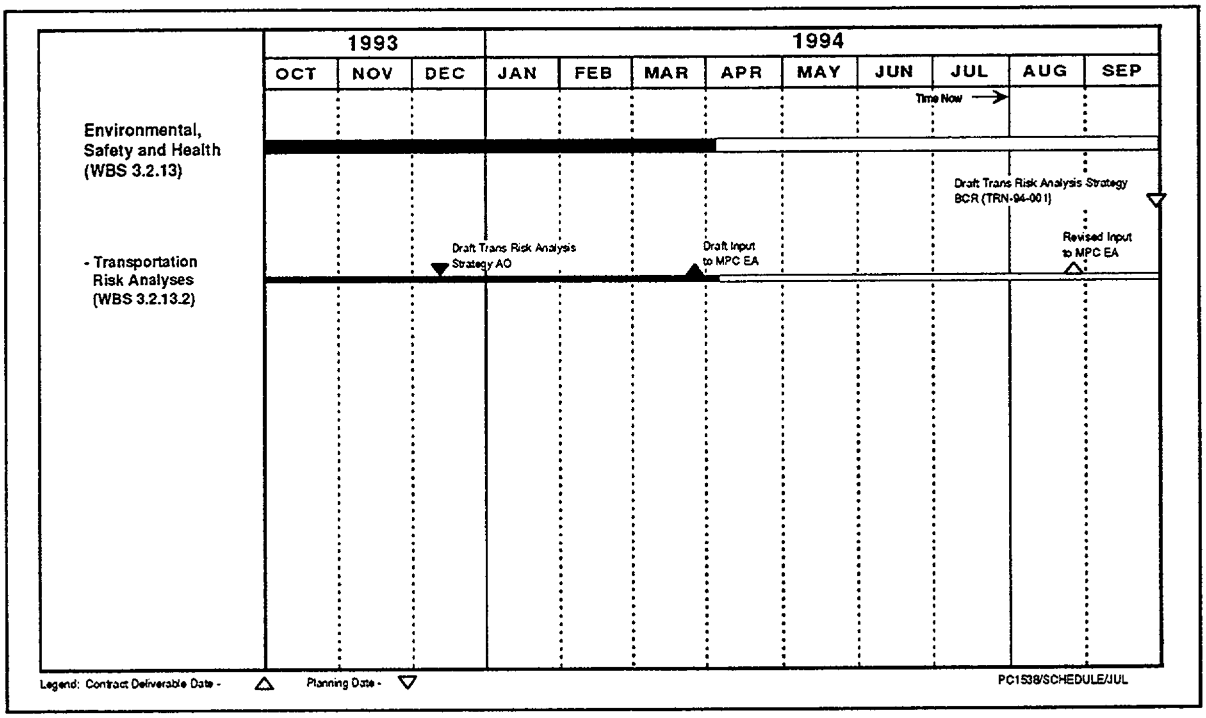
- Continued support of the MPC EIS effort in the area of transportation risk evaluations.

### 3.3.8.4 Variance Explanation:

- The cumulative schedule variance of ($73K/12%) is the result of late and slower than expected support on Risk Assessment activities by ANL and LLNL. ANL is expected to recover by year-end. The efforts by LLNL may not complete as scheduled resulting in the delay of the Final Report on Preliminary Phase of TSRA into FY95. There will be no impact to the program at this time. A BCR is being prepared to defer this effort.

### 3.3.8.5 Issues and Concerns:

- None.

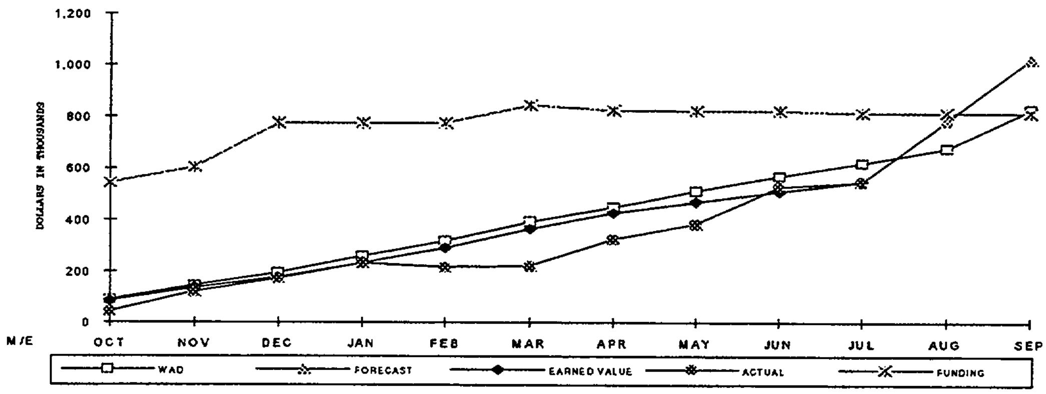



[NOTE: Draft Transportation Risk Strategy Annotated Outline (TRSAO) - Submitted to the OCRWM client on December 14, 1993. Comments were received, and the draft strategy document is currently under development. The completion schedule has been impacted by higher priority work thus slipping delivery to FY95.]

Figure 3-48. Transportation - ES&H Activity Schedule

Actuals Thru 7/31/1994

**DB-03-02-13 ENVIRONMENTAL, SAFETY, AND HEALTH**




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 89 | 57 | 50 | 63 | 60 | 75 | 56 | 62 | 58 | **51** | 57 | 150 |
| | FORECAST | 43 | 78 | 51 | 61 | (15) | 4 | 105 | 58 | 141 | **20** | 238 | 238 |
| | EARNED VALUE | 84 | 53 | 41 | 54 | 59 | 75 | 61 | 44 | 39 | **38** | | |
| | MONTH ACTUAL | 43 | 78 | 51 | 61 | (15) | 4 | 105 | 58 | 141 | **20** | | |
| | VAR/SCH | (5) | (4) | (9) | (9) | (1) | 0 | 5 | (18) | (19) | **(13)** | | |
| | VAR/COST | 41 | (25) | (10) | (7) | 74 | 71 | (44) | (14) | (102) | **18** | | |
| CUM | WAD | 89 | 146 | 196 | 259 | 319 | 394 | 450 | 512 | 570 | **621** | 678 | 828 |
| | FORECAST | 43 | 121 | 172 | 233 | 218 | 222 | 327 | 385 | 526 | **546** | 784 | 1,022 |
| | EARNED VALUE | 84 | 137 | 178 | 232 | 291 | 366 | 427 | 471 | 510 | **548** | | |
| | ACTUAL | 43 | 121 | 172 | 233 | 218 | 222 | 327 | 385 | 526 | **546** | | |
| | VAR/SCH | (5) | (9) | (18) | (27) | (28) | (28) | (23) | (41) | (60) | **(73)** | | |
| | VAR/COST | 41 | 16 | 6 | (1) | 73 | 144 | 100 | 86 | (16) | **2** | | |
| FUNDING | FY94 FUNDING | 45 | 109 | 279 | 279 | 279 | 347 | 347 | 347 | 347 | **339** | 339 | 339 |
| | PREV. FUNDED | 496 | 496 | 496 | 496 | 496 | 496 | 478 | 475 | 475 | **475** | 475 | 475 |
| | TOTAL FUNDING | 541 | 605 | 775 | 775 | 775 | 843 | 825 | 822 | 822 | **814** | 814 | 814 |

**DB-03-02-13 ENVIRONMENTAL, SAFETY, AND HEALTH**

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 17 | 5 | 0 | (12) | 5 | 154 | 79 | 0 | (75) | 79 | 192 | 191 | 1 |
| FY94 LOE | 12 | 12 | 26 | 0 | (14) | 123 | 123 | 159 | 0 | (36) | 149 | 245 | (96) |
| Subtotal FY94 | 29 | 17 | 26 | (12) | (9) | 277 | 202 | 159 | (75) | 43 | 341 | 436 | (95) |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 17 | 17 | 13 | 0 | 4 | 184 | 184 | 196 | 0 | (12) | 240 | 272 | (32) |
| Subtotal Deferred | 17 | 17 | 13 | 0 | 4 | 184 | 184 | 196 | 0 | (12) | 240 | 272 | (32) |
| Carryover Commitments (FY93 to FY94) | 5 | 5 | (18) | 0 | 23 | 161 | 161 | 191 | 0 | (30) | 248 | 315 | (67) |
| TOTAL | 51 | 39 | 21 | (12) | 18 | 622 | 547 | 546 | (75) | 1 | 829 | 1,023 | (194) |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-49. Transportation - ES&H Cost and Schedule Summary

### 3.3.9 Institutional: B&R 03-02-14 WBS 3.2.14

**MANAGER:** J. B. Blandford

**OBJECTIVE(S):** Provide technical planning and management support to the Transportation Institutional Program; oversight and direction for accomplishment of technical work products; supportive travel; general management and administrative support including communication and outreach, State, and Tribal relations; policy/regulatory analysis; and policy review and analysis.

#### 3.3.9.1 Progress During Report Period:

- Provided RW-45 with an FY95 Transporting Spent Nuclear Fuel Exhibit schedule.
- Prepared presentation materials and issued status briefing paper to RW-45 for briefings to RW-1 on Full Scale Cask Testing. Initiated a white paper on Full Scale Cask Testing Options.
- Commented on the Southern State's Energy Board's Hazardous Materials Transportation Universal Safety Act document and on material on Lawrence Livermore's truck accident risk assessment.
- Prepared meeting summaries for the National Congress of American Indians Midyear meeting, the Tribal Hazmat Emergency Response Workshop, Institutional Planning for Transportation Activities meeting, and an exhibit report on the American Nuclear Society Conference.

#### 3.3.9.2 Deliverables, Publications, and Presentations:

- Delivered the Transportation Coordination Group Meeting minutes and the quarterly report on OCRWM's Master Mailing List to RW-45.
- Staffed the Transporting Spent Nuclear Fuel Exhibit at the National Conference of State Legislatures' National Convention in New Orleans on July 23-26, 1994.

#### 3.3.9.3 Planned Work for Next Month/Major Near-Term Milestones:

- Prepare for the Technical External Coordination/Working Group planning meeting.
- Submit preliminary draft Indian Policy Brochure to RW-45.
- Attend Conference of State Railway Officials.
- Write a primer on burn-up credit for RW-46.
- Deliver white paper on Full Scale Cask Testing.

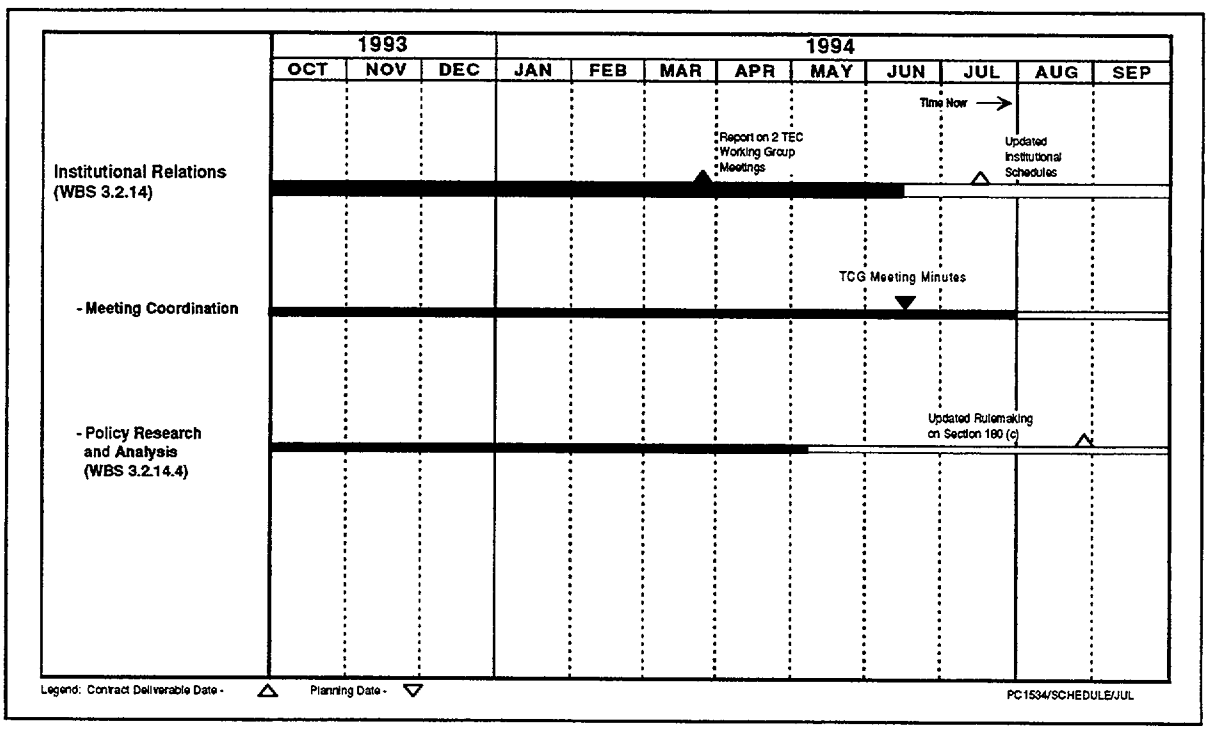
### 3.3.9.4 Variance Explanation:

- The cumulative cost variance of ($86K/17%) is due to increased activity associated with the TCG Meeting and the Issue Status Papers. These activities are now complete and the budget overrun should decrease over the next two months.

- The cumulative schedule variance of ($66K/11%) is the result of a late start on the 180(c) Option Paper. Work has now started on this effort and the scheduled tasks will be completed by fiscal year-end.

### 3.3.9.5 Issues and Concerns:

- None.

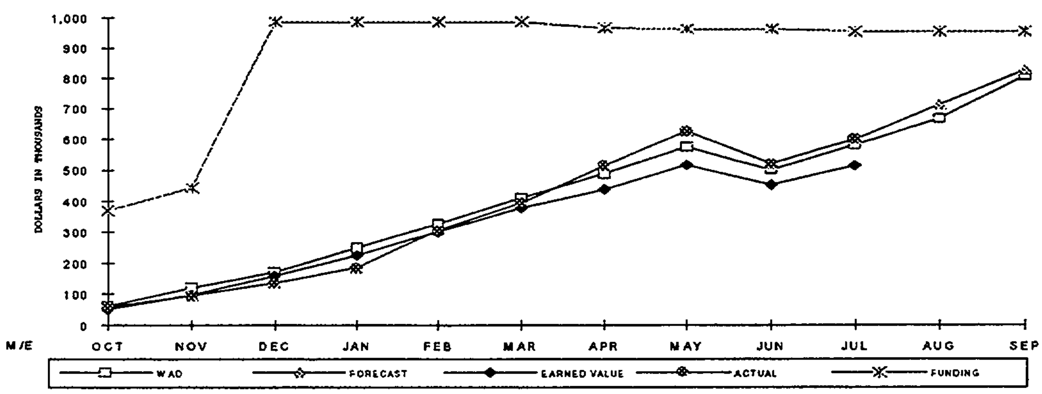



[NOTE: BCR is pending to delete updated Institutional schedules.]

Figure 3-50. Transportation - Institutional Activity Schedule

Actuals Thru 7/31/1994

**DB-03-02-14 INSTITUTIONAL**




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 61 | 59 | 52 | 77 | 76 | 85 | 78 | 85 | (73) | 79 | 88 | 140 |
| | FORECAST | 59 | 36 | 42 | 48 | 121 | 87 | 121 | 111 | (106) | 80 | 113 | 113 |
| | EARNED VALUE | 51 | 46 | 61 | 67 | 75 | 78 | 60 | 77 | (63) | 61 | | |
| | MONTH ACTUAL | 59 | 36 | 42 | 48 | 121 | 87 | 121 | 111 | (106) | 80 | | |
| | VAR/SCH | (10) | (13) | 9 | (10) | (1) | (7) | (18) | (8) | 10 | (18) | | |
| | VAR/COST | (8) | 10 | 19 | 19 | (46) | (9) | (61) | (34) | 43 | (19) | | |
| CUM | WAD | 61 | 120 | 172 | 249 | 325 | 410 | 488 | 573 | 500 | 579 | 667 | 807 |
| | FORECAST | 59 | 95 | 137 | 185 | 306 | 393 | 514 | 625 | 519 | 599 | 712 | 825 |
| | EARNED VALUE | 51 | 97 | 158 | 225 | 300 | 378 | 438 | 515 | 452 | 513 | | |
| | ACTUAL | 59 | 95 | 137 | 185 | 306 | 393 | 514 | 625 | 519 | 599 | | |
| | VAR/SCH | (10) | (23) | (14) | (24) | (25) | (32) | (50) | (58) | (48) | (66) | | |
| | VAR/COST | (8) | 2 | 21 | 40 | (6) | (15) | (76) | (110) | (67) | (86) | | |
| FUNDING | FY94 FUNDING | 52 | 127 | 670 | 670 | 670 | 670 | 670 | 670 | 670 | 662 | 662 | 662 |
| | PREV. FUNDED | 317 | 317 | 317 | 317 | 317 | 317 | 296 | 292 | 292 | 292 | 292 | 292 |
| | TOTAL FUNDING | 369 | 444 | 987 | 987 | 987 | 987 | 966 | 962 | 962 | 954 | 954 | 954 |

**DB-03-02-14 INSTITUTIONAL**

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY'94 Discrete | 30 | 20 | 39 | (10) | (19) | 316 | 265 | 332 | (51) | (67) | 387 | 396 | (9) |
| FY'94 LOE | 19 | 19 | 28 | 0 | (9) | 195 | 195 | 303 | 0 | (108) | 275 | 367 | (92) |
| Subtotal FY'94 | 49 | 39 | 67 | (10) | (28) | 511 | 460 | 635 | (51) | (175) | 662 | 763 | (101) |
| Deferred (FY'93 to FY'94) Discrete | 8 | 0 | 3 | (8) | (3) | 83 | 67 | 4 | (16) | 63 | 101 | 39 | 62 |
| Deferred (FY'93 to FY'94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 4 | (2) |
| Subtotal Deferred | 8 | 0 | 3 | (8) | (3) | 83 | 67 | 4 | (16) | 63 | 103 | 43 | 60 |
| Carryover Commitments (FY'93 to FY'94) | 23 | 23 | 9 | 0 | 14 | (15) | (15) | (40) | 0 | 25 | 42 | 21 | 21 |
| TOTAL | 80 | 62 | 79 | (18) | (17) | 579 | 512 | 599 | (67) | (87) | 807 | 827 | (20) |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending dedifigations have been made to both budget and forecast

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-51. Transportation - Institutional Cost and Schedule Summary

### 3.3.10 Transportation - Support Services: B&R 03-02-15 WBS 3.2.15

**MANAGER:** J. B. Blandford/D. Nolan/R. Kelly

**OBJECTIVE(S):** Provide project-level general administrative support to encompass training, facility and equipment services, and publications and graphics services.

#### 3.3.10.1 Progress During Report Period:

- LOE work. No support was provided this reporting period.

#### 3.3.10.2 Deliverables, Publications, and Presentations:

- None this reporting period.

#### 3.3.10.3 Planned Work for Next Month/Major Near-Term Milestones:

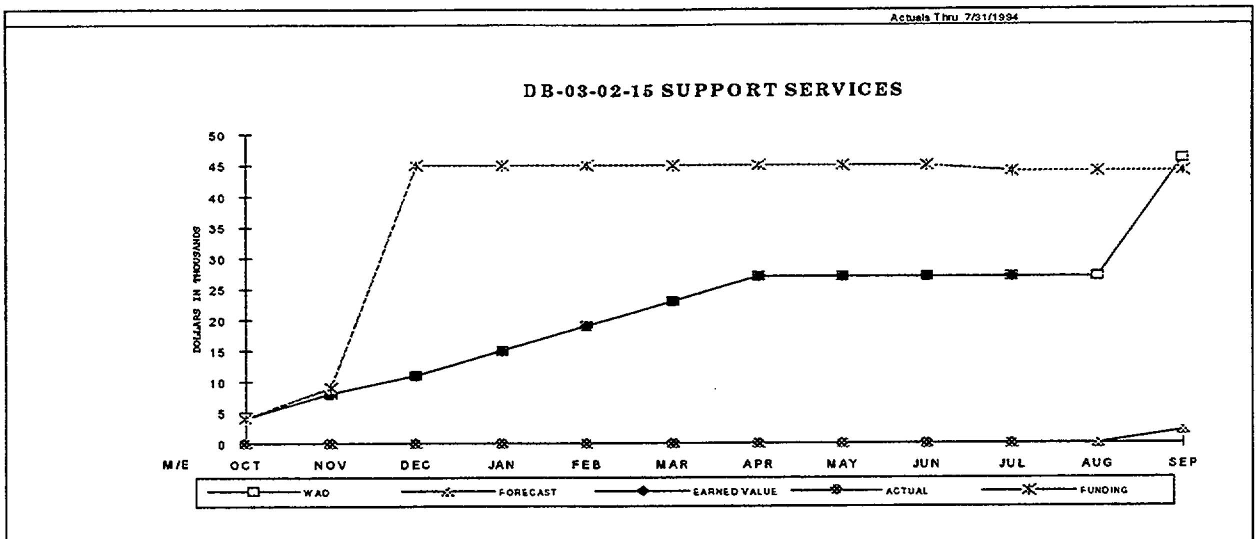
- Continue to provide administrative support as required.

#### 3.3.10.4 Variance Explanation:

- The cumulative cost variance of $27K/100% is due to lower than planned usage for support services this FY.

#### 3.3.10.5 Issues and Concerns:

- None.




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0 | 19 |
| | FORECAST | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| | EARNED VALUE | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | | |
| | MONTH ACTUAL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | | |
| CUM | WAD | 4 | 8 | 11 | 15 | 19 | 23 | 27 | 27 | 27 | 27 | 27 | 46 |
| | FORECAST | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| | EARNED VALUE | 4 | 8 | 11 | 15 | 19 | 23 | 27 | 27 | 27 | 27 | | |
| | ACTUAL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 4 | 8 | 11 | 15 | 19 | 23 | 27 | 27 | 27 | 27 | | |
| FUNDING | FY94 FUNDING | 4 | 9 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 44 | 44 | 44 |
| | PREV. FUNDED | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TOTAL FUNDING | 4 | 9 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 44 | 44 | 44 |

## DB-03-02-15 SUPPORT SERVICES

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| 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 |
| FY94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY94 LOE | 0 | 0 | 0 | 0 | 0 | 25 | 25 | 0 | 0 | 25 | 45 | 2 | 43 |
| Subtotal FY94 | 0 | 0 | 0 | 0 | 0 | 25 | 25 | 0 | 0 | 25 | 45 | 2 | 43 |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 0 | 0 | 0 | 0 | 0 | 25 | 25 | 0 | 0 | 25 | 45 | 2 | 43 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending decisions have been made to both budget and forecast

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-52. Transportation - Support Services Cost and Schedule Summary

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## 3.4 WASTE ACCEPTANCE

### 3.4.1 Waste Acceptance Process and Operations Support: B&R-03-03-01 WBS 3.3.1

**MANAGER**: J. B. Blandford/B. R. Teer

**OBJECTIVE(S)**: Support the Annual Capacity Report (ACR) Issue Resolution Process. Identify and propose resolution of contract and waste acceptance (WA) issues resulting from use of Multi-Purpose Canisters (MPCs) in the Civilian Radioactive Waste Management System (CRWMS). Support preparation of the Acceptance Priority Ranking (APR) and the ACR. Support processing and review of Delivery Commitment Schedules (DCS) as well as the operation and maintenance of the DCS Processing and Approval System (PAS). Develop a DCS status capability and a DCS Exchange Review Criterion and Processing System. Support development of operational requirements for waste acceptance, including functions, processes, and activities as well as interfaces and issues. Implement the requirements for Material Control and Accountability (MC&A) for each of the CRWMS functional elements for Storage and Transportation.

#### 3.4.1.1 Progress During Report Period:

- Met with RW-44 to discuss the Response Plan for written comments received on the Notice of Inquiry (NOI). Initiated revising the presentation on post-NOI options based on redirection from RW-44 obtained from this meeting.

- Completed review of six new DCSs received from General Atomics and submitted a draft response letter to RW-44. Completed review and submitted report on Sample DCS Exchanges proposed by RW-44 to evaluate the DCS Exchange criteria. Received four revised DCSs from Pacific Gas and Electric.

- Provided input to the WA-System Requirements Document (SRD) concerning the new System Architecture.

#### 3.4.1.2 Deliverables, Publications, and Presentations:

- Delivered working draft of anticipated questions/comments and proposed responses by category for the NOI to RW-44.

- Delivered the monthly DCS Submittal Status Report to RW-44.

#### 3.4.1.3 Planned Work for Next Month/Major Near-Term Milestones:

- Continue to assist RW-44 in activities associated with the NOI addressing potential cost sharing/MPC options and other waste acceptance issues.

- Complete final revisions to the 1993 APR and ACR in preparation for providing a camera-ready version following receipt of RW-44 comments.

- Incorporate RW-44 comments into the draft Waste Acceptance Concept of Operations Paper. Provide DOE/MC&A (Material Control and Accountability) Task Force assistance by revising the preliminary draft MC&A Task Force Report. Complete preparation of an annotated outline for RW-44 recommending a long-term approach to the management and acquisition of utility site information.

### 3.4.1.4 Variance Explanation:

- The current period cost variance of ($34K/41%) is due to continued support of NOI and MC&A activities not included in the original budget. Also, actual labor rates are higher than planned. The cumulative cost variance of ($270K/31%) and at-complete variance of ($262K/23%) are primarily caused by additional efforts expended in support of MPC, cost sharing, NOI, MC&A activities not included in original Waste Acceptance Budget, and higher labor rates. Some funds will be reallocated from WBS 3.3.2 to WBS 3.3.1. to cover these costs.

### 3.4.1.5 Issues and Concerns:

- None.

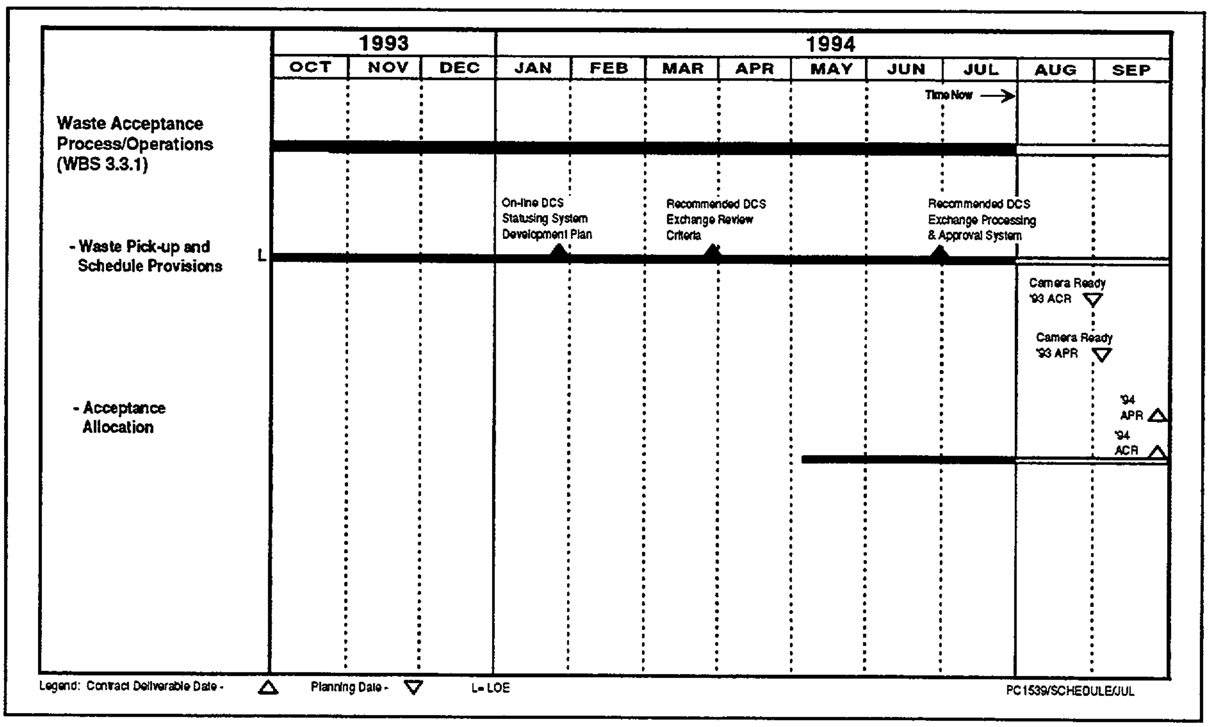
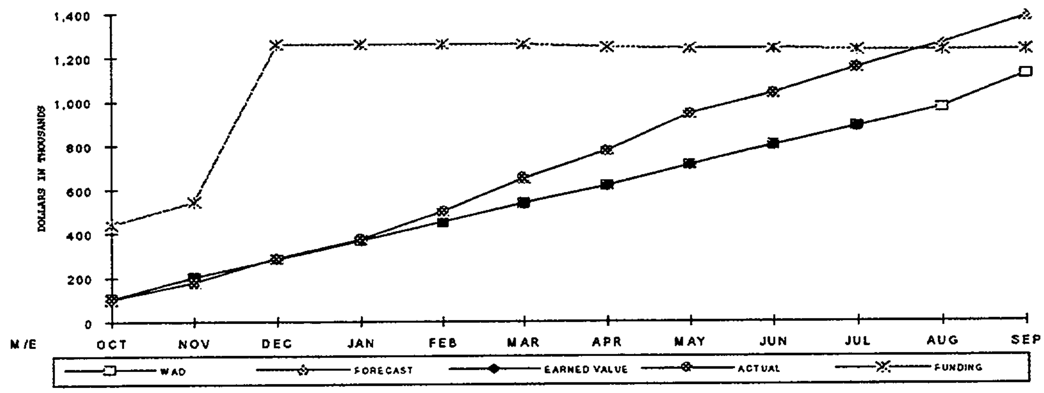



Figure 3-53. W/A - Process and Operations Activity Schedule

Actuals Thru 7/31/1994

## DB-03-03-01 WASTE ACCEPTANCE PROCESS/OPERATIONS




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 105 | 96 | 83 | 84 | 81 | 87 | 80 | 91 | 91 | 84 | 87 | 149 |
| | FORECAST | 100 | 78 | 110 | 85 | 127 | 148 | 126 | 168 | 92 | 118 | 108 | 119 |
| | EARNED VALUE | 105 | 96 | 83 | 84 | 81 | 87 | 80 | 91 | 91 | 84 | | |
| | MONTH ACTUAL | 100 | 78 | 110 | 85 | 127 | 148 | 126 | 168 | 92 | 118 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 5 | 18 | (27) | (1) | (46) | (61) | (46) | (77) | (1) | (34) | | |
| CUM | WAD | 105 | 201 | 284 | 368 | 449 | 536 | 616 | 707 | 798 | 882 | 969 | 1,118 |
| | FORECAST | 100 | 178 | 288 | 373 | 500 | 648 | 774 | 942 | 1,034 | 1,152 | 1,260 | 1,379 |
| | EARNED VALUE | 105 | 201 | 284 | 368 | 449 | 536 | 616 | 707 | 798 | 882 | | |
| | ACTUAL | 100 | 178 | 288 | 373 | 500 | 648 | 774 | 942 | 1,034 | 1,152 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 5 | 23 | (4) | (5) | (51) | (112) | (158) | (235) | (236) | (270) | | |
| FUNDING | FY94 FUNDING | 75 | 182 | 896 | 896 | 896 | 896 | 896 | 896 | 896 | 889 | 889 | 889 |
| | PREV. FUNDED | 363 | 363 | 363 | 363 | 363 | 363 | 348 | 342 | 342 | 342 | 342 | 342 |
| | TOTAL FUNDING | 438 | 545 | 1,259 | 1,259 | 1,259 | 1,259 | 1,244 | 1,238 | 1,238 | 1,231 | 1,231 | 1,231 |

## DB-03-03-01 WASTE ACCEPTANCE PROCESS/OPERATIONS

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 19 | 19 | 0 | 0 | 19 | 31 | 31 | 0 | 0 | 31 | 68 | 0 | 68 |
| FY94 LOE | 61 | 61 | 103 | 0 | (42) | 644 | 644 | 854 | 0 | (210) | 821 | 1,095 | (274) |
| Subtotal FY94 | 80 | 80 | 103 | 0 | (23) | 675 | 675 | 854 | 0 | (179) | 889 | 1,095 | (206) |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 4 | 4 | 15 | 0 | (11) | 202 | 202 | 292 | 0 | (90) | 220 | 278 | (58) |
| Subtotal Deferred | 4 | 4 | 15 | 0 | (11) | 202 | 202 | 292 | 0 | (90) | 220 | 278 | (58) |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 0 | 0 | 0 | 6 | 6 | 7 | 0 | (1) | 9 | 7 | 2 |
| TOTAL | 84 | 84 | 118 | 0 | (34) | 883 | 883 | 1,153 | 0 | (270) | 1,118 | 1,380 | (262) |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-54. W/A - Process and Operations Cost and Schedule Summary

### 3.4.2 Economic Studies: B&R-03-03-02 WBS 3.3.2

**MANAGER:** J. B. Blandford/B. R. Teer

**OBJECTIVE(S):** Draft a report for DOE to submit to Congress assessing the adequacy of the ongoing fee to provide full cost recovery of the CRWMS and provide recommendations and basis for any required fee changes. Perform required economic and financial analysis as requested. Update the uncertainty bands associated with interest and inflation rates and electricity generation parameters used to assess the adequacy of the fee.

#### 3.4.2.1 Progress During Report Period:

- None this reporting period.

#### 3.4.2.2 Deliverables, Publications, and Presentations:

- None this reporting period..

#### 3.4.2.3 Planned Work for Next Month/Major Near-Term Milestones:

- No work is planned for this task.

#### 3.4.2.4 Variance Explanation:

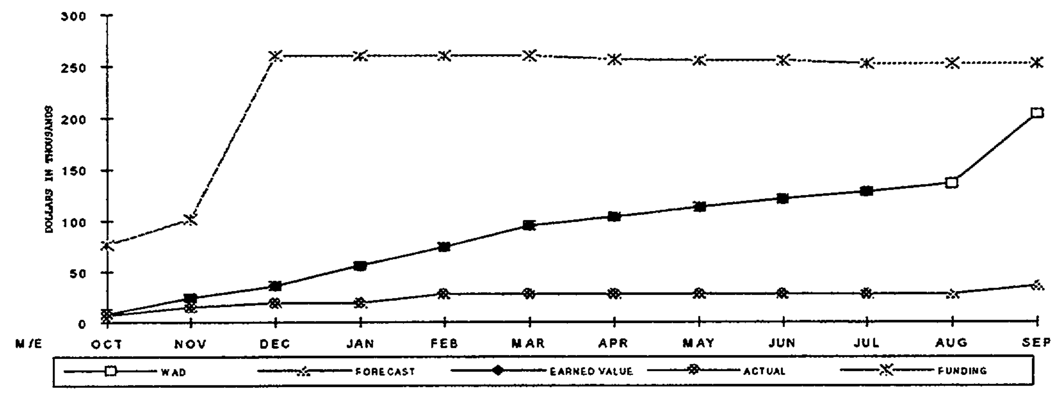
- The cumulative cost variance of $100K/78% and at-complete variance of $167K/81% are caused by not receiving the Total System Life Cycle Cost (TSLCC) to permit work on the Fee Adequacy Assessment; staff hours budgeted for WBS 3.3.2 were expended in support of MPC, cost sharing, and MC&A activities. No work is expected on this activity during the remainder of FY 94. RW-44 has verbally agreed to reallocate some funds from WBS 3.3.2 to WBS 3.3.1.

#### 3.4.2.5 Issues and Concerns:

- None.

Actuals Thru 7/31/1994

## DB-03-03-02 ECONOMIC STUDIES




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 8 | 16 | 12 | 20 | 18 | 21 | 9 | 9 | 8 | 7 | 8 | 67 |
| | FORECAST | 7 | 8 | 4 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| | EARNED VALUE | 8 | 16 | 12 | 20 | 18 | 21 | 9 | 9 | 8 | 7 | | |
| | MONTH ACTUAL | 7 | 8 | 4 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 1 | 8 | 8 | 20 | 9 | 21 | 9 | 9 | 8 | 7 | | |
| CUM | WAD | 8 | 24 | 36 | 56 | 74 | 95 | 104 | 113 | 121 | 128 | 136 | 203 |
| | FORECAST | 7 | 15 | 19 | 19 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 36 |
| | EARNED VALUE | 8 | 24 | 36 | 56 | 74 | 95 | 104 | 113 | 121 | 128 | | |
| | ACTUAL | 7 | 15 | 19 | 19 | 28 | 28 | 28 | 28 | 28 | 28 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 1 | 9 | 17 | 37 | 46 | 67 | 76 | 85 | 93 | 100 | | |
| FUNDING | FY94 FUNDING | 17 | 42 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 197 | 197 | 197 |
| | PREV. FUNDED | 60 | 60 | 60 | 60 | 60 | 60 | 56 | 55 | 55 | 55 | 55 | 55 |
| | TOTAL FUNDING | 77 | 102 | 260 | 260 | 260 | 260 | 256 | 255 | 255 | 252 | 252 | 252 |

## DB-03-03-02 ECONOMIC STUDIES

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY94 LOE | 7 | 7 | 0 | 0 | 7 | 118 | 118 | 25 | 0 | 93 | 147 | 31 | 116 |
| Subtotal FY94 | 7 | 7 | 0 | 0 | 7 | 118 | 118 | 25 | 0 | 93 | 147 | 31 | 116 |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 9 | 9 | 3 | 0 | 6 | 55 | 5 | 50 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 9 | 9 | 3 | 0 | 6 | 55 | 5 | 50 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| TOTAL | 7 | 7 | 0 | 0 | 7 | 127 | 127 | 28 | 0 | 99 | 203 | 36 | 167 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-55. W/A - Economic Studies Cost and Schedule Summary

### 3.4.3 Data Collection Studies: B&R-03-03-03 WBS 3.3.3

**MANAGER:** J. B. Blandford/B. R. Teer

**OBJECTIVE(S):** Support validation and verification of the Nuclear Fuel Data Form (RW-859) database, review revision of the RW-859 form, interface with DOE/Energy Information Administration (EIA), and disseminate database information to other program elements. Support validation of the projections for nuclear electricity capacity and forecasts of energy production and spent nuclear fuel discharges. Disseminate nuclear fuel data and related information to Program Elements as directed by DOE. Support preparation of the 1994 Spent Fuel Storage Requirements Report, which will include current utility spent fuel inventories and projected discharges and will address the effect of reactor pool, out-of-pool, and transshipping capabilities on the requirements for additional spent fuel storage. Support the Integrated Database (IDB) by providing technical liaison for spent fuel data and document review. Support the collection, processing, validation, and dissemination of other waste data as directed by DOE. Support maintenance of the Facility Interface Capability Assessment (FICA) database. Modify the FICA database and software to be compatible with the Near Site Transportation Interface (NSTI) database and other information systems to provide enhanced user interface capabilities.

#### 3.4.3.1 Progress During the Reporting Period:

- Completed the review and validation of the first draft of the 1994 Spent Fuel Discharge Projections data set. Comparison of 1994 projections to 1993 projections revealed variances in the total predicted spent fuel discharge for some individual reactors and the total predicted spent fuel discharge as being greater than the 1993 projection. The magnitude of these differences do not seem to be related to the magnitude of changes in the assumption for burnup and capacity factors. Since the third draft of the RW-859 is being modified, the spent fuel projection will have to be redone.

- Completed final round of revising the preliminary draft of the 1993 Spent Fuel Storage Requirements Report and began developing camera-ready copy.

#### 3.4.3.2 Deliverables, Publications, and Presentations:

- Delivered the review and validation of the third draft of the 1993 RW-859 data set to RW-44. Notable review findings include: 1) data set now includes all reactors; and 2) data set now accounts for all assemblies that were previously reported as discharged but then re-inserted into the reactors.

#### 3.4.3.3 Planned Work for Next Month/Major Near-Term Milestones:

- Initiate review and validation of a fourth draft of the 1993 RW-859 data set as requested by DOE/EIA.

- Initiate review of the second draft of the spent fuel projections in response to changes to the third draft of the RW-859 data set.

- Deliver a camera-ready copy of the 1993 Spent Fuel Storage Requirements Report to RW-44 for publishing.

- Meet with the IDB Steering Committee.

### 3.4.3.4 Variance Explanation:

- The cumulative cost variance of $43K/11% is due to Pacific Northwest Laboratories (PNL) support of review of the Spent Fuel Requirements Report (SFSR) not yet reflected in the actuals, and the Integrated Data Base (IDB) support will be occurring later than planned. Completion of the SFSR will occur in FY95.

### 3.4.3.5 Issues and Concerns:

- None.

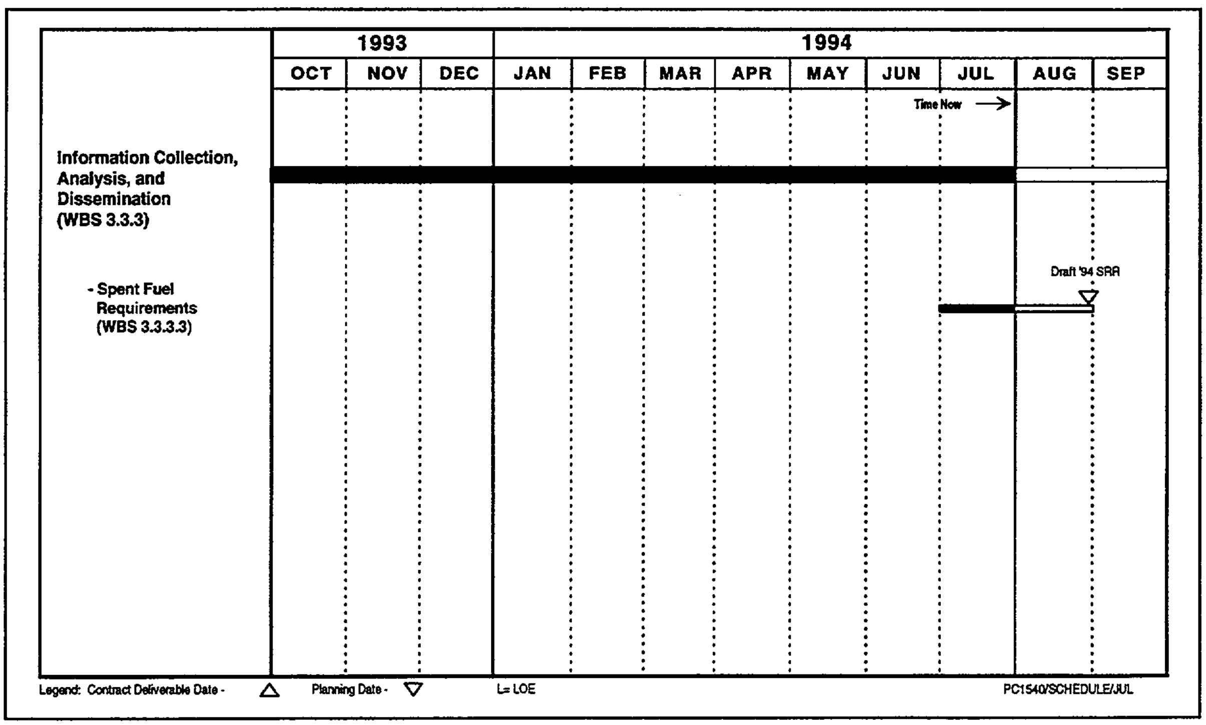
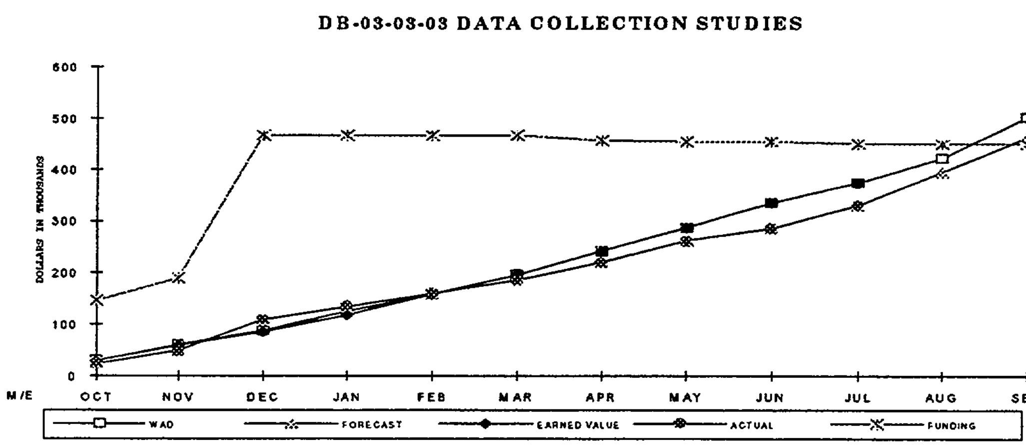



Figure 3-56. W/A - Data Collection Studies Activity Schedule

Actuals Thru 7/31/1994




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 30 | 30 | 28 | 37 | 33 | 38 | 46 | 45 | 48 | 39 | 48 | 80 |
| | FORECAST | 24 | 25 | 60 | 25 | 25 | 27 | 34 | 42 | 24 | 45 | 64 | 68 |
| | EARNED VALUE | 29 | 30 | 26 | 33 | 40 | 38 | 46 | 45 | 48 | 39 | | |
| | MONTH ACTUAL | 24 | 25 | 60 | 25 | 25 | 27 | 34 | 42 | 24 | 45 | | |
| | VAR/SCH | (1) | 0 | (2) | (4) | 7 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 5 | 5 | (34) | 8 | 15 | 11 | 12 | 3 | 24 | (6) | | |
| CUM | WAD | 30 | 60 | 88 | 125 | 158 | 196 | 242 | 287 | 335 | 374 | 422 | 502 |
| | FORECAST | 24 | 49 | 109 | 134 | 159 | 186 | 220 | 262 | 286 | 331 | 395 | 463 |
| | EARNED VALUE | 29 | 59 | 85 | 118 | 158 | 196 | 242 | 287 | 335 | 374 | | |
| | ACTUAL | 24 | 49 | 109 | 134 | 159 | 186 | 220 | 262 | 286 | 331 | | |
| | VAR/SCH | (1) | (1) | (3) | (7) | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 5 | 10 | (24) | (16) | (1) | 10 | 22 | 25 | 49 | 43 | | |
| FUNDING | FY94 FUNDING | 30 | 73 | 350 | 350 | 350 | 350 | 350 | 350 | 350 | 346 | 346 | 346 |
| | PREV. FUNDED | 116 | 116 | 116 | 116 | 116 | 116 | 107 | 104 | 104 | 104 | 104 | 104 |
| | TOTAL FUNDING | 146 | 189 | 466 | 466 | 466 | 466 | 457 | 454 | 454 | 450 | 450 | 450 |

## DB-03-03-03 DATA COLLECTION STUDIES

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | 14 | 0 | (14) | 0 | 0 | 15 | 0 | (15) | 53 | 74 | (21) |
| FY94 LOE | 35 | 35 | 17 | 0 | 18 | 293 | 293 | 217 | 0 | 76 | 344 | 286 | 58 |
| Subtotal FY94 | 35 | 35 | 31 | 0 | 4 | 293 | 293 | 232 | 0 | 61 | 397 | 360 | 37 |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 37 | 37 | 49 | 0 | (12) | 37 | 50 | (13) |
| Deferred (FY93 to FY94) LOE | 4 | 4 | 14 | 0 | (10) | 43 | 43 | 18 | 0 | 25 | 58 | 21 | 37 |
| Subtotal Deferred | 4 | 4 | 14 | 0 | (10) | 80 | 80 | 67 | 0 | 13 | 95 | 71 | 24 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 32 | 0 | (30) | 11 | 33 | (22) |
| TOTAL | 39 | 39 | 45 | 0 | (6) | 375 | 375 | 331 | 0 | 44 | 503 | 464 | 39 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-57. W/A - Data Collection Studies Cost and Schedule Summary

## 3.5 QUALITY ASSURANCE

### 3.5.1 Program Quality Assurance: B&R 09-10-00 WBS 9.1.1

**MANAGER:** R. P. Ruth

**OBJECTIVE(S):** The objective of the M&O Quality Assurance (QA) organization is to establish a quality assurance program that meets the Office of Civilian Radioactive Waste Management (OCRWM) Quality Assurance Requirements Document (QARD) requirements and is maintained through audits, surveillance, and reviews over all Civilian Radioactive Waste Management System (CRWMS) M&O quality-affecting activities.

#### 3.5.1.1 Progress During Report Period:

- Developed expanded draft guidelines for preparing Supplier Performance Evaluation Plan/Records. The expansion includes some examples and how-to details.

- Completed Surveillance 94-VIS-05 "Letters of Delegation and Temporary Records Storage" and issued two Corrective Action Reports (CARs) as a result of the surveillance.

#### 3.5.1.2 Deliverables, Publications, and Presentations:

- Issued Audit Report, 94-VIA-03.

- Issued CAR Status Report for all open CARs

#### 3.5.1.3 Planned Work for Next Month/Major Near-Term Milestones:

- Review four SNL draft procurement QA Transportation Program Procedures (TPPs) for acceptance. SNL has developed and submitted these TPPs to the M&O to meet the QARD-0333P.

- Conduct Vienna Audit 94-VIA-03 on August 15-19, 1994, covering the Quality Assurance Program; Plans, Procedures, and Drawings; Corrective Actions; and Computer Software, Design, and Control.

- Conduct further training sessions on QAP-5-1/5-2.

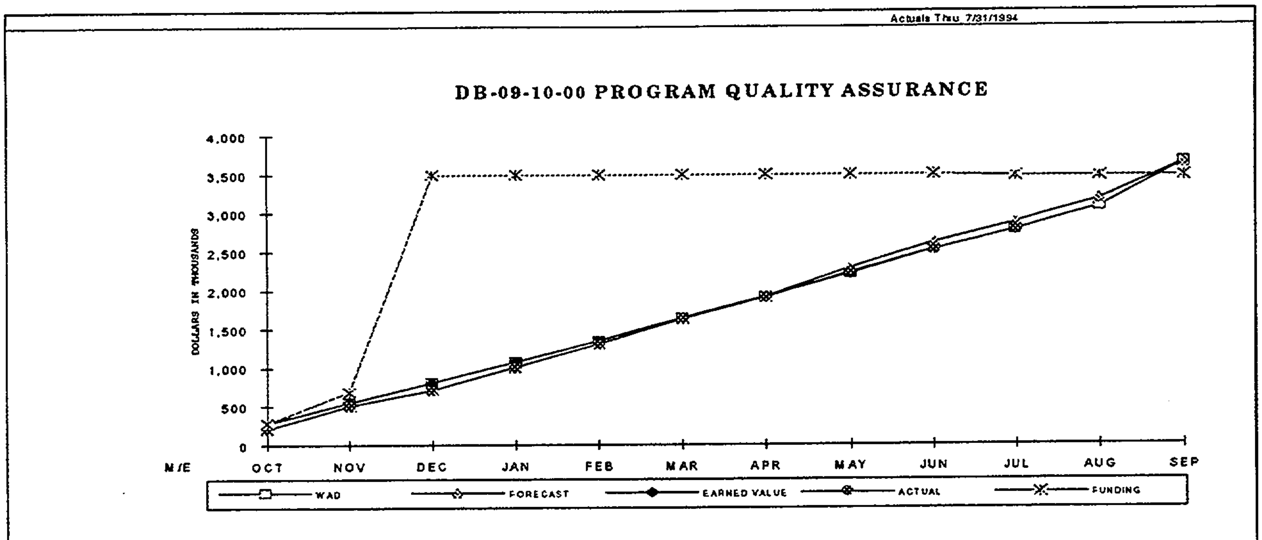
- Issue Surveillance Report, 94-VIS-05.

#### 3.5.1.4 Variance Explanation:

- All variances are within tolerance.

### 3.5.1.5 Issues and Concerns:

- None.




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 277 | 266 | 261 | 268 | 273 | 296 | 274 | 297 | 301 | 262 | 296 | 561 |
| | FORECAST | 206 | 299 | 206 | 292 | 302 | 323 | 284 | 373 | 326 | 263 | 297 | 457 |
| | EARNED VALUE | 277 | 266 | 261 | 268 | 273 | 296 | 274 | 297 | 301 | 262 | | |
| | MONTH ACTUAL | 206 | 299 | 206 | 292 | 302 | 323 | 275 | 326 | 287 | 260 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 71 | (33) | 55 | (24) | (29) | (27) | (1) | (29) | 14 | 2 | | |
| CUM | WAD | 277 | 543 | 804 | 1,072 | 1,345 | 1,641 | 1,915 | 2,212 | 2,513 | 2,775 | 3,071 | 3,632 |
| | FORECAST | 206 | 505 | 711 | 1,003 | 1,305 | 1,628 | 1,912 | 2,285 | 2,611 | 2,874 | 3,171 | 3,628 |
| | EARNED VALUE | 277 | 543 | 804 | 1,072 | 1,345 | 1,641 | 1,915 | 2,212 | 2,513 | 2,775 | | |
| | ACTUAL | 206 | 505 | 711 | 1,003 | 1,305 | 1,628 | 1,903 | 2,229 | 2,516 | 2,776 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 71 | 38 | 93 | 69 | 40 | 13 | 12 | (17) | (3) | (1) | | |
| FUNDING | FY94 FUNDING | 280 | 680 | 3,493 | 3,493 | 3,493 | 3,493 | 3,493 | 3,493 | 3,493 | 3,465 | 3,465 | 3,465 |
| | PREV. FUNDED | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TOTAL FUNDING | 280 | 680 | 3,493 | 3,493 | 3,493 | 3,493 | 3,493 | 3,493 | 3,493 | 3,465 | 3,465 | 3,465 |

## DB-09-10-00 PROGRAM QUALITY ASSURANCE

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY94 LOE | 262 | 262 | 247 | 0 | 15 | 2,724 | 2,724 | 2,684 | 0 | 40 | 3,465 | 3,528 | (63) |
| Subtotal FY94 | 262 | 262 | 247 | 0 | 15 | 2,724 | 2,724 | 2,684 | 0 | 40 | 3,465 | 3,528 | (63) |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 12 | 0 | (12) | 50 | 50 | 93 | 0 | (43) | 166 | 101 | 65 |
| TOTAL | 262 | 262 | 259 | 0 | 3 | 2,774 | 2,774 | 2,777 | 0 | (3) | 3,631 | 3,629 | 2 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-58. Quality Assurance Cost and Schedule Summary

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## 3.6 SYSTEMS INTEGRATION AND COMPLIANCE

### 3.6.1 Systems Engineering: B&R 09-20-01-1 WBS 9.2.1.1

**MANAGER:** J. J. Miller

**OBJECTIVE(S):** Identify the systems analysis requirements; develop, integrate, and allocate system requirements; develop a program test and evaluation program; maintain the system technical baseline; and verify the adequacy of designs, construction, and compliance with system requirements.

#### 3.6.1.1 Progress During Report Period:

- Completed definition of all scenarios and assumptions for the remaining FY94 MPC System analyses, including the Dual Purpose Canister Study, Monitored Retrievable Storage (MRS) versus No MRS Analysis, and all Large MPC/BST Analyses. An execution plan for the scenarios has been agreed on and execution of logistics and cost computer code runs have begun.

- Revised the Technical Management Plan for the task on the assessment of High-Level Waste Acceptance, including comments received from RW-37. Began generating costs for all scenarios related to this task.

- Documented the method used to prepare the repository costs spreadsheets for the MPC System Study. Changes in the number of units were based on either the use of tunnel boring machines, in-drift emplacement, or the MPCs.

- Completed the Verification and Validation (V&V) Test Plan and began the Life-Cycle Plan for Waste Stream Model (WSM), Version 2.1.

- Completed enhancements to the Waste Generator portion of the Engineering Cost Model (ECM). Enhancements will accommodate the analysis of MPC scenarios involving trucks. Also generated scenarios using small truck-sized MPC and scenarios using the Proposed Program Approach case to obtain the defense share of the costs.

- Completed enhancements to the High-Level Waste (HLW) logistics model. The enhancements included priority pickup capability providing highest priority to sites actively producing waste, revised pickup algorithms providing increased versatility, and revised waste selection defaults on the West Valley site.

#### 3.6.1.2 Deliverables, Publications, and Presentations:

- Delivered the Central Management and Operations Control Center (CMOCC) Issue Paper (draft) to OCRWM. This issue paper presents a functional analysis of CRWMS management and operations control; evaluates alternatives for allocation of CRWMS management and operations control to the CMOCC; describes alternatives for collocating CRWMS element management, operations control, and CMOCC sites; and includes the CMOCC in the requirements document hierarchy.

- Delivered the approved report titled "Evaluation of At-Reactor Modal Capability" to OCRWM.

- Delivered the "Sensitivity Analysis for the Multi-Purpose Canister System Conceptual Design Phase" report to OCRWM on July 11, 1994.

- Presented planned work by the M&O to provide input to the OCRWM Programmatic Environmental Impact Statement (PEIS) and Record of Decision (ROD). Emphasis was on the potential impacts of disposal of converted plutonium/high enriched uranium in a mined geologic repository. A presentation was given during the Surplus Fissile Material Control and Disposition Project interface meetings on July 25-26, 1994, at Lawrence Livermore National Laboratory.

- Delivered the System Architecture Final Report to RW-30.

### 3.6.1.3 Planned Work for Next Month/Major Near-Term Milestones:

- Continue to develop the System Requirements Documents (SRDs), Revision 2, to include comments received from RW-37 on the Preliminary Draft CRWMS Requirements Document (CRD) dated June 1994. Additionally, continue work on the other SRDs. Actual delivery of these documents has been suspended by a letter from RW-30. The letter directed the M&O to await a Program Baseline Change Control Board (PBCCB) implementation of the Proposed Program Approach before completing work associated with the SRD development effort.

- Continue to revise the Preliminary Draft MGDS-Transportation Interface Control Document. This revision incorporates comments received during internal M&O review and addresses interface needs as identified in accordance with QAP-3-12, Transmittal of Design Input.

- Continue to rewrite the System Impacts of Fuel Selection and Multi-Purpose Canister (MPC) Heat Limits white paper. The white paper reflects new results that are being generated for an MPC-based system. The potential problems associated with hot Spent Nuclear Fuel (SNF) assemblies are quantified, and the effective means of mitigating the effects of these assemblies are also identified.

- Deliver to RW-37 the Preliminary Draft WA-SRD, Revision 2, and the Preliminary Draft Trans-SRD, Revision 2 to RW-37.

- Deliver the revised Preliminary Draft MGDS-Transportation Interface Control Document to RW-30.

- Continue to assist in the reviews of the Exploratory Studies Facility (ESF) Design DRDs for the MPC-related systems and development of the Mined Geological Disposal System (MGDS) Concept of Operations (CONOPs).

- Deliver a technical supplement to the System Architecture Final Report to RW-30.

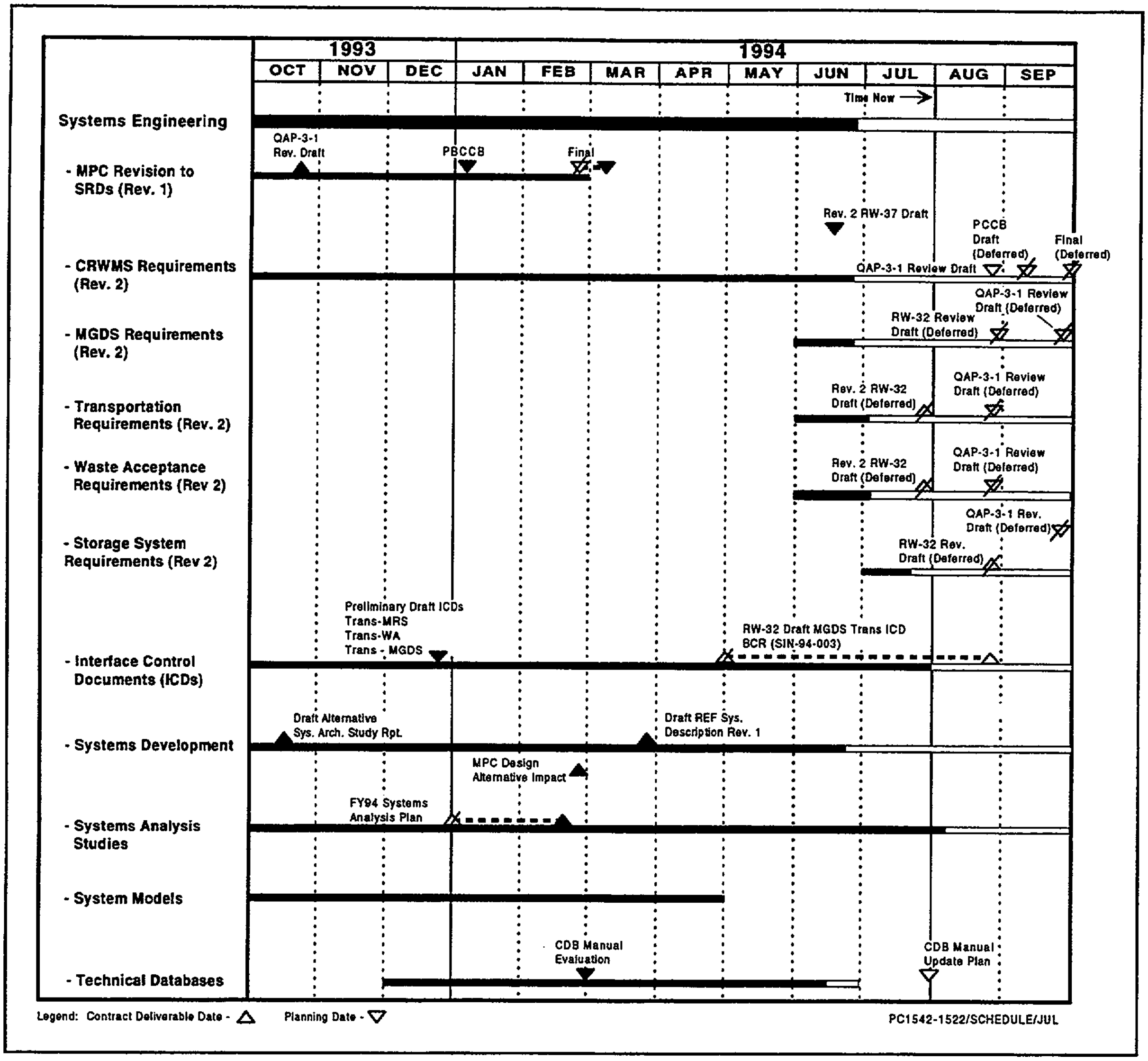
### 3.6.1.4 Variance Explanation:

- The current period cost variance of $77K/13% is due to the cancellation of a follow-on stakeholder workshop planned in July 1994, cancelled due to additional budgetary requirements for the stakeholder workshop held in February 1994.

- The current period schedule variance of ($104K/15%) is due to a customer decision to delay the QAP-3-1 delivery of Revision 2 of the CRWMS requirements document. Revisions of other System Requirements Documents slipped as a result of the delay. Revision 2 of the System Requirements Documents will slip approximately two months. Since there is no near-term schedule dependence on this revision, there is no impact. Work and funding for the revision to the System Requirements Documents is being deferred to FY95. A technical direction letter to this effect is forthcoming.

### 3.6.1.5 Issues and Concerns:

- None.



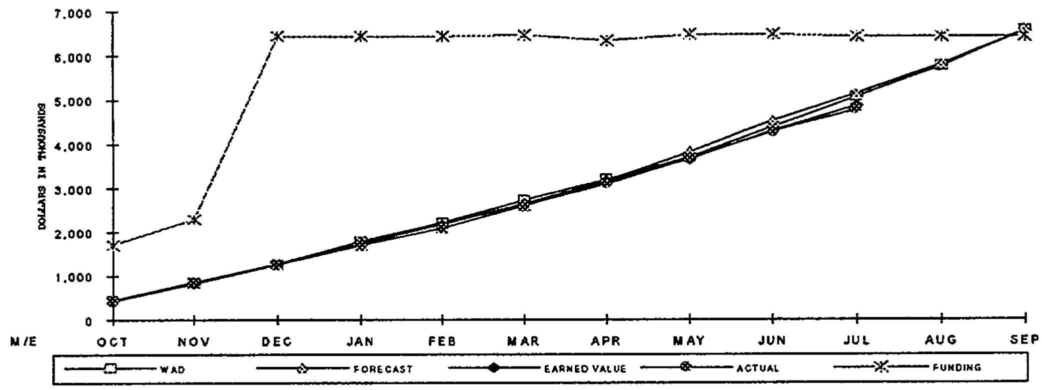

[NOTE: 1) CRWMS Requirements - The WAD and CRD and SRD schedules have been revised completely to implement the Proposed Program Approach (PPA). CRD Revision 2 RW-37 review draft was delivered on June 20, 1994. Other deliverables have been put on hold by RW-30.

2) Interface Control Documents (ICDs) - The first three ICDs (WA-TRANS, MRS-TRANS, MGDS-TRANS) were submitted to RW-30 in December 1993. Since then, MGDS-TRANS has been updated consistent with Revision 1 of the SRDs. This updated ICD is in M&O review; it will go to RW-37 for review 8/94.]

Figure 3-59. SI&C - Systems Engineering Activity Schedules

Actuals Thru 7/31/1994

## DB-09-20-01-1 SYSTEMS ENGINEERING




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 446 | 407 | 419 | 513 | 436 | 506 | 469 | 500 | 681 | 685 | 700 | 796 |
| | FORECAST | 435 | 396 | 425 | 450 | 387 | 516 | 552 | 656 | 708 | 614 | 671 | 749 |
| | EARNED VALUE | 418 | 404 | 428 | 499 | 428 | 484 | 492 | 495 | 640 | 581 | | |
| | MONTH ACTUAL | 435 | 396 | 425 | 450 | 387 | 516 | 480 | 578 | 605 | 504 | | |
| | VAR/SCH | (28) | (3) | 9 | (14) | (8) | (22) | 23 | (5) | (41) | (104) | | |
| | VAR/COST | (17) | 8 | 3 | 49 | 41 | (32) | 12 | (83) | 35 | 77 | | |
| CUM | WAD | 446 | 853 | 1,272 | 1,785 | 2,221 | 2,727 | 3,196 | 3,696 | 4,377 | 5,062 | 5,762 | 6,558 |
| | FORECAST | 435 | 831 | 1,256 | 1,706 | 2,093 | 2,609 | 3,161 | 3,817 | 4,525 | 5,139 | 5,810 | 6,559 |
| | EARNED VALUE | 418 | 822 | 1,250 | 1,749 | 2,177 | 2,661 | 3,153 | 3,648 | 4,288 | 4,869 | | |
| | ACTUAL | 435 | 831 | 1,256 | 1,706 | 2,093 | 2,609 | 3,089 | 3,667 | 4,272 | 4,776 | | |
| | VAR/SCH | (28) | (31) | (22) | (36) | (44) | (66) | (43) | (48) | (89) | (193) | | |
| | VAR/COST | (17) | (9) | (6) | 43 | 84 | 52 | 64 | (19) | 16 | 93 | | |
| FUNDING | FY94 FUNDING | 409 | 994 | 5,143 | 5,143 | 5,143 | 5,170 | 5,170 | 5,325 | 5,325 | 5,275 | 5,275 | 5,275 |
| | PREV. FUNDED | 1,304 | 1,304 | 1,304 | 1,304 | 1,304 | 1,304 | 1,171 | 1,151 | 1,151 | 1,151 | 1,151 | 1,151 |
| | TOTAL FUNDING | 1,713 | 2,298 | 6,447 | 6,447 | 6,447 | 6,474 | 6,341 | 6,476 | 6,476 | 6,426 | 6,426 | 6,426 |

## DB-09-20-01-1 SYSTEMS ENGINEERING

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY'94 Discrete | 132 | 72 | 72 | (60) | 0 | 1,231 | 1,118 | 997 | (113) | 121 | 1,570 | 1,692 | (122) |
| FY'94 LOE | 322 | 322 | 289 | 0 | 33 | 3,028 | 3,028 | 3,078 | 0 | (50) | 3,856 | 4,116 | (260) |
| Subtotal FY'94 | 454 | 394 | 361 | (60) | 33 | 4,259 | 4,146 | 4,075 | (113) | 71 | 5,426 | 5,808 | (382) |
| Deferred (FY'93 to FY'94) Discrete | 143 | 98 | 98 | (45) | 0 | 464 | 383 | 335 | (81) | 48 | 688 | 384 | 304 |
| Deferred (FY'93 to FY'94) LOE | 88 | 88 | 44 | 0 | 44 | 282 | 282 | 290 | 0 | (8) | 360 | 270 | 90 |
| Subtotal Deferred | 231 | 186 | 142 | (45) | 44 | 746 | 665 | 625 | (81) | 40 | 1,048 | 654 | 394 |
| Carryover Commitments (FY'93 to FY'94) | 0 | 0 | 1 | 0 | (1) | 58 | 58 | 78 | 0 | (20) | 85 | 97 | (12) |
| TOTAL | 685 | 580 | 504 | (105) | 76 | 5,063 | 4,869 | 4,778 | (194) | 91 | 6,559 | 6,559 | 0 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-60. SI&C - System Engineering Cost and Schedule Summary

### 3.6.2 Systems Planning and Integration: B&R 09-20-01-2 WBS 9.2.1.2

**MANAGER:** J. J. Miller/G. A. Carruth

**OBJECTIVE(S):** Develop management system documentation, develop an automated system for the management of system requirements, integrate engineering specialties, perform system safety and risk assessments, and establish technical performance measurement system and conduct evaluations.

#### 3.6.2.1 Progress During Report Period:

- Completed development activities for the Automated Requirements Management System (ARMS) Verification Test Procedures, test matrix, and controlled test data set in preparation for the formal testing. Verification testing will be conducted in mid-August to accommodate customer schedule conflicts.

- Loaded the full text of DOE Order 6430.1, General Design Criteria, into the ARMS controlled database (ACDB) to support Yucca Mountain Site Characterization Office (YMSCO) Basis-for-Design (BFD) development projects. This order is referenced significantly in the BFD, and the text load will allow phrase and word searches to establish and verify trace relationships.

- Completed primary analysis activities supporting the Tunnel Boring Machine (TBM) Safety Analysis and Failure Modes and Effects Analysis (FMEA). Provided YMSCO a draft Safety Hazards Analysis Report for incorporation into the TBM portion of the ESF Safety Analysis Report (SAR). The ESF SAR is required to support the TBM Operational Readiness Review.

#### 3.6.2.2 Deliverables, Publications, and Presentations:

- Delivered the final ARMS Life-Cycle Plan to RW-30.

- Delivered the final ARMS User Manual, Volume 1, to RW-30.

- Delivered the draft TBM Safety Hazards Analysis Report to YMSCO.

#### 3.6.2.3 Planned Work for Next Month/Major Near-Term Milestones:

- Execute ARMS Verification testing.

- Generate the final TBM Safety Hazards Analysis Report.

- Deliver the review draft ARMS User Manual, Volume 2.

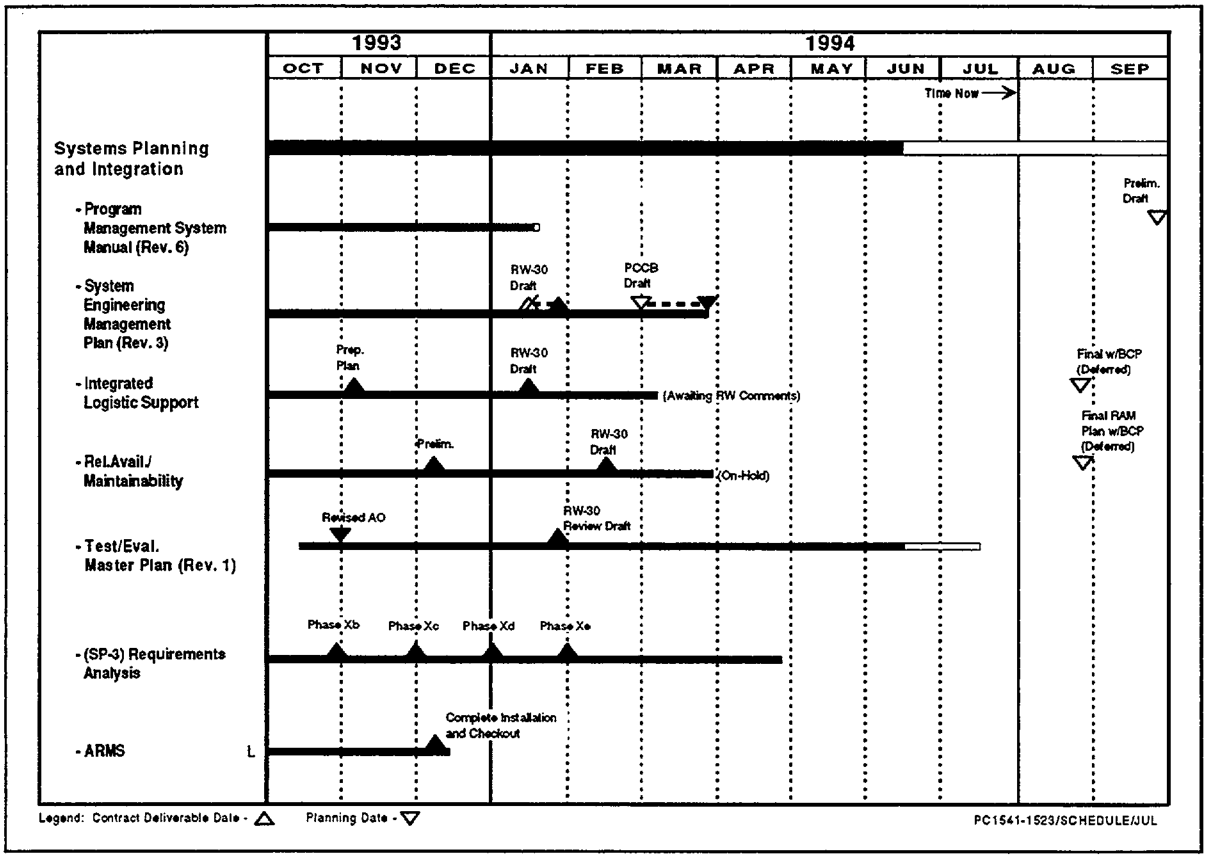
- Complete comment resolution and update the System Safety Program Plan.

### 3.6.2.4 Variance Explanation:

- All variances are within tolerance.

### 3.6.2.5 Issues and Concerns:

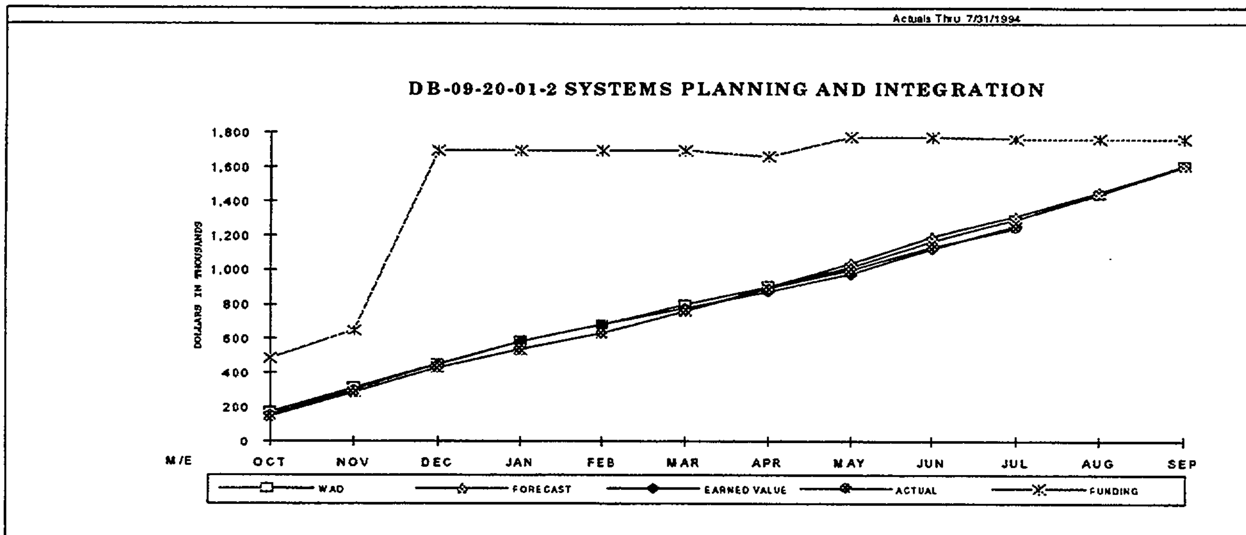
- None.




[NOTES: 1) The OCRWM Reorganization resulted in a directive to provide a draft PMSM revision in advance of the initial FY94 planning date.

2) Final Integrated Logistic Support (ILS) Plan and Responsibility Assignment Matrix with Baseline Change Proposals (BCPs) were postoned and IAW Technical Direction letter was received from RW-32.]

Figure 3-61. SI&C - Systems Planning and Integration Activity Schedule




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 170 | 143 | 138 | 132 | 101 | 114 | 105 | 109 | 155 | 130 | 143 | 169 |
| | FORECAST | 146 | 138 | 146 | 108 | 94 | 130 | 135 | 139 | 155 | 124 | 137 | 159 |
| | EARNED VALUE | 156 | 146 | 147 | 134 | 99 | 99 | 91 | 103 | 145 | 136 | | |
| | MONTH ACTUAL | 146 | 138 | 146 | 108 | 94 | 130 | 128 | 110 | 131 | 111 | | |
| | VAR/SCH | (14) | 3 | 9 | 2 | (2) | (15) | (14) | (6) | (10) | 6 | | |
| | VAR/COST | 10 | 8 | 1 | 26 | 5 | (31) | (37) | (7) | 14 | 25 | | |
| CUM | WAD | 170 | 313 | 451 | 583 | 684 | 798 | 903 | 1,012 | 1,167 | 1,297 | 1,440 | 1,609 |
| | FORECAST | 146 | 284 | 430 | 538 | 632 | 762 | 897 | 1,036 | 1,191 | 1,315 | 1,452 | 1,611 |
| | EARNED VALUE | 156 | 302 | 449 | 583 | 682 | 781 | 872 | 975 | 1,120 | 1,256 | | |
| | ACTUAL | 146 | 284 | 430 | 538 | 632 | 762 | 890 | 1,000 | 1,131 | 1,242 | | |
| | VAR/SCH | (14) | (11) | (2) | 0 | (2) | (17) | (31) | (37) | (47) | (41) | | |
| | VAR/COST | 10 | 18 | 19 | 45 | 50 | 19 | (18) | (25) | (11) | 14 | | |
| FUNDING | FY94 FUNDING | 113 | 274 | 1,322 | 1,322 | 1,322 | 1,322 | 1,322 | 1,439 | 1,439 | 1,429 | 1,429 | 1,429 |
| | PREV. FUNDED | 374 | 374 | 374 | 374 | 374 | 374 | 339 | 335 | 335 | 335 | 335 | 335 |
| | TOTAL FUNDING | 487 | 648 | 1,696 | 1,696 | 1,696 | 1,696 | 1,661 | 1,774 | 1,774 | 1,764 | 1,764 | 1,764 |

**DB-09-20-01-2 SYSTEMS PLANNING AND INTEGRATION**
FY94 CRWMS M&O PMS DATA ($000)
M/E JULY
Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 38 | 39 | 28 | 1 | 11 | 332 | 292 | 238 | (40) | 54 | 413 | 367 | 46 |
| FY94 LOE | 92 | 92 | 78 | 0 | 14 | 644 | 644 | 648 | 0 | (4) | 866 | 875 | (9) |
| Subtotal FY94 | 130 | 131 | 106 | 1 | 25 | 976 | 936 | 886 | (40) | 50 | 1,279 | 1,242 | 37 |
| Deferred (FY93 to FY94) Discrete | 0 | 5 | 1 | 5 | 4 | 269 | 269 | 297 | 0 | (28) | 269 | 325 | (56) |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 42 | 42 | 20 | 0 | 22 | 49 | 9 | 40 |
| Subtotal Deferred | 0 | 5 | 1 | 5 | 4 | 311 | 311 | 317 | 0 | (6) | 318 | 334 | (16) |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 3 | 0 | (3) | 11 | 11 | 39 | 0 | (28) | 13 | 36 | (23) |
| TOTAL | 130 | 136 | 110 | 6 | 26 | 1,298 | 1,258 | 1,242 | (40) | 16 | 1,610 | 1,612 | (2) |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-62. SI&C - System Planning and Integration Cost and Schedule Summary

### 3.6.3 Configuration Management: B&R 09-20-01-3 WBS 9.2.1.3

**MANAGER:** J. J. Miller/G. A. Carruth

**OBJECTIVE(S):** Develop and implement the OCRWM Configuration Management Program. Develop, operate, and maintain the Configuration Information System (CIS). Develop and implement the M&O Configuration Management Program.

#### 3.6.3.1 Progress During Report Period:

- Received OCRWM acceptance of the Configuration Information System (CIS) Phase 2 Acceptance Test Report. Closed 200 of 223 Information Management Change Authorizations (ICAs) generated during the CIS Phase 2 Acceptance Test. Conducted CIS Phase 2 Acceptance Test retest on July 29, 1994.

#### 3.6.3.2 Deliverables, Publications, and Presentations:

- Delivered the OCRWM Baseline Management Procedure for CI and CI Identifiers, Revision 1, to RW-37.

#### 3.6.3.3 Planned Work for Next Month/Major Near-Term Milestones:

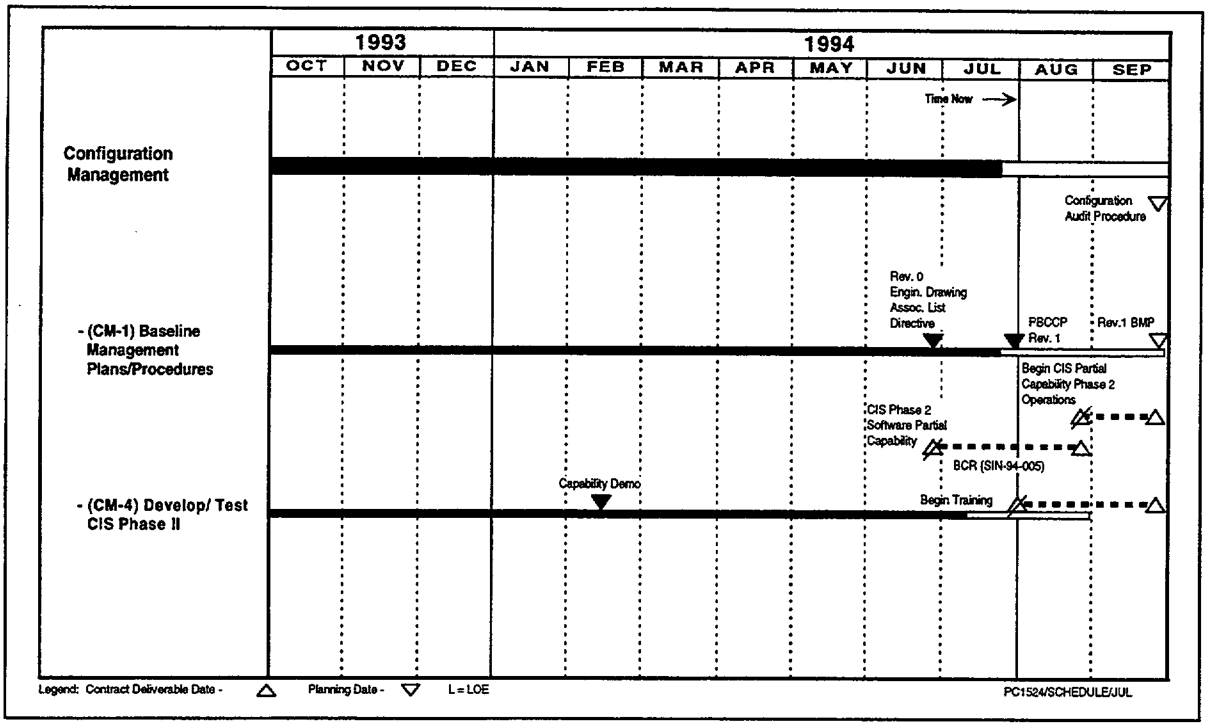
- Obtain OCRWM approval and acceptance of the CIS Phase 2.
- Deliver the Configuration Information System (CIS) Phase 2 User Manual to RW-37.
- Deliver the OCRWM Baseline Management, Program Baseline Change Control Procedure for PBCCB approval.
- Complete development of the OCRWM Baseline Management Plan, Revision 1.
- Complete comment resolution for the OCRWM Baseline Management Procedure, Configuration Audits.

#### 3.6.3.4 Variance Explanation:

- All variances are within tolerance.

#### 3.6.3.5 Issues and Concerns:

- None.



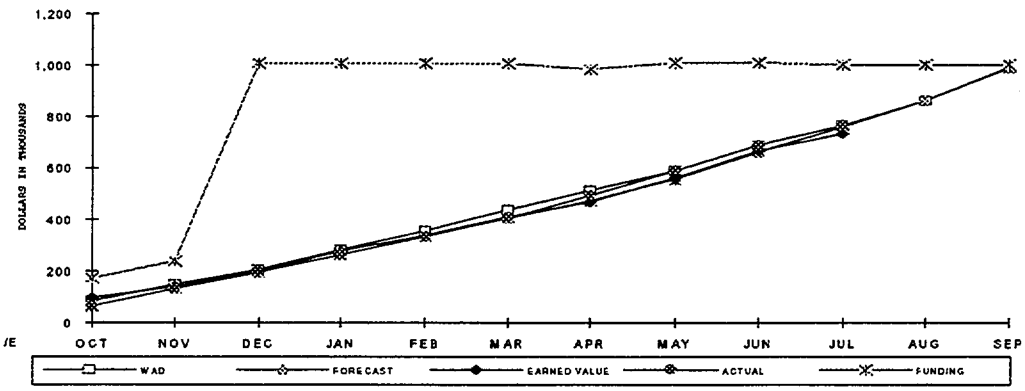

[NOTE: 1. Awaiting OCRWM approval of the Change Control Procedure.

2. Additional CIS work needs to be completed before obtaining operational status.]

Figure 3-63. SI&C - Configuration Management Activity Schedule

Actuals Thru 7/31/1994

## DB-09-20-01-3 CONFIGURATION MANAGEMENT




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 83 | 65 | 58 | 76 | 75 | 81 | 74 | 77 | 98 | 77 | 97 | 132 |
| | FORECAST | 63 | 68 | 64 | 68 | 72 | 71 | 67 | 83 | 106 | 99 | 100 | 130 |
| | EARNED VALUE | 96 | 43 | 60 | 77 | 62 | 73 | 57 | 94 | 104 | 67 | | |
| | MONTH ACTUAL | 63 | 68 | 64 | 68 | 72 | 71 | 86 | 97 | 98 | 77 | | |
| | VAR/SCH | 13 | (22) | 2 | 1 | (13) | (8) | (17) | 17 | 6 | (10) | | |
| | VAR/COST | 33 | (25) | (4) | 9 | (10) | 2 | (29) | (3) | 6 | (10) | | |
| CUM | WAD | 83 | 148 | 206 | 282 | 357 | 438 | 512 | 589 | 687 | 764 | 861 | 993 |
| | FORECAST | 63 | 131 | 195 | 263 | 335 | 406 | 473 | 556 | 662 | 761 | 861 | 991 |
| | EARNED VALUE | 96 | 139 | 199 | 276 | 338 | 411 | 468 | 562 | 666 | 733 | | |
| | ACTUAL | 63 | 131 | 195 | 263 | 335 | 406 | 492 | 589 | 687 | 764 | | |
| | VAR/SCH | 13 | (9) | (7) | (6) | (19) | (27) | (44) | (27) | (21) | (31) | | |
| | VAR/COST | 33 | 8 | 4 | 13 | 3 | 5 | (24) | (27) | (21) | (31) | | |
| FUNDING | FY94 FUNDING | 45 | 109 | 880 | 880 | 880 | 880 | 880 | 906 | 906 | 899 | 899 | 899 |
| | PREV. FUNDED | 128 | 128 | 128 | 128 | 128 | 128 | 104 | 104 | 104 | 104 | 104 | 104 |
| | TOTAL FUNDING | 173 | 237 | 1,008 | 1,008 | 1,008 | 1,008 | 984 | 1,010 | 1,010 | 1,003 | 1,003 | 1,003 |

## DB-09-20-01-3 CONFIGURATION MANAGEMENT

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 34 | 24 | 56 | (10) | (32) | 401 | 371 | 444 | (30) | (73) | 421 | 538 | (117) |
| FY94 LOE | 34 | 34 | 21 | 0 | 13 | 339 | 339 | 310 | 0 | 29 | 478 | 443 | 35 |
| Subtotal FY94 | 68 | 58 | 77 | (10) | (19) | 740 | 710 | 754 | (30) | (44) | 899 | 981 | (82) |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 9 | 9 | 0 | 0 | 9 | 19 | 19 | 0 | 0 | 19 | 88 | 0 | 88 |
| Subtotal Deferred | 9 | 9 | 0 | 0 | 9 | 19 | 19 | 0 | 0 | 19 | 88 | 0 | 88 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 10 | 0 | (6) | 4 | 9 | (5) |
| TOTAL | 77 | 67 | 77 | (10) | (10) | 763 | 733 | 764 | (30) | (31) | 991 | 990 | 1 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-64. SI&C - Configuration Management Cost and Schedule Summary

### 3.6.4 Regulatory Policy and Requirements: B&R 09-20-02-1 WBS 9.2.2.1

**MANAGER:** D. Fenster

**OBJECTIVE(S):** Issue and maintain regulatory interpretation and guidance documents. Coordinate regulatory issues for the OCRWM program and ensure National Environmental Policy Act (NEPA) compliance.

#### 3.6.4.1 Progress During Report Period:

- Compiled the draft Environmental Safety and Health Management (ES&H) Management Plan for final delivery on September 1, 1994. A new data crosscut was delivered to DOE/EH on July 25, 1994. This required the M&O to conduct a complete review of all financial data in the ES&H Management Plan.

- Prepared a rationale for selection of alternatives, basic assumptions, and descriptions of alternatives for the MPC EIS as requested by the OCRWM MPC EIS Manager.

- Prepared options papers on the OCRWM NEPA strategy that addresses the need for a Programmatic EIS.

- Prepared a draft OCRWM NEPA strategy outline resulting from RW-1 review of options papers and submitted it to RW-36 for use as a strawman for discussions with Project NEPA staff.

- Reviewed the final draft of the Notice of Intent for the Preparation of an EIS for a MPC System. The concurrence review meeting is scheduled for August 2, 1994.

#### 3.6.4.2 Deliverables, Publications, and Presentations:

- Delivered comments on the following to OCRWM (to be forwarded to the originating DOE office):

  - Draft Standards Document, "Preparation, Review, and Approval of Implementation Plans for Nuclear Safety Requirements."

  - Draft Standards Document, "Requesting and Granting Exemptions to Nuclear Safety Requirements."

  - Draft Standards Documents, "Process Safety Management for Highly Hazardous Chemicals," and "Analysis of Chemical Process Hazards."

  - Draft Directives Management Document for DOE Order 5500.4B, "Public Affairs Policy and Planning Requirements for Emergencies."

  - Directive Management Document for Consolidation and Reduction of Various DOE Orders on Federal Personnel Management.

- Submitted monthly report, Regulatory Compliance and Permit Status Report for Site Characterization, for the June 1994 period to RW-30.

- Submitted comments on DOE draft Order 5480.26, "Trending and Analysis of Operations Information Using Performance Indicators" to DOE/EH-63 on July 28, 1994 at the request of RW-45.

### 3.6.4.3 Planned Work for Next Month/Major Near-Term Milestones:

- Deliver the OCRWM ES&H Management Plan for OCRWM review.

- Complete issue paper on technical basis for excluding spent fuel and vitrified High-Level Waste (HLW) from RCRA regulations.

- Complete review of environmental regulations impacting disposal of plutonium in the geologic repository.

- Continue to assist in the development of the OCRWM NEPA strategy.

- Continue to assist MPC EIS in the effort.

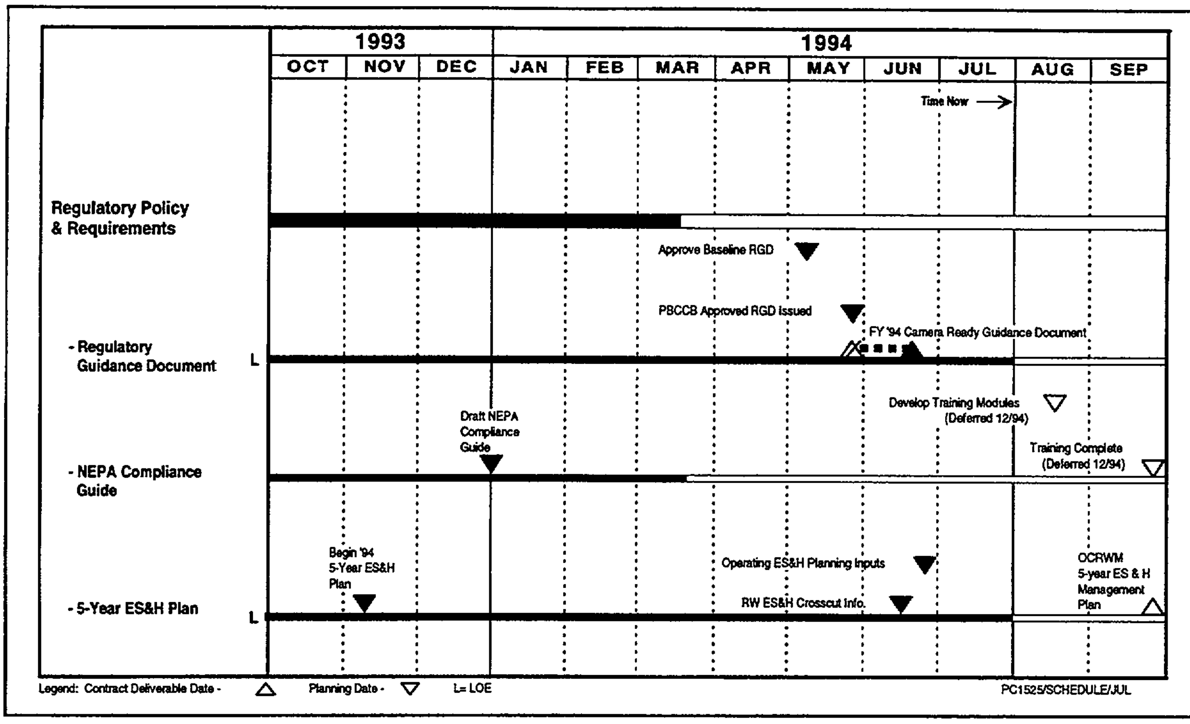
- Continue preparation of OCRWM NEPA procedures and training materials.

### 3.6.4.4 Variance Explanation:

- All variances are within tolerance.

### 3.6.4.5 Issues And Concerns:

- None.

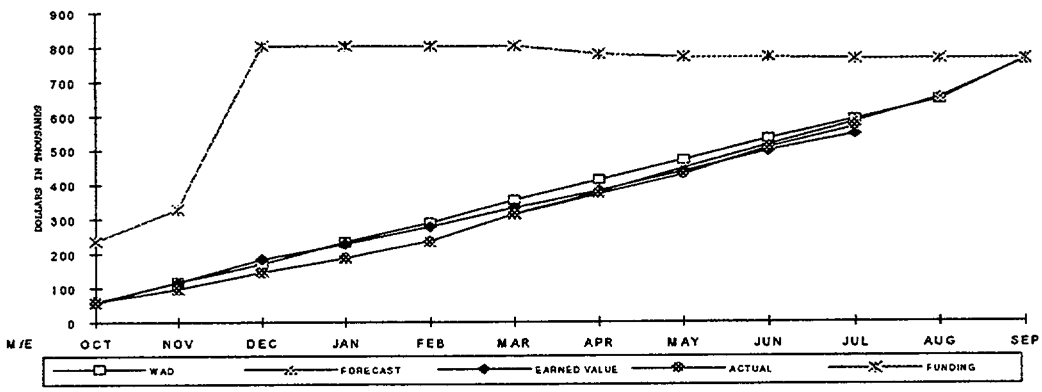



[NOTE: The secretarial policy statement on NEPA has been issued regarding implementation of NEPA. OCRWM is now revising the NEPA Compliance Manual and development of the training materials based on the new guidance. Initiation of this effort is still under consideration.]

Figure 3-65. SI&C - Regulatory Policy and Support Activity Schedule

Actuals Thru 7/31/1994

## DB-09-20-02-1 REGULATORY POLICY AND REQUIREMENTS




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 56 | 61 | 54 | 62 | 57 | 65 | 57 | 58 | 63 | 55 | 58 | 117 |
| | FORECAST | 60 | 37 | 50 | 40 | 50 | 77 | 62 | 69 | 70 | 66 | 70 | 110 |
| | EARNED VALUE | 60 | 56 | 68 | 45 | 49 | 55 | 48 | 55 | 61 | 49 | | |
| | MONTH ACTUAL | 60 | 37 | 50 | 40 | 50 | 77 | 58 | 55 | 80 | 60 | | |
| | VAR/SCH | 4 | (5) | 14 | (17) | (8) | (10) | (9) | (3) | (2) | (6) | | |
| | VAR/COST | 0 | 19 | 18 | 5 | (1) | (22) | (10) | 0 | (19) | (11) | | |
| CUM | WAD | 56 | 117 | 171 | 233 | 290 | 355 | 412 | 470 | 533 | 588 | 646 | 763 |
| | FORECAST | 60 | 97 | 147 | 187 | 237 | 314 | 376 | 445 | 515 | 581 | 651 | 761 |
| | EARNED VALUE | 60 | 116 | 184 | 229 | 278 | 333 | 381 | 436 | 497 | 546 | | |
| | ACTUAL | 60 | 97 | 147 | 187 | 237 | 314 | 372 | 427 | 507 | 567 | | |
| | VAR/SCH | 4 | (1) | 13 | (4) | (12) | (22) | (31) | (34) | (36) | (42) | | |
| | VAR/COST | 0 | 19 | 37 | 42 | 41 | 19 | 9 | 9 | (10) | (21) | | |
| FUNDING | FY94 FUNDING | 63 | 154 | 630 | 630 | 630 | 630 | 630 | 630 | 630 | 624 | 624 | 624 |
| | PREV. FUNDED | 174 | 174 | 174 | 174 | 174 | 174 | 150 | 141 | 141 | 141 | 141 | 141 |
| | TOTAL FUNDING | 237 | 328 | 804 | 804 | 804 | 804 | 780 | 771 | 771 | 765 | 765 | 765 |

### DB-09-20-02-1 REGULATORY POLICY AND REQUIREMENTS

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY94 LOE | 50 | 50 | 58 | 0 | (8) | 505 | 506 | 527 | 0 | (22) | 624 | 623 | 1 |
| Subtotal FY94 | 50 | 50 | 58 | 0 | (8) | 505 | 506 | 527 | 0 | (22) | 624 | 623 | 1 |
| Deferred (FY93 to FY94) Discrete | 5 | 1 | 2 | (4) | (1) | 80 | 39 | 23 | (41) | 16 | 125 | 116 | 9 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 0 |
| Subtotal Deferred | 5 | 1 | 2 | (4) | (1) | 80 | 39 | 23 | (41) | 16 | 130 | 121 | 9 |
| Carryover Commitments (FY93 to FY94) | 0 | (3) | 0 | (3) | (3) | 3 | 3 | 17 | 0 | (14) | 8 | 15 | (7) |
| TOTAL | 55 | 48 | 60 | (7) | (12) | 588 | 547 | 567 | (41) | (20) | 762 | 759 | 3 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-66. SI&C - Regulatory Policy and Support Cost and Schedule Summary

### 3.6.5 Regulatory Integration: B&R 09-20-02-2 WBS 9.2.2.2

**MANAGER:** D. Fenster

**OBJECTIVE(S):** Coordinate and develop regulatory, licensing, and compliance requirements for safeguards, security, and guidance document. Prepare Annotated Outlines for the potential license applications for a geologic repository and a MRS facility for the OCRWM Program Office.

#### 3.6.5.1 Progress During Report Period:

- Coordinated the DOE/NRC Technical Exchange #4 held on June 28, 1994, in Bethesda, MD. The staff coordinated and supported preliminary reviews in preparation for the Technical Exchange.

- A Licensing Support System (LSS) Working Group Meeting was held on July 21, 1994. Topics discussed included a process for viewing what DOE might put into the LSS, schedule and milestones to meet the license application date, volume estimates for the LSS, and LSS issues.

- Prepared materials for the LSS task force briefing to DOE on July 22, 1994. These materials included an agenda for the meeting and a listing of open LSS issues. Coordinated a LSS milestone paper and a paper defining the contents of the LSS with M&O Las Vegas.

- Completed a first draft of a cross walk between the Site Characterization Program Baseline (SCPB) and NRC's draft Format and Content Regulatory Guide for the license application of the waste repository. This cross walk is intended as one of the tools to focus and align project site characterization activities in accordance with major project deliverables.

- Participated in a meeting with Sandia National Laboratories on July 26, 1994, in Albuquerque, NM, to prepare a Project Plan for developing a Ground Water Travel Time (GWTT) methodology and determining whether the Yucca Mountain site conforms to DOE's GWTT guideline and NRC's rule.

- Drafted FY95 tasks, schedules, and budgets for the GWTT and Substantially Complete Containment (SCC) Issue Resolution Working Groups.

#### 3.6.5.2 Deliverables, Publications, and Presentations:

- Delivered a summary of the June 15-16, 1994, NWTRB meeting and tour of the Hanford facilities in Richland, Washington.

- Conducted a briefing for RW-36 summarizing the negotiated rulemaking for the LSS and the historical activities associated with the LSS.

- Delivered a summary of the 65th Advisory Committee on Nuclear Waste (ACNW) Meeting to OCRWM.

### 3.6.5.3 Planned Work for Next Month/Major Near-Term Milestones:

- Review Burn-up Credit Topical Report.

- Attend a meeting in Las Vegas with Sandia and YMSCO to present GWTT methodology to YMSCO.

- Conduct a Licensing Workshop in Los Alamos on August 24, 1994.

- Complete review of pertinent NRC and EPA regulations and DOE Orders to identify any provisions that either preclude disposition of other wastes or impose additional requirements.

- Prepare Baseline Change Proposal for the Regulatory Guidance Document (RGD) to incorporate the OCRWM Safeguards and Security Plan as Appendix D.

- Continue to assist YMSCO in the preparation of Seismic Hazard Topical Report #2 and the associated Annotated Outline.

- Continue participation in the LSS working group activities.

### 3.6.5.4 Variance Explanation:

- The current period cost variance of $99K/61% and cumulative cost variance of $215K/14% are due to Winston and Strawn bookings and assigning of staff members to higher priority Las Vegas tasks.

- The cumulative cost variance of $215K/14% is also due to Winston and Strawn booking lags and matrixing out of staff members to higher priority Las Vegas tasks.

### 3.6.5.5 Issues And Concerns:

- None.

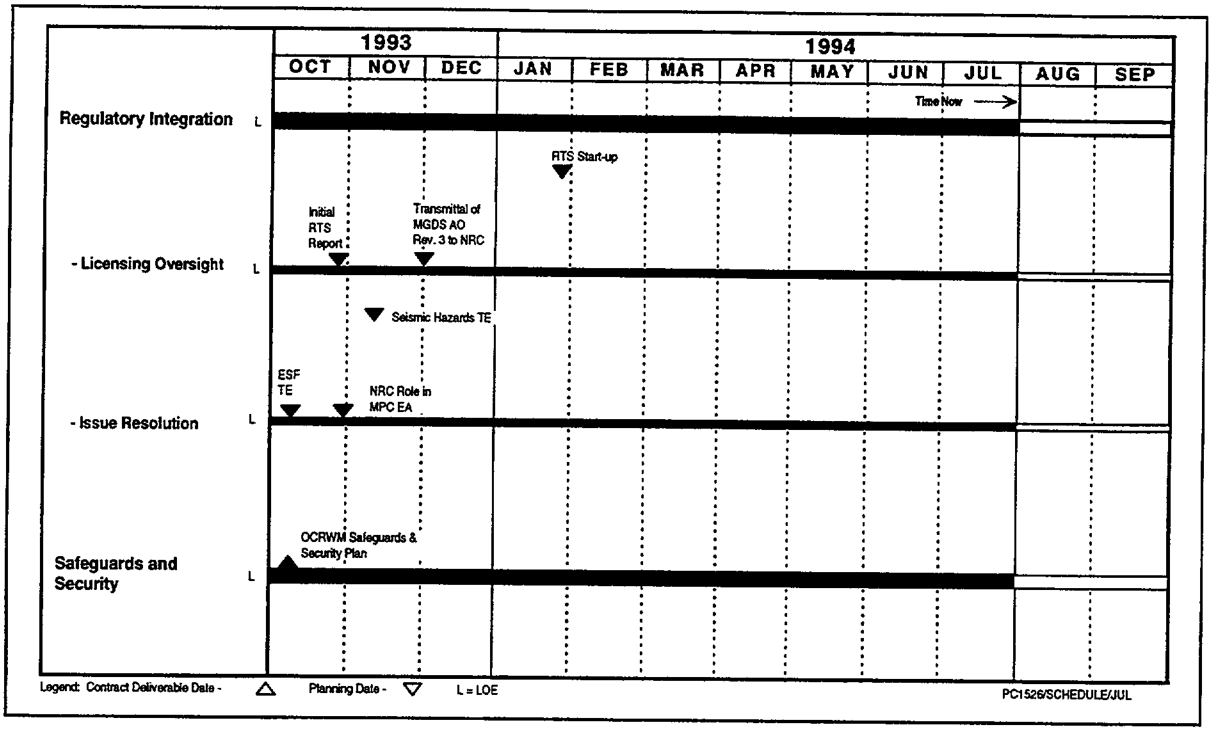
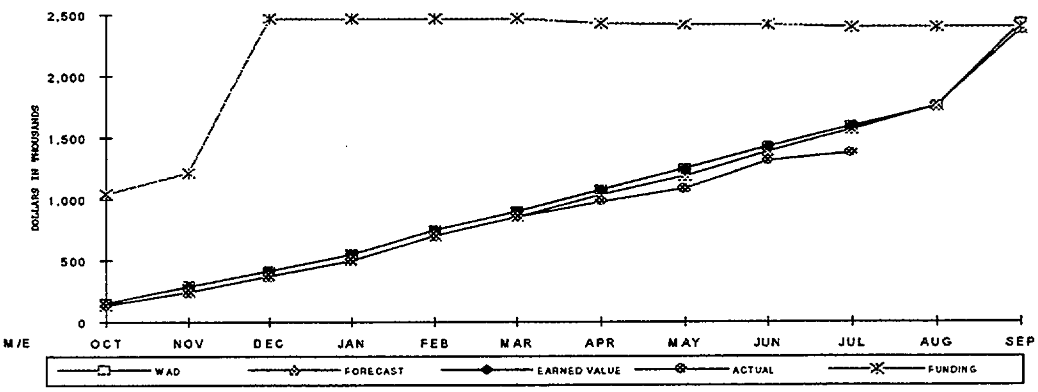



Figure 3-67. SI&C - Regulatory Integration Activity Schedule

Actuals Thru 7/31/1994

DB-09-20-02-2 REGULATORY INTEGRATION




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 155 | 134 | 123 | 136 | 194 | 153 | 178 | 173 | 178 | 163 | 162 | 670 |
| | FORECAST | 137 | 107 | 127 | 126 | 197 | 159 | 177 | 157 | 195 | 178 | 191 | 620 |
| | EARNED VALUE | 155 | 134 | 123 | 136 | 194 | 153 | 178 | 173 | 178 | 163 | | |
| | MONTH ACTUAL | 137 | 107 | 127 | 126 | 197 | 159 | 124 | 105 | 226 | 64 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 18 | 27 | (4) | 10 | (3) | (6) | 54 | 68 | (48) | 99 | | |
| CUM | WAD | 155 | 289 | 412 | 548 | 742 | 895 | 1,073 | 1,246 | 1,424 | 1,587 | 1,749 | 2,419 |
| | FORECAST | 137 | 244 | 371 | 497 | 694 | 853 | 1,030 | 1,187 | 1,382 | 1,560 | 1,751 | 2,371 |
| | EARNED VALUE | 155 | 289 | 412 | 548 | 742 | 895 | 1,073 | 1,246 | 1,424 | 1,587 | | |
| | ACTUAL | 137 | 244 | 371 | 497 | 694 | 853 | 977 | 1,082 | 1,308 | 1,372 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 18 | 45 | 41 | 51 | 48 | 42 | 96 | 164 | 116 | 215 | | |
| FUNDING | FY94 FUNDING | 124 | 302 | 1,552 | 1,552 | 1,552 | 1,552 | 1,552 | 1,552 | 1,552 | 1,531 | 1,531 | 1,531 |
| | PREV. FUNDED | 915 | 915 | 915 | 915 | 915 | 915 | 872 | 861 | 861 | 861 | 861 | 861 |
| | TOTAL FUNDING | 1,039 | 1,217 | 2,467 | 2,467 | 2,467 | 2,467 | 2,424 | 2,413 | 2,413 | 2,392 | 2,392 | 2,392 |

## DB-09-20-02-2 REGULATORY INTEGRATION

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY94 LOE | 120 | 120 | 85 | 0 | 35 | 1,200 | 1,200 | 1,083 | 0 | 117 | 1,531 | 1,815 | (284) |
| Subtotal FY94 | 120 | 120 | 85 | 0 | 35 | 1,200 | 1,200 | 1,083 | 0 | 117 | 1,531 | 1,815 | (284) |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY93 to FY94) | 43 | 43 | (21) | 0 | 64 | 388 | 388 | 288 | 0 | 100 | 888 | 556 | 332 |
| TOTAL | 163 | 163 | 64 | 0 | 99 | 1,588 | 1,588 | 1,371 | 0 | 217 | 2,419 | 2,371 | 48 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-68. SI&C - Regulatory Integration Cost and Schedule Summary

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## 3.7 STRATEGIC PLANNING

### 3.7.1 Strategic Planning: B&R 09-32-00 WBS 9.3.2

**MANAGER:** F. Ridolphi

**OBJECTIVE(S):** Provide complete strategic analyses to the Government and to the general manager of the M&O contract.

#### 3.7.1.1Progress During Report Period:

- Assisted in the development process for performing contingency planning. Submitted a draft white paper describing the process to RW-34 for review.

- Assisted RW-2 and RW-34 in the development of program contingency options.

- Produced the revised draft OCRWM Program Plan incorporating M&O comments.

#### 3.7.1.2Deliverables, Publications, and Presentations:

- Delivered the draft report titled "OCRWM Planning for the Contingency of Yucca Mountain Unsuitability" to OCRWM.

#### 3.7.1.3Planned Work for Next Month/Major Near-Term Milestones:

- Deliver the proposed draft OCRWM Program Plan to OCRWM.

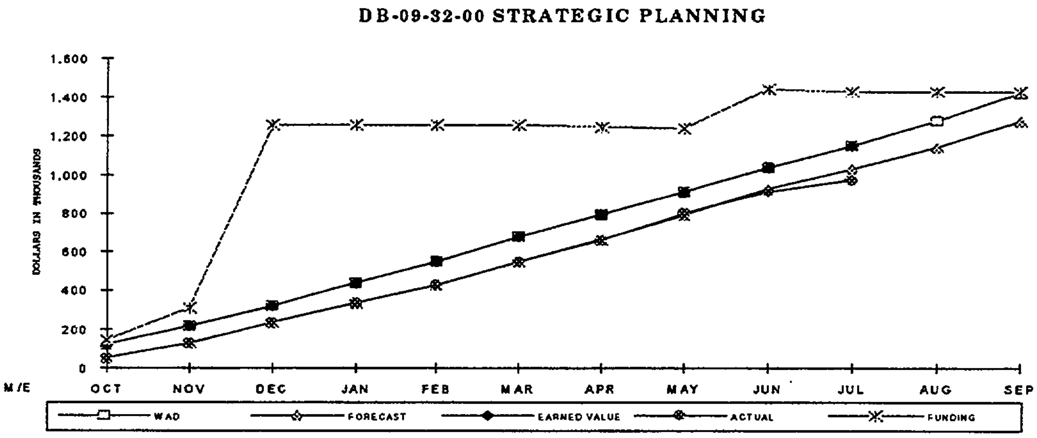
#### 3.7.1.4Variance Explanation:

- The current period cost variance of $49K/44% and the cumulative cost variance of $177K/16% are due to a decision by the client not to pursue a technical support contract with LLNL and reduced labor due to a special assignment to work for a suitability approach briefing for RW-1 Las Vegas. There is no program impact, and no corrective action is required. This LLNL activity has been deleted from the forecast.

#### 3.7.1.5Issues and Concerns:

•None.

Actuals Thru 7/31/1994




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 121 | 97 | 101 | 118 | 112 | 128 | 118 | 118 | 128 | 112 | 127 | 141 |
| | FORECAST | 52 | 77 | 107 | 99 | 91 | 122 | 114 | 129 | 139 | 103 | 113 | 132 |
| | EARNED VALUE | 121 | 97 | 101 | 118 | 112 | 128 | 118 | 118 | 128 | 112 | | |
| | MONTH ACTUAL | 52 | 77 | 107 | 99 | 91 | 122 | 111 | 143 | 111 | 63 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 69 | 20 | (6) | 19 | 21 | 6 | 7 | (25) | 17 | 49 | | |
| CUM | WAD | 121 | 218 | 319 | 437 | 549 | 677 | 795 | 913 | 1,041 | 1,153 | 1,280 | 1,421 |
| | FORECAST | 52 | 129 | 236 | 335 | 426 | 548 | 662 | 791 | 930 | 1,033 | 1,146 | 1,278 |
| | EARNED VALUE | 121 | 218 | 319 | 437 | 549 | 677 | 795 | 913 | 1,041 | 1,153 | | |
| | ACTUAL | 52 | 129 | 236 | 335 | 426 | 548 | 659 | 802 | 913 | 976 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 69 | 89 | 83 | 102 | 123 | 129 | 136 | 111 | 128 | 177 | | |
| FUNDING | FY94 FUNDING | 115 | 279 | 1,228 | 1,228 | 1,228 | 1,228 | 1,228 | 1,228 | 1,428 | 1,416 | 1,416 | 1,416 |
| | PREV. FUNDED | 30 | 30 | 30 | 30 | 30 | 30 | 18 | 13 | 13 | 13 | 13 | 13 |
| | TOTAL FUNDING | 145 | 309 | 1,258 | 1,258 | 1,258 | 1,258 | 1,246 | 1,241 | 1,441 | 1,429 | 1,429 | 1,429 |

## DB-09-32-00 STRATEGIC PLANNING

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY'94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY'94 LOE | 112 | 112 | 63 | 0 | 49 | 1,150 | 1,150 | 968 | 0 | 182 | 1,416 | 1,268 | 148 |
| Subtotal FY'94 | 112 | 112 | 63 | 0 | 49 | 1,150 | 1,150 | 968 | 0 | 182 | 1,416 | 1,268 | 148 |
| Deferred (FY'93 to FY'94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY'93 to FY'94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY'93 to FY'94) | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 7 | 0 | (2) | 7 | 10 | (3) |
| TOTAL | 112 | 112 | 63 | 0 | 49 | 1,155 | 1,155 | 975 | 0 | 180 | 1,423 | 1,278 | 145 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-69. Strategic Planning Cost and Schedule Summary

### 3.7.2 International Waste Management Technology: B&R 09-33-00 WBS 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 activities into the domestic program. Report on special issues regarding international program activities and provide specific recommendations.

#### 3.7.2.1 Progress During the Reporting Period:

- Initiated restructuring of M&O assistance to International Programs.

#### 3.7.2.2 Deliverables, Publications, and Presentations:

- None this reporting period.

#### 3.7.2.3 Planned Work for Next Month/Major Near-Term Milestones:

- No major milestones or deliverables are planned for the next reporting period.

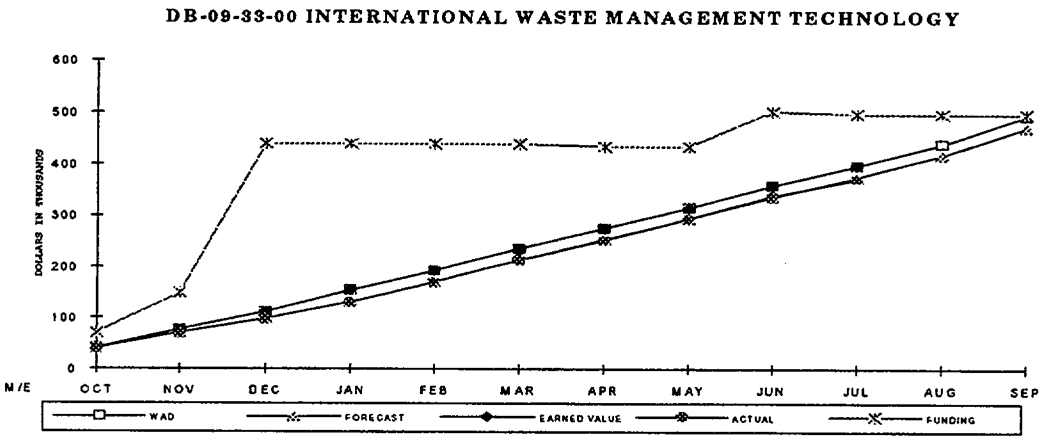
#### 3.7.2.4 Variance Explanation:

- All variances are within tolerance.

#### 3.7.2.5 Issues and Concerns:

- None.

Actuals Thru 7/31/1994




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 41 | 36 | 34 | 44 | 38 | 43 | 40 | 40 | 43 | 38 | 43 | 54 |
| | FORECAST | 40 | 30 | 28 | 33 | 40 | 43 | 40 | 40 | 43 | 38 | 43 | 54 |
| | EARNED VALUE | 41 | 36 | 34 | 44 | 38 | 43 | 40 | 40 | 43 | 38 | | |
| | MONTH ACTUAL | 40 | 30 | 28 | 33 | 40 | 43 | 38 | 42 | 45 | 32 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 1 | 6 | 6 | 11 | (2) | 0 | 2 | (2) | (2) | 6 | | |
| CUM | WAD | 41 | 77 | 111 | 155 | 193 | 236 | 276 | 316 | 359 | 397 | 440 | 494 |
| | FORECAST | 40 | 70 | 98 | 131 | 171 | 214 | 254 | 294 | 337 | 375 | 418 | 472 |
| | EARNED VALUE | 41 | 77 | 111 | 155 | 193 | 236 | 276 | 316 | 359 | 397 | | |
| | ACTUAL | 40 | 70 | 98 | 131 | 171 | 214 | 252 | 294 | 339 | 371 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 1 | 7 | 13 | 24 | 22 | 22 | 24 | 22 | 20 | 26 | | |
| FUNDING | FY94 FUNDING | 55 | 134 | 424 | 424 | 424 | 424 | 424 | 424 | 492 | 488 | 488 | 488 |
| | PREV. FUNDED | 15 | 15 | 15 | 15 | 15 | 15 | 10 | 10 | 10 | 10 | 10 | 10 |
| | TOTAL FUNDING | 70 | 149 | 439 | 439 | 439 | 439 | 434 | 434 | 502 | 498 | 498 | 498 |

**DB-09-33-00 INTERNATIONAL WASTE MANAGEMENT TECHNOLOGY**

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EARNED | | VARIANCE | | | EARNED | | VARIANCE | | | | |
| | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY94 LOE | 38 | 38 | 32 | 0 | 6 | 391 | 391 | 360 | 0 | 31 | 488 | 464 | 24 |
| Subtotal FY94 | 38 | 38 | 32 | 0 | 6 | 391 | 391 | 360 | 0 | 31 | 488 | 464 | 24 |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 0 | 0 | 0 | 6 | 6 | 10 | 0 | (4) | 6 | 6 | 0 |
| TOTAL | 38 | 38 | 32 | 0 | 6 | 397 | 397 | 370 | 0 | 27 | 494 | 470 | 24 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-70. International Waste Management Technology Cost and Schedule Summary

## 3.8 PROGRAM CONTROL AND ADMINISTRATION

### 3.8.1 Program Control and Administration: B&R 09-35-00 WBS 9.3.5

**MANAGER:** J. L. Stern/M. King

**OBJECTIVE(S):** Provide program control and administrative support to the Office of Civilian Radioactive Waste Management (OCRWM) by implementing and maintaining a Program Control System for the program and Program Support elements. Prepare Monthly Program Status Reports/Charts and bi-monthly Director's Program Reviews (DPRs). Develop the FY94 Total-System Life-Cycle Cost (TSLCC) analysis; maintain the program and Program Cost and Schedule Baseline and Work Breakdown Structure (WBS) dictionaries; and publish weekly/bi-weekly reports from the Management Tracking System (MTS) and Operations Management Tracking System (OMTS) databases.

#### 3.8.1.1 Progress During Report Period:

- Drafted a letter for RW-10 defining the Mined Geologic Disposal System (MGDS) cost data and schedule needed to support the Total-System Life-Cycle Cost (TSLCC) analysis for FY95.

- Assisted the Program Management Enhancement Task Force by working on tasks in support of the Program Management and Control Task Team. Discussed aspects of technical baseline performance assessment to include linkage to the schedule, and baseline. Discussed the integration of the work authorizations issued by the contracting officers with the project control change management process.

- Updated the FY95 Responsibility Assignment Matrix (RAM) and Budget distribution, based on RW-35 directions and produced a new RAM and corresponding Cost Performance Reports (CPRs) for OCRWM distribution.

#### 3.8.1.2 Deliverables, Publications, and Presentations:

- Delivered the monthly Planning and Control System (PACS) Performance Measurements reports for month-end June 1994 to RW-15.

- Delivered Month-End Performance Measurement books to RW-15.

#### 3.8.1.3 Planned Work for Next Month/Major Near-Term Milestones:

- Support the pre-review of the formats for the FY95 Workplans review presentations.

- Initiate preparation of OD Workplan review briefing to RW-35.

- Deliver the final "Monthly Report on Program Status as of June 30, 1994" to RW-35.

### 3.8.1.3 Planned Work for Next Month/Major Near-Term Milestones:

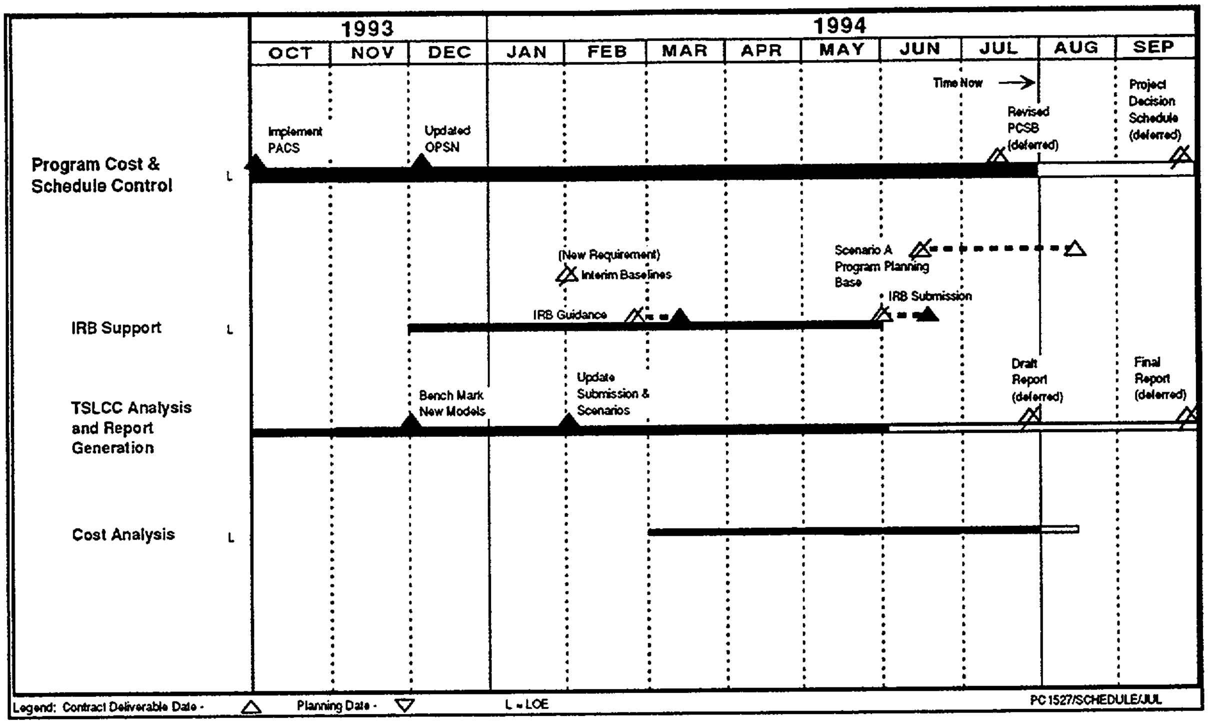
- Support the pre-review of the formats for the FY95 Workplans review presentations.
- Initiate preparation of OD Workplan review briefing to RW-35.
- Deliver the final "Monthly Report on Program Status as of June 30, 1994" to RW-35.

### 3.8.1.4 Variance Explanation:

- The cumulative cost variance of $228K/19% is due to an underrun in three primary areas: 1) Program and Schedule Performance Analysis, resulting from a Program Summary Level Network not being available; 2) not performing the documention of the S/W procedure for the LAN; and 3) a reduced level-of-effort support for PACS Operations. In addition, the staff build-up occurred more slowly than planned over the course of the fiscal year. A Technical Direction Letter is in process to change the workscope from documenting S/W Procedure for the LAN to writing the Cost/Schedule estimating guidelines.

### 3.8.1.5 Issues and Concerns:

- None.

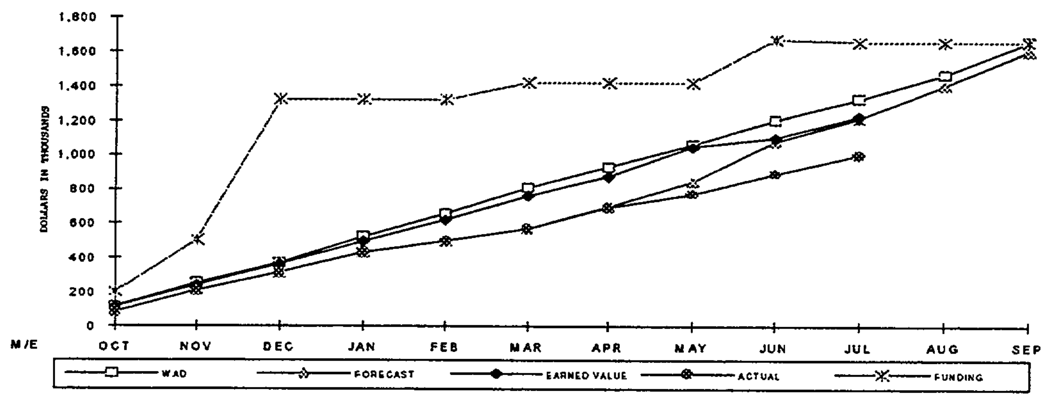



[NOTE: Program Cost and Schedule Baseline (PCSB) and Product Data Sheet (PDS) Interim Baselines and TSLCC completion have been delayed because of incorporation of the Proposed Program Approach. A Technical Direction Letter ( TDL) is being prepared to revise deliverable dates.]

Figure 3-71. Program Control and Administration Activity Schedule

Actuals Thru 7/31/1994

## DB-09-35-00 PROGRAM CONTROL AND ADMINISTRATION




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 115 | 138 | 117 | 150 | 137 | 153 | 121 | 131 | 146 | 123 | 140 | 190 |
| | FORECAST | 83 | 126 | 106 | 117 | 66 | 70 | 129 | 151 | 234 | 137 | 190 | 197 |
| | EARNED VALUE | 112 | 129 | 121 | 133 | 123 | 144 | 113 | 174 | 55 | 125 | | |
| | MONTH ACTUAL | 83 | 126 | 106 | 117 | 66 | 70 | 126 | 78 | 119 | 110 | | |
| | VAR/SCH | (3) | (9) | 4 | (17) | (14) | (9) | (8) | 43 | (91) | 2 | | |
| | VAR/COST | 29 | 3 | 15 | 16 | 57 | 74 | (13) | 96 | (64) | 15 | | |
| CUM | WAD | 115 | 253 | 370 | 520 | 657 | 810 | 931 | 1,062 | 1,208 | 1,331 | 1,471 | 1,661 |
| | FORECAST | 83 | 209 | 315 | 432 | 498 | 568 | 697 | 848 | 1,082 | 1,219 | 1,409 | 1,606 |
| | EARNED VALUE | 112 | 241 | 362 | 495 | 618 | 762 | 875 | 1,049 | 1,104 | 1,229 | | |
| | ACTUAL | 83 | 209 | 315 | 432 | 498 | 568 | 694 | 772 | 891 | 1,001 | | |
| | VAR/SCH | (3) | (12) | (8) | (25) | (39) | (48) | (56) | (13) | (104) | (102) | | |
| | VAR/COST | 29 | 32 | 47 | 63 | 120 | 194 | 181 | 277 | 213 | 228 | | |
| FUNDING | FY94 FUNDING | 200 | 500 | 1,323 | 1,323 | 1,323 | 1,423 | 1,423 | 1,423 | 1,673 | 1,659 | 1,659 | 1,659 |
| | PREV. FUNDED | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TOTAL FUNDING | 200 | 500 | 1,323 | 1,323 | 1,323 | 1,423 | 1,423 | 1,423 | 1,673 | 1,659 | 1,659 | 1,659 |

## DB-09-35-00 PROGRAM CONTROL AND ADMINISTRATION

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 42 | 44 | 24 | 2 | 20 | 425 | 323 | 339 | (102) | (16) | 517 | 516 | 1 |
| FY94 LOE | 81 | 81 | 86 | 0 | (5) | 905 | 905 | 660 | 0 | 245 | 1,144 | 1,088 | 56 |
| Subtotal FY94 | 123 | 125 | 110 | 2 | 15 | 1,330 | 1,228 | 999 | (102) | 229 | 1,661 | 1,604 | 57 |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 123 | 125 | 110 | 2 | 15 | 1,330 | 1,228 | 999 | (102) | 229 | 1,661 | 1,604 | 57 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure 3-72. Program Control and Administration Cost and Schedule Summary

## 3.9 INFORMATION MANAGEMENT

### 3.9.1 Information Resources Management: B&R 09-36-00 WBS 9.3.6

**MANAGER:** V. M. Skrinak/C. Kerrigan

**OBJECTIVE(S):** Manage and operate the OCRWM and M&O Records Management Systems; operate OCRWM's Quality Records Center (QRC), Central Records Facility (CRF), and receipt and screening functions as well as M&O's Local Records Center (LRC), Document Control Center (DCC), receipt and screening functions, mail room, and Technical Information Center (TIC). Procure the Document Capture System (DCS) for evaluation and provide Records Management requirements input into InfoSTREAMS. Participate in the development of the Records Inventory Disposition Schedule (RIDS) and coordinate OCRWM Records Management Activities with other program participants. Develop, implement, and evaluate plans, policies, and procedures to facilitate the management of OCRWM program information, data, and records. Continue the implementation of the InfoSTREAMS system to provide office automation and information management capabilities. Prepare short-range, long-range, and acquisition plans for Information Technology Resources and install, support, operate, and maintain all M&O Automated Data Processing (ADP) resources.

#### 3.9.1.1 Progress During Report Period

- Completed development of InfoSTREAMS (IS) Build 12.2 for delivery to Field Test on August 1, 1994. DEC acknowledged a problem with their Storage Monitor/ Distributed Services Library (SM/DSL) for NetWare implementation that has prevented Wide-Area Network (WAN) operability of the product and postponed plans for the pilot deployment to use the WAN. Coordinated with Systems Planning and Integration organization to participate as pilot group for the deployment of Increment 2.0. Continued Computer-Based Training (CBT) development and Quick Reference Guide updates.

- Provided the final InfoSTREAMS Overview Video to DOE/Public Affairs. Began approval process from both DOE and TRW to use the video at the NIRMA conference.

- Received approval from YMSCO for procurement of remaining equipment needed to support the two-site Records evaluation of LDMS after October 1, 1994.

- Completed query subsystem (indexed and full text search) User interface that was presented as part of the July LDMS demo.

- Updated the LSS cost model and provided costing data to the LSS Working Group. Provided assistance to the LSS Working Group meetings and participated in preparation of briefings.

- Provided Automated Forms System (AFS) user support at M&O/Las Vegas facility and training to M&O and SAIC forms designers. Continued to test CaLANdar synchronization issues in a test environment in conjunction with Kenrob. Developing standard operating procedures for the help desk and technical support. Looking for a Help Desk automation tool to automate logging and track trouble calls, etc.

- Initiated plans for implementing M&O Monthly Summary Report database. Met with RW-14 and OCRWM Technical Management and Support Services to discuss implementation strategy for this database.

- Conducted NIRMA 1995 kick-off meeting. Attendees included representatives from Ogden Services, PRC, Duke, and RW-15 (co-chair of the Technical Program).

- Conducted a briefing on Correspondence Control Records Unit (CCRU) operations and service for Rich Minning, RW-2.

- Prepared updated versions of RW 1324.5 Records Management Program and RW 1324.2 OCRWM RIDS for discussion at Records Management Council meeting. Senior Records staff participated in the OCRWM Records Management Council meeting, July 18-20, 1994, in Albuquerque; the Council reached consensus concerning the establishment of an I-RIS Change Control Board.

- Prepared and conducted RIDS training for YMSCO participant Records Managers during the Records Management Council meeting and for Sandia National Labs/Geocenters Records management staff.

- Participated in a roundtable discussion with new HQ Office of HR and Administration management (RW-15) to provide background on IRM activities, future requirements, and issues.

- Participated in Software Advisory Group meetings in Denver on July 27-28, 1994. Received assignment to participate as a member of Database Working Group to investigate issues concerning requirements for databases that store QA data.

### 3.9.1.2 Deliverables, Publications, and Presentations:

- Presented first of three progress demonstrations of the Licensing Data Management System (LDMS) to YMSCO and RW-15. Also presented a Video for Windows (VFW) demonstration of InfoSTREAMS Increment 2 on July 20, 1994 to RW-15.

- Presented InfoSTREAMS and LDMS overviews and demonstrations to members of the NWTRB staff on July 13, 1994.

- Presented a briefing on CCRU operations to RW-1. RW-2 requested that training on correspondence be provided to all OCRWM HQ staff.

- Delivered the FY95 ADP Short-Range Site Plan to OCRWM HQ on July 29, 1994.

- Completed and implemented M&O Vienna Computer Protection Plan, Revision 1, on July 1, 1994.

### 3.9.1.3 Planned Work for Next Month/Major Near-Term Milestones:

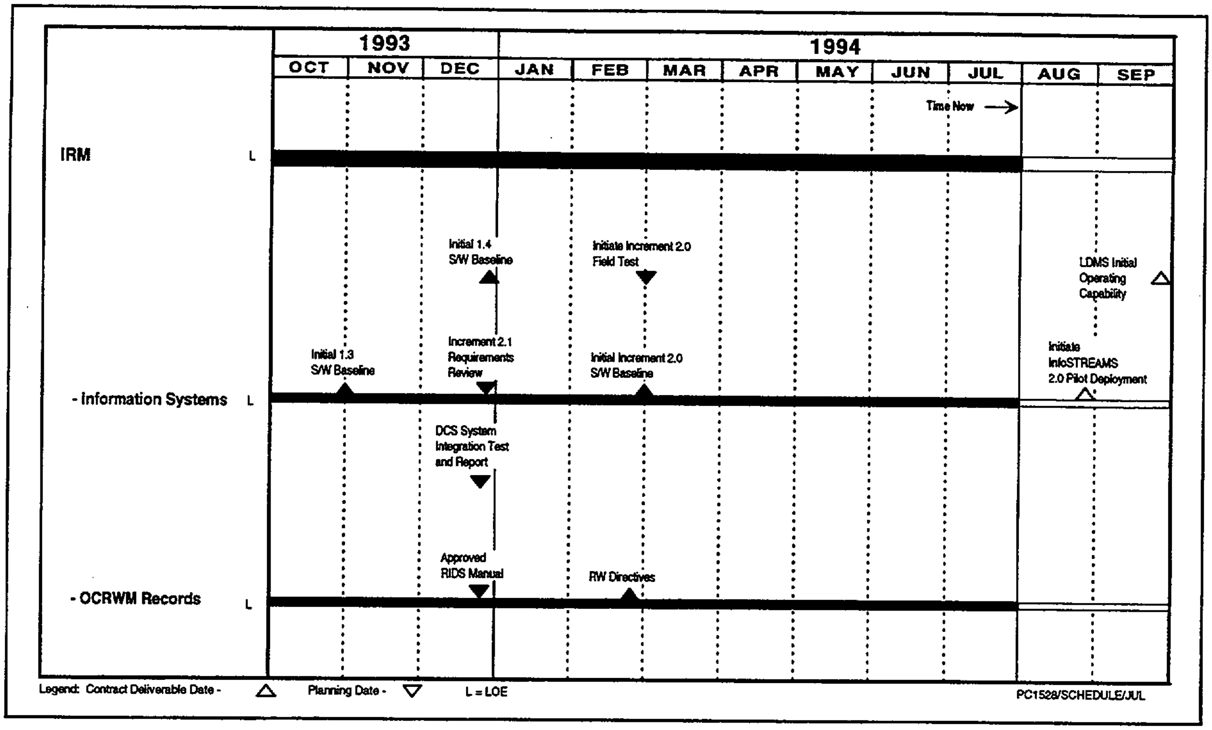
- Initiate I2.0 pilot deployment to Systems Planning and Integration organization pilot group in Vienna.
- Continue LDMS efforts towards second demonstration; tentatively rescheduled for mid-August.
- Continue LSS cost model refinements and costing runs for LSS based on scenarios.
- Provide support at LSS Working Group meetings.
- Review I-RIS import utility design with Las Vegas developers.
- Initiate activity for Standard Operating Procedures to support LDMS Operations Plan.
- Complete text and image data load for test database for LDMS.
- Continue monitoring and coordinating CaLANdar implementation.
- Coordinate attendance to RW-1 staff meeting to brief kickoff of OCRWM Records, Module 2 training.
- Attend and host booth at annual NIRMA conference.
- Attend YMSCO Records meeting off site in Michigan.
- Rewrite of records QA procedures to be in compliance with QAP-17.1Q.
- Continue preparation of user procedures for RIDS implementation.
- Continue research and preparation of position paper on long-term storage options.
- Complete revision of the Software Management Site Plan for review.

### 3.9.1.4 Variance Explanation:

- The current period cost variance of $302K/20% is due to the delay in booking of ITR Management and InfoSTREAMS ODC. The actual costs will be reflected in future months.

### 3.9.1.5 Issues and Concerns:

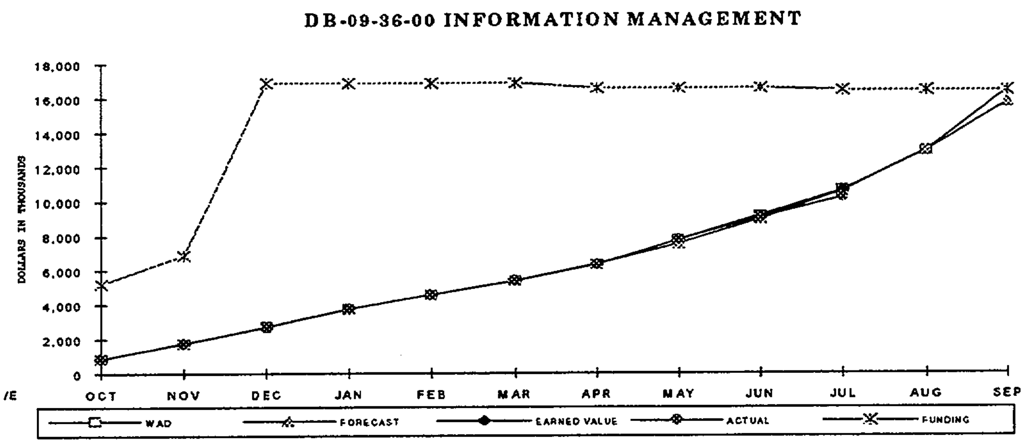
- None.




[NOTE: In the process of being re-baselined.]

Figure 3-73. Information Resource Management Activity Schedule

Actuals Thru 7/31/1994




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 852 | 897 | 965 | 1,033 | 815 | 823 | 935 | 1,425 | 1,405 | 1,481 | 2,286 | 3,554 |
| | FORECAST | 852 | 897 | 965 | 1,033 | 815 | 823 | 962 | 1,199 | 1,411 | 1,633 | 2,345 | 2,817 |
| | EARNED VALUE | 852 | 897 | 965 | 1,033 | 815 | 823 | 935 | 1,425 | 1,406 | 1,481 | | |
| | MONTH ACTUAL | 852 | 897 | 965 | 1,033 | 815 | 823 | 935 | 1,425 | 1,299 | 1,179 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | | |
| | VAR/COST | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 107 | 302 | | |
| CUM | WAD | 852 | 1,749 | 2,714 | 3,747 | 4,562 | 5,385 | 6,320 | 7,745 | 9,150 | 10,631 | 12,917 | 16,471 |
| | FORECAST | 852 | 1,749 | 2,714 | 3,747 | 4,562 | 5,385 | 6,347 | 7,546 | 8,957 | 10,590 | 12,935 | 15,752 |
| | EARNED VALUE | 852 | 1,749 | 2,714 | 3,747 | 4,562 | 5,385 | 6,320 | 7,745 | 9,151 | 10,632 | | |
| | ACTUAL | 852 | 1,749 | 2,714 | 3,747 | 4,562 | 5,385 | 6,320 | 7,745 | 9,044 | 10,223 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | | |
| | VAR/COST | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 107 | 409 | | |
| FUNDING | FY94 FUNDING | 1,020 | 2,702 | 12,704 | 12,704 | 12,704 | 12,704 | 12,704 | 12,704 | 12,704 | 12,559 | 12,559 | 12,559 |
| | PREV. FUNDED | 4,179 | 4,179 | 4,179 | 4,179 | 4,179 | 4,179 | 3,891 | 3,890 | 3,890 | 3,890 | 3,890 | 3,890 |
| | TOTAL FUNDING | 5,199 | 6,881 | 16,883 | 16,883 | 16,883 | 16,883 | 16,595 | 16,594 | 16,594 | 16,449 | 16,449 | 16,449 |

## DB-09-36-00 INFORMATION MANAGEMENT

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | 0 | 0 | 0 | 17 | 18 | 14 | 1 | 4 | 23 | 21 | 2 |
| FY94 LOE | 1,240 | 1,240 | 834 | 0 | 406 | 8,178 | 8,178 | 7,683 | 0 | 495 | 12,691 | 12,178 | 513 |
| Subtotal FY94 | 1,240 | 1,240 | 834 | 0 | 406 | 8,195 | 8,196 | 7,697 | 1 | 499 | 12,714 | 12,199 | 515 |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 1 | 0 | (1) | 521 | 521 | 523 | 0 | (2) | 521 | 515 | 6 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 221 | 221 | 221 | 0 | 0 | 234 | 234 | 0 |
| Subtotal Deferred | 0 | 0 | 1 | 0 | (1) | 742 | 742 | 744 | 0 | (2) | 755 | 749 | 6 |
| Carryover Commitments (FY93 to FY94) | 241 | 241 | 344 | 0 | (103) | 1,693 | 1,693 | 1,781 | 0 | (88) | 3,001 | 2,803 | 198 |
| TOTAL | 1,481 | 1,481 | 1,179 | 0 | 302 | 10,630 | 10,631 | 10,222 | 1 | 409 | 16,470 | 15,751 | 719 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee -

Figure 3-74. Information Resource Management Cost and Summary Schedule

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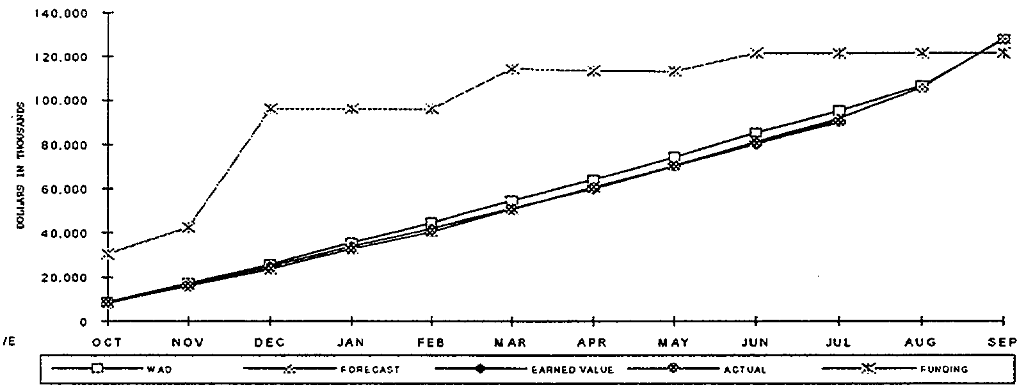
Actuals Thru 7/31/1994

## WASTE MANAGEMENT SYSTEMS




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 8,722 | 8,517 | 8,468 | 9,771 | 9,128 | 10,062 | 9,532 | 10,137 | 10,830 | 9,983 | 11,517 | 21,043 |
| | FORECAST | 8,054 | 7,760 | 7,836 | 8,849 | 8,034 | 9,981 | 10,116 | 9,835 | 10,714 | 10,301 | 14,326 | 22,301 |
| | EARNED VALUE | 8,442 | 7,893 | 8,457 | 8,844 | 8,260 | 9,135 | 8,836 | 10,261 | 9,957 | 10,615 | | |
| | MONTH ACTUAL | 8,054 | 7,760 | 7,836 | 8,849 | 8,034 | 9,981 | 9,956 | 9,799 | 10,328 | 9,089 | | |
| | VAR/SCH | (280) | (624) | (11) | (927) | (868) | (927) | (696) | 124 | (873) | 632 | | |
| | VAR/COST | 388 | 133 | 621 | (5) | 226 | (846) | (1,120) | 462 | (371) | 1,526 | | |
| CUM | WAD | 8,722 | 17,239 | 25,707 | 35,478 | 44,606 | 54,668 | 64,200 | 74,337 | 85,167 | 95,150 | 106,667 | 127,710 |
| | FORECAST | 8,054 | 15,814 | 23,650 | 32,499 | 40,533 | 50,514 | 60,630 | 70,465 | 81,179 | 91,480 | 105,806 | 128,107 |
| | EARNED VALUE | 8,442 | 16,335 | 24,792 | 33,636 | 41,896 | 51,031 | 59,867 | 70,128 | 80,085 | 90,700 | | |
| | ACTUAL | 8,054 | 15,814 | 23,650 | 32,499 | 40,533 | 50,514 | 60,470 | 70,269 | 80,597 | 89,686 | | |
| | VAR/SCH | (280) | (904) | (915) | (1,842) | (2,710) | (3,637) | (4,333) | (4,209) | (5,082) | (4,450) | | |
| | VAR/COST | 388 | 521 | 1,142 | 1,137 | 1,363 | 517 | (603) | (141) | (512) | 1,014 | | |
| FUNDING | FY94 FUNDING | 8,400 | 20,400 | 74,036 | 74,036 | 74,036 | 92,386 | 93,410 | 93,709 | 102,109 | 101,142 | 101,142 | 101,142 |
| | PREV. FUNDED | 21,961 | 21,961 | 21,961 | 21,961 | 21,961 | 21,961 | 20,131 | 19,614 | 19,614 | 20,519 | 20,519 | 20,519 |
| | TOTAL FUNDING | 30,361 | 42,361 | 95,997 | 95,997 | 95,997 | 114,347 | 113,541 | 113,323 | 121,723 | 121,661 | 121,661 | 121,661 |

## WASTE MANAGEMENT SYSTEMS

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

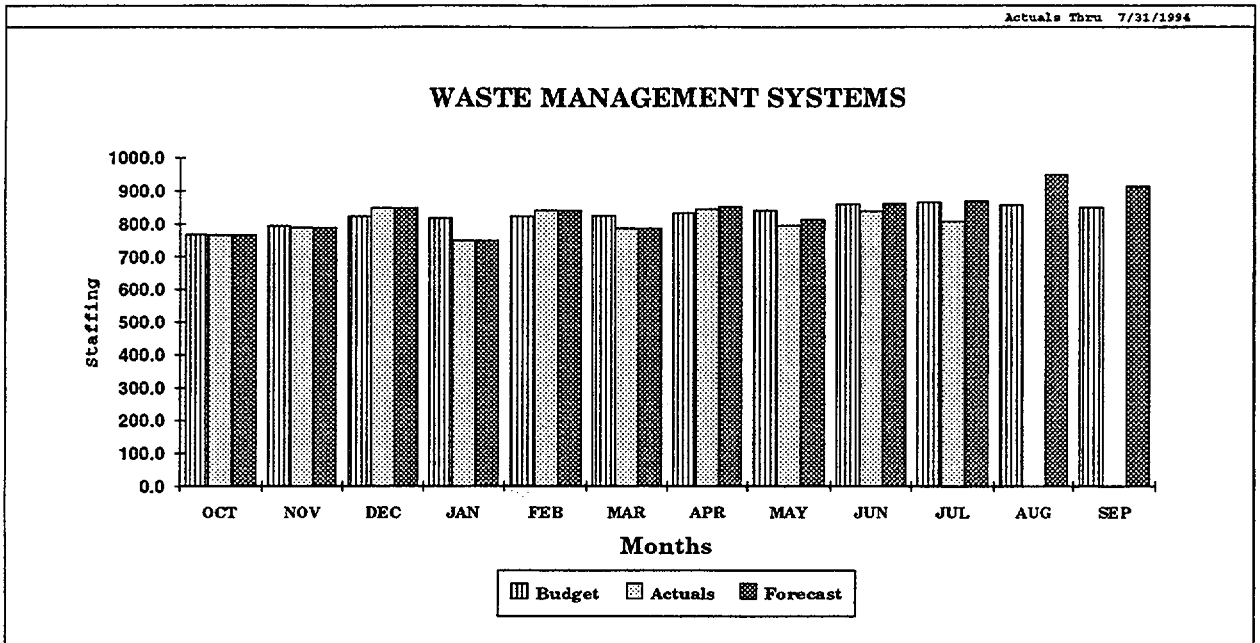
| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EARNED | | VARIANCE | | | EARNED | | VARIANCE | | | | |
| | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | FCST | VAC |
| FY94 Discrete | 2,666 | 3,348 | 2,481 | 682 | 867 | 27,555 | 23,268 | 25,671 | (4,287) | (2,403) | 33,676 | 34,902 | (1,226) |
| FY94 LOE | 6,163 | 6,190 | 5,669 | 27 | 521 | 56,693 | 56,721 | 54,189 | 28 | 2,532 | 74,275 | 74,399 | (124) |
| Subtotal FY94 | 8,829 | 9,538 | 8,150 | 709 | 1,388 | 84,248 | 79,989 | 79,860 | (4,259) | 129 | 107,951 | 109,301 | (1,350) |
| Deferred (FY93 to FY94) Discrete | 248 | 163 | 156 | (85) | 7 | 2,117 | 1,926 | 1,823 | (191) | 103 | 2,719 | 2,427 | 292 |
| Deferred (FY93 to FY94) LOE | 238 | 249 | 112 | 11 | 137 | 2,045 | 2,045 | 2,066 | 0 | (21) | 2,760 | 2,596 | 164 |
| Subtotal Deferred | 486 | 412 | 268 | (74) | 144 | 4,162 | 3,971 | 3,889 | (191) | 82 | 5,479 | 5,023 | 456 |
| Carryover Commitments (FY93 to FY94) | 668 | 665 | 671 | (3) | (6) | 6,740 | 6,740 | 5,937 | 0 | 803 | 9,807 | 9,310 | 497 |
| TOTAL | 9,983 | 10,615 | 9,089 | 632 | 1,526 | 95,150 | 90,700 | 89,686 | (4,450) | 1,014 | 127,710 | 128,107 | (397) |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast:

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure A-1. Total Program -Waste Management System



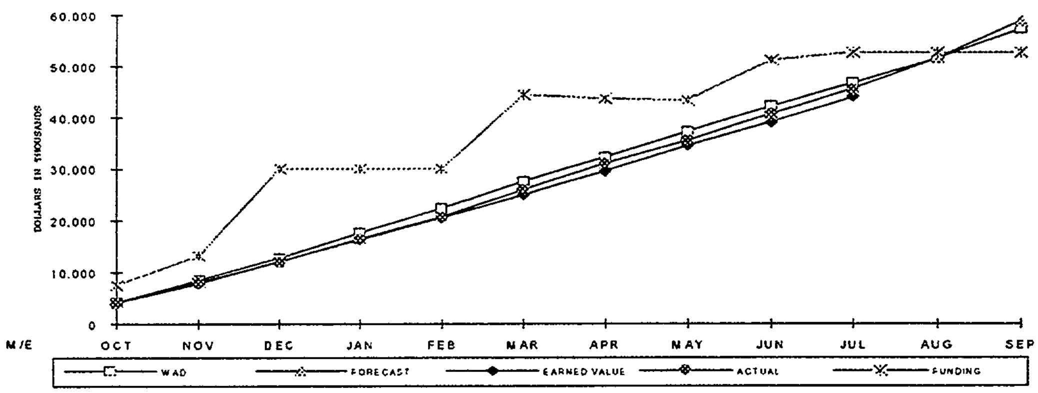

| | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast | 767.0 | 788.6 | 846.7 | 750.2 | 840.0 | 785.4 | 851.3 | 812.1 | 862.1 | 868.6 | 949.0 | 913.6 |
| Budget | 768.9 | 793.3 | 823.0 | 817.6 | 823.0 | 825.2 | 832.9 | 839.3 | 858.9 | 865.8 | 858.0 | 848.9 |
| Actuals | 767.0 | 788.6 | 846.7 | 750.2 | 840.0 | 785.4 | 843.1 | 793.8 | 837.8 | 808.1 | | |

The staff month chart above depicts only direct support FTEs. For the month of July, 140.5 indirect FTEs were in place for the M&O.

Figure A-2. Total Program - Waste Management System Staffing

Actuals Thru 7/31/1994

YUCCA MOUNTAIN SITE CHARACTERIZATION




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 4,199 | 4,302 | 4,244 | 4,891 | 4,729 | 5,181 | 4,802 | 4,851 | 5,035 | 4,468 | 4,922 | 5,711 |
| | FORECAST | 4,023 | 4,117 | 3,816 | 4,633 | 4,188 | 5,243 | 5,042 | 4,513 | 5,110 | 4,825 | 6,066 | 7,325 |
| | EARNED VALUE | 4,050 | 3,718 | 4,311 | 4,203 | 4,224 | 4,511 | 4,538 | 5,004 | 4,504 | 4,940 | | |
| | MONTH ACTUAL | 4,023 | 4,117 | 3,816 | 4,633 | 4,188 | 5,243 | 5,042 | 4,513 | 5,110 | 4,825 | | |
| | VAR/SCH | (149) | (584) | 67 | (688) | (505) | (670) | (264) | 153 | (531) | 472 | | |
| | VAR/COST | 27 | (399) | 495 | (430) | 36 | (732) | (504) | 491 | (606) | 115 | | |
| CUM | WAD | 4,199 | 8,501 | 12,745 | 17,636 | 22,365 | 27,546 | 32,348 | 37,199 | 42,234 | 46,702 | 51,624 | 57,335 |
| | FORECAST | 4,023 | 8,140 | 11,956 | 16,589 | 20,777 | 26,020 | 31,062 | 35,575 | 40,685 | 45,510 | 51,576 | 58,901 |
| | EARNED VALUE | 4,050 | 7,768 | 12,079 | 16,282 | 20,506 | 25,017 | 29,555 | 34,559 | 39,063 | 44,003 | | |
| | ACTUAL | 4,023 | 8,140 | 11,956 | 16,589 | 20,777 | 26,020 | 31,062 | 35,575 | 40,685 | 45,510 | | |
| | VAR/SCH | (149) | (733) | (666) | (1,354) | (1,859) | (2,529) | (2,793) | (2,640) | (3,171) | (2,699) | | |
| | VAR/COST | 27 | (372) | 123 | (307) | (271) | (1,003) | (1,507) | (1,016) | (1,622) | (1,507) | | |
| FUNDING | FY94 FUNDING | 4,113 | 9,895 | 26,675 | 26,675 | 26,675 | 41,072 | 41,072 | 41,072 | 48,954 | 49,490 | 49,490 | 49,490 |
| | PREV. FUNDED | 3,366 | 3,366 | 3,366 | 3,366 | 3,366 | 3,366 | 2,584 | 2,278 | 2,278 | 3,183 | 3,183 | 3,183 |
| | TOTAL FUNDING | 7,479 | 13,261 | 30,041 | 30,041 | 30,041 | 44,438 | 43,656 | 43,350 | 51,232 | 52,673 | 52,673 | 52,673 |

## YUCCA MOUNTAIN SITE CHARACTERIZATION

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

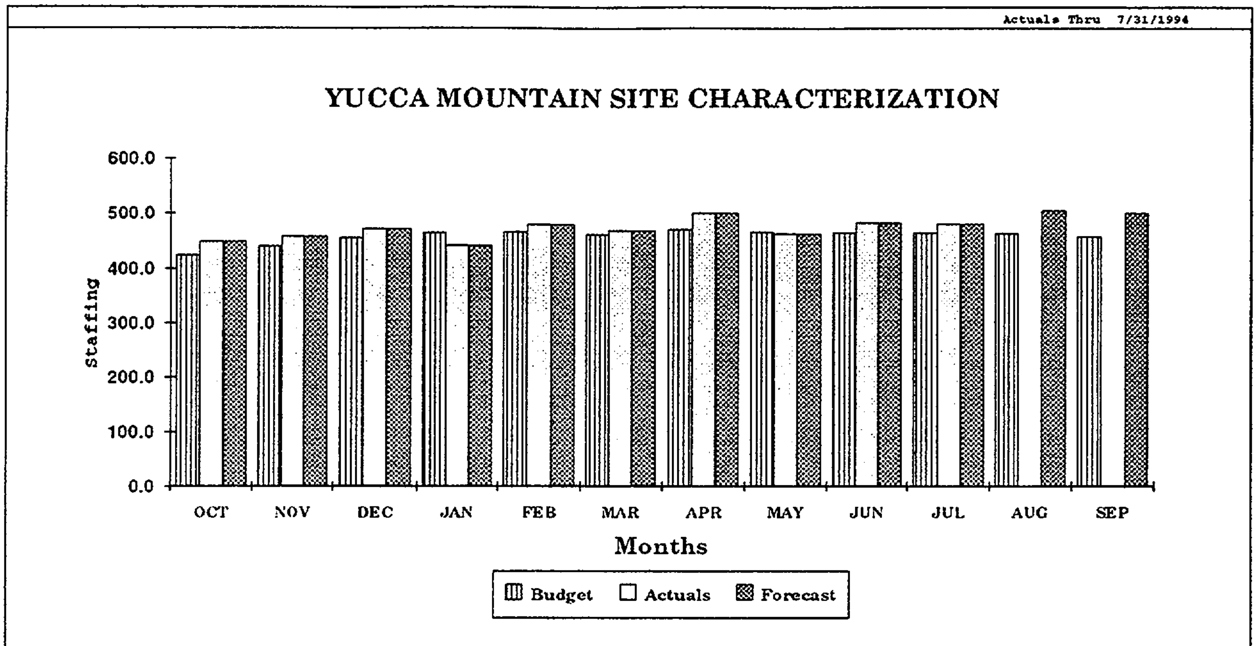
Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EARNED | | VARIANCE | | | EARNED | | VARIANCE | | | | |
| | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | FCST | VAC |
| FY94 Discrete | 1,710 | 2,155 | 1,663 | 445 | 492 | 17,870 | 15,144 | 16,355 | (2,726) | (1,211) | 21,865 | 21,259 | 606 |
| FY94 LOE | 2,614 | 2,641 | 2,911 | 27 | (270) | 26,704 | 26,731 | 27,054 | 27 | (323) | 32,953 | 34,975 | (2,022) |
| Subtotal FY94 | 4,324 | 4,796 | 4,574 | 472 | 222 | 44,574 | 41,875 | 43,409 | (2,699) | (1,534) | 54,818 | 56,234 | (1,416) |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 189 | 0 | (189) | 0 | 189 | (189) |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 189 | 0 | (189) | 0 | 189 | (189) |
| Carryover Commitments (FY93 to FY94) | 144 | 144 | 251 | 0 | (107) | 2,129 | 2,129 | 1,911 | 0 | 218 | 2,518 | 2,477 | 41 |
| TOTAL | 4,468 | 4,940 | 4,825 | 472 | 115 | 46,703 | 44,004 | 45,509 | (2,699) | (1,505) | 57,336 | 58,900 | (1,564) |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast
- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure A-3. Yucca Mountain Site

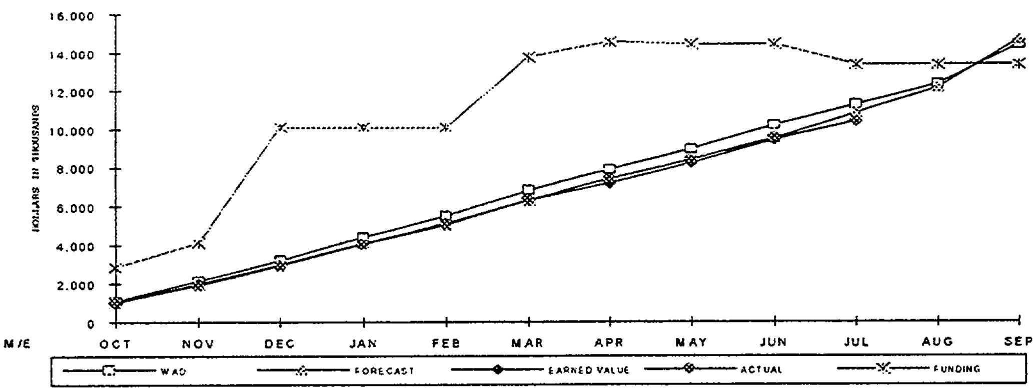



| | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast | 448.8 | 457.1 | 471.4 | 441.0 | 479.6 | 468.5 | 500.8 | 462.1 | 483.2 | 480.5 | 505.6 | 500.1 |
| Budget | 423.6 | 440.4 | 454.7 | 464.3 | 466.0 | 461.3 | 469.9 | 465.8 | 464.5 | 464.5 | 463.9 | 457.1 |
| Actuals | 448.8 | 457.1 | 471.4 | 441.0 | 479.6 | 468.5 | 500.8 | 462.1 | 483.2 | 480.5 | | |

Figure A-4. Yucca Mountain Site Staffing

Actuals Thru 7/31/1994

MONITORED RETRIEVABLE STORAGE




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 1,098 | 1,035 | 1,077 | 1,206 | 1,111 | 1,287 | 1,086 | 1,053 | 1,256 | 1,061 | 1,079 | 2,034 |
| | FORECAST | 1,013 | 894 | 1,018 | 1,142 | 970 | 1,251 | 1,091 | 1,008 | 1,129 | 1,294 | 1,343 | 2,488 |
| | EARNED VALUE | 975 | 1,022 | 996 | 1,098 | 1,060 | 1,155 | 848 | 1,071 | 1,177 | 1,013 | | |
| | MONTH ACTUAL | 1,013 | 894 | 1,018 | 1,142 | 970 | 1,251 | 1,091 | 1,008 | 1,129 | 875 | | |
| | VAR/SCH | (123) | (13) | (81) | (108) | (51) | (132) | (238) | 18 | (79) | (48) | | |
| | VAR/COST | (38) | 128 | (22) | (44) | 90 | (96) | (243) | 63 | 48 | 138 | | |
| CUM | WAD | 1,098 | 2,133 | 3,210 | 4,416 | 5,527 | 6,814 | 7,900 | 8,953 | 10,209 | 11,270 | 12,349 | 14,383 |
| | FORECAST | 1,013 | 1,907 | 2,925 | 4,067 | 5,037 | 6,288 | 7,379 | 8,387 | 9,516 | 10,810 | 12,153 | 14,641 |
| | EARNED VALUE | 975 | 1,997 | 2,993 | 4,091 | 5,151 | 6,306 | 7,154 | 8,225 | 9,402 | 10,415 | | |
| | ACTUAL | 1,013 | 1,907 | 2,925 | 4,067 | 5,037 | 6,288 | 7,379 | 8,387 | 9,516 | 10,391 | | |
| | VAR/SCH | (123) | (136) | (217) | (325) | (376) | (508) | (746) | (728) | (807) | (855) | | |
| | VAR/COST | (36) | 90 | 68 | 24 | 114 | 18 | (225) | (162) | (114) | 24 | | |
| FUNDING | FY94 FUNDING | 985 | 2,243 | 8,216 | 8,216 | 8,216 | 11,883 | 12,907 | 12,907 | 12,907 | 11,839 | 11,839 | 11,839 |
| | PREV. FUNDED | 1,884 | 1,884 | 1,884 | 1,884 | 1,884 | 1,884 | 1,633 | 1,511 | 1,511 | 1,511 | 1,511 | 1,511 |
| | TOTAL FUNDING | 2,869 | 4,127 | 10,100 | 10,100 | 10,100 | 13,767 | 14,540 | 14,418 | 14,418 | 13,350 | 13,350 | 13,350 |

MONITORED RETRIEVABLE STORAGE

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

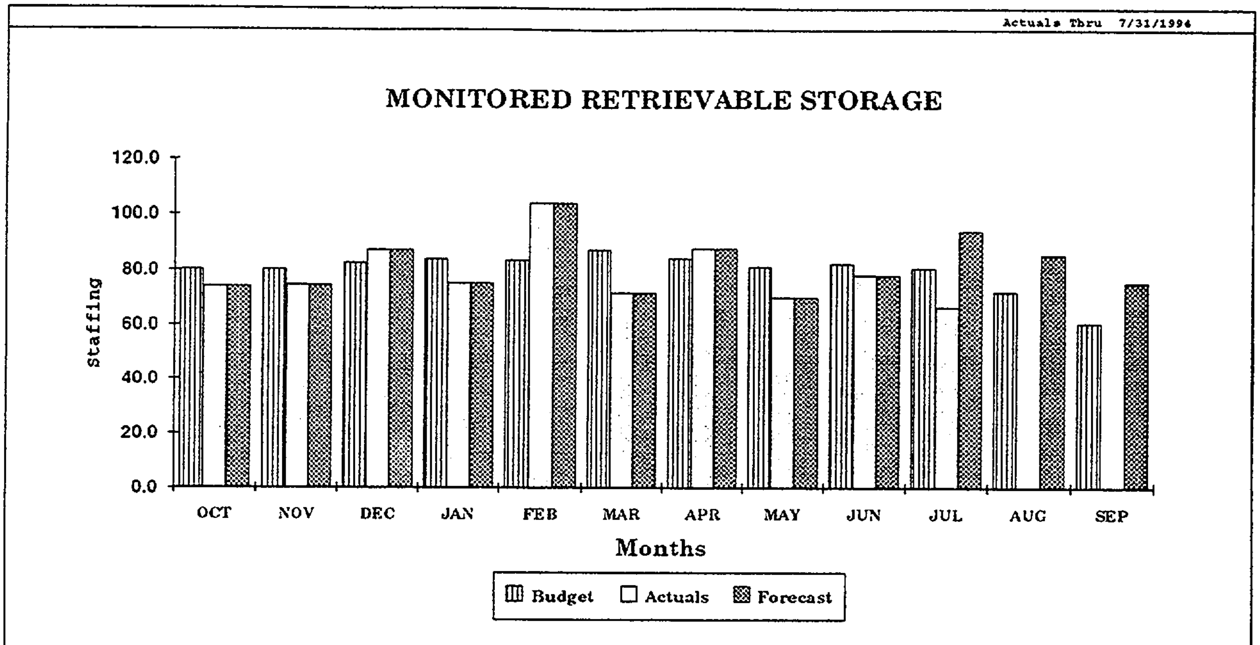
| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | EARNED VALUE | ACTUALS | VARIANCE SCHED | VARIANCE COST | BUDGET | FCST | VAC |
| FY94 Discrete | 207 | 186 | 257 | (21) | (71) | 3,338 | 2,545 | 3,907 | (793) | (1,362) | 3,713 | 5,470 | (1,757) |
| FY94 LOE | 775 | 775 | 546 | 0 | 229 | 6,810 | 6,810 | 5,555 | 0 | 1,255 | 9,177 | 7,971 | 1,206 |
| Subtotal FY94 | 982 | 961 | 803 | (21) | 158 | 10,148 | 9,355 | 9,462 | (793) | (107) | 12,890 | 13,441 | (551) |
| Deferred (FY93 to FY94) Discrete | 30 | 2 | 50 | (28) | (48) | 444 | 382 | 395 | (62) | (13) | 629 | 453 | 176 |
| Deferred (FY93 to FY94) LOE | 50 | 50 | 23 | 0 | 27 | 205 | 205 | 147 | 0 | 58 | 329 | 261 | 68 |
| Subtotal Deferred | 80 | 52 | 73 | (28) | (21) | 649 | 587 | 542 | (62) | 45 | 958 | 714 | 244 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | (1) | 0 | 1 | 472 | 472 | 388 | 0 | 84 | 534 | 487 | 47 |
| TOTAL | 1,062 | 1,013 | 875 | (49) | 138 | 11,269 | 10,414 | 10,392 | (855) | 22 | 14,382 | 14,642 | (260) |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure A-5. MRS

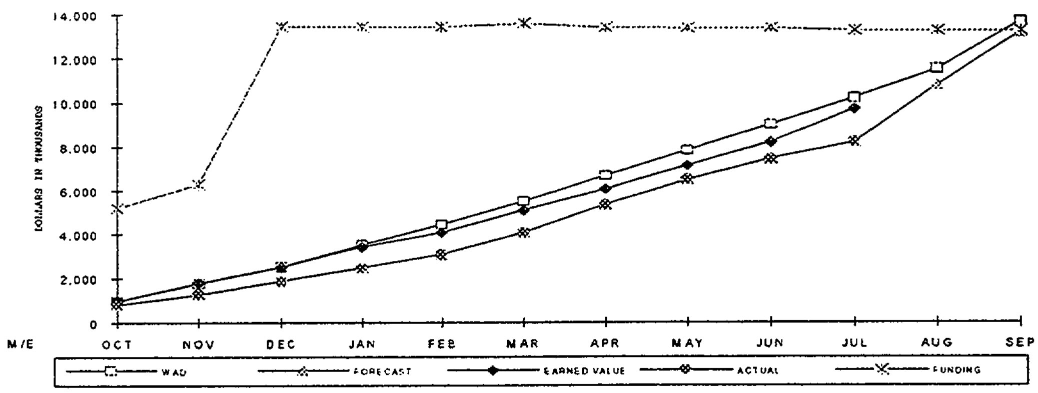



| | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast | 73.8 | 74.5 | 87.2 | 75.0 | 104.1 | 71.7 | 87.7 | 69.9 | 78.0 | 94.1 | 85.5 | 75.3 |
| Budget | 80.1 | 80.2 | 82.4 | 83.9 | 83.4 | 87.2 | 84.1 | 81.2 | 82.2 | 80.6 | 72.0 | 60.7 |
| Actuals | 73.8 | 74.5 | 87.2 | 75.0 | 104.1 | 71.7 | 87.7 | 69.9 | 78.0 | 66.6 | | |

Figure A-6. MRS Staffing

Actuals Thru 7/31/1994

TRANSPORTATION SYSTEM




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 966 | 793 | 754 | 1,002 | 918 | 1,087 | 1,138 | 1,161 | 1,194 | 1,197 | 1,321 | 2,145 |
| | FORECAST | 814 | 465 | 604 | 599 | 599 | 978 | 1,302 | 1,111 | 971 | 765 | 2,588 | 2,394 |
| | EARNED VALUE | 987 | 802 | 719 | 919 | 643 | 1,027 | 969 | 1,068 | 1,067 | 1,519 | | |
| | MONTH ACTUAL | 814 | 465 | 604 | 599 | 599 | 978 | 1,302 | 1,111 | 971 | 765 | | |
| | VAR/SCH | 21 | 9 | (35) | (83) | (275) | (60) | (169) | (93) | (127) | 322 | | |
| | VAR/COST | 173 | 337 | 115 | 320 | 44 | 49 | (333) | (43) | 96 | 754 | | |
| CUM | WAD | 966 | 1,759 | 2,513 | 3,515 | 4,433 | 5,520 | 6,658 | 7,819 | 9,013 | 10,210 | 11,531 | 13,676 |
| | FORECAST | 814 | 1,279 | 1,883 | 2,482 | 3,081 | 4,059 | 5,361 | 6,472 | 7,443 | 8,208 | 10,796 | 13,190 |
| | EARNED VALUE | 987 | 1,789 | 2,508 | 3,427 | 4,070 | 5,097 | 6,066 | 7,134 | 8,201 | 9,720 | | |
| | ACTUAL | 814 | 1,279 | 1,883 | 2,482 | 3,081 | 4,059 | 5,361 | 6,472 | 7,443 | 8,208 | | |
| | VAR/SCH | 21 | 30 | (5) | (88) | (363) | (423) | (592) | (685) | (812) | (490) | | |
| | VAR/COST | 173 | 510 | 625 | 945 | 989 | 1,038 | 705 | 662 | 758 | 1,512 | | |
| FUNDING | FY94 FUNDING | 756 | 1,839 | 8,999 | 8,999 | 8,999 | 9,159 | 9,159 | 9,159 | 9,159 | 9,035 | 9,035 | 9,035 |
| | PREV. FUNDED | 4,455 | 4,455 | 4,455 | 4,455 | 4,455 | 4,455 | 4,252 | 4,223 | 4,223 | 4,223 | 4,223 | 4,223 |
| | TOTAL FUNDING | 5,211 | 6,294 | 13,454 | 13,454 | 13,454 | 13,614 | 13,411 | 13,382 | 13,382 | 13,258 | 13,258 | 13,258 |

## TRANSPORTATION SYSTEM

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EARNED | | VARIANCE | | | EARNED | | VARIANCE | | | | |
| | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | FCST | VAC |
| FY94 Discrete | 486 | 809 | 366 | 323 | 443 | 3,908 | 3,425 | 3,362 | (483) | 63 | 5,035 | 4,965 | 70 |
| FY94 LOE | 320 | 320 | 299 | 0 | 21 | 3,061 | 3,061 | 2,483 | 0 | 578 | 4,273 | 3,644 | 629 |
| Subtotal FY94 | 806 | 1,129 | 665 | 323 | 464 | 6,969 | 6,486 | 5,845 | (483) | 641 | 9,308 | 8,609 | 699 |
| Deferred (FY93 to FY94) Discrete | 69 | 57 | 4 | (12) | 53 | 304 | 296 | 12 | (8) | 284 | 450 | 395 | 55 |
| Deferred (FY93 to FY94) LOE | 82 | 93 | 14 | 11 | 79 | 1,024 | 1,024 | 1,076 | 0 | (52) | 1,362 | 1,512 | (150) |
| Subtotal Deferred | 151 | 150 | 18 | (1) | 132 | 1,328 | 1,320 | 1,088 | (8) | 232 | 1,812 | 1,907 | (95) |
| Carryover Commitments (FY93 to FY94) | 240 | 240 | 81 | 0 | 159 | 1,914 | 1,914 | 1,274 | 0 | 640 | 2,557 | 2,673 | (116) |
| TOTAL | 1,197 | 1,519 | 764 | 322 | 755 | 10,211 | 9,720 | 8,207 | (491) | 1,513 | 13,677 | 13,189 | 488 |

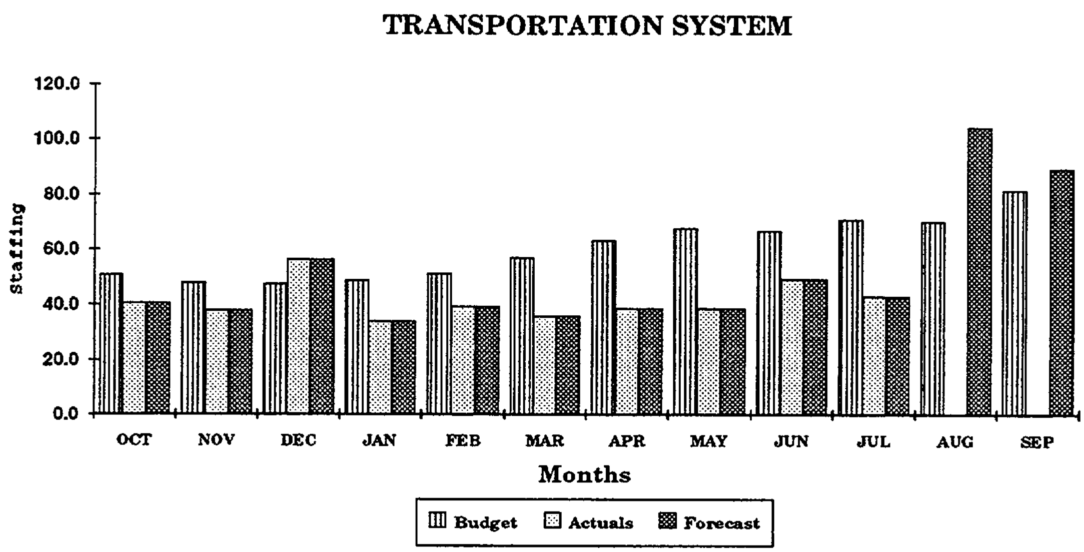
Numbers may vary due to independent rounding

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure A-7. Transportation

Actuals Thru 7/31/1994




| | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast | 40.5 | 37.9 | 56.2 | 34.1 | 39.3 | 35.9 | 38.6 | 38.8 | 49.4 | 43.2 | 104.4 | 89.4 |
| Budget | 50.8 | 48.0 | 47.6 | 49.0 | 51.1 | 57.0 | 63.2 | 67.7 | 66.8 | 70.9 | 70.2 | 81.6 |
| Actuals | 40.5 | 37.9 | 56.2 | 34.1 | 39.3 | 35.9 | 38.6 | 38.8 | 49.4 | 43.2 | | |

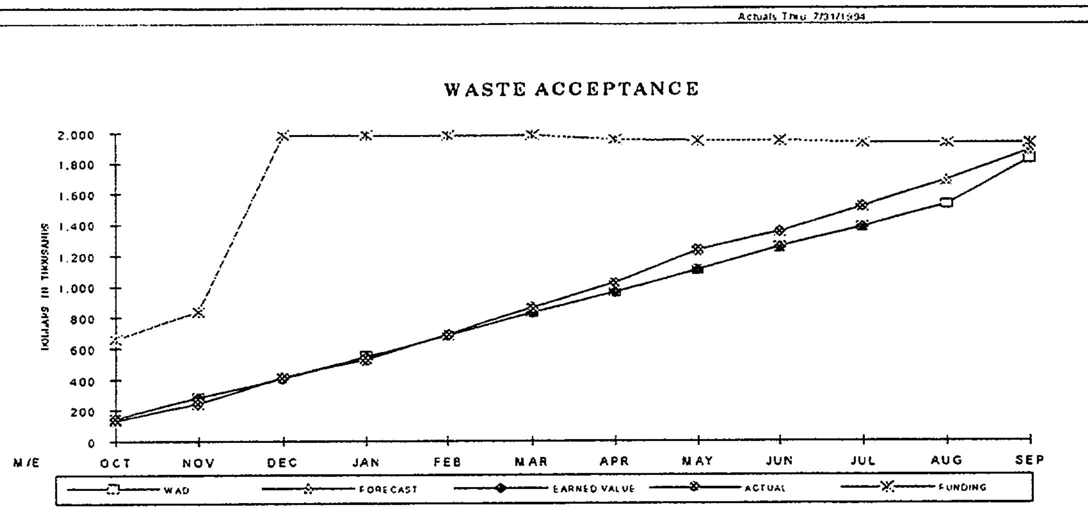
***NOTE: Jan - May Actuals Excludes WBO**

## TRANSPORTATION SYSTEM

| | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast TRW/TM | 30.6 | 31.1 | 35.4 | 35.4 | 37.9 | 35.9 | 38.6 | 38.8 | 36.2 | 35.6 | 38.2 | 37.2 |
| Budget TRW/TM | 35.9 | 35.8 | 35.6 | 35.7 | 34.3 | 35.7 | 37.9 | 37.3 | 37.3 | 38.3 | 38.1 | 43.3 |
| Actuals TRW/TM | 30.6 | 31.1 | 35.4 | 34.1 | 39.3 | 35.9 | 38.6 | 38.8 | 36.2 | 35.6 | | |

*SUBSET OF DATA ABOVE

Figure A-8. Transportation Staffing




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 143 | 143 | 123 | 141 | 132 | 146 | 134 | 144 | 147 | 130 | 142 | 297 |
| | FORECAST | 131 | 111 | 174 | 110 | 161 | 175 | 160 | 210 | 117 | 164 | 173 | 195 |
| | EARNED VALUE | 142 | 142 | 121 | 138 | 139 | 146 | 134 | 144 | 147 | 130 | | |
| | MONTH ACTUAL | 131 | 111 | 174 | 110 | 161 | 175 | 160 | 210 | 117 | 164 | | |
| | VAR/SCH | (1) | (1) | (2) | (3) | 7 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 11 | 31 | (53) | 28 | (22) | (29) | (26) | (66) | 30 | (34) | | |
| CUM | WAD | 143 | 286 | 409 | 550 | 682 | 828 | 962 | 1,106 | 1,253 | 1,383 | 1,525 | 1,822 |
| | FORECAST | 131 | 242 | 416 | 526 | 687 | 862 | 1,022 | 1,232 | 1,349 | 1,513 | 1,686 | 1,881 |
| | EARNED VALUE | 142 | 284 | 405 | 543 | 682 | 828 | 962 | 1,106 | 1,253 | 1,383 | | |
| | ACTUAL | 131 | 242 | 416 | 526 | 687 | 862 | 1,022 | 1,232 | 1,349 | 1,513 | | |
| | VAR/SCH | (1) | (2) | (4) | (7) | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 11 | 42 | (11) | 17 | (5) | (34) | (60) | (126) | (96) | (130) | | |
| FUNDING | FY94 FUNDING | 122 | 297 | 1,446 | 1,446 | 1,446 | 1,446 | 1,446 | 1,446 | 1,446 | 1,432 | 1,432 | 1,432 |
| | PREV. FUNDED | 539 | 539 | 539 | 539 | 539 | 539 | 511 | 501 | 501 | 501 | 501 | 501 |
| | TOTAL FUNDING | 661 | 836 | 1,985 | 1,985 | 1,985 | 1,985 | 1,957 | 1,947 | 1,947 | 1,933 | 1,933 | 1,933 |

## WASTE ACCEPTANCE

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

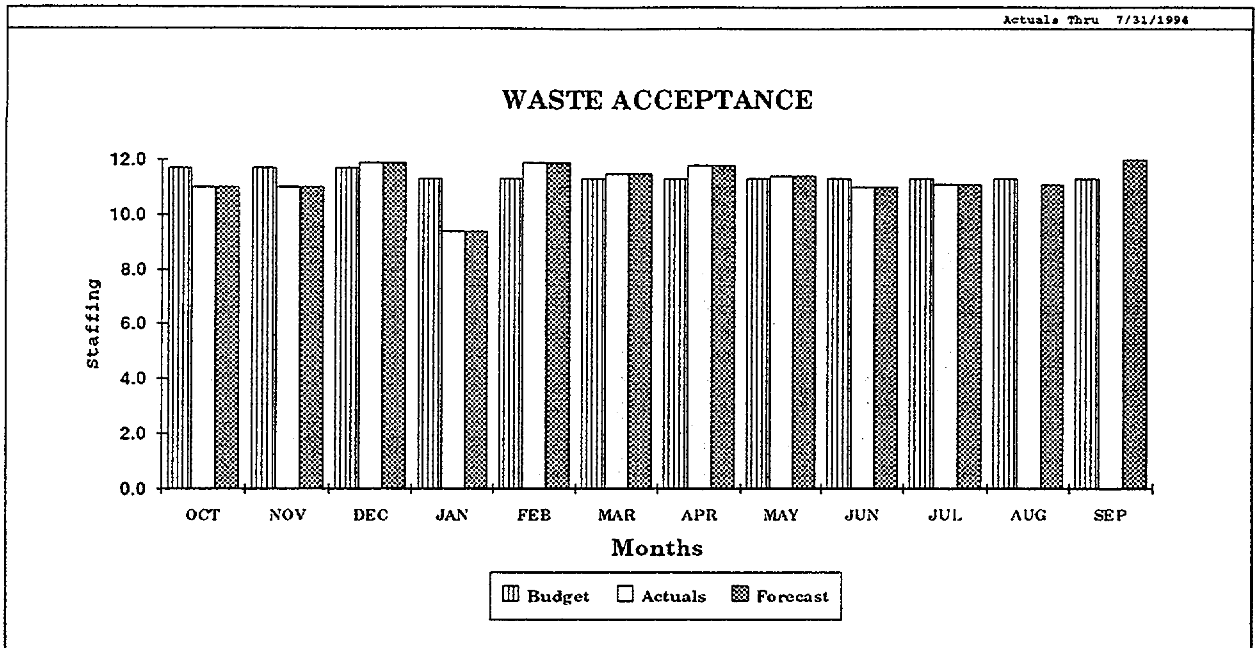
| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EARNED | | VARIANCE | | | EARNED | | VARIANCE | | | | |
| | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | FCST | VAC |
| FY94 Discrete | 19 | 19 | 14 | 0 | 5 | 31 | 31 | 15 | 0 | 16 | 121 | 74 | 47 |
| FY94 LOE | 103 | 103 | 120 | 0 | (17) | 1,055 | 1,055 | 1,097 | 0 | (42) | 1,311 | 1,412 | (101) |
| Subtotal FY94 | 122 | 122 | 134 | 0 | (12) | 1,086 | 1,086 | 1,112 | 0 | (26) | 1,432 | 1,486 | (54) |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 37 | 37 | 49 | 0 | (12) | 37 | 50 | (13) |
| Deferred (FY93 to FY94) LOE | 9 | 9 | 29 | 0 | (20) | 254 | 254 | 312 | 0 | (58) | 333 | 304 | 29 |
| Subtotal Deferred | 9 | 9 | 29 | 0 | (20) | 291 | 291 | 361 | 0 | (70) | 370 | 354 | 16 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 0 | 0 | 0 | 8 | 8 | 39 | 0 | (31) | 21 | 40 | (19) |
| TOTAL | 131 | 131 | 163 | 0 | (32) | 1,385 | 1,385 | 1,512 | 0 | (127) | 1,823 | 1,880 | (57) |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

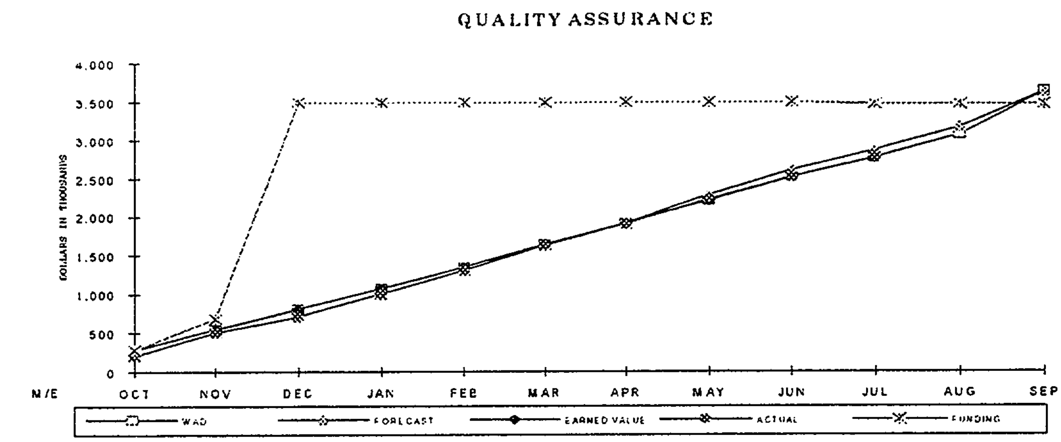
Figure A-9. Waste Acceptance




| | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast | 11.0 | 11.0 | 11.9 | 9.4 | 11.9 | 11.5 | 11.8 | 11.4 | 11.0 | 11.1 | 11.1 | 12.0 |
| Budget | 11.7 | 11.7 | 11.7 | 11.3 | 11.3 | 11.3 | 11.3 | 11.3 | 11.3 | 11.3 | 11.3 | 11.3 |
| Actuals | 11.0 | 11.0 | 11.9 | 9.4 | 11.9 | 11.5 | 11.8 | 11.4 | 11.0 | 11.1 | | |

Figure A-10. Waste Acceptance Staffing

Actuals Thru 7/31/1994




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 277 | 266 | 261 | 268 | 273 | 296 | 274 | 297 | 301 | 262 | 296 | 561 |
| | FORECAST | 206 | 299 | 206 | 292 | 302 | 323 | 284 | 373 | 326 | 263 | 297 | 457 |
| | EARNED VALUE | 277 | 266 | 261 | 268 | 273 | 296 | 274 | 297 | 301 | 262 | | |
| | MONTH ACTUAL | 206 | 299 | 206 | 292 | 302 | 323 | 275 | 326 | 287 | 260 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 71 | (33) | 55 | (24) | (29) | (27) | (1) | (29) | 14 | 2 | | |
| CUM | WAD | 277 | 543 | 804 | 1,072 | 1,345 | 1,641 | 1,915 | 2,212 | 2,513 | 2,775 | 3,071 | 3,632 |
| | FORECAST | 206 | 505 | 711 | 1,003 | 1,305 | 1,628 | 1,912 | 2,285 | 2,611 | 2,874 | 3,171 | 3,628 |
| | EARNED VALUE | 277 | 543 | 804 | 1,072 | 1,345 | 1,641 | 1,915 | 2,212 | 2,513 | 2,775 | | |
| | ACTUAL | 206 | 505 | 711 | 1,003 | 1,305 | 1,628 | 1,903 | 2,229 | 2,516 | 2,776 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 71 | 38 | 93 | 69 | 40 | 13 | 12 | (17) | (3) | (1) | | |
| FUNDING | FY94 FUNDING | 280 | 680 | 3,493 | 3,493 | 3,493 | 3,493 | 3,493 | 3,493 | 3,493 | 3,465 | 3,465 | 3,465 |
| | PREV. FUNDED | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TOTAL FUNDING | 280 | 680 | 3,493 | 3,493 | 3,493 | 3,493 | 3,493 | 3,493 | 3,493 | 3,465 | 3,465 | 3,465 |

## QUALITY ASSURANCE

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

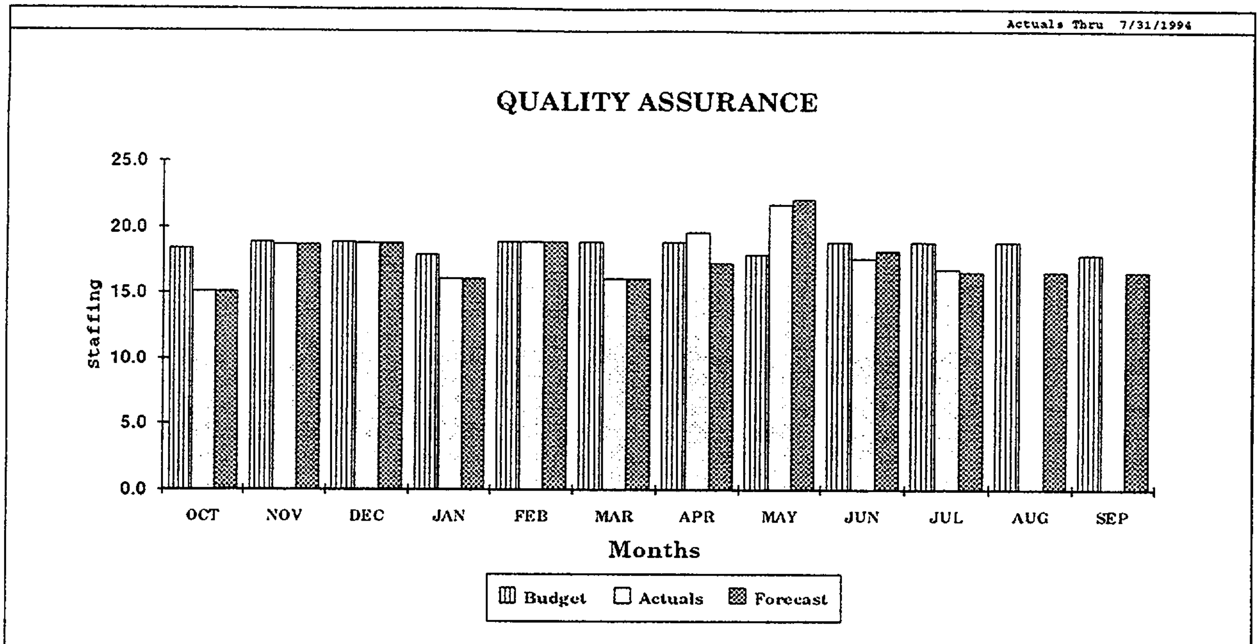
| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EARNED | | VARIANCE | | | EARNED | | VARIANCE | | | | |
| | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FY94 LOE | 262 | 262 | 247 | 0 | 15 | 2,724 | 2,724 | 2,684 | 0 | 40 | 3,465 | 3,528 | (63) |
| Subtotal FY94 | 262 | 262 | 247 | 0 | 15 | 2,724 | 2,724 | 2,684 | 0 | 40 | 3,465 | 3,528 | (63) |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 12 | 0 | (12) | 50 | 50 | 93 | 0 | (43) | 166 | 101 | 65 |
| TOTAL | 262 | 262 | 259 | 0 | 3 | 2,774 | 2,774 | 2,777 | 0 | (3) | 3,631 | 3,629 | 2 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure A-11. Quality Assurance

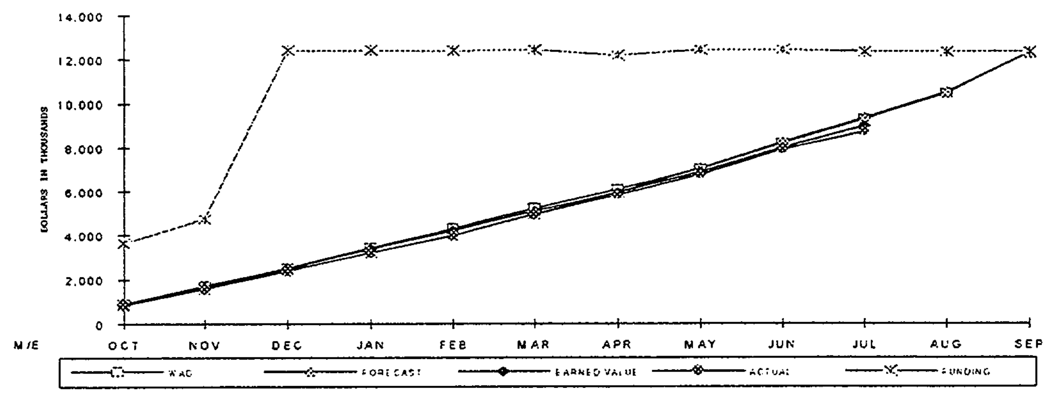



| | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast | 15.1 | 18.7 | 18.8 | 16.1 | 18.9 | 16.1 | 17.3 | 22.1 | 18.2 | 16.6 | 16.6 | 16.6 |
| Budget | 18.4 | 18.9 | 18.9 | 17.9 | 18.9 | 18.9 | 18.9 | 17.9 | 18.9 | 18.9 | 18.9 | 17.9 |
| Actuals | 15.1 | 18.7 | 18.8 | 16.1 | 18.9 | 16.1 | 19.6 | 21.7 | 17.6 | 16.8 | | |

Figure A-12. Quality Assurance Staffing

Actuals Thru 7/31/1994

SYSTEMS INTEGRATION AND COMPLIANCE




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 910 | 810 | 792 | 919 | 863 | 918 | 884 | 918 | 1,174 | 1,109 | 1,160 | 1,883 |
| | FORECAST | 841 | 745 | 813 | 792 | 800 | 953 | 991 | 1,103 | 1,235 | 1,081 | 1,169 | 1,767 |
| | EARNED VALUE | 885 | 783 | 827 | 891 | 832 | 864 | 866 | 921 | 1,128 | 995 | | |
| | MONTH ACTUAL | 841 | 745 | 813 | 792 | 800 | 953 | 876 | 945 | 1,140 | 816 | | |
| | VAR/SCH | (25) | (27) | 35 | (28) | (31) | (54) | (18) | 3 | (46) | (114) | | |
| | VAR/COST | 44 | 38 | 14 | 99 | 32 | (89) | (10) | (24) | (12) | 179 | | |
| CUM | WAD | 910 | 1,720 | 2,512 | 3,431 | 4,294 | 5,212 | 6,096 | 7,014 | 8,186 | 9,297 | 10,457 | 12,340 |
| | FORECAST | 841 | 1,586 | 2,399 | 3,191 | 3,991 | 4,944 | 5,935 | 7,038 | 8,273 | 9,354 | 10,523 | 12,290 |
| | EARNED VALUE | 885 | 1,668 | 2,495 | 3,386 | 4,218 | 5,082 | 5,948 | 6,869 | 7,997 | 8,992 | | |
| | ACTUAL | 841 | 1,586 | 2,399 | 3,191 | 3,991 | 4,944 | 5,820 | 6,765 | 7,905 | 8,721 | | |
| | VAR/SCH | (25) | (52) | (17) | (45) | (76) | (130) | (148) | (145) | (191) | (305) | | |
| | VAR/COST | 44 | 82 | 96 | 195 | 227 | 138 | 128 | 104 | 92 | 271 | | |
| FUNDING | FY94 FUNDING | 754 | 1,832 | 9,527 | 9,527 | 9,527 | 9,554 | 9,554 | 9,852 | 9,852 | 9,758 | 9,758 | 9,758 |
| | PREV. FUNDED | 2,895 | 2,895 | 2,895 | 2,895 | 2,895 | 2,895 | 2,636 | 2,592 | 2,592 | 2,592 | 2,592 | 2,592 |
| | TOTAL FUNDING | 3,649 | 4,727 | 12,422 | 12,422 | 12,422 | 12,449 | 12,190 | 12,444 | 12,444 | 12,350 | 12,350 | 12,350 |

## SYSTEMS INTEGRATION AND COMPLIANCE

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

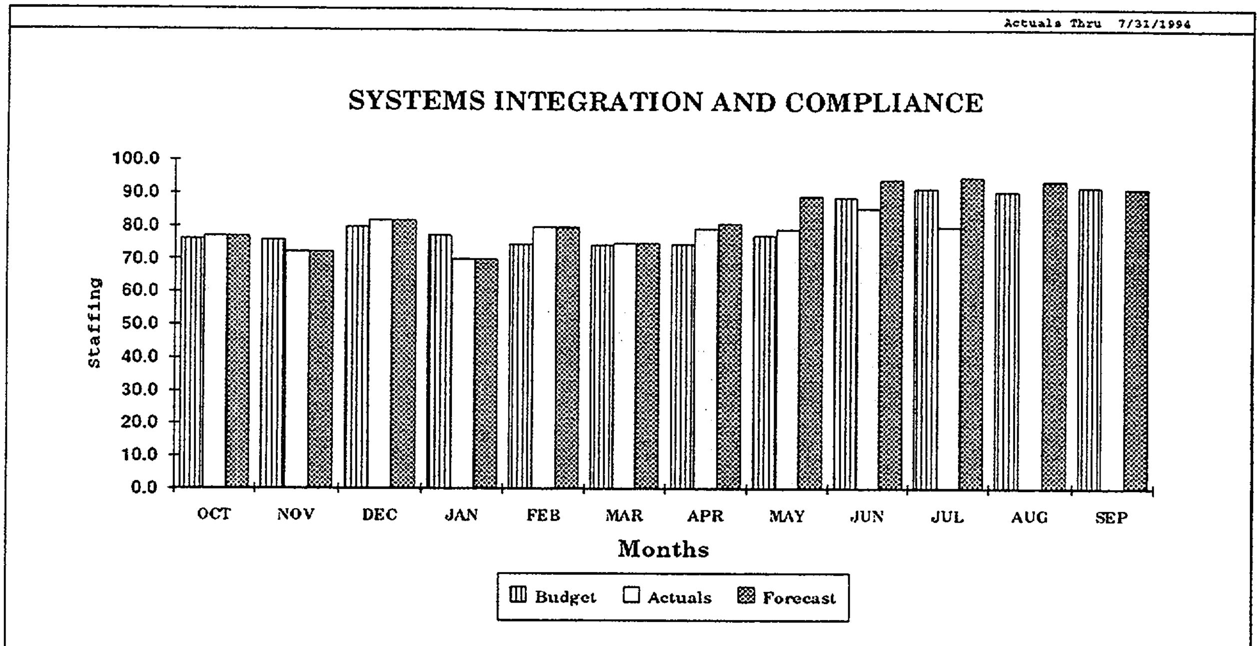
| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EARNED | | VARIANCE | | | EARNED | | VARIANCE | | | | |
| | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | FCST | VAC |
| FY94 Discrete | 204 | 136 | 156 | (68) | (20) | 1,964 | 1,781 | 1,678 | (183) | 103 | 2,403 | 2,597 | (194) |
| FY94 LOE | 617 | 617 | 532 | 0 | 85 | 5,716 | 5,716 | 5,645 | 0 | 71 | 7,356 | 7,872 | (516) |
| Subtotal FY94 | 821 | 753 | 688 | (68) | 65 | 7,680 | 7,497 | 7,323 | (183) | 174 | 9,759 | 10,469 | (710) |
| Deferred (FY93 to FY94) Discrete | 148 | 105 | 101 | (43) | 4 | 812 | 690 | 655 | (122) | 35 | 1,082 | 825 | 257 |
| Deferred (FY93 to FY94) LOE | 97 | 97 | 45 | 0 | 52 | 342 | 342 | 310 | 0 | 32 | 502 | 285 | 217 |
| Subtotal Deferred | 245 | 202 | 146 | (43) | 56 | 1,154 | 1,032 | 965 | (122) | 67 | 1,584 | 1,110 | 474 |
| Carryover Commitments (FY93 to FY94) | 43 | 40 | (17) | (3) | 57 | 463 | 463 | 432 | 0 | 31 | 997 | 713 | 284 |
| TOTAL | 1,109 | 995 | 817 | (114) | 178 | 9,297 | 8,992 | 8,720 | (305) | 272 | 12,340 | 12,292 | 48 |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure A-13. Systems Integration and Compliance

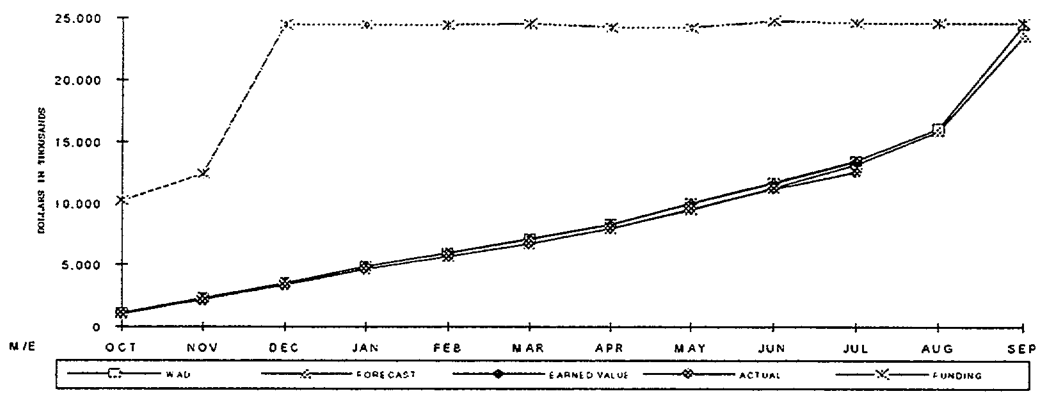



| | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast | 77.1 | 72.2 | 81.7 | 69.9 | 79.8 | 75.0 | 80.7 | 89.1 | 94.1 | 94.9 | 93.6 | 91.3 |
| Budget | 76.2 | 75.9 | 79.8 | 77.2 | 74.6 | 74.3 | 74.6 | 77.2 | 88.7 | 91.4 | 90.4 | 91.7 |
| Actuals | 77.1 | 72.2 | 81.7 | 69.9 | 79.8 | 75.0 | 79.1 | 78.9 | 85.3 | 79.7 | | |

Figure A-14. Systems Integration and Compliance Staffing

Actuals Thru 7/31/1994

## PROGRAM MANAGEMENT




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 1.129 | 1.168 | 1.216 | 1.345 | 1.103 | 1.147 | 1.214 | 1.713 | 1.723 | 1,754 | 2.597 | 8.411 |
| | FORECAST | 1.027 | 1.129 | 1.205 | 1.281 | 1.013 | 1.057 | 1.246 | 1.519 | 1.826 | 1,910 | 2.691 | 7.673 |
| | EARNED VALUE | 1.126 | 1.159 | 1.221 | 1.328 | 1.088 | 1.138 | 1.206 | 1.756 | 1.632 | 1,757 | | |
| | MONTH ACTUAL | 1.027 | 1.129 | 1.205 | 1.281 | 1.013 | 1.057 | 1.210 | 1.688 | 1.575 | 1,384 | | |
| | VAR/SCH | (3) | (9) | 5 | (17) | (15) | (9) | (8) | 43 | (91) | 3 | | |
| | VAR/COST | 99 | 30 | 16 | 47 | 75 | 81 | (4) | 68 | 57 | 373 | | |
| CUM | WAD | 1.129 | 2.297 | 3.513 | 4.858 | 5.961 | 7.108 | 8.322 | 10.035 | 11.758 | 13,512 | 16.109 | 24.520 |
| | FORECAST | 1.027 | 2.156 | 3.361 | 4.642 | 5.655 | 6.712 | 7.958 | 9.477 | 11.303 | 13,213 | 15.904 | 23.577 |
| | EARNED VALUE | 1.126 | 2.285 | 3.506 | 4.834 | 5.922 | 7.060 | 8.266 | 10.022 | 11.654 | 13,411 | | |
| | ACTUAL | 1.027 | 2.156 | 3.361 | 4.642 | 5.655 | 6.712 | 7.922 | 9.610 | 11.185 | 12,569 | | |
| | VAR/SCH | (3) | (12) | (7) | (24) | (39) | (48) | (56) | (13) | (104) | (101) | | |
| | VAR/COST | 99 | 129 | 145 | 192 | 267 | 348 | 344 | 412 | 469 | 842 | | |
| FUNDING | FY94 FUNDING | 1.390 | 3.615 | 15.679 | 15.679 | 15.679 | 15.779 | 15.779 | 15.779 | 16.297 | 16,122 | 16.122 | 16.122 |
| | PREV. FUNDED | 8.822 | 8.822 | 8.822 | 8.822 | 8.822 | 8.822 | 8.516 | 8.510 | 8.510 | 8,510 | 8.510 | 8.510 |
| | TOTAL FUNDING | 10.212 | 12.437 | 24.501 | 24.501 | 24.501 | 24.601 | 24.295 | 24.289 | 24.807 | 24,632 | 24.632 | 24.632 |

## PROGRAM MANAGEMENT

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EARNED | | VARIANCE | | | EARNED | | VARIANCE | | | | |
| | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | FCST | VAC |
| FY94 Discrete | 42 | 44 | 25 | 2 | 19 | 443 | 341 | 354 | (102) | (13) | 540 | 538 | 2 |
| FY94 LOE | 1,472 | 1,472 | 1,014 | 0 | 458 | 10,625 | 10,625 | 9,671 | 0 | 954 | 15,739 | 14,997 | 742 |
| Subtotal FY94 | 1,514 | 1,516 | 1,039 | 2 | 477 | 11,068 | 10,966 | 10,025 | (102) | 941 | 16,279 | 15,535 | 744 |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 1 | 0 | (1) | 521 | 521 | 523 | 0 | (2) | 521 | 515 | 6 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 221 | 221 | 221 | 0 | 0 | 234 | 234 | 0 |
| Subtotal Deferred | 0 | 0 | 1 | 0 | (1) | 742 | 742 | 744 | 0 | (2) | 755 | 749 | 6 |
| Carryover Commitments (FY93 to FY94) | 241 | 241 | 344 | 0 | (103) | 1,704 | 1,704 | 1,799 | 0 | (95) | 3,015 | 2,819 | 196 |
| TOTAL | 1,755 | 1,757 | 1,384 | 2 | 373 | 13,514 | 13,412 | 12,568 | (102) | 844 | 24,522 | 23,576 | 946 |

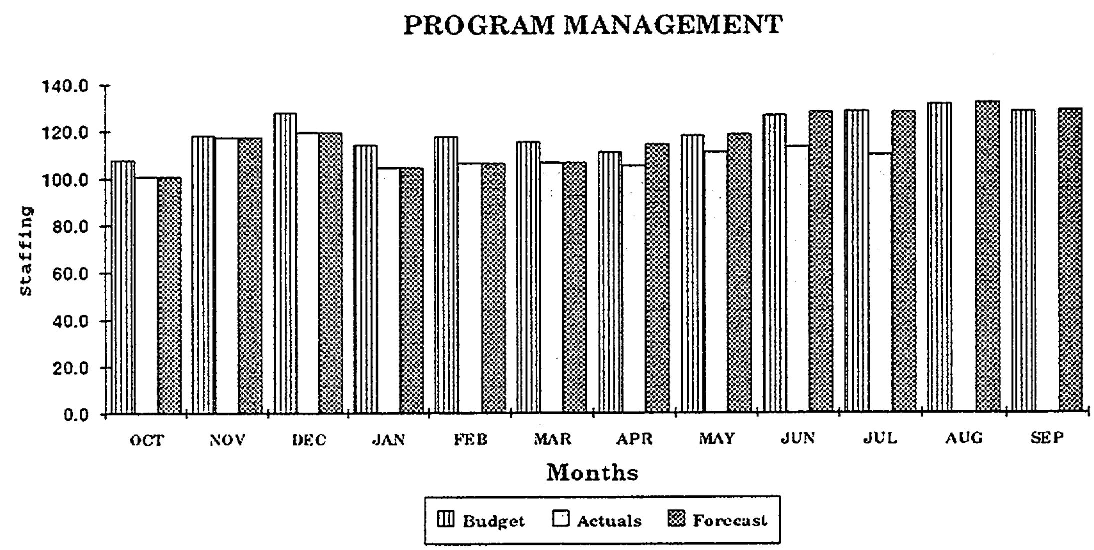
Numbers may vary due to independent rounding

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure A-15. Program Management

Actuals Thru 7/31/1994

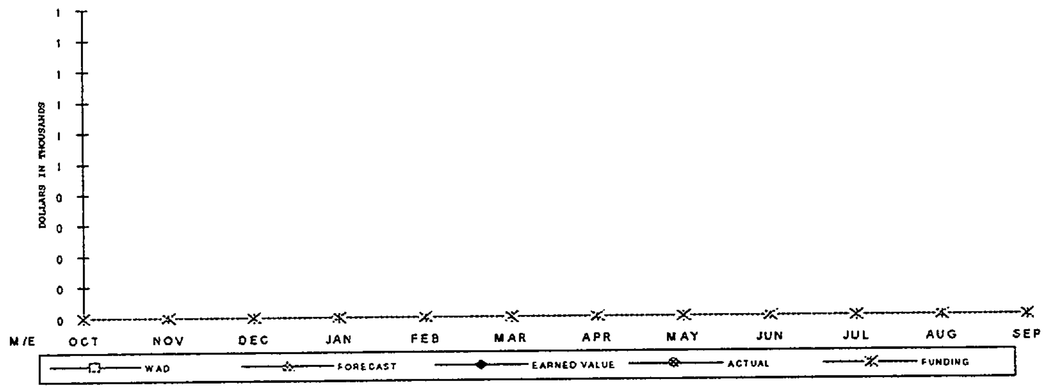



| | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast | 100.7 | 117.3 | 119.5 | 104.6 | 106.4 | 106.7 | 114.4 | 118.7 | 128.2 | 128.1 | 132.2 | 128.9 |
| Budget | 108.0 | 118.2 | 127.9 | 114.0 | 117.6 | 115.3 | 111.0 | 118.2 | 126.7 | 128.3 | 131.3 | 128.4 |
| Actuals | 100.7 | 117.3 | 119.5 | 104.6 | 106.4 | 106.7 | 105.4 | 111.1 | 113.3 | 110.1 | | |

Figure A-16. Program Management Staffing

Actuals Thru 7/31/1994

ADJUSTMENT FOR ROUNDING




| | | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | WAD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | FORECAST | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | EARNED VALUE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | MONTH ACTUAL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| CUM | WAD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | FORECAST | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | EARNED VALUE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | ACTUAL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | VAR/COST | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| FUNDING | FY94 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 |

ADJUSTMENT FOR ROUNDING

FY94 CRWMS M&O PMS DATA ($000)

M/E JULY

Actuals Thru 7/31/1994

| TITLE | CURRENT MONTH | | | | | FISCAL YEAR-TO-DATE | | | | | AT COMPLETE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EARNED | | VARIANCE | | | EARNED | | VARIANCE | | | | |
| | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | VALUE | ACTUALS | SCHED | COST | BUDGET | FCST | VAC |
| FY94 Discrete | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | (1) | 1 | (1) | 0 | (1) |
| FY94 LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal FY94 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | (1) | 1 | (1) | 0 | (1) |
| Deferred (FY93 to FY94) Discrete | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deferred (FY93 to FY94) LOE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Deferred | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover Commitments (FY93 to FY94) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | (1) | 1 | (1) | 0 | (1) |

Numbers may vary due to independent rounding.

The following unauthorized/undefinitized pending deobligations have been made to both budget and forecast

- FY93 Underrun/Overrun
- FY93 Remaining Teammate Award Fee

Figure A-17. Adjustments

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# APPENDIX B

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# FY94 M&O MAJOR DELIVERABLE STATUS

| WBS | MAJOR DELIVERABLE TITLE | DUE DATE | COMPLETE | BCR NUMBER | RESULT OF APPROVED BCR |
|---|---|---|---|---|---|
| 1.2 | ESFDR, REV. 2. (Activity No.12006) | 30-Jun-94 | - - | YMP-94-026 | ON HOLD |
| 1.2 | ESFDR, REV. 1. (Activity No.12009) | 30-Sep-94 | - - | YMP-94-026 | NEW DELIVERY DATE IS 30-SEP-94 |
| 1.2 | TL STUDY FINAL REPORT. (Activity No.12029) | 30-Sep-94 | - - | | |
| 1.2 | WPPA/EM STUDY FINAL REPORT. (Activity No.12030) | 30-Sep-94 | - - | | |
| 1.2 | UPDATE OF SITE INVESTIGATIONS LONG-RANGE PLAN. (Activity No.12050) | 29-Jul-94 | - - | YMP-94-025 | NEW DELIVERY DATE IS 31-SEP-94 |
| 1.2 | SITE CHARACTERIZATION PROGRESS REPORT #9. (Activity No.12106) | 31-Jan-94 | 07-Feb-94 (Late) | | |
| 1.2 | SITE CHARACTERIZATION PROGRESS REPORT #10. (Activity No.12107) | 31-Jul-94 | 28-Jan-94 (Early) | | |
| 1.2 | LICENSE APPLICATION ANNOTATED OUTLINE, REVISION 3 . (Activity No.12112) | 30-Nov-93 | 30-Nov-93 (On-Time) | | |
| 1.2 | FINAL RECOMMENDATION FOR EPA STANDARD TO DOE. (Activity No.12130) | 30-Apr-94 | 16-Mar-94 (Early) | | |
| 1.2 | MANAGEMENT PLAN FOR 10 CFR 960 REVISION TO DOE. (Activity No.12131) | 30-Nov-93 | 14-Jan-94 (Late) | | |
| 1.2 | PROCESS FOR EVALUATING SUITABILITY OPTIONS ANALYSIS PAPER (Activity No.12132) | 29-Jul-94 | - - | YMP-94-037 | CHANGED NAME, DELIVERY DATE & MOVED TO WBS 120506 |
| 1.2 | SITE SUITABILITY METHODOLOGY IMPLEMENTATION PLAN TO DOE (Activity No.12756) | 30-Sep-94 | - - | YMP-94-037 | CHANGED NAME, DELIVERY DATE & MOVED TO WBS 120506 |
| 1.2 | DESIGN PACKAGE 2B (Activity No.12137) | 30-May-94 | 06-Apr-94 (Early) | YMP-94-022 | |
| 1.2 | DESIGN PACKAGE 1C (Activity No.12138) | 15-Apr-94 | 06-May-94 (Late) | | |
| 1.2 | DESIGN PACKAGE 2C (Activity No.12139) | 29-Jul-94 | - - | YMP-94-012 | NEW DELIVERY DATE IS 14-SEP-94 |

* Denotes Planning Date

# FY94 M&O MAJOR DELIVERABLE STATUS

| WBS | MAJOR DELIVERABLE TITLE | DUE DATE | COMPLETE | BCR NUMBER | RESULT OF APPROVED BCR |
|---|---|---|---|---|---|
| 1.2 | BASIS FOR DESIGN DOCUMENT (Activity No.12140) | 30-Sep-94 | - - | | |
| 1.2 | DESIGN PACKAGE 1D (Activity No.12142) | 30-Sep-94 | - - | | |
| 1.2 | DESIGN PACKAGE 8B (Activity No.12144) | 30-Sep-94 | - - | YMP-94-007 | DELETED FROM WAD |
| 1.2 | SITE DEVELOPMENT PLAN (Activity No.12149) | 31-Aug-94 | - - | | |
| 1.2 | FINAL 1994 PROJECT PLAN (Activity No.12353) | 11-Jul-94* | 11-Jul -94 (On-Time) | YMP-94-021 | 30 DAYS AFTER YMSCO ACCEPTS DRAFT |
| 1.2 | FINAL 1995 PROJECT PLAN (Activity No.12356) | 01-Sep-94* | - - | YMP-94-024 | 45 DAYS AFTER YMSCO ACCEPTANCE |
| 1.2 | UPDATE REPOSITORY BASIS FOR DESIGN (Activity No.12474) | 31-May-94 | - - | YMP-94-026 | ON HOLD |
| 1.2 | INFORMATION RESOURCE MANAGEMENT LONG-RANGE PLAN (Activity No.12516) | 31-Jan-94 | 28-Feb-94 (Late) | | |
| 1.2 | INFORMATION RESOURCE MANAGEMENT SHORT-RANGE PLAN (Activity No.12520) | 31-Aug-94 | - - | | |
| 1.2 | UPDATE TO YMPO FIVE YEAR SAFETY AND HEALTH PLAN (Activity No.12523) | 31-May-94 | 25-May-94 (Early) | | |
| 1.2 | RESPONSES FOR COMPLETED FOR SUBSTANTIALLY COMPLETE CONTAINMENT RELATED ITEMS 46 & 47 (Activity No.12754) | 30-Jun-94 | 10-Jun-94 (Early) | YMP-94-038 | CHANGED TITLE |
| 3.1 | FINAL DRAFT MPC ENVIRONMENTAL ASSESSMENT (Activity No.31195) | 30-Sep-94 | - - | | |
| 3.1 | QAP DRAFT MPC SUBSYSTEM DESIGN REQUIREMENTS DOCUMENT (Activity No.31540) | 30-Jun-94 | 30-Jun-94 (On-Time) | | |
| 3.1 | QAP DRAFT MPC TRANSPORTATION CASK SUBSYSTEM DESIGN REQUIREMENTS DOCUMENT (Activity No.31541) | 29-Jul-94 | 24-Jun-94 (Early) | | |
| 3.1 | PRELIMINARY DRAFT (MPC-FOCUSED) TEST AND EVALUATION MASTER PLAN (Activity No.31547) | 31-Aug-94 | - - | MRS-94-006 | DELETED FROM WAD - DEFERED TO FY95 |

*** Denotes Planning Date**

# FY94 M&O MAJOR DELIVERABLE STATUS

| WBS | MAJOR DELIVERABLE TITLE | DUE DATE | COMPLETE | BCR NUMBER | RESULT OF APPROVED BCR |
|---|---|---|---|---|---|
| 3.1 | MPC SYSTEM REQUEST FOR PROPOSAL SUPPORT PACKAGE (SOW, SPECIFICATION) (Activity No.31553) | 30-Apr-94 | 26-May-94 (Late) | | |
| 3.1 | FINAL DRAFT OF BARE STORED NUCLEAR FUEL TRANSFER SYSTEM REQUEST FOR PROPOSAL (Activity No.31555) | 30-May-94 | - - | | NEW DELIVERY DATE IS 31-DEC-94 |
| 3.1 | FY96 INTERNAL REVIEW BUDGET PACKAGE (Activity No.31558) | 30-Apr-94 | 19-Apr-94 (Early) | | |
| 3.1 | ANNUAL PLAN (Activity No.31560) | 29-Jul-94 | - - | | NEW DELIVERY DATE IS 26-AUG-94 |
| 3.1 | UPDATED COST AND SCHEDULE BASELINE (Activity No.31561) | 31-Mar-94 | - - (Late) | | NEW DELIVERY DATE IS 5-AUG-94 |
| 3.1 | ESAR PRESENTATION PACKAGE (Activity No.31660) | 31-Mar-94 | 14-Apr-94 (Late) | | |
| 3.1 | COST LOADED NETWORK (Activity No.31661) | 31-Mar-94 | 09-Jun-94 (Late) | | |
| 3.2 | DRAFT REQUEST FOR PROPOSAL FOR EXISTING LEGAL-WEIGHT TRUCK CASKS (Activity No.32214) | 25-Feb-94 | - - | TRN-94-011 | |
| 3.2 | BENCHMARKING REPORT ON CRITICAL RESTARTS (Activity No.32220) | 15-May-94 | - - | TRN-94-014 | DELETED FROM WAD |
| 3.2 | REPORT ON VERIFICATION & VALIDATION FOR SCALE CODE SYSTEM (Activity No.32221) | 15-Sep-94 | - - | | |
| 3.2 | LEGAL-WEIGHT TRUCK TRACTOR FINAL TEST REPORT (Activity No.32242) | 30-Sep-94 | - - | | |
| 3.2 | UPDATED INSTITUTIONAL SCHEDULES TO INTEGRATE TO TRANSPORTATION PLANNING (Activity No.32264) | 29-Jul-94 | - - | | DELETED FROM WAD |
| 3.2 | DRAFT MATERIALS FOR RULEMAKING ON SECTION 180(C) (Activity No.32265) | 30-Aug-94 | - - | | |
| 3.2 | REPORT ON TRANSPORTATION EXTERNAL COORDINATION WORKING GROUP MEETINGS (Activity No.32266) | 29-Apr-94 | 07-Mar-94 (Early) | | |
| 3.3 | DRAFT 1994 ANNUAL PRIORITY RANKING (Activity No.32269) | 31-Aug-94 | - - | | |

*** Denotes Planning Date**

# FY94 M&O MAJOR DELIVERABLE STATUS

| WBS | MAJOR DELIVERABLE TITLE | DUE DATE | COMPLETE | BCR NUMBER | RESULT OF APPROVED BCR |
|---|---|---|---|---|---|
| 3.3 | DRAFT 1994 AREA CHARACTERIZATION REPORT (Activity No.33270) | 30-Sep-94 | - - | | |
| 9.2 | CRWMS REQUIREMENTS DOCUMENT, REVISION 2 PBCCB REVIEW (Activity No.92361) | 13-Sep-94* | - - | | |
| 9.2 | WASTE ACCEPTANCE REQUIREMENTS DOCUMENT, REVISION 2 PBCCB REVIEW DRAFT (Activity No.92362) | 28-Oct-94* | - - | SIN-94-003 | |
| 9.2 | DRAFT CONCEPTUAL DESCRIPTION OF THE CRWMS, REVISION 1 (Activity No.92364) | 31-Mar-94 | 31-Mar-94 (On-Time) | | |
| 9.2 | RW-30 REVISION DRAFT ILSP (Activity No.92397) | 31-Jan-94 | 15-Jan-94 (Early) | | |
| 9.2 | RW-30 REVIEW DRAFT RELIABILITY, AVAILABILITY, AND MAINTAINABILITY PLAN (Activity No.92400) | 15-Feb-94 | 15-Feb-94 (On-Time) | | |
| 9.2 | TEST AND EVALUATION MASTER PLAN, PRELIMINARY DRAFT (Activity No.92403) | 30-Oct-93 | 01-Nov-93 (Late) | | |
| 9.2 | DRAFT AUTOMATED REQUIREMENTS MANAGEMENT SYSTEM LIFE-CYCLE PLAN (Activity No.92409) | 1-Jul-94* | 1-Jul -94 | | |
| 9.2 | CONFIGURATION INFORMATION SYSTEM PHASE 2 SOFTWARE FOR PARTIAL CAPABILITY (Activity No.92452) | 30-Jun-94 | - - | SIN-94-005 | NEW DELIVERY DATE IS 31-AUG-94 |
| 9.2 | BEGIN CONFIGURATION INFORMATION SYSTEM PARTIAL CAPABILITY PHASE 2 OPERATIQNS (Activity No.92455) | 31-Aug-94 | - - | | |
| 9.2 | RW FY94 ENVIRONMENTAL, SAFETY & HEALTH 5-YEAR PLAN TRANSMITTED TO CR-1 AND EH-1 (Activity No.92456) | 15-Jun-94 | 15-Jun-94 (On-Time) | SIN-94-004 | |
| 9.2 | TRANSMITTAL OF MGDS ANNOTATED OUTLINE, REVISION 3 COMMENT RESOLUTION REPORT (Activity No.92457) | 30-Nov-93 | 30-Nov-93 (On-Time) | | |
| 9.2 | START-UP OF REGULATORY TRACKING SYSTEM (Activity No.92458) | 31-Jan-94 | 01-Feb-94 (Late) | | |
| 9.3 | RW PROGRAM PLAN (Activity No.92338) | 31-Aug-94 | - - | SPI-94-001 | |
| 9.3 | REPORT - STRATEGIC IMPLICATIONS OF RECENT NUCLEAR WASTE TECHNICAL REVIEW BOARD REPORTS (Activity No.93339) | 30-Apr-94 | 30-Apr-94 (On-Time) | SPI-94-001 | TITLE CHANGED |

* Denotes Planning Date

# FY94 M&O MAJOR DELIVERABLE STATUS

| WBS | MAJOR DELIVERABLE TITLE | DUE DATE | COMPLETE | BCR NUMBER | RESULT OF APPROVED BCR |
|---|---|---|---|---|---|
| 9.3 | APPROVED RECORDS INVENTORY AND DISPOSAL SCHEDULES MANUAL (Activity No.93345) | 31-Dec-93 | 22-Dec-93 (Early) | | |
| 9.3 | RW DIRECTIVES (Activity No.93346) | 25-Feb-94 | 24-Feb-94 (Early) | | |





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# APPENDIX C

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Figure C-1. Monthly Progress/Update Summary

## M&O Monthly Progress/Update Summary ($K) as of Jul 31, 1994

| B&R | B&R Title | 0<br>Total Budget FY94/Defer/ Commit | 1<br>Cum to Date Budget/FY94/ Defer/Commit | 2<br>Cum to Date Forecast/FY 94 Defer/Commit | 3<br>(FIS) Cum to Date Actuals | 2-3<br>Variance (Fore-Act) | 4<br>Total Funding-FY 94 & Previ-ously Funded | 1-3<br>Variance (Cum Budget - Act) | 0-3<br>Variance (Total Budget - Act) |
|---|---|---|---|---|---|---|---|---|---|
| DB0102010 | YMP Systems Engineering | 4,955 | 4,000 | 3,793 | 3,687 | 106 | 4,909 | 313 | 1,268 |
| DB0102020 | YMP Waste Package | 2,215 | 1,765 | 1,600 | 1,569 | 31 | 1,572 | 196 | 646 |
| DB0102030 | YMP Site Investigations | 3,605 | 2,896 | 2,743 | 2,685 | 58 | 2,761 | 211 | 920 |
| DB0102040 | YMP Repository | 2,473 | 2,065 | 2,208 | 2,162 | 46 | 2,447 | -97 | 311 |
| DB0102050 | YMP Regulatory | 12,157 | 9,828 | 8,924 | 8,682 | 242 | 10,236 | 1,146 | 3,475 |
| DB0102060 | YMP Exploratory Studies Fac. | 14,004 | 11,583 | 13,819 | 13,468 | 351 | 15,402 | -1,885 | 536 |
| DB0102070 | YMP Test Facilities | 457 | 368 | 218 | 218 | 0 | 417 | 150 | 239 |
| DB0102090 | YMP Project Management | 7,122 | 5,793 | 4,998 | 4,942 | 56 | 5,863 | 851 | 2,180 |
| DB0102130 | YMP Environ., Safety & Health | 987 | 806 | 707 | 697 | 10 | 979 | 109 | 290 |
| DB0102140 | YMP Institutional | 322 | 257 | 220 | 209 | 11 | 245 | 48 | 113 |
| DB0102150 | YMP Support Services | 3,583 | 2,928 | 2,330 | 2,284 | 46 | 3,228 | 644 | 1,299 |
| DB0102160 | YMP Quality Assurance | 1,714 | 1,377 | 1,342 | 1,308 | 34 | 1,279 | 69 | 406 |
| DB0102170 | YMP Information Management | 3,742 | 3,037 | 2,606 | 2,606 | 0 | 3,335 | 431 | 1,136 |
| | **Total YMP** | **57,336** | **46,703** | **45,509** | **44,517** | **992** | **52,672** | **2,186** | **12,819** |
| | **% of WAD** | | | **97.44%** | **95.32%** | **2.12%** | | **4.68%** | |
| DB0301010 | MRS Systems Engineering | 1,724 | 1,387 | 1,679 | 1,639 | 40 | 1,683 | -252 | 85 |
| DB0301030 | MRS Site Investigations | 1,054 | 755 | 616 | 532 | 84 | 1,046 | 223 | 522 |
| DB0301040 | MRS MRS Facility | 467 | 365 | 175 | 113 | 62 | 486 | 252 | 354 |
| DB0301050 | MRS Regulatory | 895 | 663 | 514 | 497 | 17 | 890 | 166 | 398 |
| DB0301070 | MRS Engineering Development | 5,137 | 4,184 | 4,626 | 4,245 | 381 | 4,169 | -61 | 892 |
| DB0301090 | MRS Project Management | 1,898 | 1,299 | 1,347 | 1,247 | 100 | 1,890 | 52 | 651 |
| DB0301110 | MRS Quality Assurance | 376 | 265 | 162 | 139 | 23 | 377 | 126 | 237 |
| DB0301120 | MRS Information Management | 162 | 136 | 113 | 105 | 8 | 161 | 31 | 57 |
| DB0301130 | MRS Environ., Safety & Health | 1,397 | 1,146 | 782 | 732 | 50 | 1,382 | 414 | 665 |
| DB0301140 | MRS Institutional | 1,184 | 992 | 712 | 610 | 102 | 1,177 | 382 | 574 |
| DB0301150 | MRS Support Services | 88 | 76 | 83 | 78 | 5 | 88 | -2 | 10 |
| | **Total MRS** | **14,383** | **11,269** | **10,811** | **9,937** | **874** | **13,350** | **1,332** | **4,446** |
| | **% of WAD** | | | **95.94%** | **88.18%** | **7.76%** | | **11.82%** | |
| DB0302010 | Trans. Systems Engineering | 946 | 685 | 596 | 575 | 21 | 945 | 110 | 371 |
| DB0302020 | Trans. Casks | 6,192 | 4,682 | 4,017 | 3,740 | 277 | 6,033 | 942 | 2,452 |
| DB0302040 | Trans. Support Systems | 3,612 | 2,647 | 1,762 | 1,708 | 54 | 3,226 | 939 | 1,904 |
| DB0302050 | Trans. Regulatory | 170 | 139 | 169 | 166 | 3 | 170 | -27 | 4 |
| DB0302090 | Trans. Project Management | 875 | 713 | 512 | 497 | 15 | 872 | 216 | 378 |
| DB0302110 | Trans. Quality Assuranc | 169 | 96 | 0 | 0 | 0 | 169 | 96 | 169 |
| DB0302120 | Trans. Info Management | 30 | 21 | 4 | 0 | 4 | 30 | 21 | 30 |
| DB0302130 | Trans. Environ., Safety & Health | 829 | 622 | 546 | 523 | 23 | 814 | 99 | 306 |
| DB0302140 | Trans. Institutional | 807 | 579 | 600 | 584 | 16 | 954 | -5 | 223 |
| DB0302150 | Trans. Support Services | 45 | 25 | 0 | 0 | 0 | 44 | 25 | 45 |
| | **Total Transportation** | **13,676** | **10,210** | **8,207** | **7,793** | **414** | **13,258** | **2,417** | **5,883** |
| | **% of WAD** | | | **80.38%** | **76.33%** | **4.05%** | | **23.67%** | |

## M&O Monthly Progress/Update Summary ($K) as of Jul 31, 1994

| B&R | B&R Title | 0<br>Total Budget FY94/Defer/Commit | 1<br>Cum to Date Budget/FY94/Defer/Commit | 2<br>Cum to Date Forecast/FY 94 Defer/Commit | 3<br>(FIS) Cum to Date Actuals | 2-3<br>Variance (Fore-Act) | 4<br>Total Funding FY 94 & Previously Funded | 1-3<br>Variance (Cum Budget - Act) | 0-3<br>Variance (Total Budget - Act) |
|---|---|---|---|---|---|---|---|---|---|
| DB0303010 | Waste Accept Process/Oprtns | 1,118 | 882 | 1,153 | 1,124 | 29 | 1,230 | -242 | -6 |
| DB0303020 | Waste Acceptance Econ. Stud. | 203 | 128 | 28 | 26 | 2 | 252 | 102 | 177 |
| DB0303030 | Waste Acceptance Data Collect. | 502 | 374 | 331 | 296 | 35 | 451 | 78 | 206 |
| | **Total Waste Acceptance** | 1,823 | 1,384 | 1,513 | 1,446 | 67 | 1,933 | -62 | 377 |
| | **% of WAD** | | | 109.29% | 104.47% | 4.82% | | -4.47% | |
| DB0910030 | **Program Quality Assurance** | 3,631 | 2,774 | 2,875 | 2,667 | 208 | 3,465 | 107 | 964 |
| | **% of WAD** | | | 103.64% | 96.16% | 7.48% | | 3.84% | |
| DB0920011 | Systems Engineering | 6,559 | 5,063 | 5,140 | 4,655 | 485 | 6,426 | 408 | 1,904 |
| DB0920012 | Systems Planning & Integration | 1,610 | 1,297 | 1,314 | 1,212 | 102 | 1,764 | 85 | 398 |
| DB0920013 | Configuration Management | 991 | 762 | 761 | 750 | 11 | 1,003 | 12 | 241 |
| DB0920021 | Regulatory Policy & Requirements | 761 | 587 | 579 | 549 | 30 | 765 | 38 | 212 |
| DB0920022 | Regulatory Integration | 2,419 | 1,588 | 1,560 | 1,325 | 235 | 2,393 | 263 | 1,094 |
| | **Total Systems & Compliance** | 12,341 | 9,297 | 9,355 | 8,491 | 864 | 12,350 | 806 | 3,850 |
| | **% of WAD** | | | 100.62% | 91.33% | 9.29% | | 8.67% | |
| DB0932000 | Strategic Planning | 1,423 | 1,155 | 1,032 | 950 | 82 | 1,429 | 205 | 473 |
| DB0933000 | Int'l Waste Management Tech. | 494 | 397 | 374 | 366 | 8 | 498 | 31 | 128 |
| | **Total Strategic Planning** | 1,918 | 1,552 | 1,406 | 1,316 | 90 | 1,927 | 236 | 602 |
| | **% of WAD** | | | 90.54% | 84.77% | 5.77% | | 15.23% | |
| DB0935000 | **Program Control & Admin.** | 1,661 | 1,331 | 1,217 | 985 | 232 | 1,659 | 346 | 676 |
| | **% of WAD** | | | 91.47% | 74.02% | 17.46% | | 25.98% | |
| DB0936010 | **Information Resources Mgmt** | 16,470 | 10,630 | 10,589 | 10,016 | 573 | 16,449 | 614 | 6,454 |
| | **% of WAD** | | | 99.62% | 94.23% | 5.39% | | 5.77% | |
| DB0937000 | **Contract Business Mgmt** | 4,473 | 0 | 0 | 0 | 0 | 4,597 | 0 | 4,473 |
| | **% of WAD** | | | #DIV/0! | #DIV/0! | #DIV/0! | | #DIV/0! | |
| | **M&O Totals** | 127,710 | 95,150 | 91,491 | 87,166 | 4,319 | 121,661 | 7,982 | 40,542 |
| | **M&O Total % of WAD** | | | 96.14% | 91.61% | 4.53% | | 8.39% | |
| | **M&O Total % of NB&R** | | | 71.63% | 68.25% | 3.38% | | 6.25% | |

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

**EG&G ENERGY MEASUREMENTS**
**Santa Barbara Operations**
EG&G ENERGY MEASUREMENTS, INC., 101 CONVENTION CENTER DRIVE, LAS VEGAS, NEVADA 89109 TEL: (702)794-7463

I-361524

WBS 1.2.13.4
NQA

RPTS 1.7

September 1, 1994
LV94-RAG-044

Wendy Dixon, Director
Project and Operations Control Division
Yucca Mountain Project Office
DOE Field Office, Nevada
P. O. Box 98518
Las Vegas, NV 89193-8518

**AUGUST 1994 PROGRESS REPORT**

9/11/94

Attached is the August 1994 progress report on biological studies and support activities conducted by EG&G/EM for the Yucca Mountain Site Characterization Project. Please contact Tom O'Farrell (293-7762) or me (794-7474) if you have questions regarding this report.

W. Kent Ostler

W. Kent Ostler, Director
Environmental Sciences Division

RG:vk

Attachment

cc: G. Ryder, DOE/YMP
D. Sorensen, SAIC
P. Schilling, SAIC

DIVISION Dixon
CC Ryder

REC'D IN YMP
9-2-94

ENCLOSURE 3

# YUCCA MOUNTAIN PROJECT
# BIOLOGICAL RESOURCES PROGRAM
# MONTHLY PROGRESS REPORT
# AUGUST 1994

Summary of Work Accomplished During Report Period

EG&G Energy Measurements (EG&G/EM) conducted work for the Biological Resources Task (WBS 1.2.13.4.11) for the Project Office.

**ISSUES and CONCERNS**

- In the July monthly report, EG&G/EM expressed the concern about not being informed of construction schedule changes when tortoise monitoring was involved. This resulted in biologists reporting for construction monitoring when no construction was being done. In response to that issue, Gene Ryder (DOE/YMP), Hal Estes (SAIC), Tom Leonard (REECo), Steve Singer (SAIC), Kent Ostler (EG&G/EM), and Danny Rakestraw (EG&G/EM) met to discuss the problems faced in recent months regarding preactivity surveys. Proper procedures for requesting surveys and other mitigation actions were discussed. Gene identified which groups were responsible for each step of the survey process. A follow-up meeting will be held with S. Singer, D. Rakestraw, Audrey Hughes (EG&G/EM), and possibly DRI to establish more effective communications between construction personnel and survey personnel.

**WORK PROGRESS**

- EG&G/EM submitted one reclamation stipulation report to the Project Office. Mitigation recommendations also were submitted for expansion of a sanitary sewer line. Resurveys for tortoises were conducted at two construction sites. Tortoises were monitored at the deep seismic shot holes in Crater Flats and at the water tanks on top of Exile Hill.

- All other work was part of continuing studies. Radiomarked desert tortoises were located twice each week. Two radiomarked tortoises were displaced from the water tank construction site on top of Exile Hill. Hatchling tortoises were captured as they emerged from their nests. As of August 28, 33 hatchlings had been marked and 8 of these had been fitted with radiotransmitters. Small mammals were captured, marked, and released on eight plots to monitor the effects of site characterization activities on population abundance and survival. Spotlight surveys were conducted in Crater Flats to monitor lagomorph and predator populations. Four topsoil stockpiles were stabilized. Soil samples for analysis of microbial activity were collected from the borrow pit topsoil stockpile.

- EG&G/EM participated in a Public Outreach Tour of YMP.

- Continued preparing and working with Project Office on FY95 budgets.

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

WBS 1.2.5
QA: NA

I-362/14
BAH

September 16, 1994
NV-94-686

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

**AUGUST 1 - AUGUST 31 , 1994, PROGRESS REPORT - EG&G/ENERGY MEASUREMENTS, INC. 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 August 1, 1994 through August 31, 1994.

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

315
Asst Mgrs (6)
w/ Dyer
Smith
w/ CC: See CC
CC: list (7)
CC:
CC:
CC:

REC'D IN YMP 9-19-94

ENCLOSURE 4

cc w/Encl 1

S. Ronshaugen, DOE/NV EMD
W. Dixon, DOE/YMP
M. Dockter, DOE/NV
R. Dyer, DOE/YMP
J. Gandi, DOE/YMP
J. Lorenz, REECo/YMP (Encls 1 & 2)
C. Newbury, DOE/YMP (Encls 1 & 2)
M. Ryder, DOE/YMP
M. Tynan, DOE/YMP (Encls 1 & 2)
D. Williams, DOE/YMP
W. Wilson, DOE/YMP (Encls 1 & 2)

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

**WBS 1.2.3** SITE INVESTIGATIONS

**WBS 1.2.3.9.4** SPECIAL STUDIES: TRACERS, FLUIDS AND MATERIALS

**SA OE394A** TRACERS, FLUIDS AND MATERIALS

**REPORT PERIOD:** August 1, 1994 - August 31, 1994

**REPORT DATE:** September 16, 1994

**RESPONSIBLE INDIVIDUAL:** Jim Beckett

**SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:**

1. The Tracers, Fluids and Materials database application was installed on Mohammad Lateef's (TRW) personal computer on August 11.

2. The INGRES PC application development tools have been received and work has begun on the on-line INGRES version of the TFM database.

3. The following TFM data was received and processed into the GENISES.
   BAB000000-01717-2200-00005 Rev 0, TS North Ramp.

4. The Tracers, Fluids and Materials database application was installed on Jan Wilt's (M&O/WCFS) personal computer on August 11.

5. A listing of all currently approved TFM's sorted alphabetically by TFM name with corresponding Job Package and Test Planning Package was prepared for Jan Wilt (M&O/WCFS) on August 5.

6. A copy of all existing TFM reports, a list of all data fields available for TFM files and a list of currently approved TFMs were provided to Jan Wilt (M&O/WCFS) on August 5.

**MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN:** None.

**ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:**

1. The transfer of the TFM database into GENISES will be completed and an acceptance letter provided to YMSCO after verification of the data by the M&O.

2. The project level procedures for the handling of TFM data will be submitted for approval by the end of September 1994.

3. On-line access the TFM application will be established for Beta testing for selected TFM users.

**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 OE395A** 3-D MODELING AND VISUALIZATION

**REPORT PERIOD:** August 1, 1994 - August 31, 1994

**REPORT DATE:** September 16, 1994

**RESPONSIBLE INDIVIDUAL:** D. Brickey

**SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:**

1. A briefing was provided to Susan Jones on August 17 on the status of the 3-D modeling activities and plans for FY95. Larry Tinney, David Brickey and David Jefferis presented EG&G/EM's activities in support of YMP numerical and 3-D modeling.

2. A preliminary package of FY95 Summary Accounts was developed from Technical Implementation Plan input provided by DOE and was submitted to Robert Spiro (M&O) for input to the PACS for planning purposes.

3. David Jefferis continued work on the Extended Site Model. 2-D fault surfaces and a 3-D fault model have been created.

4. David Brickey continued work on integrating digitized orthophotos, digital elevation models (DEMs) and surface mapping at Lathrop Wells Volcanic Center.

5. Work continues on the development of Yucca Mountain Line Procedures for software classification, verification and validation, and configuration management.

6. Cameron Williams, a recent Masters graduate from the University of Arizona, has been hired as a numerical modeling scientist. He will begin his employment with EG&G/EM on September 19.

7. David Jefferis attended the Advanced Geological Modeling course at Dynamic Graphics, Inc. (DGI) during the week of August 20 - September 1.

8. An additional Silicon Graphics Inc. (SGI) Indigo$^2$ workstation was received for Cameron Williams.

9. Purchase requisitions were submitted to purchase a second license of EarthVision; the EarthVision Coordinate Transform module; high resolution SPOT satellite imagery of the Yucca Mountain site; Ingres Windows 4GL, Net and Protocol for SGI; ArcView2 for SGI; and a read/write optical disk drive for SGI.

10. EG&G was made a Beta Test site for DGI's EarthVision software.

11. The following products were generated:

| | |
|---|---|
| YMP-94-220.1 | A cross section B-B' was provided to Mark Tynan (YMSCO) on August 4. |
| YMP-94-238.1 | A report of differences between estimated and observed data at selected boreholes was provided to Mark Tynan (YMSCO) on August 4. |
| YMP-94-278.0 | The following digital files were provided to Robert Elayer (M&O/MK) on August 12 in Lynx GMS format for the conceptual controlled area boundary: roads, disturbed areas, flood prone areas and Scott and Bonk surface geology. |
| YMP-94-291.0 | A well prognosis for SRG-3 was prepared for Norma Biggar (M&O/WCFS) on August 25. |

**MAJOR PROBLEMS AND CORRECTIVE ACTION:** None.

**ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:**

1. Cameron Williams will join the EG&G/EM YMPSAS numerical modeling team on September 19.

2. Work will continue on the 3-D Extended Site Model.

3. Work will continue on the basaltic volcanism volumetrics and data integration project.

4. FY95 tasking and PACS inputs will be finalized.

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

**WBS 1.2.5** REGULATORY

**WBS 1.2.5.3.5** GENISES

**SA OE535L94** TECHNICAL DATABASE INPUT

**REPORT PERIOD:** August 1, 1994 - August 31, 1994

**REPORT DATE:** September 16, 1994

**RESPONSIBLE INDIVIDUAL:** J. Beckett

1. The following data was submitted and accepted into the YMP Technical Database.

   EGESD930709000.000 - Raven Surveys At Yucca and Bare Mountains, 1991-1993 Accepted 29-aug-1994

**MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN:** None.

**ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:**

1. The EG&G/EM Environmental Sciences Department continues processing of data acquired from on-going activities.

## Work Accomplished

**WBS 1.2.5** REGULATORY

**WBS 1.2.5.3.6** GENISES

**SA OE536A** TECHNICAL DATABASE

**REPORT PERIOD:** August 1, 1994 - August 31 , 1994

**REPORT DATE:** September 16, 1994

**RESPONSIBLE INDIVIDUAL:** J. Beckett

**SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:**

1. A meeting with Steve Bodnar and Takai Asakura (TRW), Elaine Ezra and Jim Beckett was conducted on August 3 to discuss Parameter Dictionary and Attribute links.

2. A meeting with Steve Bodnar (TRW), Elaine Ezra and Jim Beckett was conducted on August 3 to discuss the Tracers, Fluids and Materials database and how it relates to the YMP Technical Database.

3. A meeting with Tom Bjerstedt (YMSCO), Jim Beckett and Elaine Ezra was conducted on August 25 to discuss the U.S. Nuclear Regulatory Commission's request for technical data that is part of the backlog.

4. The M&O has tasked the TDB to provide input to the Yucca Mountain Technical Parameter Dictionary.

5. The meeting of the Technical Data Management Working Group was held on August 17 and 18, 1994. In attendance from EG&G/EM were Elaine Ezra, Jim Beckett, and Chris Berlien. This meeting was held to finalize the Technical Data Management Plan currently under revision.

6. The following data transfers to the YMP Technical Database were received:

GS921108312331.001 - Revised Potentiometric Surface Map of Yucca Mountain and Vicinity, Nevada, By E.M. Ervin, R.R. Luckey & D.J. Burkhardt was received on August 1.

GS930983117432.014 - Fluvial Origin of the Beatty Scarp, Nye County, Nevada, By L.W. Anderson was received on August 1.

| | |
|---|---|
| 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) was received on August 1. |
| GS940408312312.008 - | Water-Level Altitude Data, First Quarter 1994 was received on August 8. |
| GS910508315215.005 - | Strontium Isotope Ratios and Isotope Dilution Data for Rubidium and Strontium Collected 5/3/89 to 5/9/91 was received on August 17. |
| GS920208315215.008 - | Strontium Isotope Ratios and Isotope Dilution Data for Rubidium and Strontium Collected 5/10/91 to 2/28/92 was received on August 17. |
| GS920208315215.012 - | Strontium Isotope Ratios and Isotope Dilution Data for Rubidium and Strontium Collected 4/8/88 to 5/2/89 was received on August 17. |
| GS930908315215.027 - | 87SR/86SR Ratios in Samples from Yucca Mountain Vicinity was received on August 17. |
| GS920808314213.003 - | Assessment of Geophysical Logs from Borehole USW G-2, with Recommendations for Future Logging at Yucca Mountain, Nevada, By P.H. Nelson and Ulrich Schimschal was received on August 17. |
| GS930708315142.003 - | Physical Properties and Radiometric Age Estimates of Surficial and Fracture-Fill Deposits Along a Portion of the Carpetbag Fault System, Nevada Test Site, Nye County, Nevada By R.R. Shroba, D.R. Muhs was received on August 17. |
| GS931008315215.029 - | Strontium Isotope Ratios and Isotope Dilution Data for Rubidium and Strontium Collected 11/19/92 to 12/3/93 was received on August 17. |
| GS931208314211.051 - | X-Ray Fluorescence Elemental Compositions, 3/9/93 - 3/14/93 was received on August 17. |

GS930108315215.008 - Preliminary Study of Lead Isotopes in the Carbonate-Silica Veins of Trench 14, Yucca Mountain, Nevada was received on August 24.

7. The following submittals were processed into the YMP TDB.

GS931208312133.002 - Depth-To-Water Data for UE-29A #1 and #2 and UE-29 UZN #91 Collected in Water Year 1992 (accepted August 2).

GS931208312133.003 - Depth-To-Water Data for UE-29A #1 and #2 and UE-29 UZN #91 Collected in Water Year 1993 (accepted August 2).

GS930508312312.017 - Water-Level and Fluid-Pressure Response to Earthquakes Observed in Wells USW-H-5 and USW H-6, 5/17 - 5/19, 1993 (accepted August 12).

GS930808312332.003 - Properties of Core Samples from Bullfrog Member Formation (East of Little Skull Mountain) (accepted August 16).

GS930908312313.014 - SN-0027, Pulse Flowmeter Survey at the UE-25 C-Hole Complex, Nevada (accepted August 17).

GS930108312312.003 - Earthquake-Induced Water-Level Fluctuations at Yucca Mountain, Nevada, June 1992 by Grady M. O'Brien (accepted August 19).

GS900908314213.008 - Borehole Gravity Meter Survey In Drill Hole USW G-4, Yucca Mountain Area, Nye County, Nevada (accepted August 22).

GS900983115212.003 - Report on Televiewer Log and Stress Measurements in Holes USW G-3 and UE-25p1 Yucca Mountain, Nye County, Nevada (accepted August 22).

GS900908312232.001 - Geohydrologic Data From Test Hole USW UZ-7, Yucca Mountain Area, Nye County, Nevada (accepted August 22).

GS900908314221.005 - Photogeologic study of small-scale linear features near a potential nuclear-waste repository site at Yucca Mountain, Southern Nye County, Nevada (accepted August 22).

| | |
|---|---|
| 00908314215.008 - | Preliminary Interpretation Of Paleomagnetic And Magnetic Property Data From Drill Holes USW-G-1, G-2, GU-3, G-3, and VH-1 And Surface Localities In The Vicinity Of Yucca Mountain, Nye County, Nevada (accepted August 22). |
| GS920108312231.006 - | Preliminary Permeability and Water-Retention Data for Nonwelded and Bedded Tuff Samples, Yucca Mountain Area, Nye County, Nevada (accepted August 22). |
| GS920808312232.001 - | Geohydrologic Data from Drill-Bit Cuttings and Rotary Cores from Test Hole USW UZ-13, Yucca Mountain Area, Nye County, Nevada (accepted August 22). |
| GS931031174102.001 - | Strain Accumulation Near Yucca Mountain, Nevada, 1983-1993, compiled by J.C. Savage, M. Lisowski, W.K. Gross, N.E. King, and J.L. Svarc (accepted August 22). |
| GS910708314211.011 - | 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 (accepted August 22). |
| GS900908315133.002 - | Climatic Changes Inferred from Analyses of Lake-Sediment Cores, Walker Lake, Nevada (accepted August 22). |
| GS931031174102.003 - | Survey of Deformation of 50-KM-Aperture Trilateration Network Using GPS and a Geodolite, Centered in Yucca Mountain, 1993 (accepted August 24). |
| GS931031174102.002 - | Survey of Deformation of 50-KM-Aperture Trilateration Network using a Geodolite, Centered on Yucca Mountain, 1983-1984 (accepted August 26). |
| EGESD930709000.000 - | Raven Surveys At Yucca and Bare Mountains, 1991-1993 (accepted August 29). |
| GS930708314211.030 - | Preliminary Lithology Well Reports: UE-25 WT#4, USW WT-11, and UE-25 WT#12 (accepted August 30). |
| GS940308314211.015 - | Preliminary Lithology Well Reports: UE-25 WT#13 and USW WT-15 (accepted August 30). |
| GS931008314224.006 - | Detailed Line Survey Data For Exploratory Studies Facility, North Ramp Starter Tunnel, Right Slash (accepted August 31). |

GS931108312132.019 - Spreadsheets for hydrochemical analyses, a poster by John Czarnecki; data from well USW UZ-14, and NA-7, (accepted August 31).

8. The following is a list of backlog data packages currently in-progress for processing:

| | |
|---|---|
| GS900908312249.001 - | Triaxial Compression Extraction of Pore Water from Unsaturated Tuff, Yucca Mountain, Nevada. |
| GS900908314212.002 - | Fractures in Outcrops in the Vicinity of Drill Hole USE G-4, Yucca Mountain, Nevada - Data Analysis and Compilation. |
| GS900908314212.003 - | Preliminary Gravity Investigations of the Wahmonie Site, Nevada Test Site, Nye County, Nevada. |
| GS900908314215.007 - | Stratigraphic Correlation and Petrography of the Bedded Tuffs, Yucca Mountain, Nye County, Nevada. |
| GS900908314221.004 - | Interpretation of Resistivity and Induced Polarization Profiles with Severe Topographic Effects, Yucca Mountain Area, Nevada Test Site, Nevada. |
| GS900908314225.001 - | Geophysical Studies of the Syncline Ridge Area Nevada Test Site, Nye County, Nevada. |
| GS900908315142.002 - | Uranium-Trend Dating of Quaternary Deposits in the Nevada Test Site Area, Nevada and California. |
| GS900983116111.002 - | PMF (Probable Maximum Flood) Study For Nevada Nuclear Waste Storage Investigation Project. |
| GS900983117351.001 - | Data Report For The 1985 Seismic Refraction Experiment At Yucca Mountain and Vicinity, Southwestern Nevada. |
| GS900983117411.001 - | Southern Great Basin Seismological Data Report for 1980 and Preliminary Data Analysis. |
| GS900983117411.003 - | Southern Great Basin Seismological Data Report for 1981 and Preliminary Data Analysis. |
| GS900983117411.004 - | Historical Catalog of Southern Great Basin Earthquakes 1868-1978. |
| GS900983117411.005 - | Earthquake Location Data for the Southern Great Basin of Nevada and California: 1984 through 1986. |

| | |
|---|---|
| GS900983117411.006 - | Evaluation of the Seismicity of the Southern Great Basin and Its Relationship to the Tectonic Framework of the Region. |
| GS900983117412.004 - | Data Report For The 1983 Seismic-Refraction Experiment at Yucca Mountain, Beatty and Vicinity, Southwestern Nevada. |
| GS900983117412.047 - | Location Refinement of Earthquakes In The Southwestern Great Basin, 1931-1974, and Seismotectonic Characteristics of Some of the Important Events. |
| GS900983117412.047 - | Location Refinement of Earthquakes in the Southwestern Great Basin, 1931-1974, and Seismotectonic Characteristics of some of the Important Events. |
| GS900983117461.001 - | Preliminary Study Of Quaternary Faulting On The East Side Of Bare Mountain, Nye County, Nevada. |
| GS900983117472.004 - | Principal Facts of Gravity Stations with Gravity and Magnetic Profiles from the Southwest Nevada Test Site, Nye County, Nevada, as of January, 1982. |
| GS920908314211.002 - | Stratigraphic and Structural Relations of Volcanic Rocks in Drill Holes USW GU-3 and USW G-3, Yucca Mountain, Nye County, Nevada. By Robert B. Scott and Mayra Castellanos. |
| GS930308315215.015 - | Water-Table Decline In The South-Central Great Basin During The Quaternary Period: Implications For Toxic-Waste Disposal. |
| LA000000000038.001 - | Ground Water Chemistry Along Flow Paths Between A Proposed Repository Site And The Accessible Environment. |
| LLLLYMP9104035.000 - | Laboratory Determined Suction Potential of Topopah Springs Tuff at High Temperatures. |
| LLLYMP9107104.000 - | Spent fuel hardware activities as a function of time to 1,000.000 years. |
| SNSAND86713000.000 - | Mechanical, Ultrasonic, and Hydrologic Properties of Welded Tuff from the Grouse Canyon Heated Block Site. |

9. The following tabular reports were processed from the Technical Database.

| | |
|---|---|
| YMP-94-254.0 | A report listing the activity-id, UTM easting and northing coordinates, and elevation for all survey points at YMP were provided to Wendy Weiland (EDCON) on August 3. |
| YMP-94-264.0 | A report listing site activities within 850 feet of selected seismic shotholes was prepared for John Savino (SAIC) on August 5. |
| YMP-94-270.0 | A digital copy of geophysical and core curves for forty boreholes was provided to David Olson (SAIC) on August 11. |
| YMP-94-276.0 | A listing of proposed boreholes greater than 1000 feet identified in the 1988 SCP and a listing of 1994 proposed boreholes greater than 1000 feet were prepared for Norma Biggar (M&O/WCFS) on August 11. |
| YMP-94-283.0 | A digital data transfer was prepared in response to an NRC request on August 15 for the following data tracking numbers: GS930731174101.003; GS920983117412.032; GS920783117412.022; GS920483117412.014. The remaining DTNs requested by the NRC are being processed and are expected to be complete by September 15. |
| YMP-94-292.0 | A digital and hardcopy output of existing borehole coordinates and surface elevations was provided to Robert Clayton (M&O/WCFS) on August 26. |
| YMP-94-294.0 | A digital copy of the following parameters for data collected within the controlled area boundary was provided to Robert Clayton (M&O/WCFS) on August 30: Density, permeability, saturation, pore water content, porosity, sonic velocity and location. |

**MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN:** None

**ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:**

1. All backlog data will be processed into the TDB by 30 September 1994.

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** GENISES

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

**REPORT PERIOD:** August 1, 1994 - August 31 , 1994

**REPORT DATE:** September 16, 1994

**RESPONSIBLE INDIVIDUAL:** S. Ross

**SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:**

1. The FY93 Site Atlas was received from the Government Printing Office. The 250 copies have been reviewed for binding errors - 10 copies were rejected. There are several printing errors that are being compiled into an Errata Sheet.

2. The fourth quarter GIS Data Catalog was initiated.

3. Work continued on the FY94 Site Atlas. The maps are approximately 70% complete. The Remote Sensing Laboratory has developed in-house capabilities to produce the FY94 Site Atlas, which will eliminate the numerous printing problems encountered with the FY93 version.

4. Proposed borehole location changes were compiled and provided to Norma Biggar (M&O/WCFS) for review and verification on August 15. Once verified, the GIS baseline coverage will be updated.

5. A data search of meteorological data was completed and a report compiled for Grover Prowell (SAIC) on August 9. This report was also provided to the 14 participants of the July 12 Regional Meteorology Study Plan review.

6. A data transfer was received from RSN on August 19 of the survey data for pits and trenches under Job Packages 92-02 and 92-05. The data consists of as-built survey data for generation of profile and cross-sections. These data were requested in support of a request for information by Tim Sullivan (YMSCO).

7. Compilation of ARC/INFO coverage metadata into standardized formats continues in support of the Federal Spatial Data Transfer Standards.

8. Work continues in identification of data discrepancies and updates for data related to ongoing site characterization, specifically for boreholes, trenches, and pits.

9. One third quarter GIS Data Catalog was provided to Joanne Cooperman (SAIC) on August 17.

**MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN:**

The FY93 Site Atlas, originally scheduled for completion on September 30, 1993, was delivered by the Government Printing Office on August 23. The FY93 Site Atlas (240 copies) and Errata will be delivered along with a Site Atlas Supplement.

**ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:**

1. Verification of GIS data will continue in support of the fourth quarter GIS Data Catalog.

2. The FY93 Site Atlas and Supplement will be distributed.

3. The FY94 Site Atlas will be completed and reproduction 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 OE536C4** GIS, MAPPING AND ANALYSIS SUPPORT

**REPORT PERIOD:** August 1, 1994 - August 31, 1994

**REPORT DATE:** September 16, 1994

**RESPONSIBLE INDIVIDUAL:** J. Donovan

**SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:**

1. GIS map products were generated to support project participants and are detailed in the "Deliverables" statement.

2. Photo products include the following:

NR94071203 One 40"x40" color print from EG&G Perf #7488 was provided to Jerry Lorenz (REECo) on August 4.

NR94081601 Eleven 8"x10" color prints from negative #94H-205L were provided to Jerry Lorenz (REECo) on August 19.

NR94082201 One 8"x10" color print from EG&G Negative No 94H-205L was provided to Jerry Lorenz (REECo) on August 25.

NR94082302 Two 16"x20" color prints of EG&G Negative #89A0086 were provided to Allison Inglett (SAIC) on August 25.

NR94081602 The following products from negative #93E171L were prepared for Carma Hernandez on August 28: six 8"x10" color prints; six 35mm color slides and six 8"x10" color transparencies.

NR94081901 One contact color print of the following 9"x9" aerial photo frames were prepared to Robert Elayer (M&O/MK) on August 29:
Perf# 7135 Frames 39-50, 59-70, 148-161
Perf# 7136 Frames 5-18

3. The following digital data transfers were prepared:

| | |
|---|---|
| YMP-94-252.0 | ARC/INFO export files on a QIC tape of the following datasets were provided to Craig Matthews (SAIC) on August 3: emergency response grid; faults; topography and trenches. |
| YMP-94-278.0 | A Lynx GMS map QIC tape for the following data within the controlled area boundary was provided to Robert Elayer (M&O/MK) on August 12. |
| YMP-94-280.0 | A TAR format QIC tape of eight 1:250,000 scale digital elevation model files was prepared for Wendy Weiland (EDCON) on August 18. |
| YMP-94-236.0 | ARC/INFO export files of the following data were provided to John Carlson (SAIC) on August 24: Census blocks; census block group; TIGER roads; TIGER railroads; and census tracks. |
| YMP-94-272.0 | A DXF file of 10-foot elevation contour topographic data for an area bounded by 565500,755600 and 568000,757600 was provided to Carl Brechtel (Agipito and Associates) on August 25. |

4. The following miscellaneous products were prepared:

| | |
|---|---|
| YMP-94-257.0 | A data search of all meteorological data held in the GENISES database was prepared for Grover Prowell (SAIC) on August 1. The report consisted of a listing of all meterological attribute data; the GIS map products that have been delivered to YMP meterological data users; and meterological data sources. |
| YMP-94-259.0 | A report was generated that compared elevation values from two 1:250,000 scale digital elevation model datasets for Roger Olson (RSN) on August 4. |
| YMP-94-289.0 | An editplot of the Lathrop Wells Volcanic Center map digitized by EG&G/EM was provided by Kean Finnegan (LANL) on August 23. |

**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 OE536F4** REMOTE SENSING

**REPORT PERIOD:** August 1, 1994 - August 31 , 1994

**REPORT DATE:** September 16, 1994

**RESPONSIBLE INDIVIDUAL:** C.E. 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 OE536E4** COMPUTER SUPPORT

**REPORT PERIOD:** August 1, 1994 - August 31 , 1994

**REPORT DATE:** September 16, 1994

**RESPONSIBLE INDIVIDUAL:** T. Radermacher

**SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:**

1. The YMPSAS SUN workstations located at the Bank of America facility were transitioned to Solaris 2.3. The new operating system and associated applications were installed, including INGRES 6.4/04.

2. INGRES and INGRES Windows4GL were installed and tested on the RSL SPARCstation 10 fileserver and final preparations for implementation of operational status were completed.

3. EarthVision 2.0 and EASI-PACE image processing software were installed on the SGI Indigo$^2$.

4. The Cisco router for the YMPSAS network extension to P-118 was configured. Approval from EG&G/EM Information Services Division and the RSL ACPPM was received for the planned network/security configuration.

5. The new Environmental Sciences Division's Novell Fileserver was received and configured. Final preparations for implementation were completed.

6. The CD-ROM authoring system was received and inventoried.

**MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN:** None.

**ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:**

1. Final checkout of the SUN SPARCserver 1000/GENISES system configuration will be completed in preparation for connect for on-line access for YMP participants.

2. The SPARCstation 10 system will be installed at the RSL.

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 OE536G4** CAPITAL EQUIPMENT

**REPORT PERIOD:** August 1, 1994 - August 31 , 1994

**REPORT DATE:** September 16, 1994

**RESPONSIBLE INDIVIDUAL:** E. Ezra

**SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:**

1. Purchase requests for the additional workstations were placed through REECo Purchasing.

**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 OE536D4** PROJECT MANAGEMENT

**REPORT PERIOD:** August 1, 1994 - August 31 , 1994

**REPORT DATE:** September 16, 1994

**RESPONSIBLE INDIVIDUAL:** E. Ezra

**SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:**

Reporting/Tracking/Planning

1. EG&G/EM RSL July Progress report was compiled and submitted to DOE/YMSCO (NV-94-622).

2. July PACS input was compiled (NV-94-616) and submitted to Robert Spiro (M&O).

3. The Fiscal Year 1995 Information Resources Management Short-Range Plan was prepared (YMSO-94-164) and submitted to DOE/YMSCO on August 1.

Meetings:

1. Weekly Technical Data Managers staff meetings were held with Claudia Newbury (DOE/YMSCO), Steve Bodnar, Diane McAlister and Bob Lewis (M&O), Jan Statler (SAIC) and Elaine Ezra and Jim Beckett.

2. Weekly YMPSAS staff meetings were held.

Conferences/Training

1. Rose Denton, Christopher Pytel and Pamela Pratt completed the YMP Orientation (Sections A, B, and C) on August 2.

2. James Ephlin attended Solaris System Training in Milpitas, California during the week of August 22 - 26.

3. Elaine Ezra and Dave Brickey attended a conference on Mapping Tools for the 21st Century in Washington, DC. during the weekend of August 27 - 29.

4. David Jefferis attended Advanced Dynamic Graphics training during the week of August 29 - 31.

General:

1. Additional space has been arranged on the first floor of the Bank of America Annex. Staff from the EG&G/EM Environmental Sciences Division have moved to the space, and modular furniture is expected for delivery the second week in September.

Employee Actions:

1. An offer was extended to Cameron Williams for the Scientist II position to support numerical and 3-D modeling work. Cameron accepted and will join the team on September 19.

Quality Assurance:

1. The following procedures have been drafted/revised and are in internal review:

    Tracers, Fluids and Materials Data Flow To and From the YMP Database (drafted as a YLP).

    Technical Data Flow To and From the YMP Technical Database (revised)

    QA Software Qualification procedures (drafted as YLPs).

ES&H:

1. A monthly safety inspection was conducted in Suite 1010 on August 28.

**MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN:** None.

**ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:**

1. Training and indoctrination for Cameron Williams will be initiated.

**PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP**
<u>Work Accomplished</u>

**WBS 1.2.12.2.3** PARTICIPANT RECORDS MANAGEMENT

**SA OEC23A4** RECORDS MANAGEMENT

**REPORT PERIOD:** August 1, 1994 - August 31 , 1994

**REPORT DATE:** September 16, 1994

**RESPONSIBLE INDIVIDUAL:** J. Wiggins

**SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:**

1. An internal audit of the EG&G/EM and YMP Controlled Documents was completed with no discrepancies.

2. Thirty-seven Quality Assurance record packages were processed into the YMP Central Records Facility.

**MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN:** None.

**ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:**

1. The backlog of quality data record packages will be processed for submittal to the YMP Central Records Facility.

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

**WBS 1.2.12.2.3** ADMINISTRATIVE SUPPORT

**SA OE152A4** PHOTO/GRAPHICS SUPPORT

**REPORT PERIOD:** August 1, 1994 - August 31 , 1994

**REPORT DATE:** September 16, 1994

**RESPONSIBLE INDIVIDUAL:** E. 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.

Expenditures from August 1 through August 28, 1994
(Dollars in thousands)

| Task | Budget | August Cost | Total Costs To Date | Total Costs Remaining |
|---|---|---|---|---|
| WBS 1.2.3 Site Investigations | $ 697 | $ 74 | $ 449 | $ 248 |
| WBS 1.2.3 Site Investigations | $ 50 | $ 49 | $ 49 | $ 1 |
| WBS 1.2.5 Regulatory | $2,154 | $ 191 | $1,967 | $ 187 |
| WBS 1.2.12 Records Management | $ 100 | $ 9 | $ 67 | $ 33 |
| WBS 1.2.15 Support Services | $ 12 | $ 0 | $ 11 | $ 1 |
| TOTALS | $3,013 | $ 323 | $2,543 | $ 470 |

| | | | | |
|---|---|---|---|---|
| WBS 1.2.5 FY93 Carryover Capital Equipment | $ 357 | $ 15 | $ 280 | $ 77 |

## STATUS OF DELIVERABLES FOR EG&G/EM RSL SUPPORT TO YMP
August 1, 1994 through August 31, 1994

### GIS MAP SUPPORT

| Description | Requested by/ Organization | Date Sent | Size | No. of Copies |
|---|---|---|---|---|
| YMP-94-049.0 Springs within 50 Miles of the NTS | Moscati/USGS | 8/1/94 | Full | 2 |
| YMP-93-165.5 Air Quality and Meteorological Monitoring Sites | Fathauer/TRW | 8/1/94 | Page | 1 |
| YMP-94-209.1 Plant Succession & Ecological Study Plots with Disturbance Features | Gabbert/EG&G/EM | 8/1/94 | Full | 1 |
| YMP-94-031.0 YMP Characterization Project Geophysical Data | Tynan/YMPO | 8/3/94 | Full | 1 |
| YMP-93-337.2 YMP Existing & Planned Boreholes with Geologic Structure | Tynan/YMPO | 8/3/94 | Full | 1 |
| YMP-94-241.0 YMP Regional Site Location Map | Rogers/M&O | 8/5/94 | Full | 2 |
| YMP-94-102.0 Proposed Seismic Reflection Line Locations and Proposed Deep Seismic Shothole Locations Southwest Area | Savino/SAIC | 8/5/94 | Full | 5 |
| YMP-94-103.0 Proposed Seismic Reflection Line Locations and Proposed Deep Seismic Shothole Locations Northeast Area | Savino/SAIC | 8/5/94 | Full | 5 |
| YMP-93-337.2 Existing and Selected Planned Boreholes with Geologic Structure | Rankin/M&O | 8/5/94 | Full | 2 |

| | | | | |
|---|---|---|---|---|
| YMP-94-007.0 View of Thermal/ Mechanical 3D Model | Broderick/EG&G/EM | 8/10/94 | Full | 1 |
| YMP-94-275.0 Inset Area 2 | Prowell/SAIC | 8/11/94 | Page | 20 |
| YMP-94-256.0 Inset Area 1 | Prowell/SAIC | 8/11/94 | Page | 20 |
| YMP-94-255.0 Locations of Meteorological Stations Around Yucca Mountain | Prowell/SAIC | 8/11/94 | Page | 20 |
| YMP-93-106.0 YM Area with Emergency Response Grid | Matthews/SAIC | 8/11/94 | Page | 500 |
| YMP-94-258.0 YMP Major Diesel Fuel Storage Locations | Smith/SAIC | 8/11/94 | Page | 2 |
| YMP-94-273.0 Ten Foot Contour Lines | Brechtel/SNL | 8/11/94 | Full | 1 |
| YMP-94-253.0 Chuckwalla Observation Locations | Gabbert/EG&G/EM | 8/16/94 | Page | 5 |
| YMP-94-208.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-240.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-222.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-209.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-190.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-189.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-188.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-187.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-198.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-199.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-202.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-93-153.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-93-152.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-93-151.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-233.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-232.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-231.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-230.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-229.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-228.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-227.0 | Hennessy/USGS | 8/18/94 | Page | 1 |

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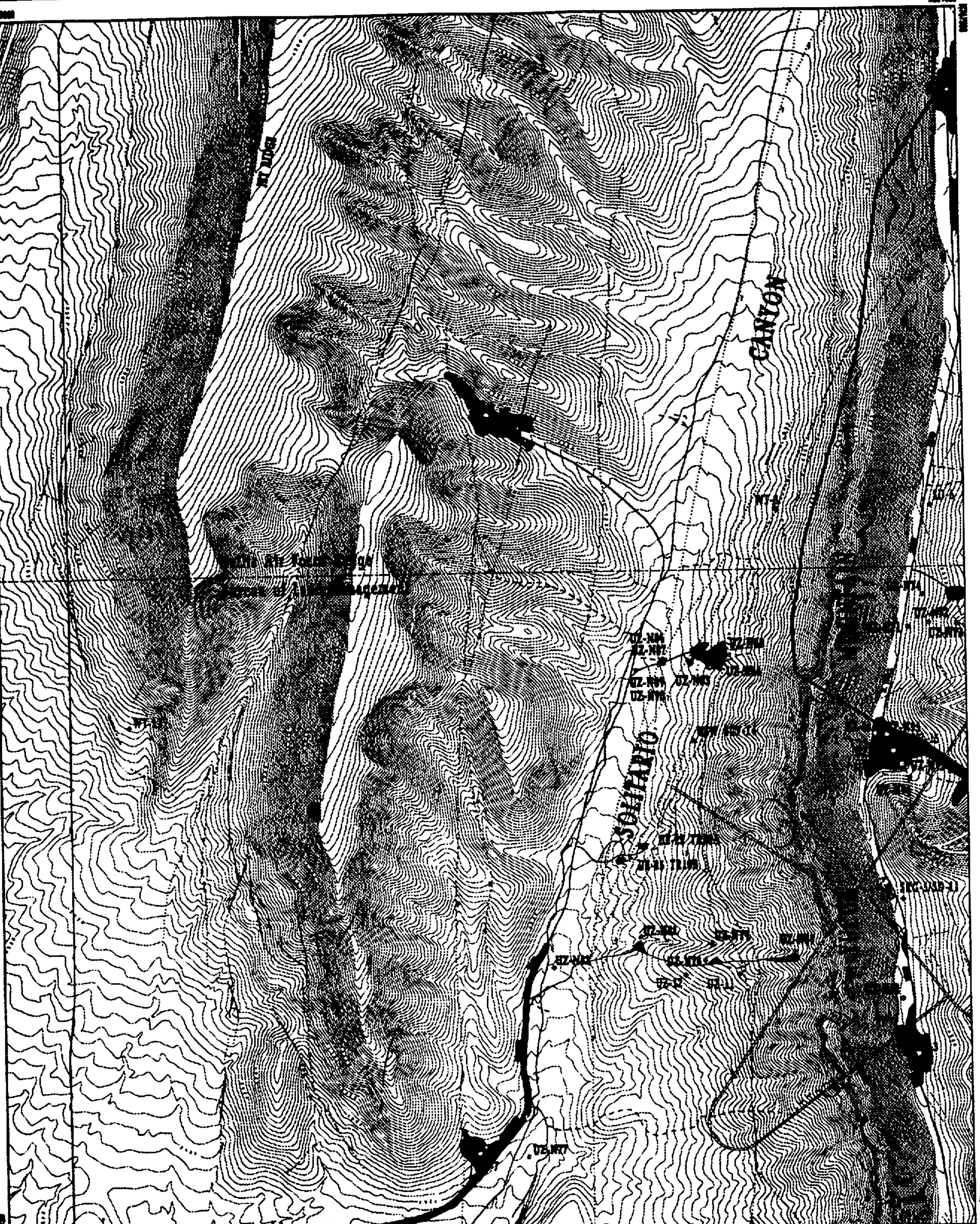
|---|---|---|---|---|
| YMP-94-226.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-225.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-216.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-214.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-215.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-210.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-175.1 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-221.0 | Hennessy/USGS | 8/18/94 | Page | 1 |
| YMP-94-274.0 Existing Bore-holes & Trenches | Wilt/WCFS | 8/18/94 | Full | 1 |
| YMP-94-286.0 Planned Bore-holes & Trenches | Wilt/WCFS | 8/18/94 | Full | 1 |
| YMP-94-281.0 Planned Boreholes | Inglett/SAIC | 8/18/94 | Page | 10 |
| YMP-94-282.0 Existing Boreholes | Inglett/SAIC | 8/18/94 | Page | 10 |
| YMP-94-261.0 Tour Map for YMP Participants | Inglett/SAIC | 8/18/94 | Page | 10 |
| YMP-94-262.0 Tour Map for YMP Participants | Inglett/SAIC | 8/18/94 | Page | 10 |
| YMP-92-027.0 Air Quality and Meteorology Monitoring Sites | Prowell/SAIC | 8/18/94 | Page | 2 |
| YMP-94-017.0 Tortoise Observa-tion Sites | Dlugosz/YMPO | 8/22/94 | Full | 1 |
| YMP-94-045.0 Eco Plots | Dlugosz/YMPO | 8/22/94 | Full | 1 |
| YMP-94-106.0 Vegetation Classes | Dlugosz/YMPO | 8/22/94 | Full | 1 |
| YMP-94-139.0 Ecological Study Plots | Dlugosz/YMPO | 8/22/94 | Full | 1 |
| YMP-94-192.0 Meteorological Monitoring Sites | Dlugosz/YMPO | 8/22/94 | Full | 1 |

| | | | | |
|---|---|---|---|---|
| YMP-94-209.2 Plant Succession and Ecological Study Plots with Disturbance Features | Dlugosz/YMPO | 8/22/94 | Full | 1 |
| YMP-94-097.0 Las Vegas, NV/AZ/CA Quadrangle | Dlugosz/YMPO | 8/22/94 | Full | 1 |
| YMP-94-098.0 Caliente, NV/UT Quadrangle | Dlugosz/YMPO | 8/22/94 | Full | 1 |
| YMP-94-099.0 Goldfield, NV/CA Quadrangle | Dlugosz/YMPO | 8/22/94 | Full | 1 |
| YMP-94-100.0 Far Field Radiological Environmental Monitoring Station Locations, Death Valley, CA/NV | Dlugosz/YMPO | 8/22/94 | Full | 1 |
| YMP-94-198.0 Existing Boreholes | Newbury/YMPO | 8/24/94 | Full | 1 |
| YMP-94-199.0 Planned Boreholes | Newbury/YMPO | 8/24/94 | Full | 1 |
| YMP-94-022.3 Surface Based Testing Activities with Geologic Structure, Sheet 9 | Yasek/YMPO | 8/26/94 | Full | 1 |
| YMP-94-023.3 Surface Based Testing Activities with Geologic Structure, Sheet 10 | Yasek/YMPO | 8/26/94 | Full | 1 |
| YMP-94-024.3 Surface Based Testing Activities with Geologic Structure, Sheet 11 | Yasek/YMPO | 8/26/94 | Full | 1 |
| YMP-94-025.3 Surface Based Testing Activities with Geologic Structure, Sheet 15 | Yasek/YMPO | 8/26/94 | Full | 1 |
| YMP-94-026.3 Surface Based Testing Activities with Geologic Structure, Sheet 16 | Yasek/YMPO | 8/26/94 | Full | 1 |

| | | | | |
|---|---|---|---|---|
| YMP-94-027.3 Surface Based Testing Activities with Geologic Structure, Sheet 17 | Yasek/YMPO | 8/26/94 | Full | 1 |
| YMP-94-028.3 Surface Based Testing Activities with Geologic Structure, Sheet 21 | Yasek/YMPO | 8/26/94 | Full | 1 |
| YMP-94-029.3 Surface Based Testing Activities with Geologic Structure, Sheet 22 | Yasek/YMPO | 8/26/94 | Full | 1 |
| YMP-94-030.3 Surface Based Testing Activities with Geologic Structure, Sheet 23 | Yasek/YMPO | 8/26/94 | Full | 1 |
| YMP-94-209.2 Ecological and Succession study Plots with Disturbance Features | Gabbert/EG&G/EM | 8/26/94 | Full | 4 |
| YMP-94-261.1 Tour Map for YMP Visitors | Hernandez/SAIC | 8/26/94 | Page | 10 |
| YMP-94-262.1 Tour Map for YMP Visitors | Hernandez/SAIC | 8/26/94 | Page | 10 |
| YMP-94-026.0 Historical Seismic Activity, Natural Events Near Yucca Mountain | Rogers/TRW | 8/27/49 | Full | 2 |
| YMP-94-211.0 Historical Seismic Activity, Southwest Seismic Events within 500 Miles of Yucca Mountain | Rogers/TRW | 8/27/49 | Full | 2 |
| YMP-94-279.0 Ecological Study Plots | Hessing/EG&G/EM | 8/29/94 | Full | 1 |

TOTAL NEW MAPS 36

TOTAL MAPS 672




14,000-scale orthophoto sheet index

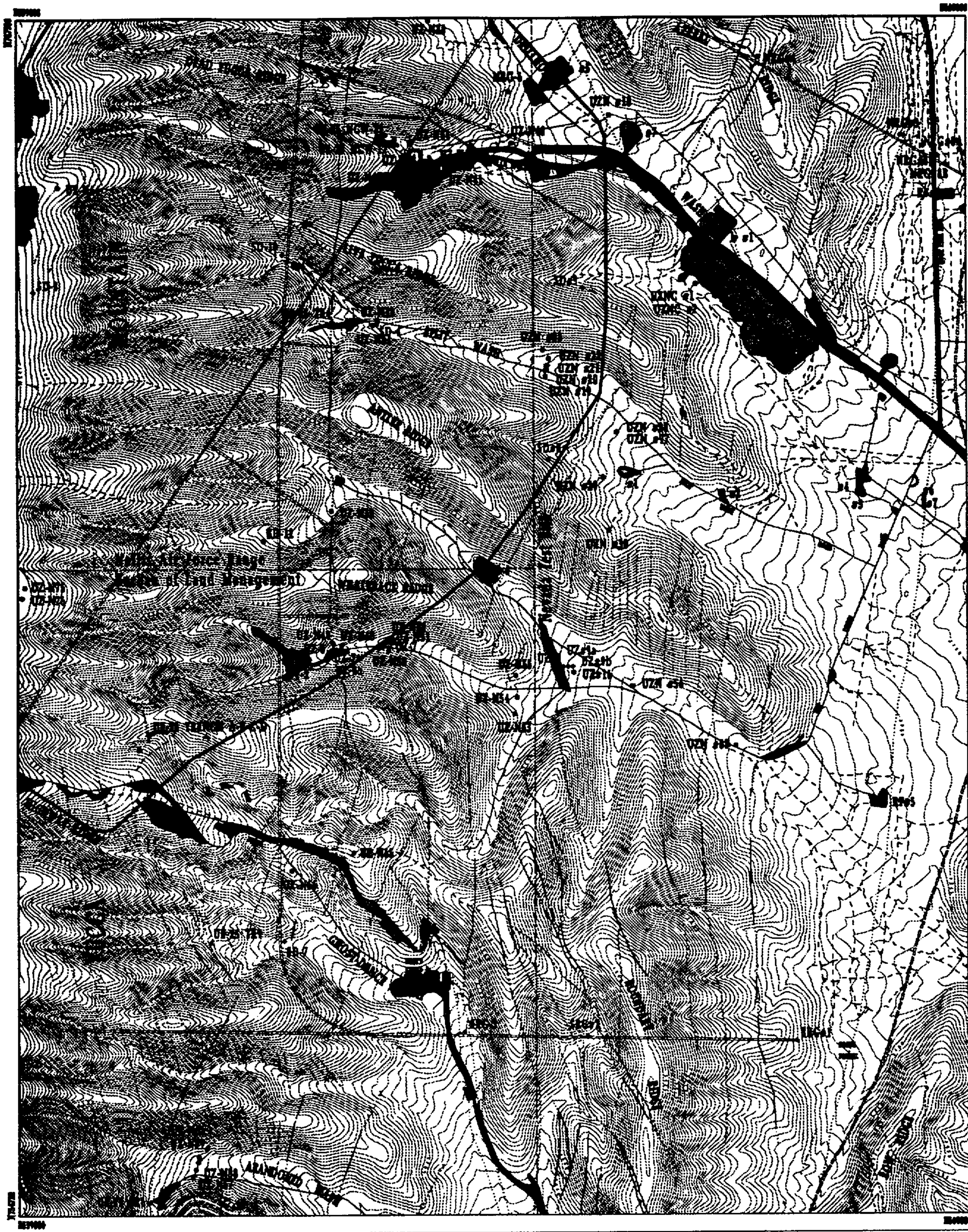
| | | | | | |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 |

# YUCCA MOUNTAIN

## SITE CHARACTERIZATION PROJECT

## SURFACE-BASED TESTING ACTIVITIES WITH GEOLOGIC STRUCTURE MAP SHEET 15

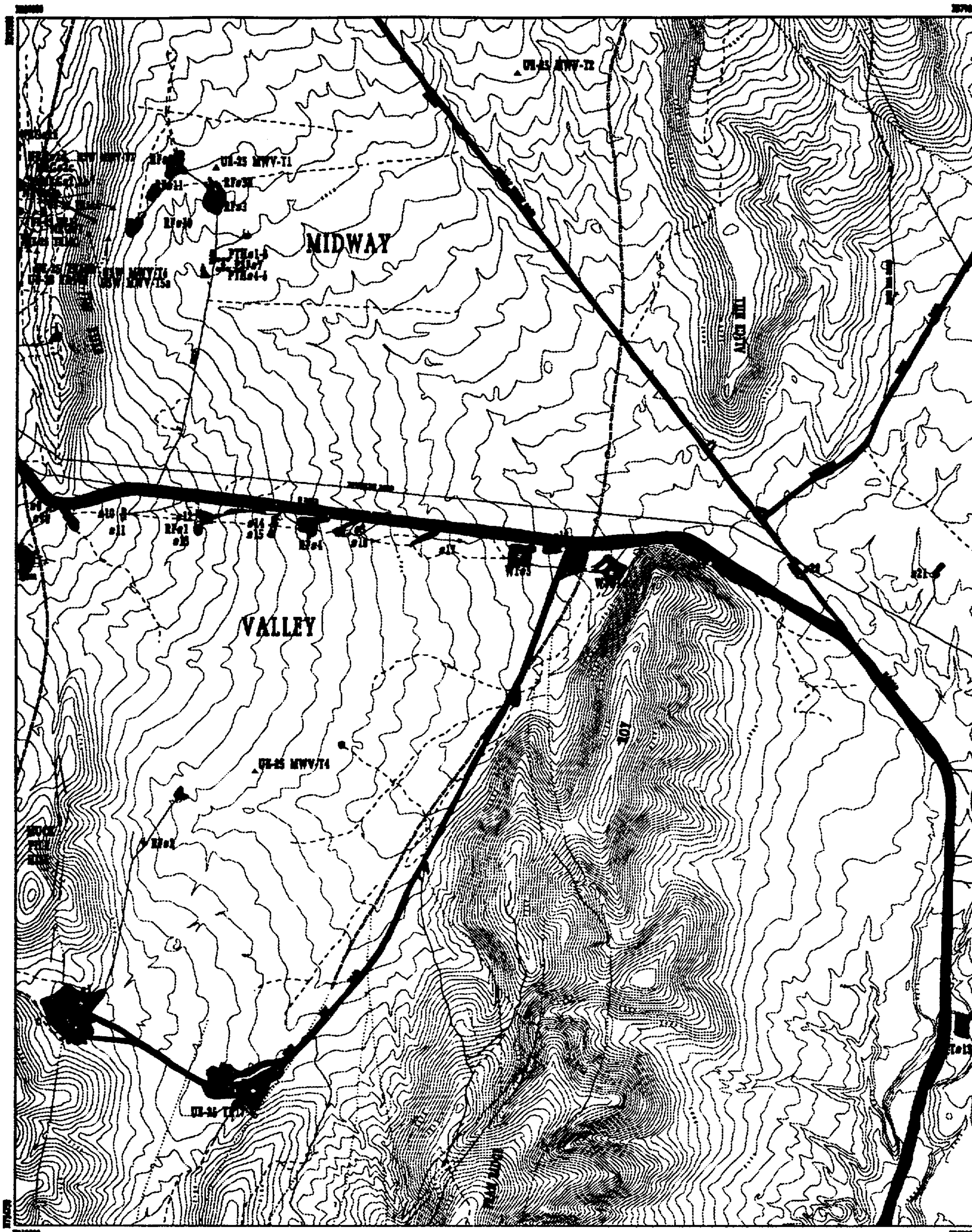
YMP-94-085.1



# YUCCA MOUNTAIN
## SITE CHARACTERIZATION PROJECT

### SURFACE-BASED TESTING ACTIVITIES WITH GEOLOGIC STRUCTURE MAP SHEET 16

YMP-94-026.3




1:6,000-scale orthophoto sheet index

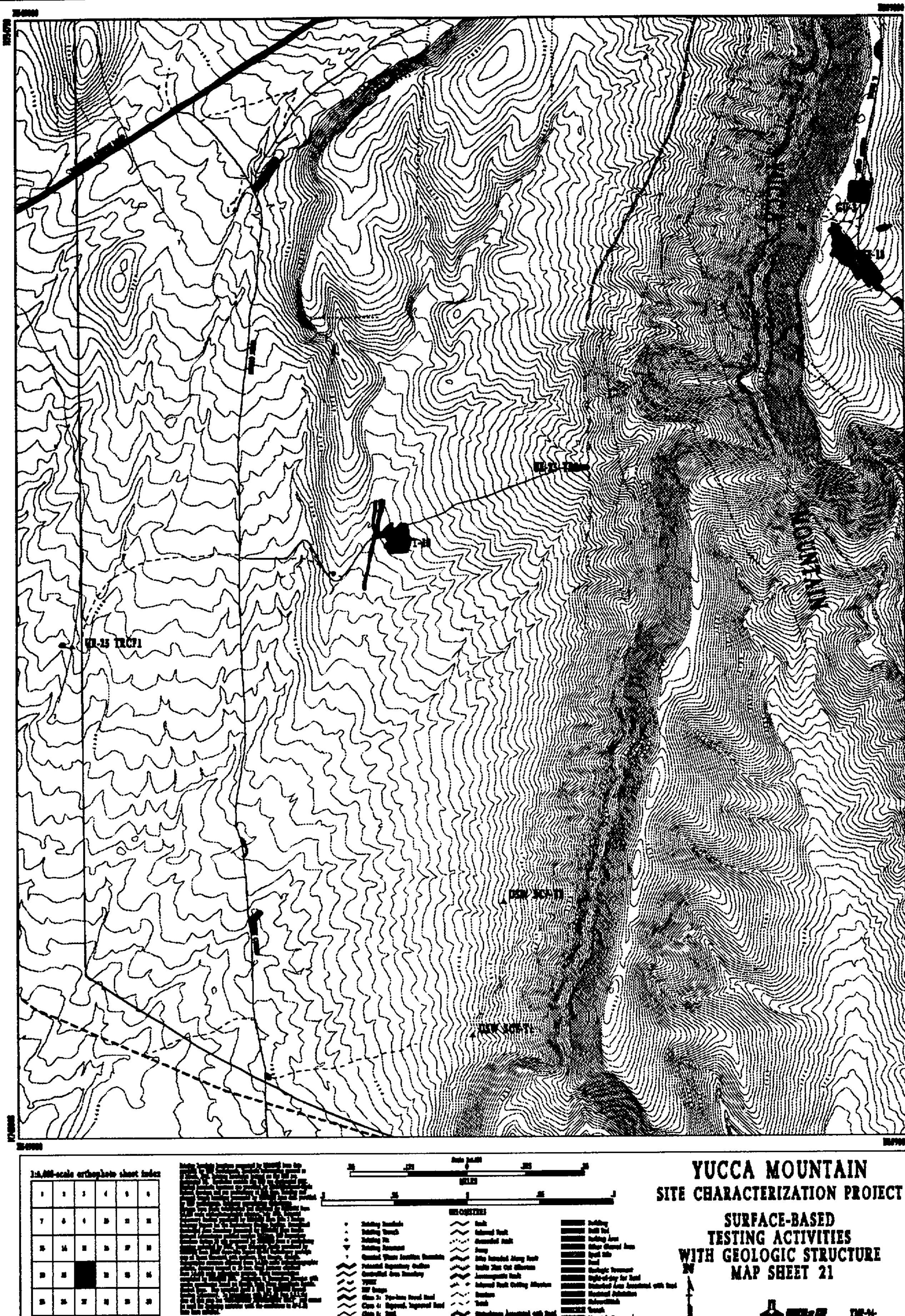
# YUCCA MOUNTAIN

## SITE CHARACTERIZATION PROJECT

### SURFACE-BASED TESTING ACTIVITIES WITH GEOLOGIC STRUCTURE MAP SHEET 17

YMP-94-0

Ymp-94-027.3

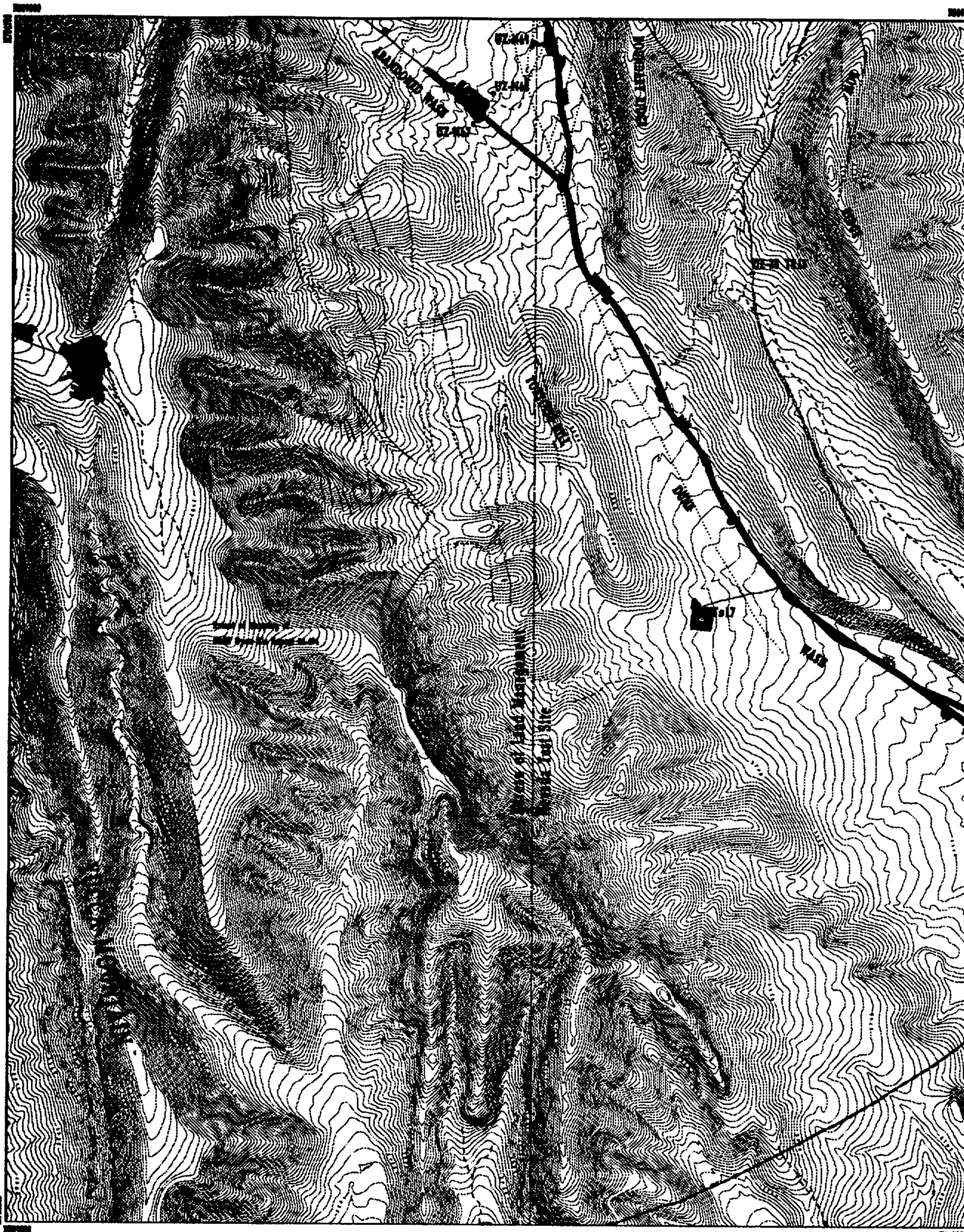



# YUCCA MOUNTAIN
## SITE CHARACTERIZATION PROJECT

SURFACE-BASED
TESTING ACTIVITIES
WITH GEOLOGIC STRUCTURE
MAP SHEET 21

YMP-94-

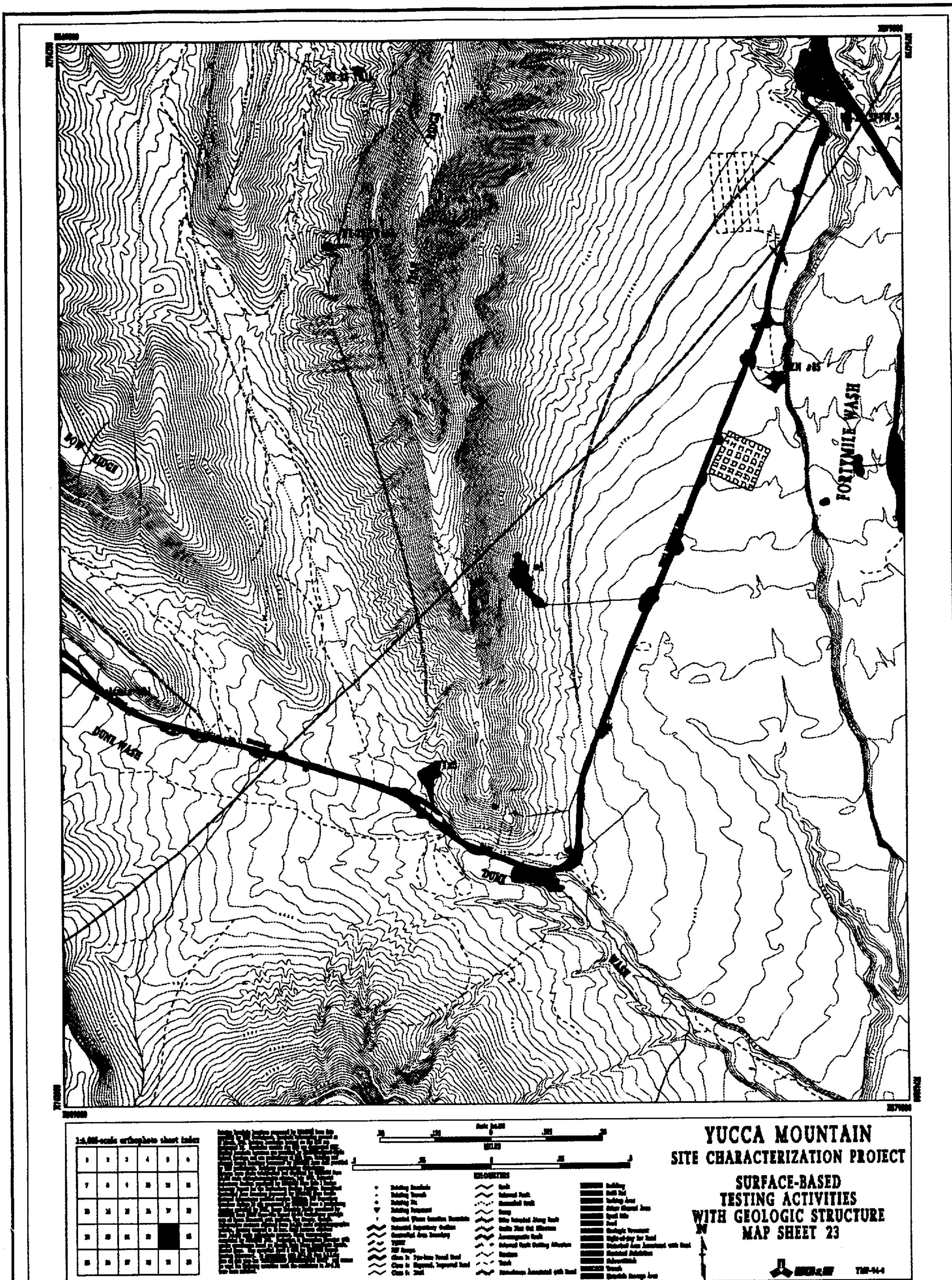
YMP-94-Ø28.3




# YUCCA MOUNTAIN
## SITE CHARACTERIZATION PROJECT
### SURFACE-BASED TESTING ACTIVITIES WITH GEOLOGIC STRUCTURE MAP SHEET 22

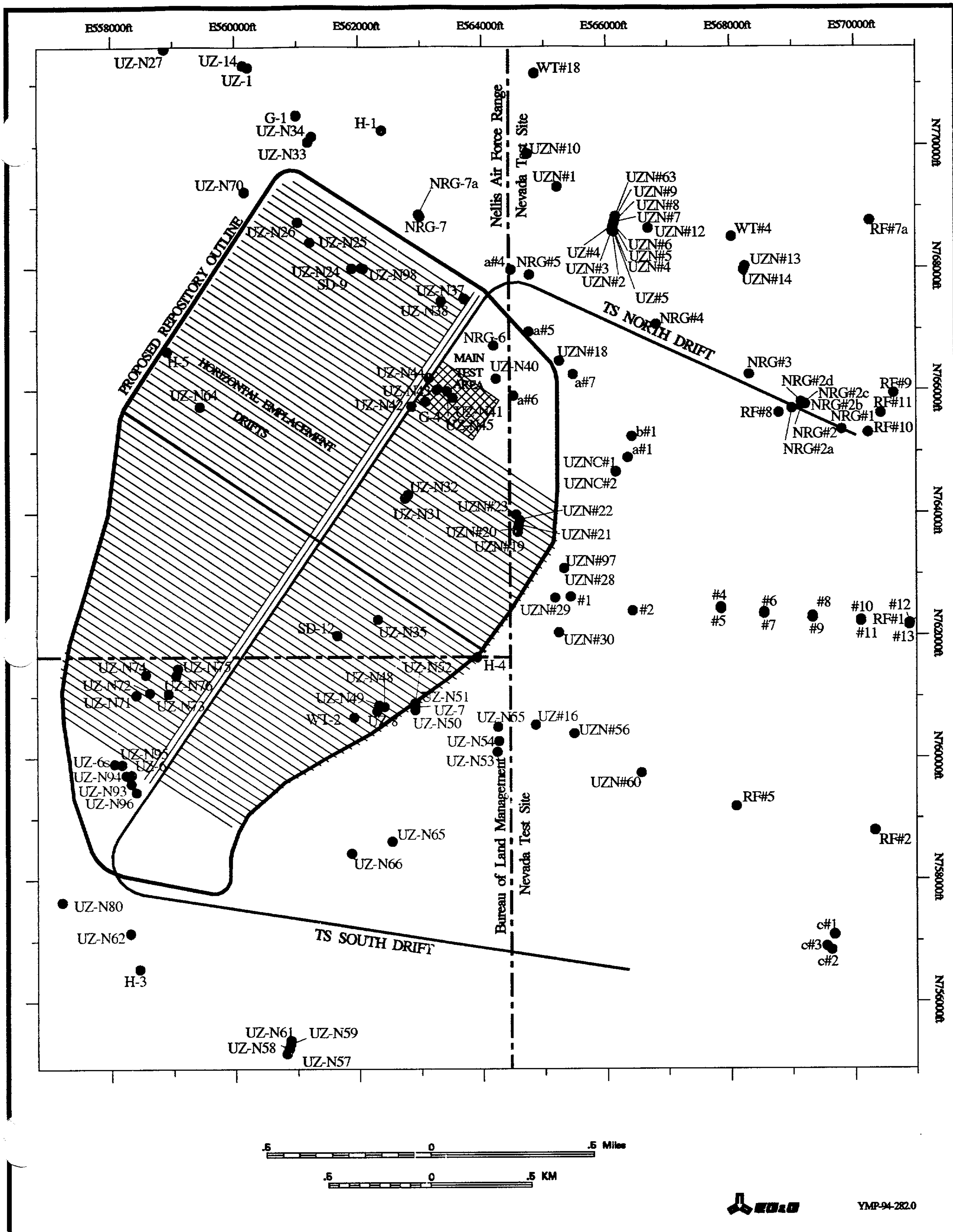
1:6,000-scale orthophoto sheet index

YMP-94-029.3



FORTYMILE WASH
DUNE WASH
BOW RIDGE
1:6,000-scale orthophoto sheet index
YUCCA MOUNTAIN
SITE CHARACTERIZATION PROJECT
SURFACE-BASED
TESTING ACTIVITIES
WITH GEOLOGIC STRUCTURE
MAP SHEET 23


YMP-94-030.3



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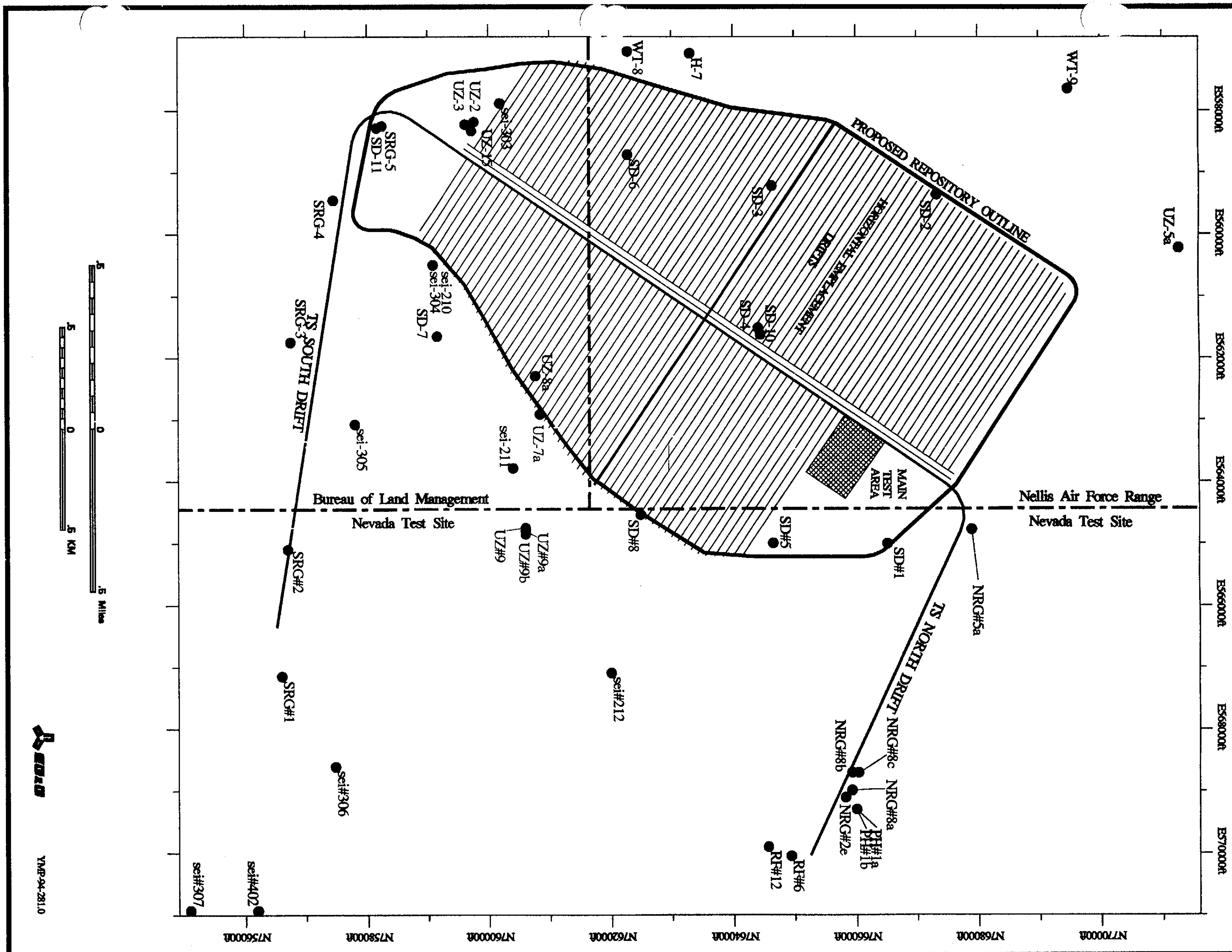
PROPOSED REPOSITORY OUTLINE
HORIZONTAL EMPLACEMENT
DRIFTS
MAIN
TEST
AREA
TS NORTH DRIFT
TS SOUTH DRIFT
Nellis Air Force Range
Nevada Test Site
Bureau of Land Management
Nevada Test Site
UZ-N27
UZ-14
UZ-1
WT#18
G-1
UZ-N34
UZ-N33
H-1
UZN#10
UZ-N70
UZN#1
NRG-7a
NRG-7
UZN#63
UZN#9
UZN#8
UZN#7
UZN#12
WT#4
RF#7a
UZ-N26
UZ-N25
UZ#4
UZN#3
UZN#2
UZN#6
UZN#5
UZN#4
UZ#5
UZN#13
UZN#14
a#4
NRG#5
UZ-N24
SD-9
UZ-N98
UZ-N37
UZ-N38
NRG#4
a#5
NRG-6
H-5
UZN#18
UZ-N40
a#7
NRG#3
UZ-N44
UZ-N43
UZ-N42
UZ-N64
a#6
NRG#2d
NRG#2c
NRG#2b
RF#9
RF#11
RF#8
NRG#1
NRG#2
NRG#2a
RF#10
G-4
UZ-N41
UZ-N45
b#1
a#1
UZNC#1
UZNC#2
UZ-N32
UZ-N31
UZN#23
UZN#22
UZN#20
UZN#21
UZN#19
UZN#97
UZN#28
#1
#2
#4
#5
#6
#7
#8
#9
#10
#11
#12
#13
RF#1
UZN#29
UZN#30
SD-12
UZ-N35
H-4
UZ-N74
UZ-N75
UZ-N72
UZ-N76
UZ-N71
UZ-N73
UZ-N48
UZ-N52
UZ-N49
UZ-N51
UZ-7
WT-2
UZ-8
UZ-N50
UZ-N55
UZ#16
UZN#56
UZ-N54
UZ-N53
UZN#60
UZ-6s
UZ-N95
UZ-6
UZ-N94
UZ-N93
UZ-N96
RF#5
RF#2
UZ-N65
UZ-N66
UZ-N80
UZ-N62
H-3
c#1
c#3
c#2
UZ-N61
UZ-N59
UZ-N58
UZ-N57
.5
0
.5 Miles
.5
0
.5 KM
YMP-94-282.0



PROPOSED REPOSITORY OUTLINE
HORIZONTAL EMPLACEMENT DRIFTS
MAIN TEST AREA
TS SOUTH DRIFT
TS NORTH DRIFT
Bureau of Land Management
Nevada Test Site
Nellis Air Force Range
Nevada Test Site
WT-8
H-7
WT-9
UZ-2
UZ-3
sei-303
UZ-15
SRG-5
SD-11
SD-6
SD-3
SD-2
SRG-4
UZ-5a
sei-210
sei-304
SD-7
SD-10
SD-4
SRG-3
UZ-8a
UZ-7a
sei-211
sei-305
SD#8
SD#5
SD#1
UZ#9a
UZ#9b
UZ#9
SRG#2
NRG#5a
SRG#1
sei#212
NRG#8c
NRG#8b
NRG#8a
NRG#2e
PH#1a
PH#1b
RF#12
RF#6
sei#306
sei#307
sei#402
E558000ft
E560000ft
E562000ft
E564000ft
E566000ft
E568000ft
E570000ft
N756000ft
N758000ft
N760000ft
N762000ft
N764000ft
N766000ft
N768000ft
N770000ft
.5 0 .5 KM
.5 0 .5 Miles
YMP-94-281.0

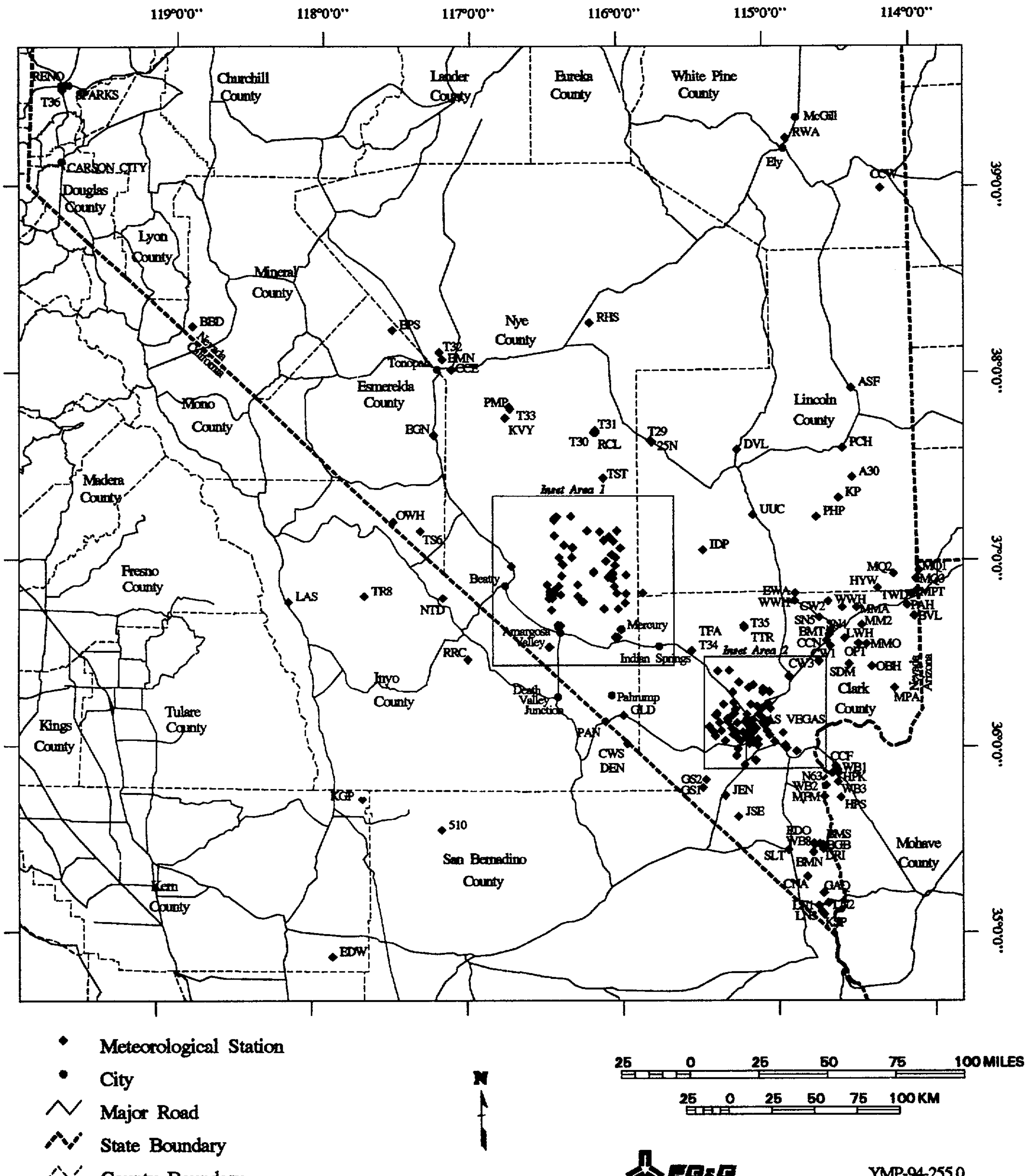



Figure 2-1. Locations of Meteorological Stations Around Yucca Mountain.

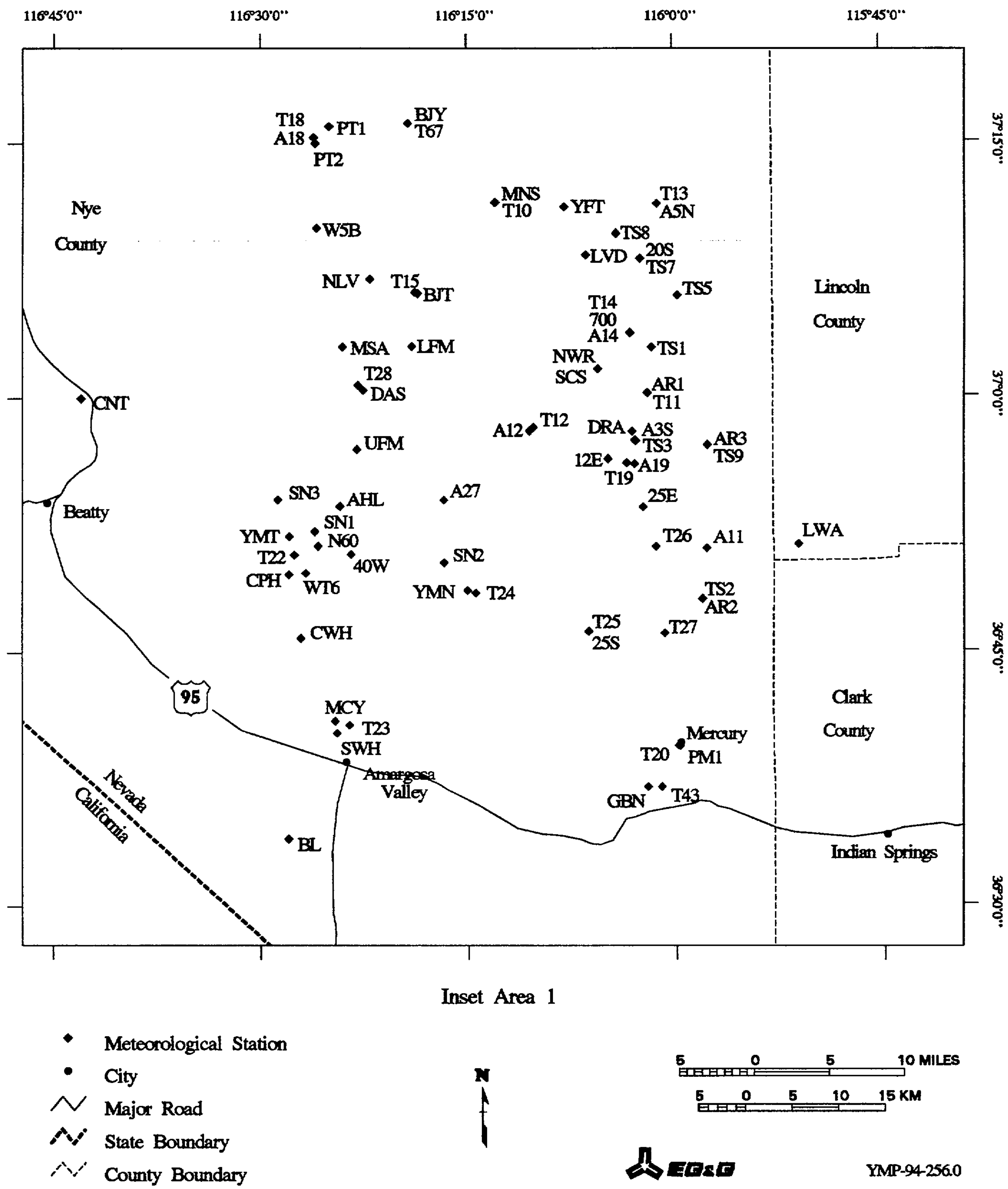
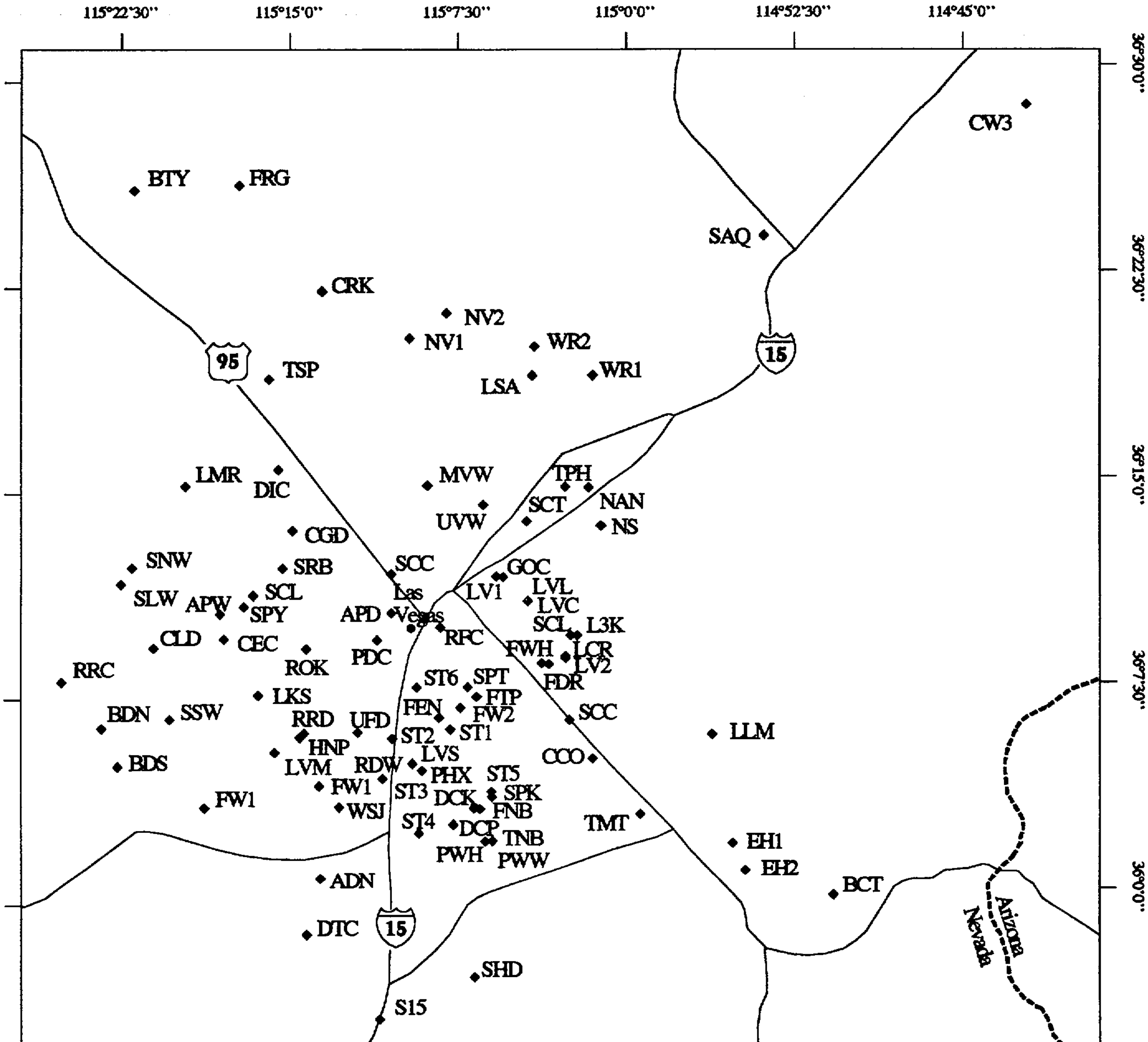
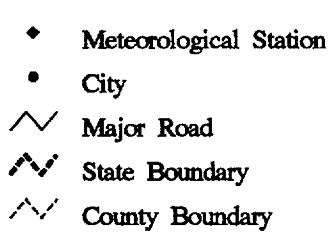
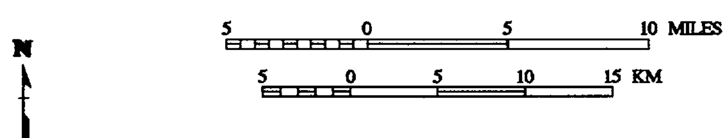



Figure 2-1. Continued.




Inset Area 2

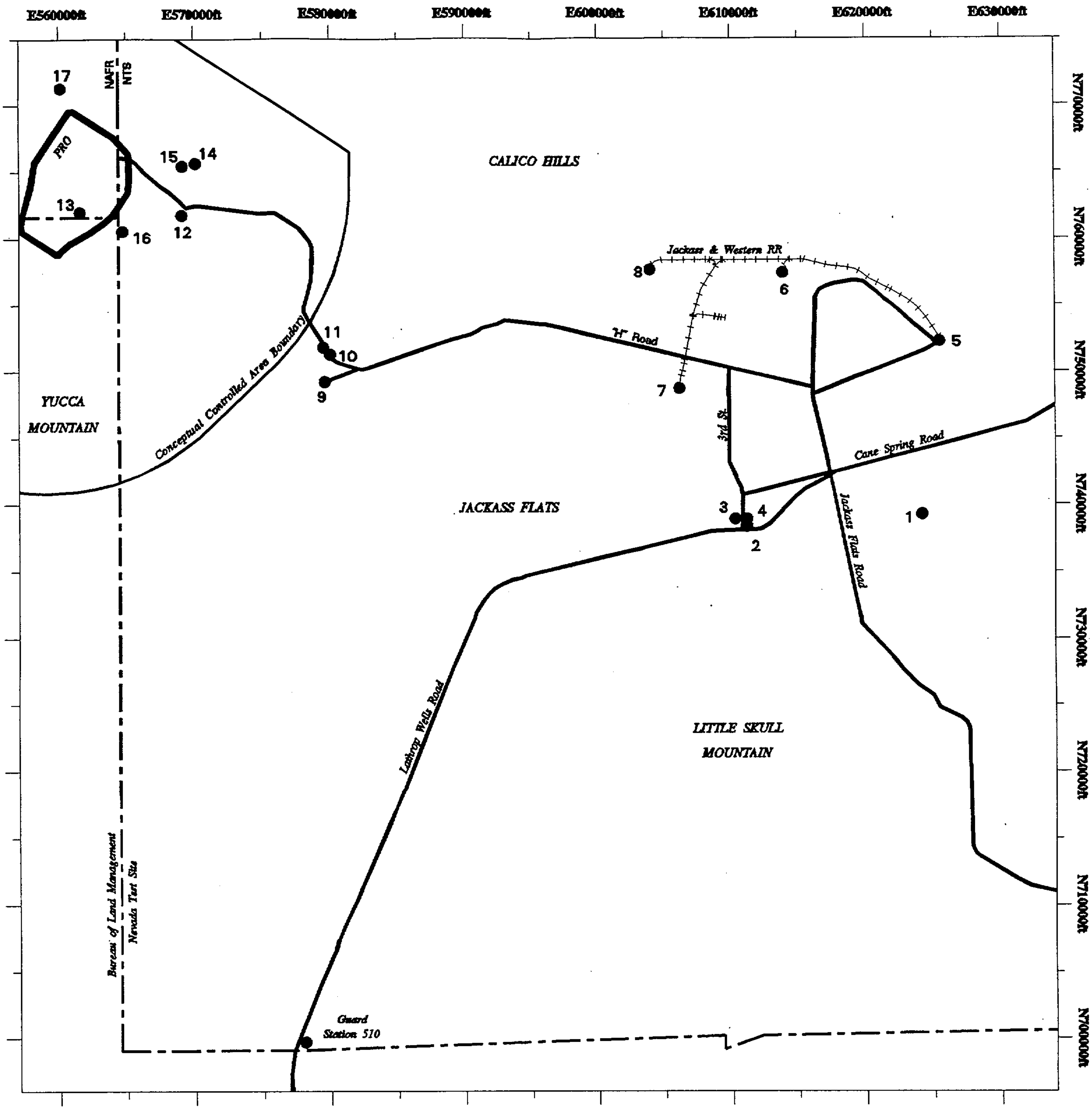


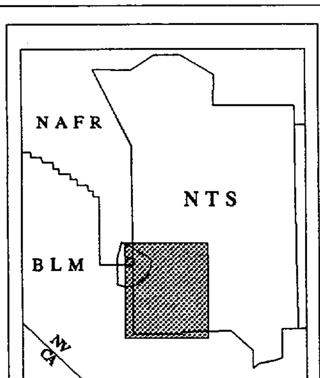




EG&G

YMP-94-275.0

Figure 2-1. Continued.




SITE CHARACTERIZATION FEATURES

● Points of Interest

1. BREN Tower
2. Field Operations Center
3. Sample Management Facility
4. Hydrological Research Facility
5. R-MAD
6. Test Cell 'C'
7. E-MAD
8. Engine Test Stand No. 1
9. Well J-13
10. Reclamation Site #3
11. Blue Water Tanks
12. 60 Meter Tower
13. Borehole SD-12
14. ESF North Portal Access Pad
15. Trench 14
16. Borehole UE-25 VSP-2 (UZ#16)
17. Borehole USW UZ-14

N

1 0 1 2 3 MILES

1 0 1 2 3 KM

Scale 1:125,000

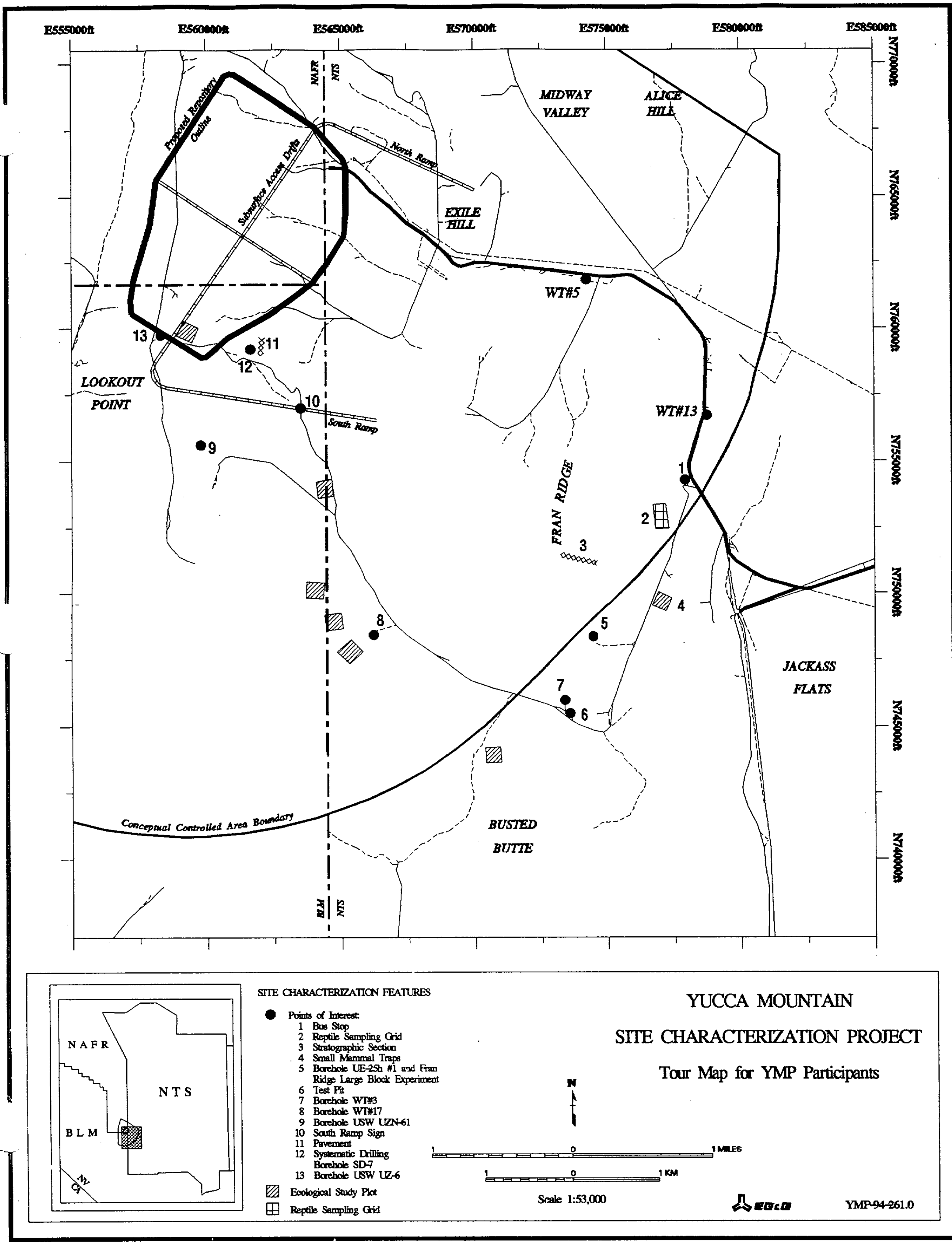
YUCCA MOUNTAIN

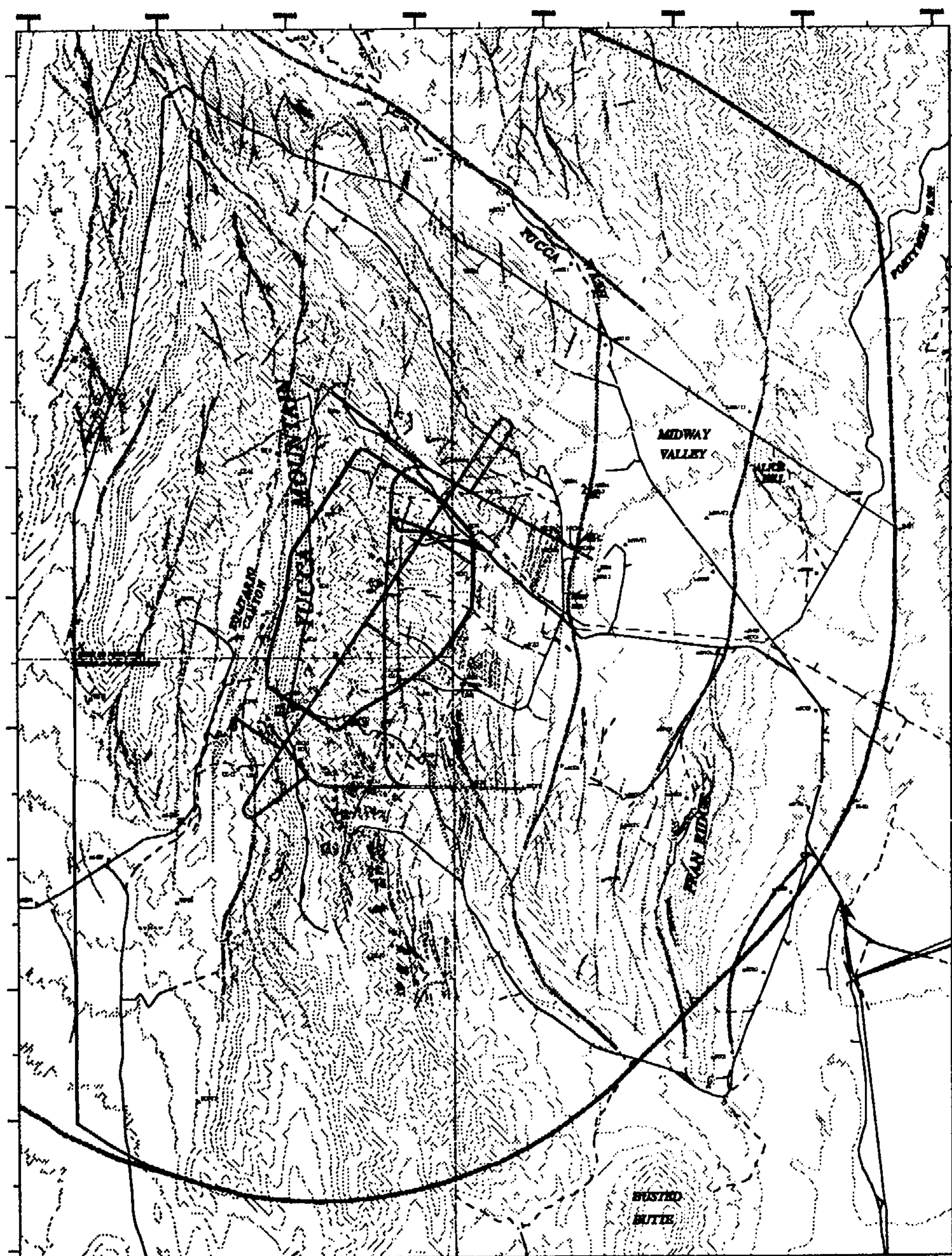
SITE CHARACTERIZATION PROJECT

Tour Map for YMP Participants

EG&G

YMP-94-262.0


E555000ft
E560000ft
E565000ft
E570000ft
E575000ft
E580000ft
E585000ft
N770000ft
N765000ft
N760000ft
N755000ft
N750000ft
N745000ft
N740000ft
NAFR
NTS
Proposed Repository Outline
Subsurface Access Drifts
North Ramp
South Ramp
MIDWAY VALLEY
ALICE HILL
EXILE HILL
WT#5
WT#13
LOOKOUT POINT
FRAN RIDGE
JACKASS FLATS
BUSTED BUTTE
Conceptual Controlled Area Boundary
BLM
NTS
SITE CHARACTERIZATION FEATURES
Points of Interest:
1 Bus Stop
2 Reptile Sampling Grid
3 Stratographic Section
4 Small Mammal Traps
5 Borehole UE-25h #1 and Fran Ridge Large Block Experiment
6 Test Pit
7 Borehole WT#3
8 Borehole WT#17
9 Borehole USW UZN-61
10 South Ramp Sign
11 Pavement
12 Systematic Drilling Borehole SD-7
13 Borehole USW UZ-6
Ecological Study Plot
Reptile Sampling Grid
NAFR
NTS
BLM
NV
CA
N
1 MILES
1 KM
Scale 1:53,000
YUCCA MOUNTAIN
SITE CHARACTERIZATION PROJECT
Tour Map for YMP Participants
YMP-94-261.0



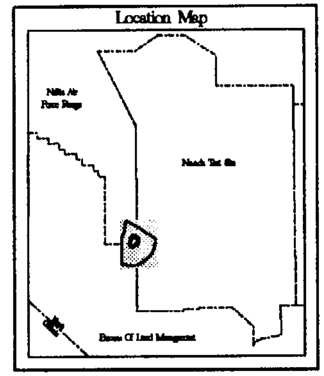

YUCCA MOUNTAIN

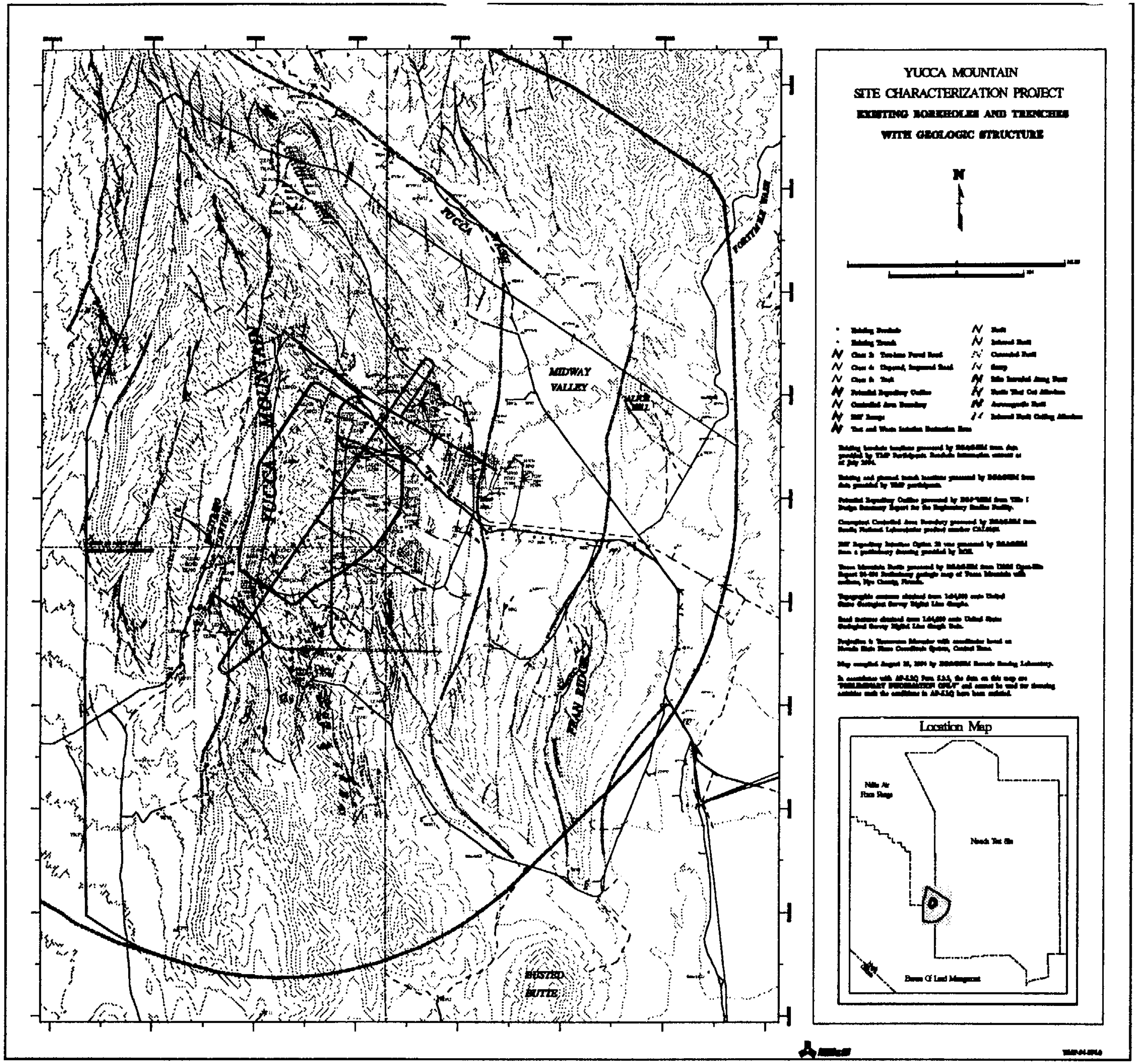
SITE CHARACTERIZATION PROJECT

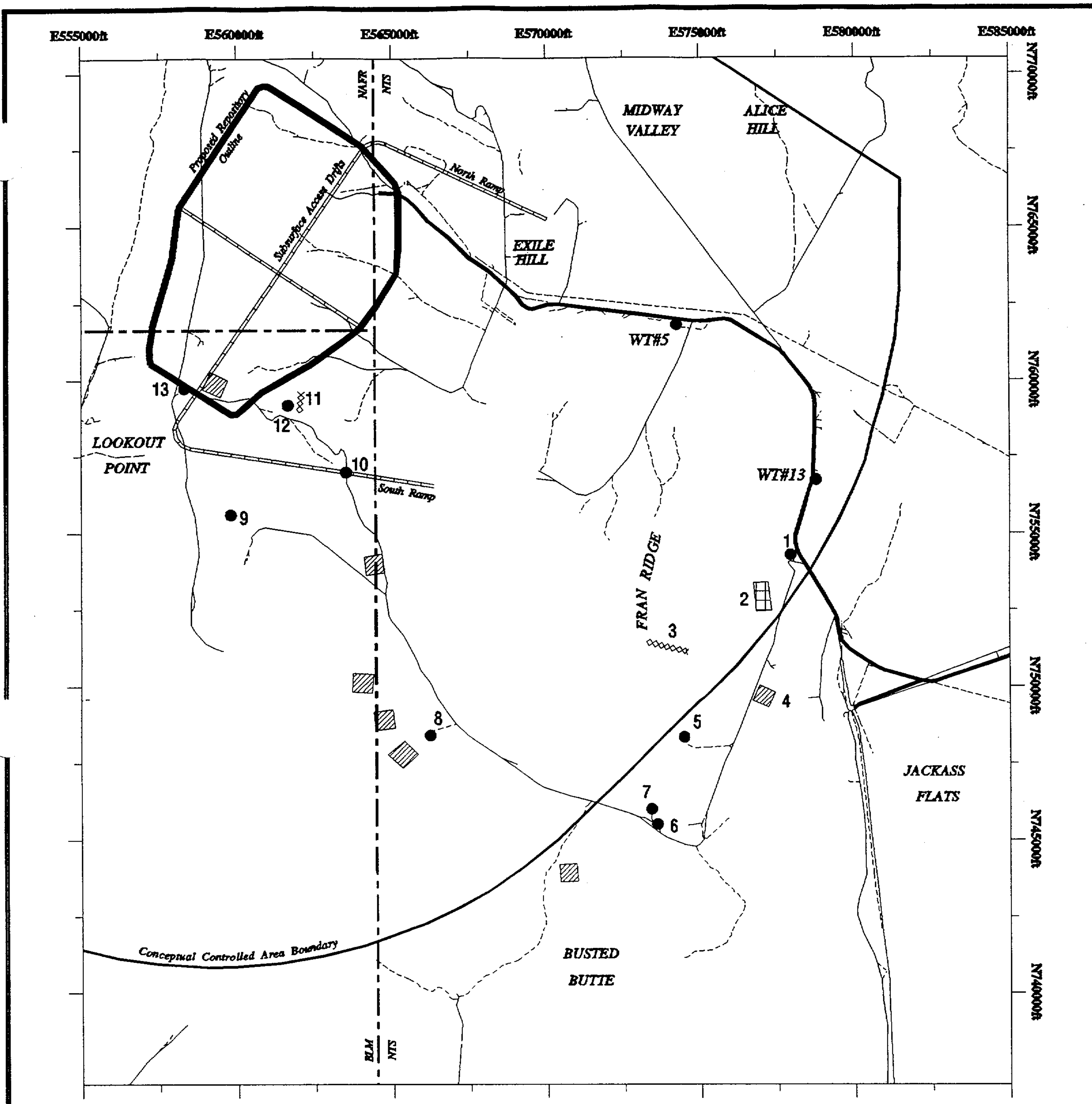
**PLANNED BOREHOLES AND TRENCHES**

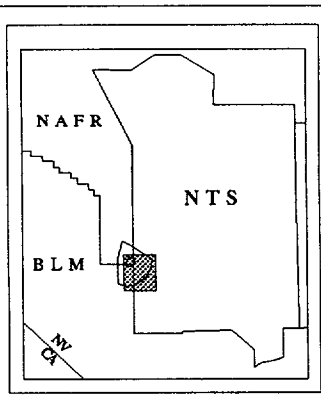
**WITH GEOLOGIC STRUCTURE**

Location Map




YUCCA MOUNTAIN
SITE CHARACTERIZATION PROJECT
EXISTING BOREHOLES AND TRENCHES
WITH GEOLOGIC STRUCTURE
N
Location Map
Nevada Test Site
Bureau Of Land Management
YUCCA
MOUNTAIN
MIDWAY
VALLEY
FRAN RIDGE
BUSTED
BUTTE




SITE CHARACTERIZATION FEATURES

- ● Points of Interest:
  1. Bus Stop
  2. Reptile Sampling Grid
  3. Stratigraphic Section
  4. Small Mammal Traps
  5. Borehole UE-25h #1 and Fran Ridge Large Block Experiment
  6. Test Pit
  7. Borehole WT#3
  8. Borehole WT#17
  9. Borehole USW UZN-61
  10. South Ramp Sign
  11. Pavement
  12. Systematic Drilling Borehole SD-7
  13. Borehole USW UZ-6
- Ecological Study Plot
- Reptile Sampling Grid

N

1 0 1 MILES

1 0 1 KM

Scale 1:53,000

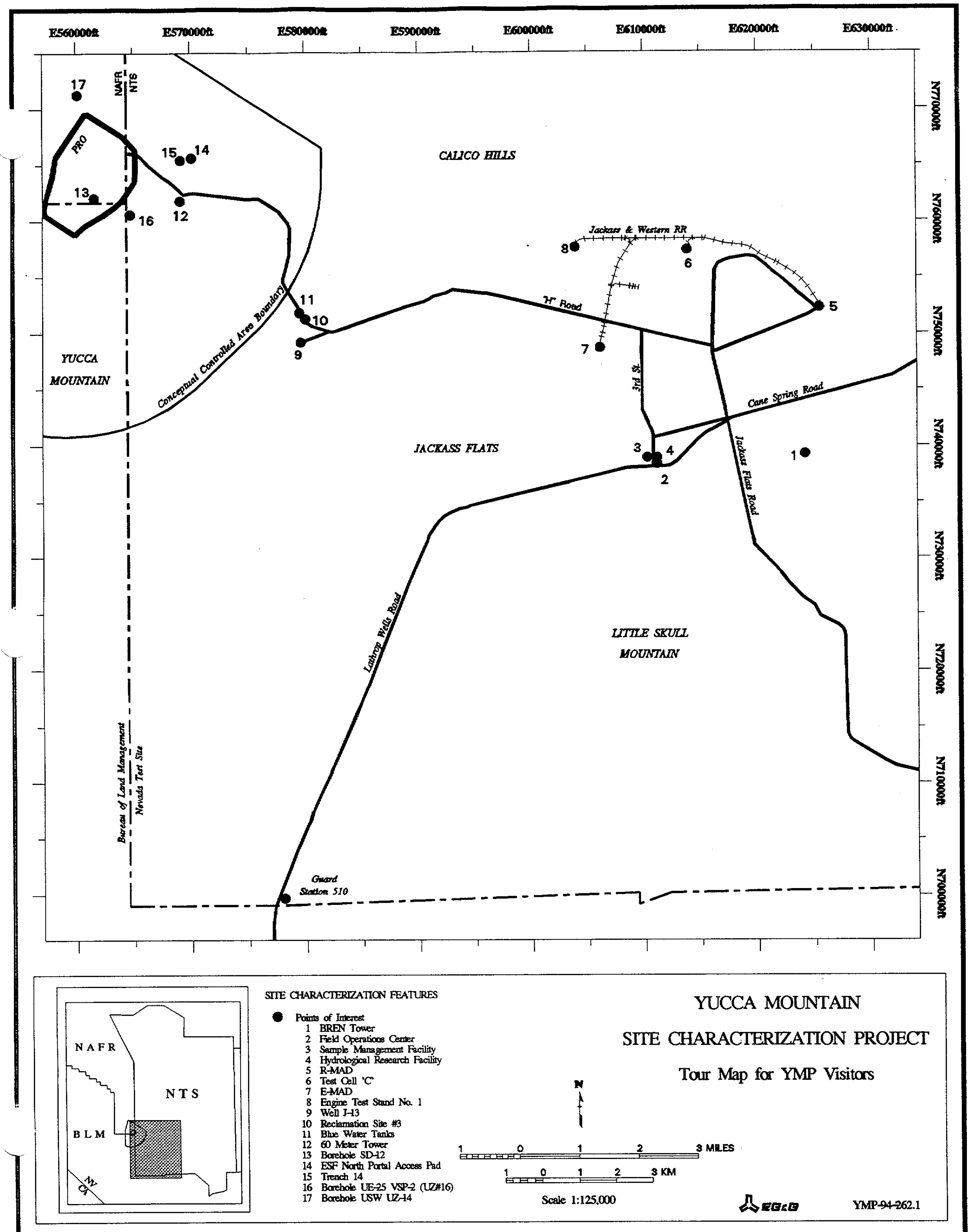
YUCCA MOUNTAIN

SITE CHARACTERIZATION PROJECT

Tour Map for YMP Visitors

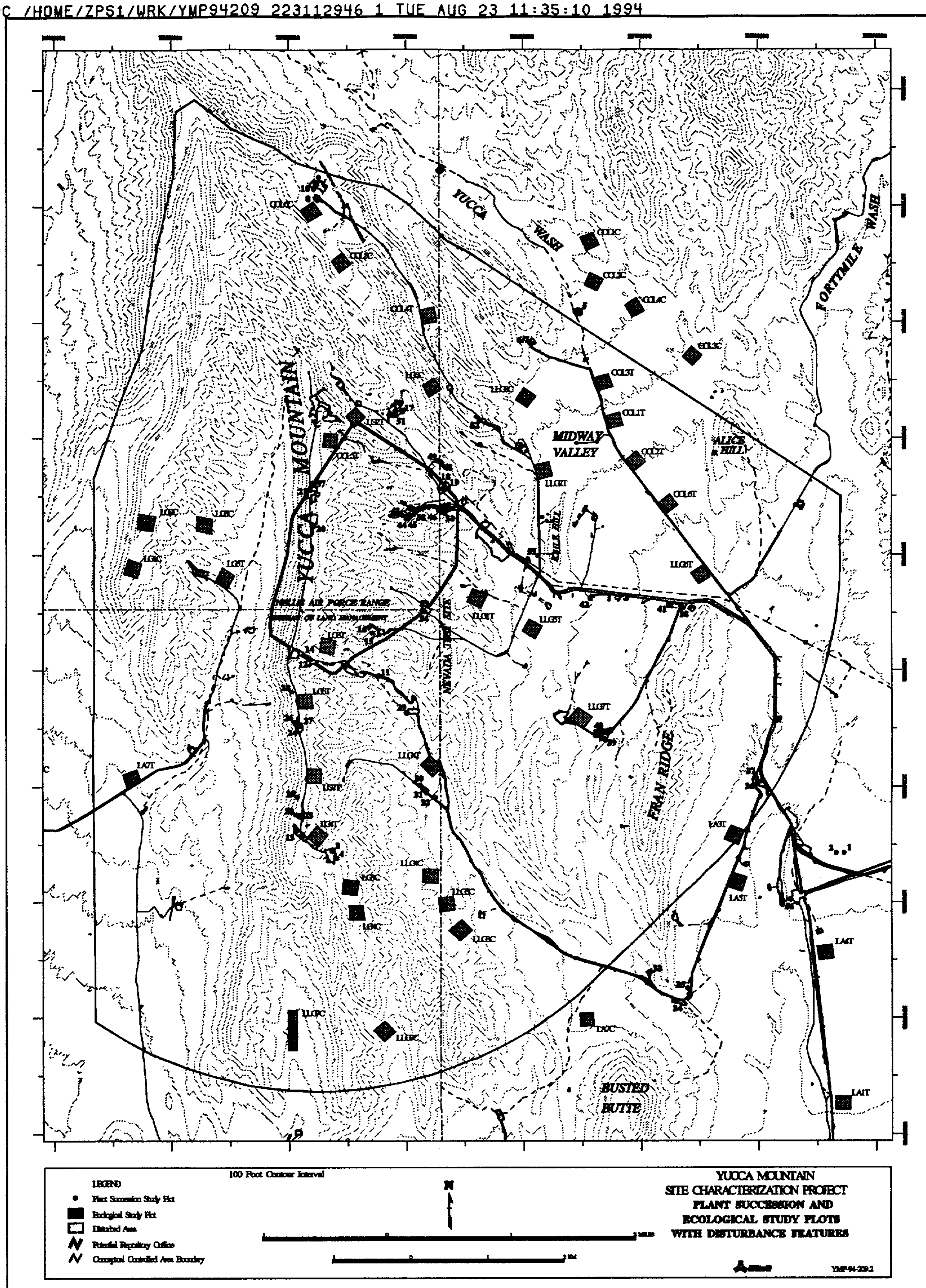
EG&G

YMP-94-261.1



E560000ft
E570000ft
E580000ft
E590000ft
E600000ft
E610000ft
E620000ft
E630000ft
N770000ft
N760000ft
N750000ft
N740000ft
N730000ft
N720000ft
N710000ft
N700000ft
NAFR
NTS
PRO
CALICO HILLS
Jackass & Western RR
"H" Road
Conceptual Controlled Area Boundary
YUCCA MOUNTAIN
3rd St.
Cane Spring Road
JACKASS FLATS
Jackass Flats Road
Lathrop Wells Road
LITTLE SKULL MOUNTAIN
Bureau of Land Management
Nevada Test Site
Guard Station 510
NAFR
NTS
BLM
NV
CA
SITE CHARACTERIZATION FEATURES
Points of Interest
1 BREN Tower
2 Field Operations Center
3 Sample Management Facility
4 Hydrological Research Facility
5 R-MAD
6 Test Cell 'C'
7 E-MAD
8 Engine Test Stand No. 1
9 Well J-13
10 Reclamation Site #3
11 Blue Water Tanks
12 60 Meter Tower
13 Borehole SD-12
14 ESF North Portal Access Pad
15 Trench 14
16 Borehole UE-25 VSP-2 (UZ#16)
17 Borehole USW UZ-14
N
1 0 1 2 3 MILES
1 0 1 2 3 KM
Scale 1:125,000
YUCCA MOUNTAIN
SITE CHARACTERIZATION PROJECT
Tour Map for YMP Visitors
EG&G
YMP-94-262.1

WALR DC /HOME/ZPS1/WRK/YMP94209 223112946 1 TUE AUG 23 11:35:10 1994

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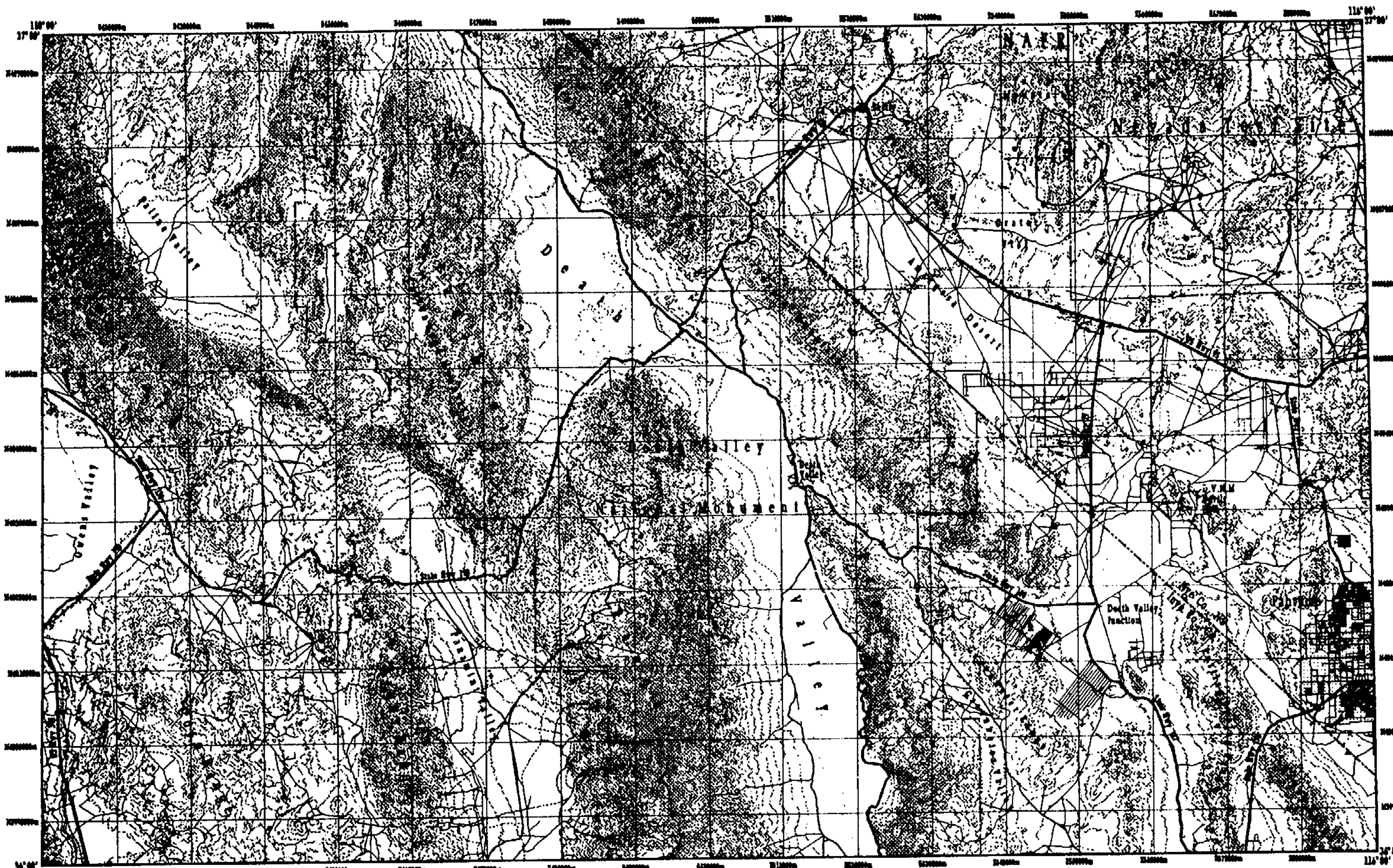
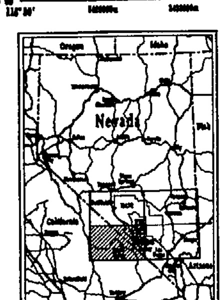


Location of map TMP-93-154.0

A. Potential Repository Outline
B. Conceptual Controlled Area Boundary

MILES

KILOMETERS

Scale 1:250,000

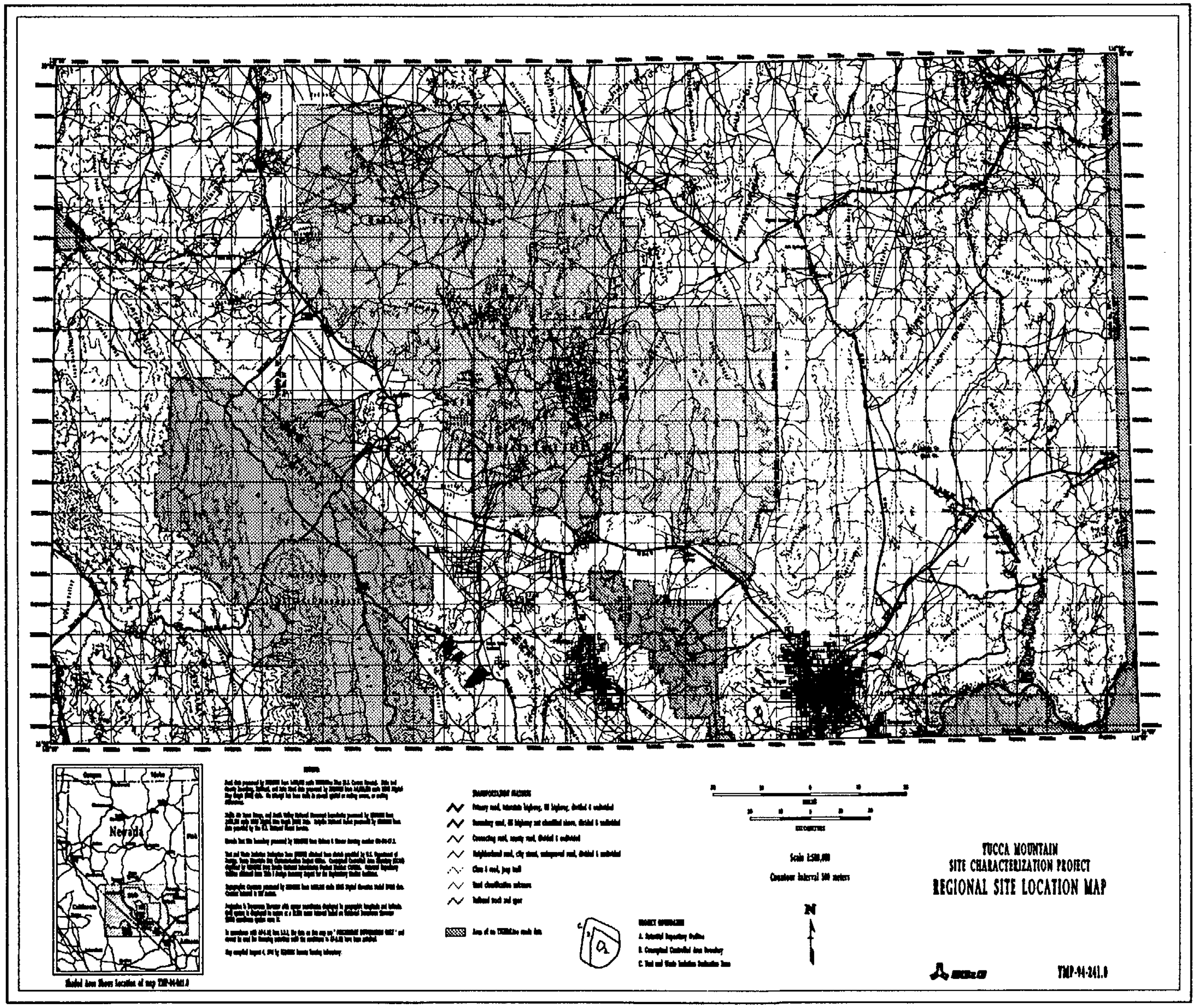
Contour Interval 100 meters

N

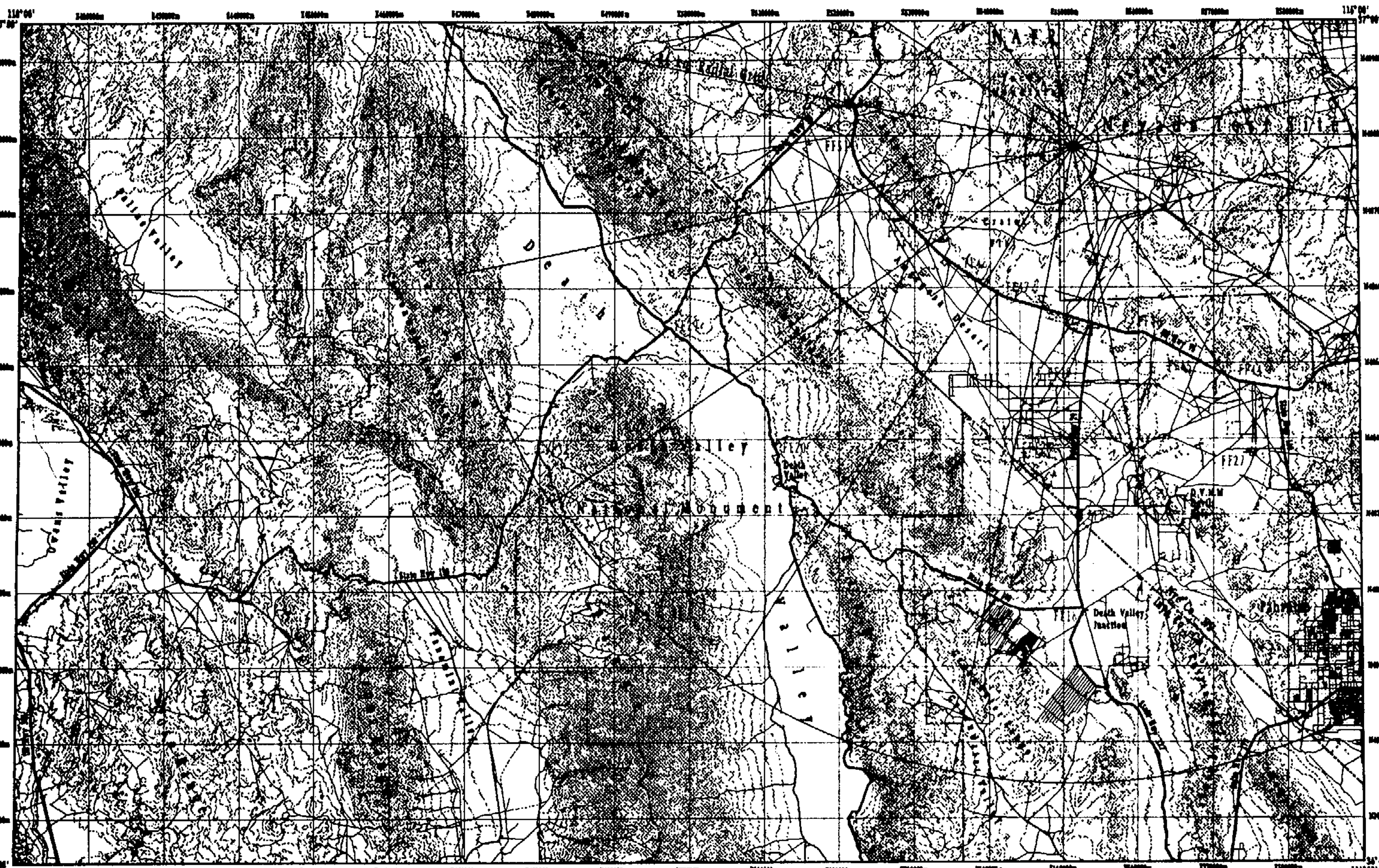
# YUCCA MOUNTAIN
## SITE CHARACTERIZATION PROJECT
## SOUTHERN GREAT BASIN
## DIGITAL SEISMIC NETWORK PLANNING MAP

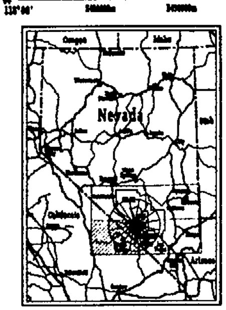
USGS 1:250,000 Scale Death Valley, CA Quadrangle

TMP-93-154.0



Nevada
California
N
YUCCA MOUNTAIN
SITE CHARACTERIZATION PROJECT
REGIONAL SITE LOCATION MAP
YMP-94-241.0




Scale 1:250,000

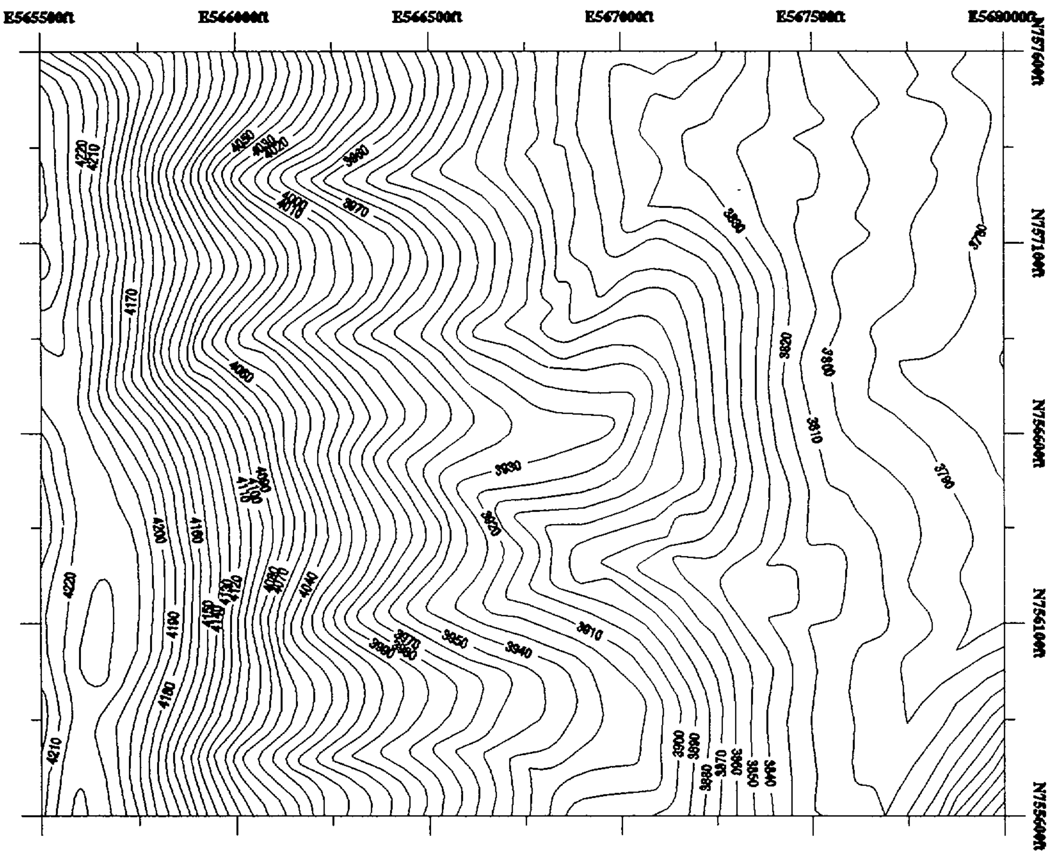
Contour Interval 100 meters

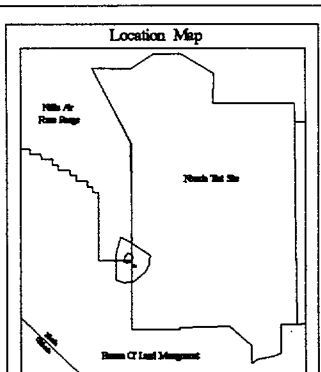
YUCCA MOUNTAIN
SITE CHARACTERIZATION PROJECT

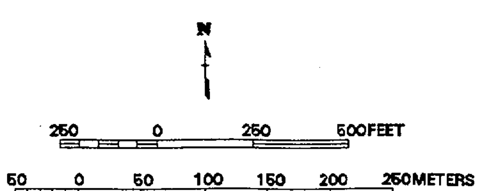
# FAR FIELD RADIOLOGICAL ENVIRONMENTAL MONITORING STATION LOCATIONS

USGS 1:250,000 Scale Death Valley, CA/NV Quadrangle

YMP-94-180.0



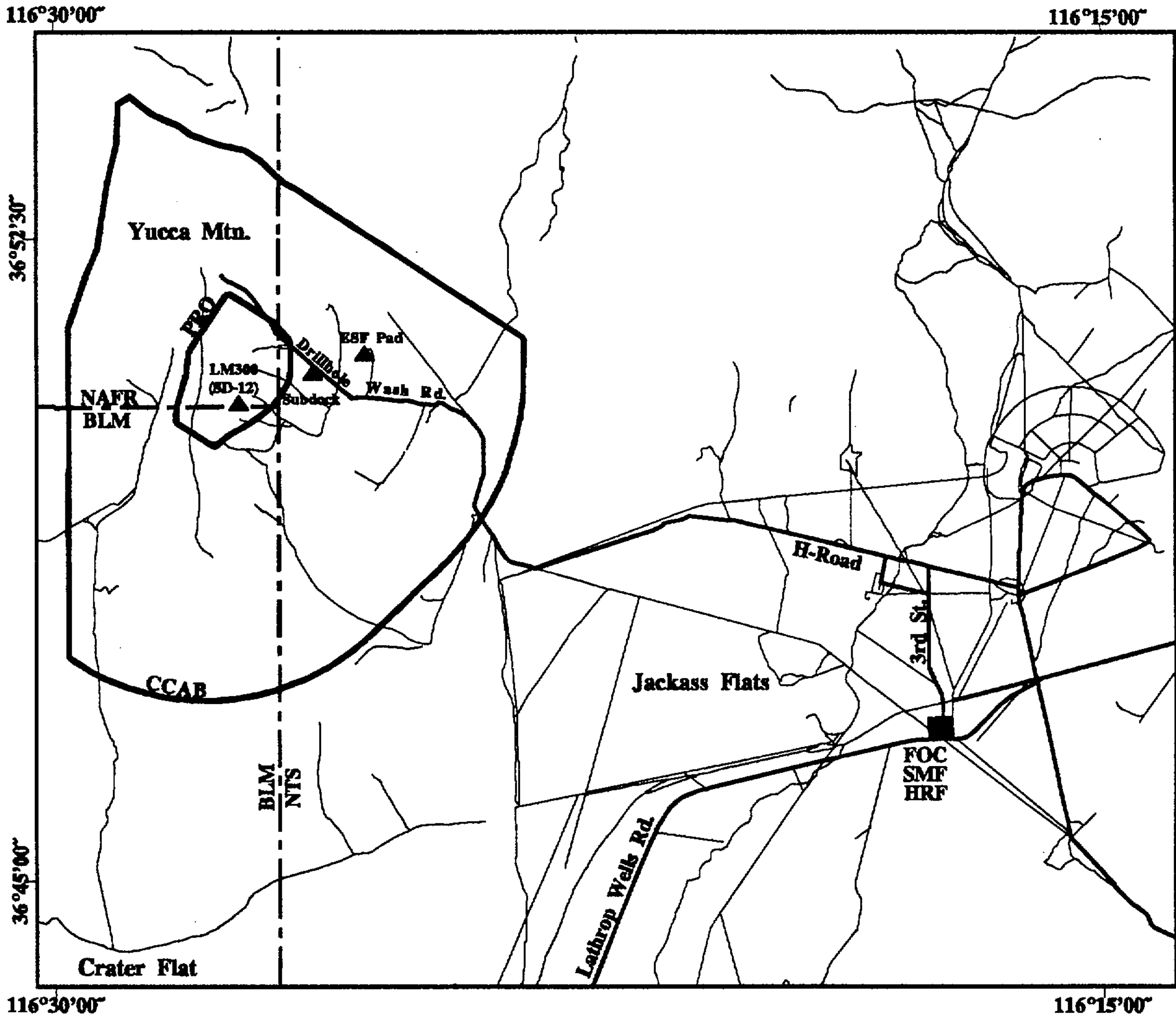

Scale 1:6,000

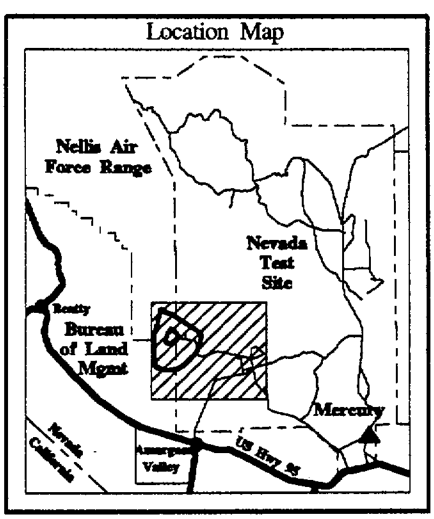
YUCCA MOUNTAIN

SITE CHARACTERIZATION PROJECT

Ten Foot Contour Lines

YMP-94-273.0




MILES

KILOMETERS

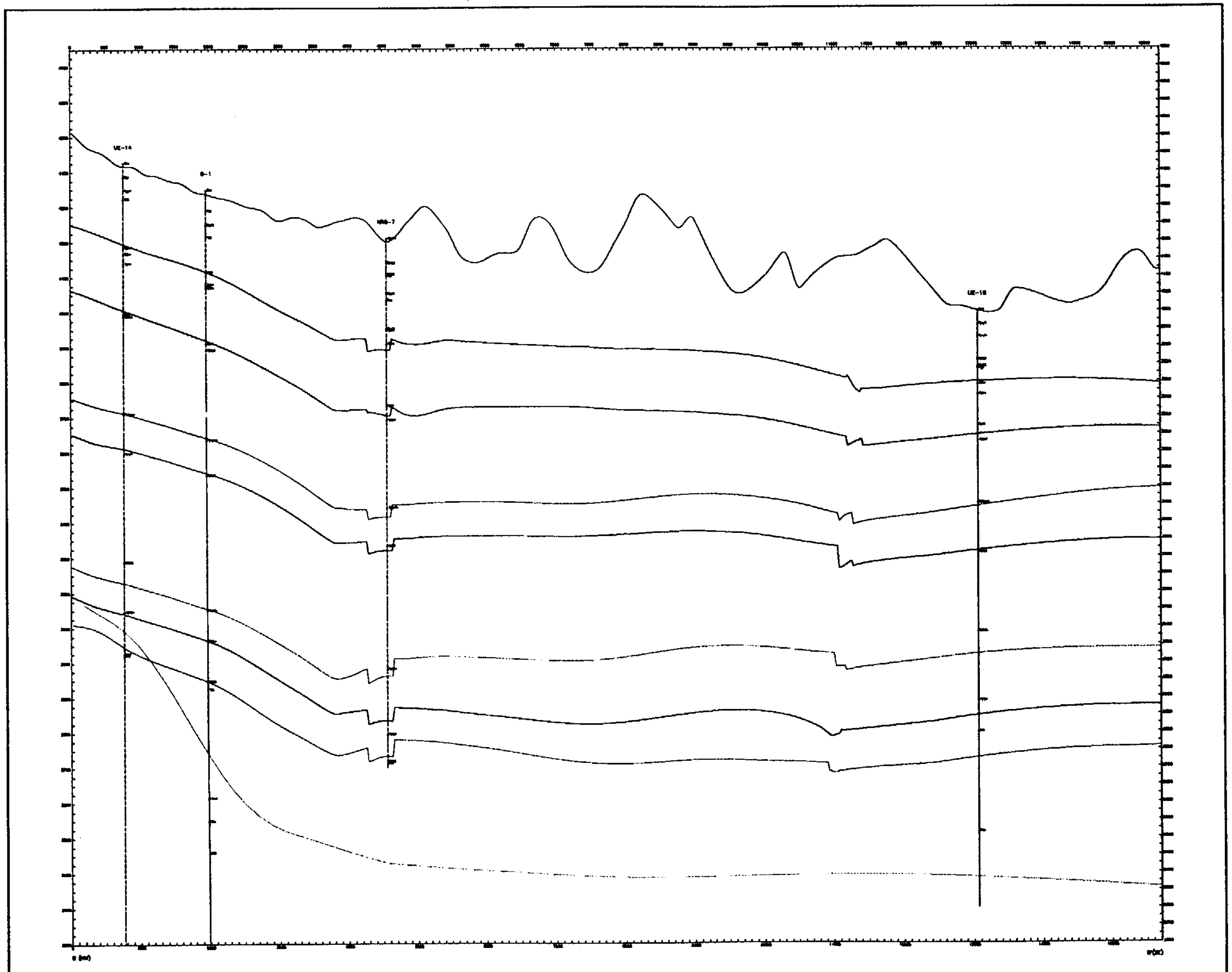
**YUCCA MOUNTAIN**
**SITE CHARACTERIZATION PROJECT**
# MAJOR DIESEL FUEL STORAGE LOCATIONS

▲ Diesel Fuel Storage Location

PRO = Proposed Repository Outline
CCAB = Conceptual Controlled Area Boundary
FOC = Field Operations Center
SMF = Sample Management Facility
HRF = Hydrological Research Facility

EG&G

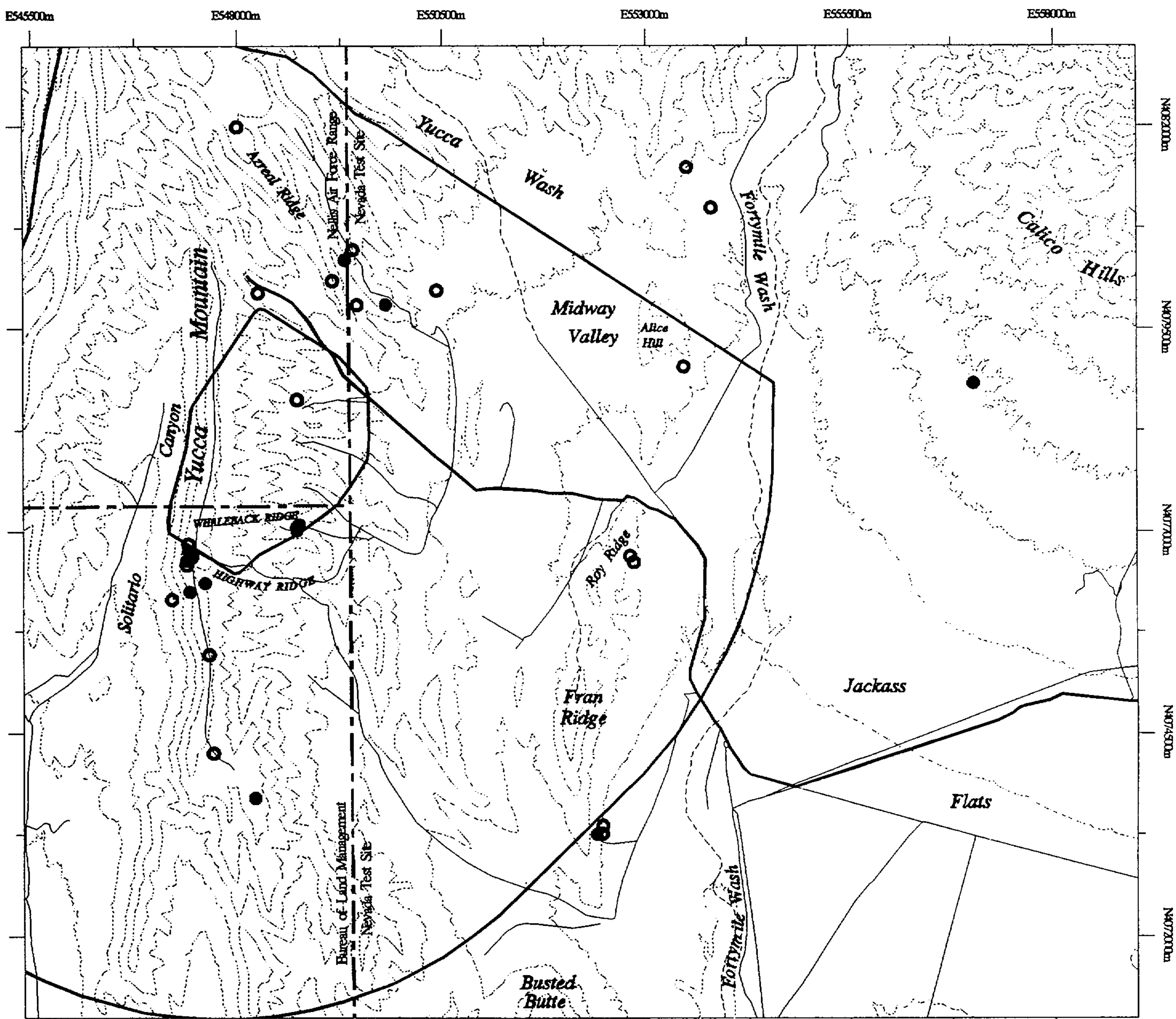
YMP-94-258.0




Cross Section B-B'

Vertical Scale: 1 in = 150 ft
Horizontal Scale: 1 in = 600 ft
0 500 1000 1500
FEET

Topography
Top Caprock
Top Upper Lithophysal
Top Middle Non-Lithophysal
Top Lower Lithophysal
Top Lower Non-Lithophysal
Top Basal Vitrophyre
Base Topopah Spring
Water Table




1 0 1 Miles

1 0 1 2 Km

Contour Interval 200 Feet

N

LOCATIONS
- ○ 1993
- ● 1994

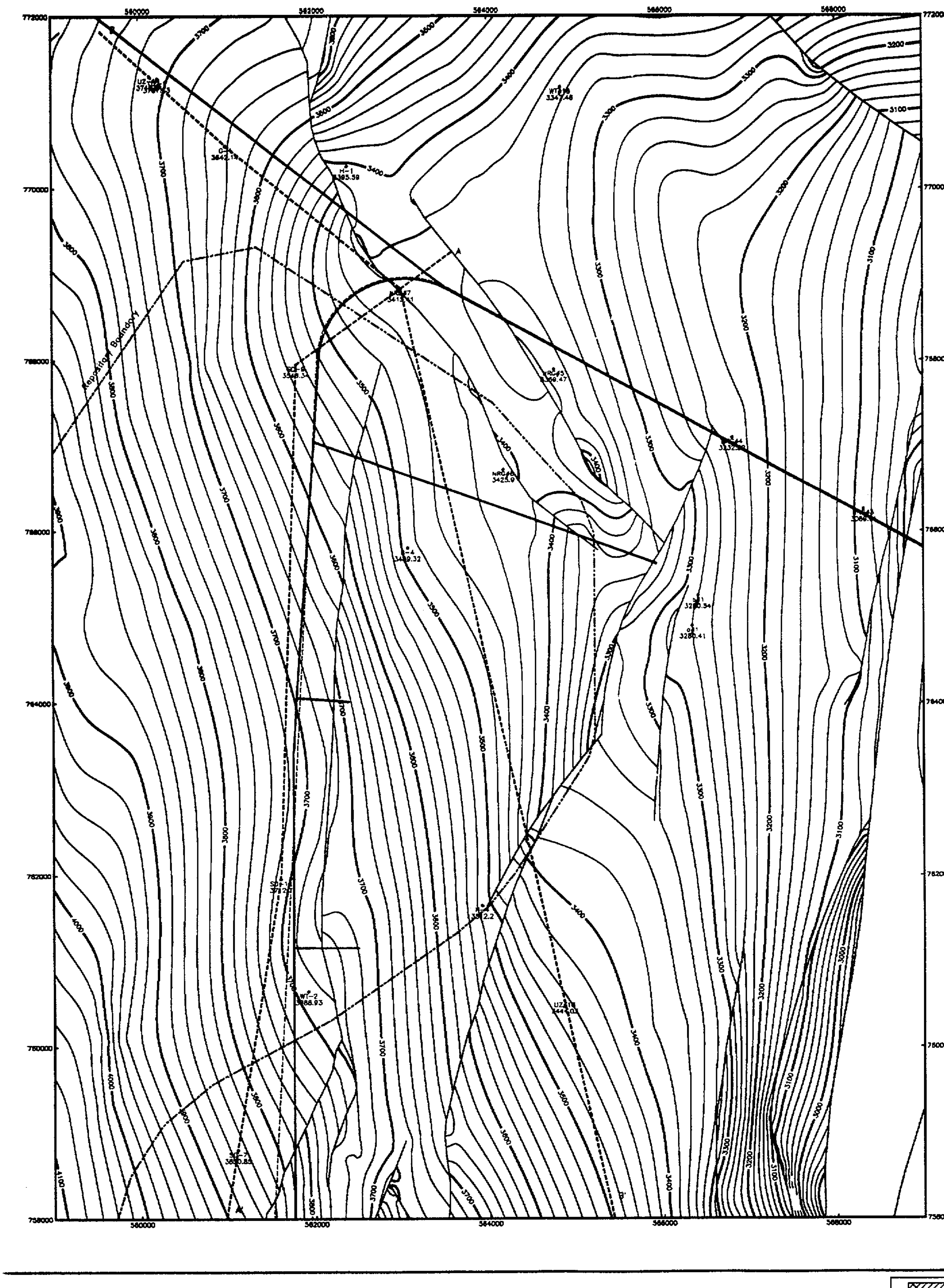
ROADS
- Light Duty, Class 3, Hard Surface
- Unimproved, Class 4, Gravel Surface
- Trail, Class 5, Four Wheel Drive or Other

YUCCA MOUNTAIN
SITE CHARACTERIZATION PROJECT

## CHUCKWALLA OBSERVATION LOCATIONS

EG&G

YMP-94-253.0




The structure contours are based on the USGS Demonstration Lithostratigraphic Model that was converted from Lynx to EarthVision by EG&G/EM. The TVD value annotated at the drillhole is the value of the horizon at the location of the drillhole and not the picked depth (i.e., the USGS model does honor the data). This also holds true for the SD wells.

Original Exploratory Studies Facility is solid purple line, dashed purple line is new alignment.

# Top Middle Non-Lithophysal

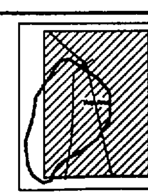
Contour Interval: 20 ft

Scale 1: 6,000

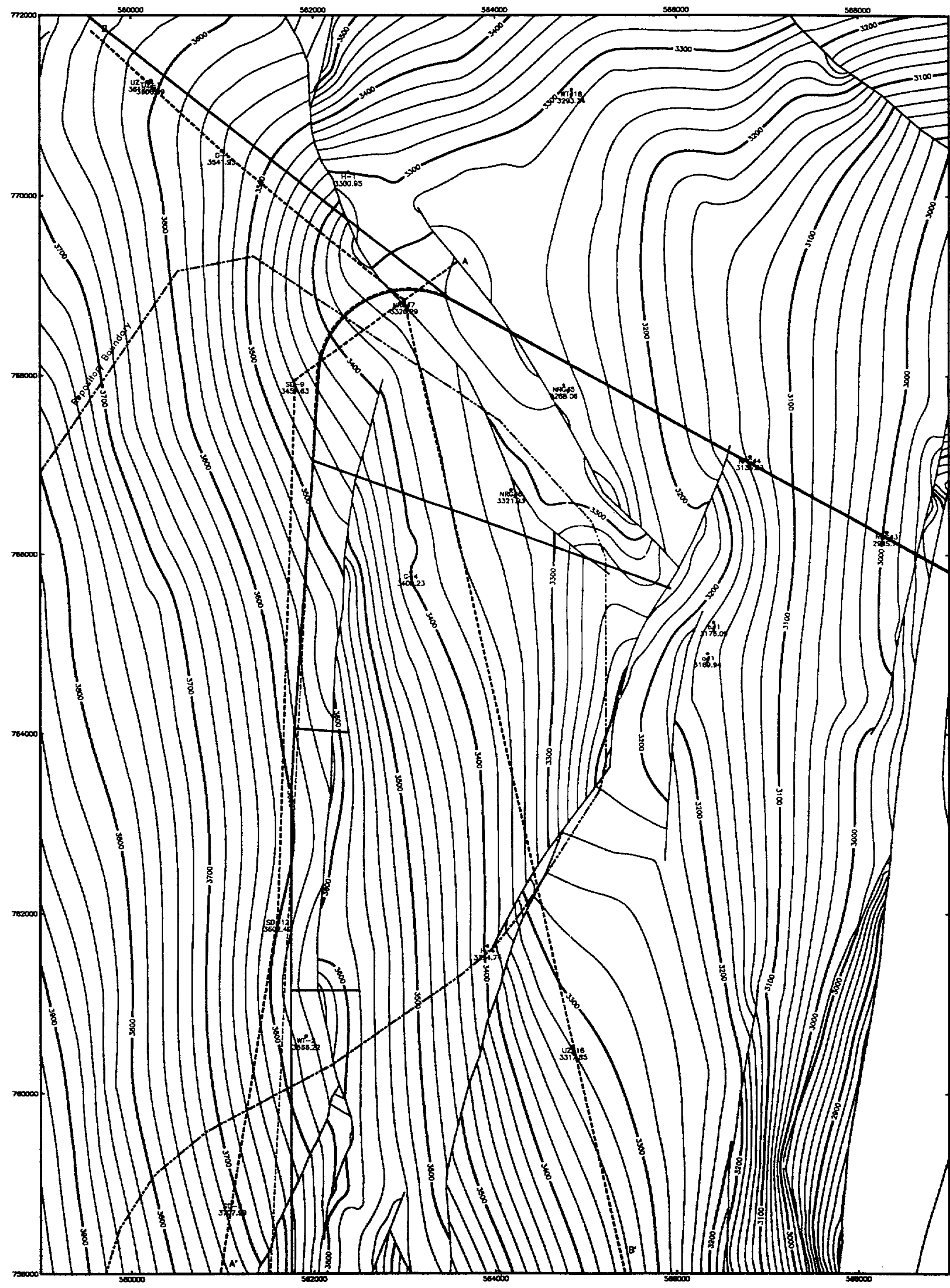
0 500 1000 1500

FEET

- Repository Boundary
- ESF (original)
- ESF (new alignment)
- Faults
- Cross Section Traverses



Jul 27 09: 16: 24 1994 Vol. 3d. 217




## Base Middle Non-Lithophysal

Contour Interval: 20 ft

Scale: 1 in = 500 ft

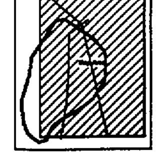
0 500 1000 1500

FEET

The structure contours are based on the USGS Demonstration Lithostratigraphic Model that was converted from Lynx to EarthVision by E&BO/DM. The TVD value associated of the drillhole is the value of the horizon at the location of the drillhole and not the picked depth (i.e., the USGS model does honor the data). This also holds true for the SD wells.

Original Exploratory Studies Facility is solid purple line, dashed purple line is new alignment.

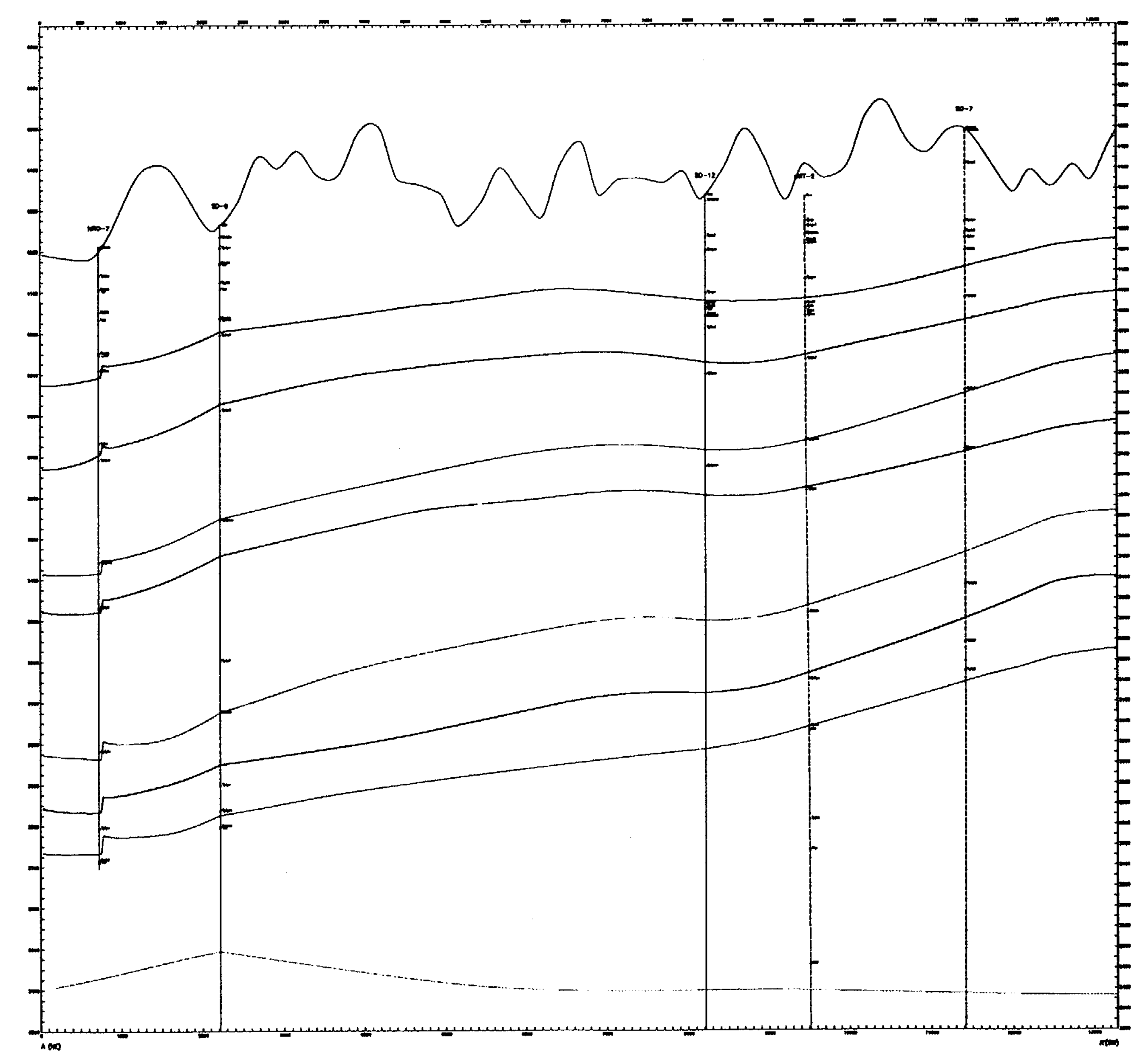
Repository Boundary
ESF (original)
ESF (new alignment)
Faults
Cross Section Traverses



Tue Jul 27 08:47:36 1994

VMD 94-218 B

jupiter: zehplot Job: a_a26101700_1.rgc Date: Tue Jul 27 10:19:07 1994




The structure (profiles) are based on the USGS Demonstration Lithostratigraphic Model that was converted from Lynx to EarthVision by EG&G/DL. From top to bottom the profiles are: Topography, Top Caprock, Top Upper Lithophysal, Top Middle Non-Lithophysal, Top Lower Lithophysal, Top Lower Non-Lithophysal, Top Basal Vitrophyre, Base Topopah Spring, and Static Water Table. Picks of drillholes provided by [illegible] Clayton [illegible].

Well WT-2 has been projected into the section and hung on the Top Middle Non-Lithophysal by adding [illegible] ft. to Collar Elevation. Shown on section as pWT-2.

[illegible]

## Cross Section A–A'

Vertical Scale: 1 in = 100 ft

Horizontal Scale: 1 in = 880 ft

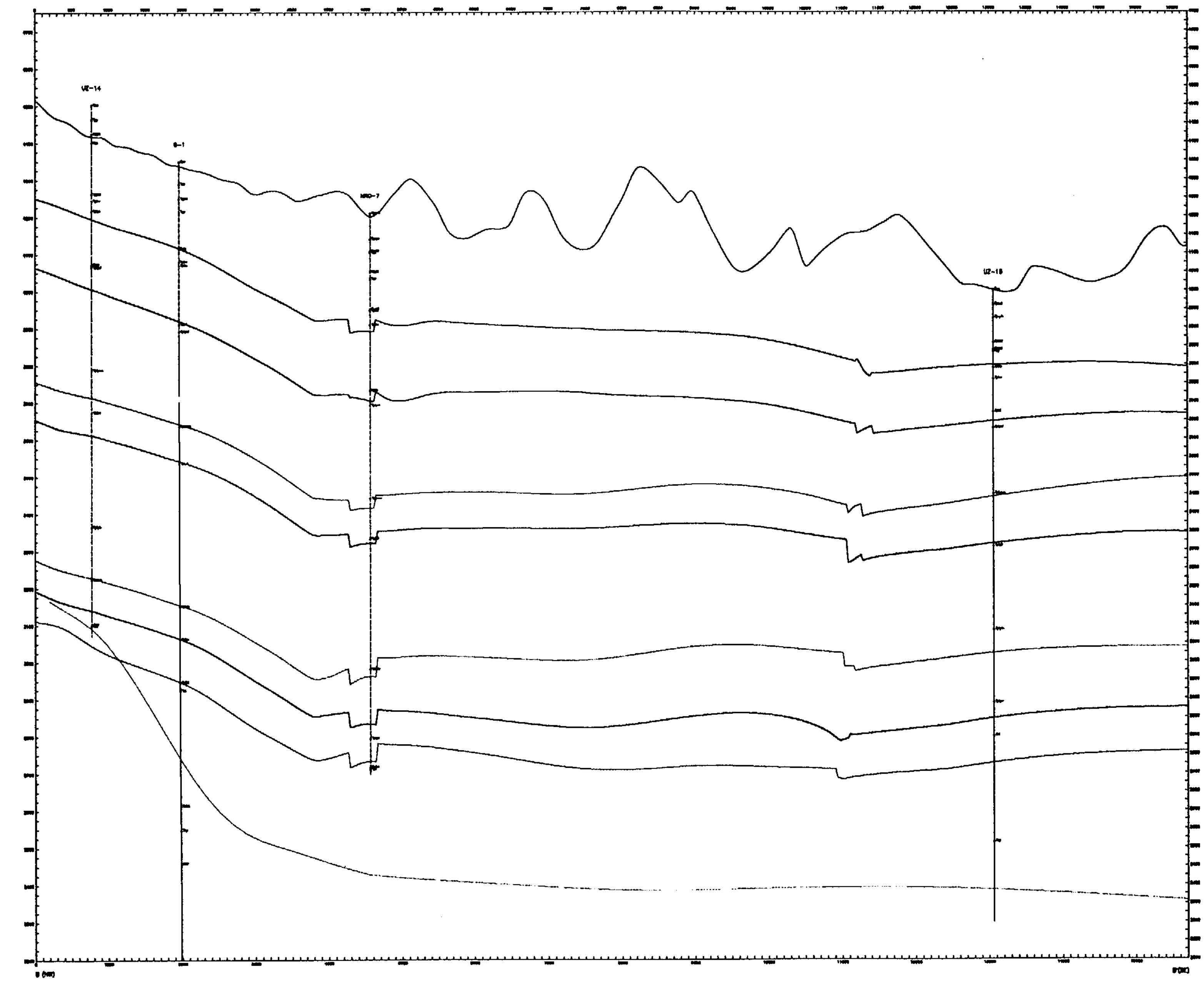
0 500 1000 1500

FEET

Topography
Top Caprock
Top Upper Lithophysal
Top Middle Non-Lithophysal
Top Lower Lithophysal
Top Lower Non-Lithophysal
Top Basal Vitrophyre
Base Topopah Spring
Water Table

YMP-94-219.Ø

jupiter: zehplot Job: b_b26100801_1.rgc Date: Tue Jul 27 10:09:05 1994



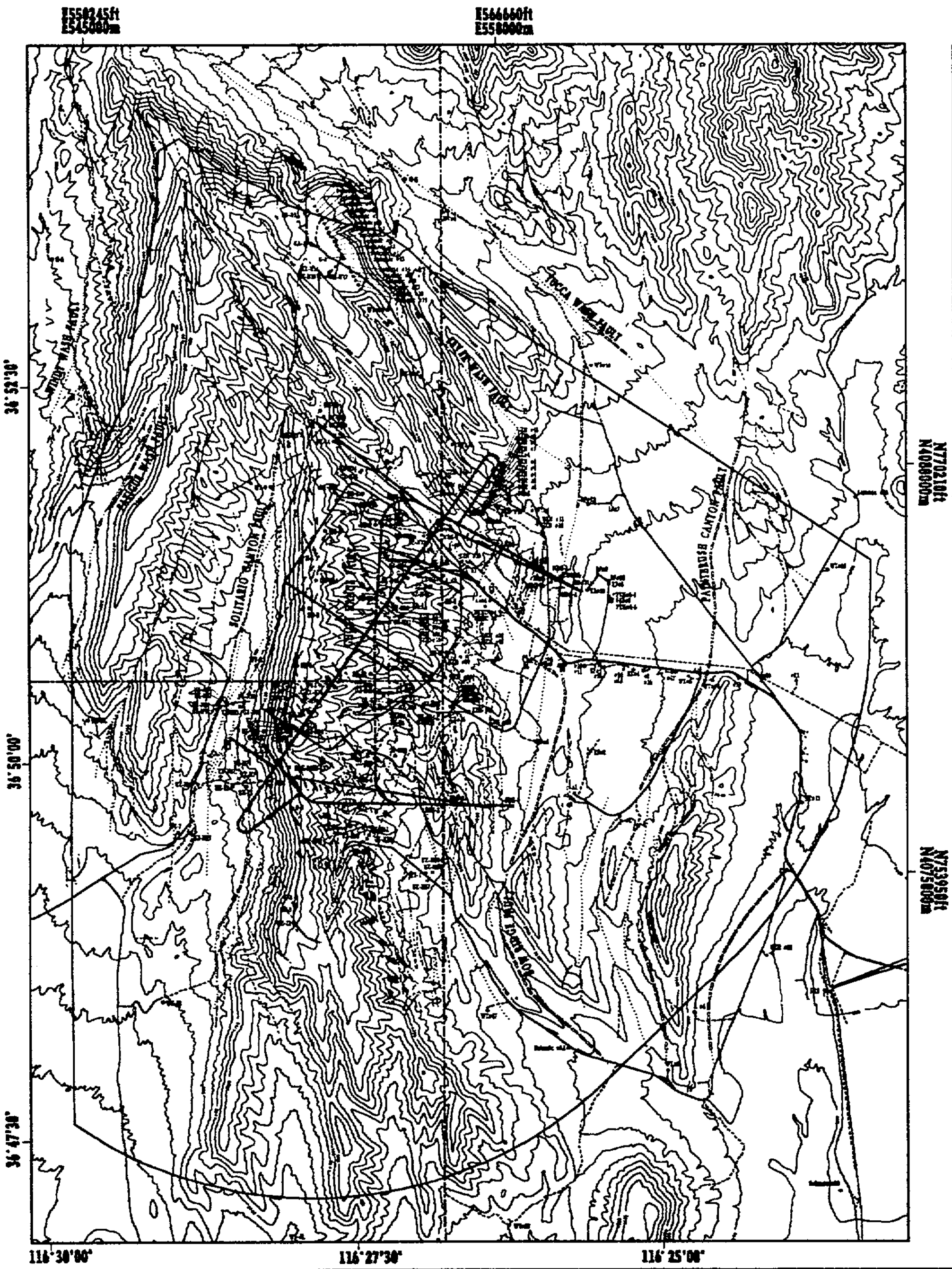

Cross Section B–B'

Vertical Scale: 1 in = 100 ft
Horizontal Scale: 1 in = 800 ft

0 500 1000 1500
FEET

Topography
Top Caprock
Top Upper Lithophysal
Top Middle Non-Lithophysal
Top Lower Lithophysal
Top Lower Non-Lithophysal
Top Basal Vitrophyre
Base Topopah Spring
Water Table

YMP-94-220.0




DATA ON THIS MAP ARE NOT TO BE RELEASED

YUCCA MOUNTAIN
SITE CHARACTERIZATION PROJECT

# EXISTING AND SELECTED PLANNED BOREHOLES WITH GEOLOGIC STRUCTURE

1 0 1
MILES
1 0 1
KILOMETERS

**ROADS**

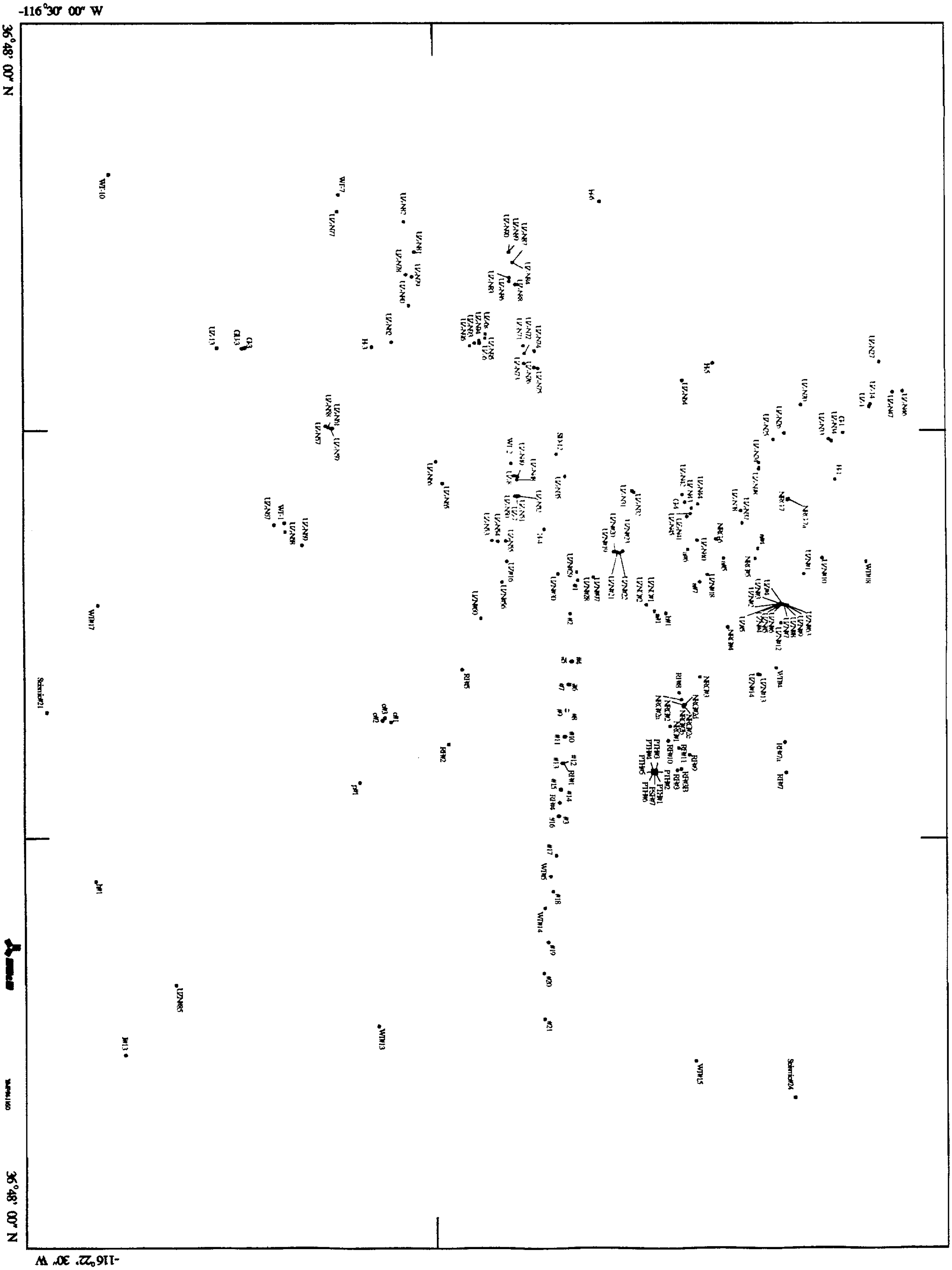
- Light Duty, Class 3, Hard Surface
- Unimproved, Class 4, Gravel Surface
- Trail, Class 5, Four Wheel Drive or Other

**GEOLOGIC STRUCTURE**

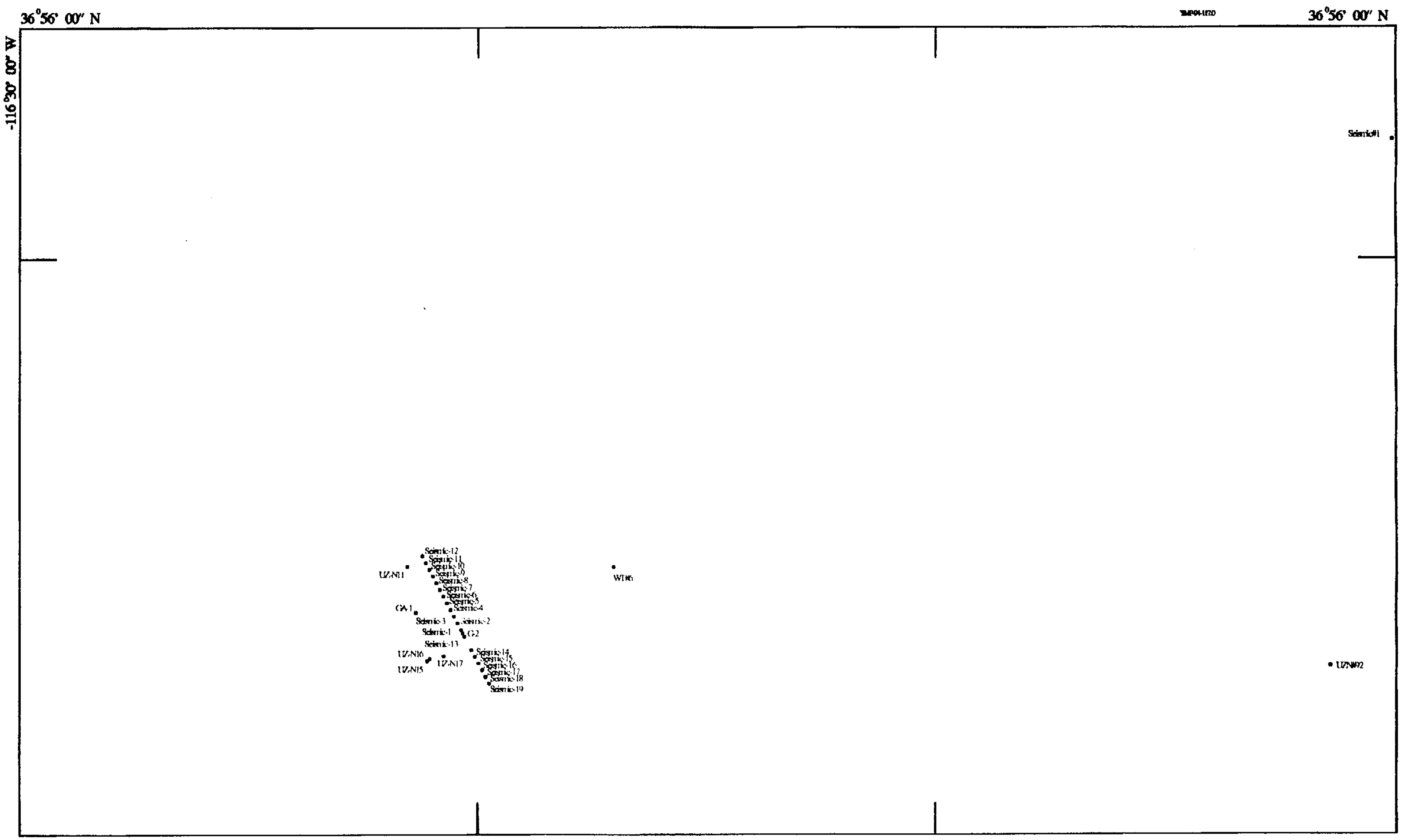
- Fault
- Inferred Fault
- Concealed Fault
- Aeromagnetic Fault
- Fracture

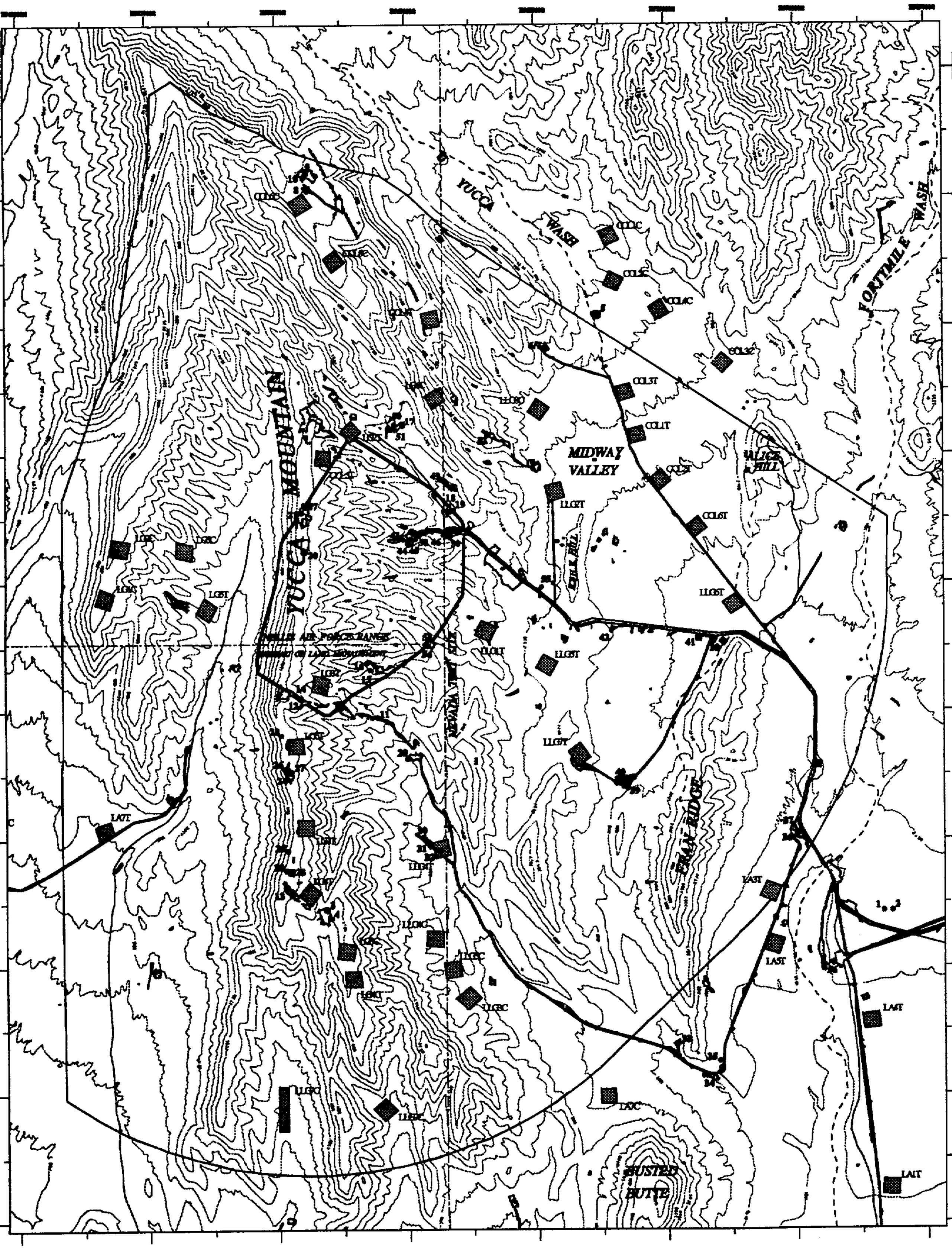
**BOREHOLES**

- Existing
- Planned



-116°30' 00" W
36°48' 00" N
36°48' 00" N
-116°22' 30" W


36°56' 00" N
36°56' 00" N
-116°30' 00" W
-116°22' 30" W
Seismic#1
UZN#2
WT#6
UZ-N11
GA-1
G-2
UZ-N16
UZ-N15
UZ-N17
Seismic-1
Seismic-2
Seismic-3
Seismic-4
Seismic-13
Seismic-12
Seismic-14
Seismic-19

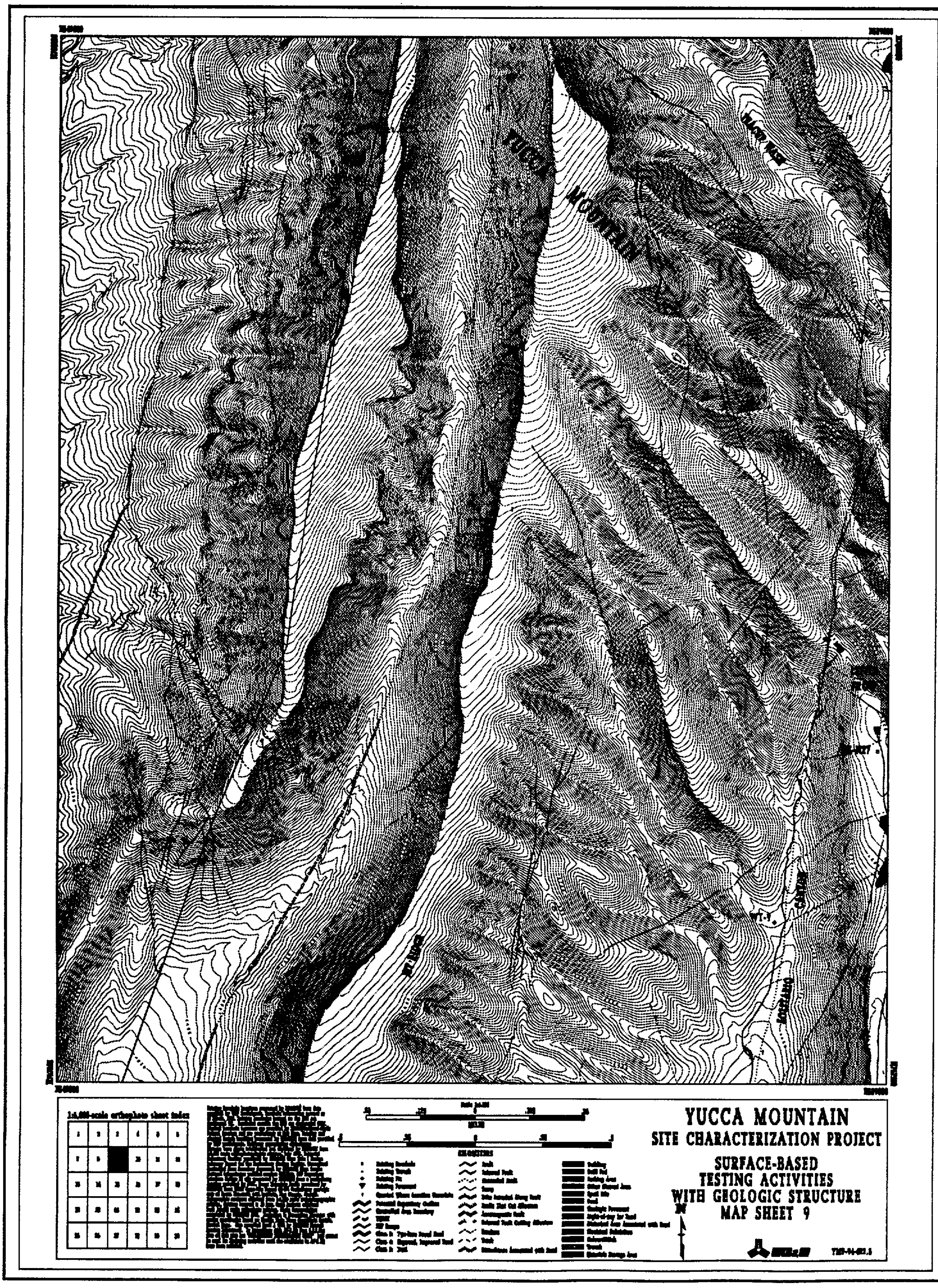



LEGEND

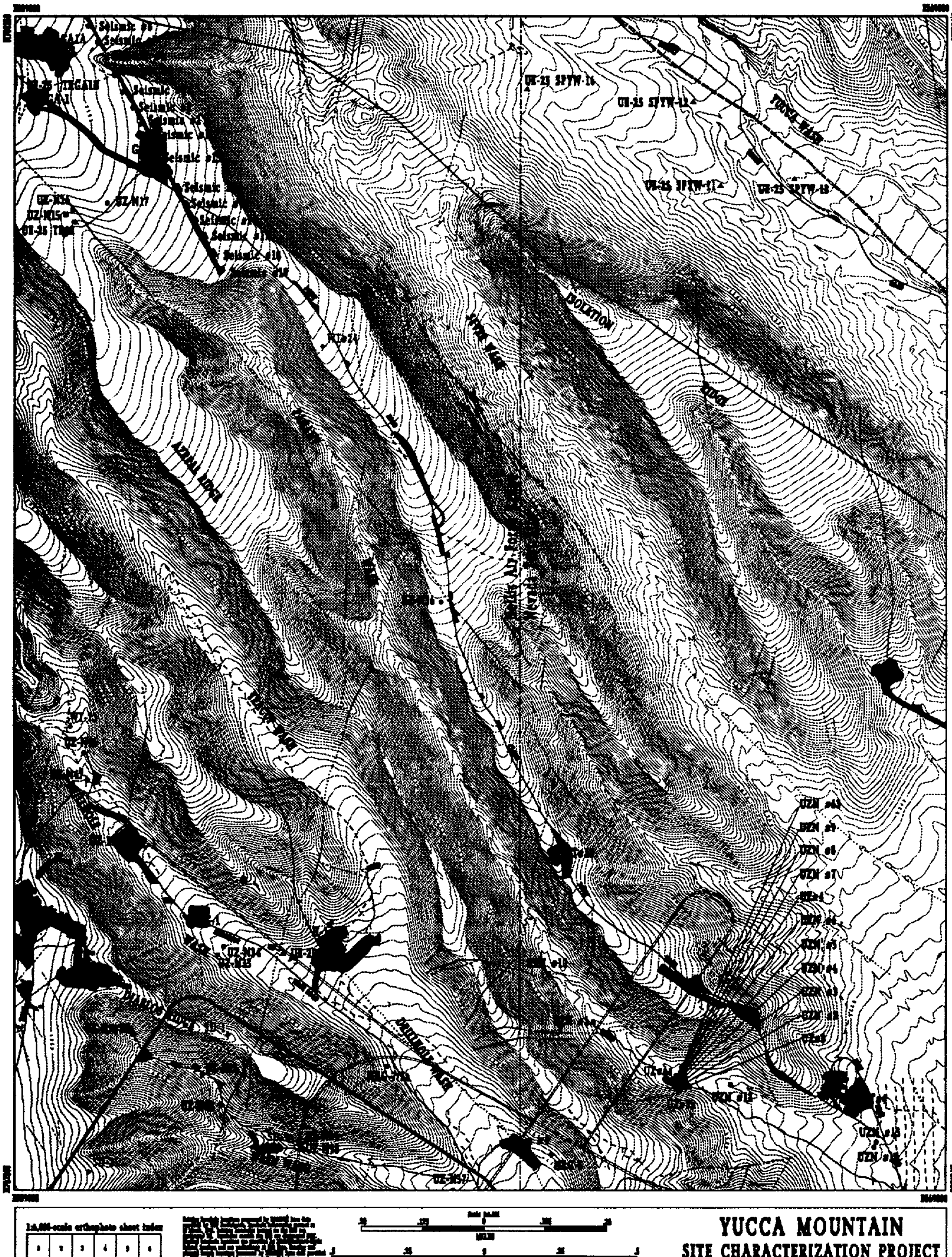
- Plant Succession Study Plot
- Ecological Study Plot
- Disturbed Area
- Potential Repository Outline
- Conceptual Controlled Area Boundary

YUCCA MOUNTAIN
SITE CHARACTERIZATION PROJECT
PLANT SUCCESSION AND
ECOLOGICAL STUDY PLOTS
WITH DISTURBANCE FEATURES

YMP-94-209.1



YUCCA
MOUNTAIN
WT-1
CANYON
SOLITARIO
1:6,000-scale orthophoto sheet index
LEGEND
MILES
YUCCA MOUNTAIN
SITE CHARACTERIZATION PROJECT
SURFACE-BASED
TESTING ACTIVITIES
WITH GEOLOGIC STRUCTURE
MAP SHEET 9

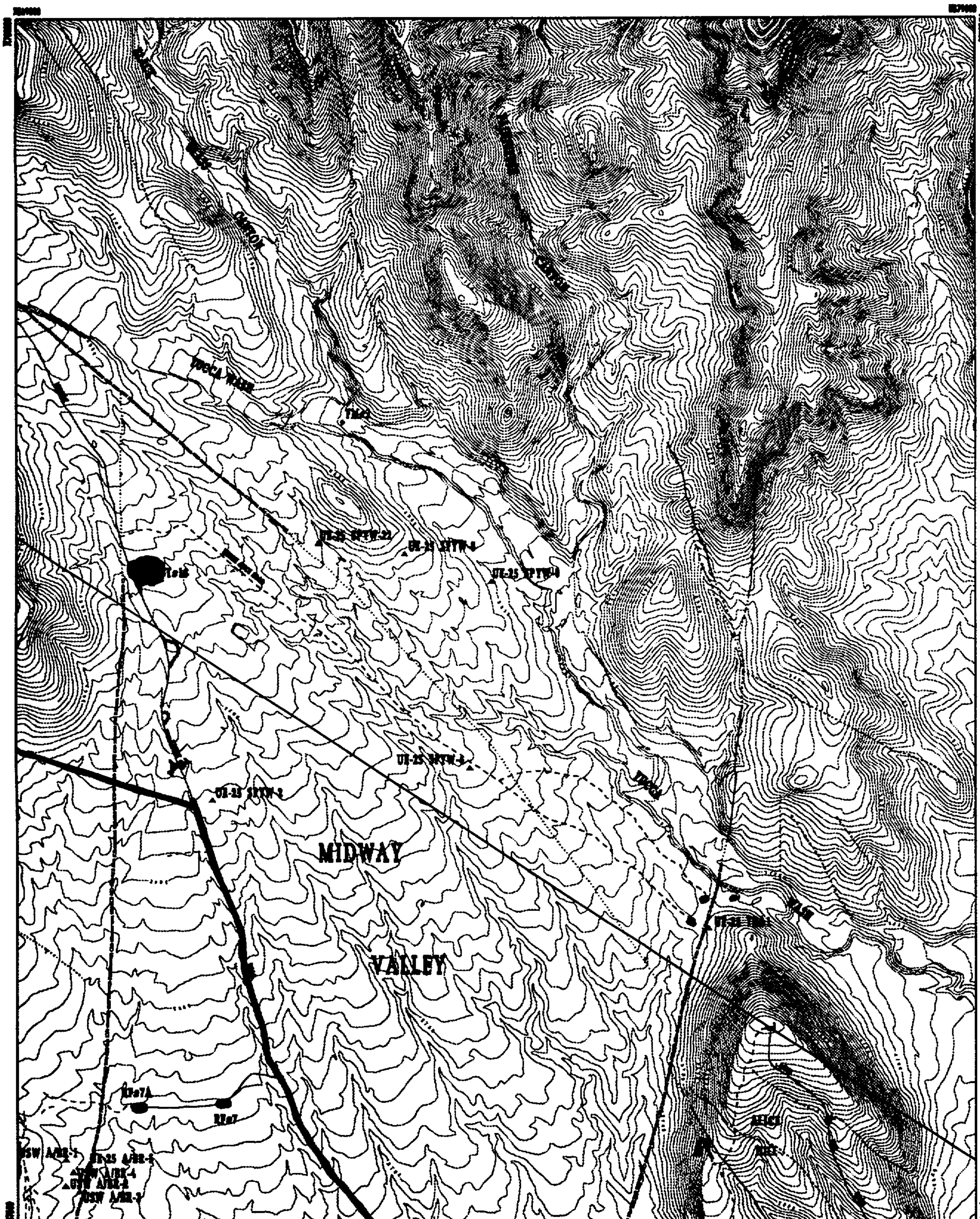



# YUCCA MOUNTAIN
## SITE CHARACTERIZATION PROJECT
### SURFACE-BASED TESTING ACTIVITIES WITH GEOLOGIC STRUCTURE MAP SHEET 10

1:6,000-scale orthophoto sheet index

YMP-94-

YMP-94-023.3




# YUCCA MOUNTAIN
## SITE CHARACTERIZATION PROJECT

### SURFACE-BASED TESTING ACTIVITIES WITH GEOLOGIC STRUCTURE MAP SHEET 11

Lawrence Livermore National Laboratory

LLYMP9408108
August 24, 1994

WBS 1.2.9
QA: N/A

Robert M. Nelson, Jr., Acting Project Manager
Yucca Mountain Site Characterization Office
Department of Energy
P.O. Box 98518
Las Vegas, Nevada 89193-8518

SUBJECT: Yucca Mountain Project Status Report - July 1994 (SCP: N/A)

Attached is the July Project Status Report for LLNL's participation in the Yucca Mountain Site Characterization Project.

If further information is required, please contact Carol Passos at 702-794-7511 or Jim Blink at 702-794-7157.

Sincerely,

for W.L. Clarke
Technical Project Officer
LLNL-YMP

WC/CP

cc: Distribution

DISCLAIMER

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

ENCLOSURE 5

Recycled

Lawrence Livermore National Laboratory Yucca Mountain Project
Technical Highlights and Status Report
July 1994

Table of Contents

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

July 1994

EXECUTIVE SUMMARY
(Items Proposed for Reporting in YMSCO or OCRWM Reports)

1) **WBS 1.2.1.5, Special Studies:** In support of the thermal loading system study, LLNL has calculated the impact of enhanced gas-phase diffusion and matrix hydrological properties on temperature and relative humidity conditions in the repository. The duration of the boiling period, $t_{bp}$, is insensitive to the range of six sets of matrix hydrological properties considered. However, enhanced vapor diffusion can enhance the rate of heat loss from the repository, modestly decreasing $t_{bp}$, particularly for the inner 75% of the repository. Enhanced vapor flow also can reduce the relative humidity at the end of the boiling period, particularly at the repository edge.

2) **WBS 1.2.2.3.1.1, Waste Form Testing - Spent Fuel:** LLNL-sponsored Spent Fuel Dissolution Tests under unsaturated conditions at 90°C are in progress at Argonne National Laboratory (ANL) to evaluate the long-term performance of spent fuel in the potential Yucca Mountain repository. Alpha and gamma counting data from sampling done in April 1994, after 581 days of exposure, are now complete. The results for the high drip-rate tests indicate that the fuel fragments are being leached at a consistent rate during the first year and a half of continuous testing. The materials which are leached have a high proportion of americium and curium, relative to the plutonium content. The size distribution of the actinides in the colloidal fraction appears to be unique for each fuel. To date, the actinide release rate for the low drip-rate tests is two orders of magnitude lower than that found in the high drip-rate tests.

3) **WBS 1.2.2.3.1.1, Waste Form Testing - Spent Fuel:** At LLNL, an initial four schoepite ($UO_3 \bullet H_2O$) dissolution experiments at room-temperature and 20% oxygen were completed. They consisted of the four combinations of pH 8 and 10 combined with total carbonate concentrations of $2 \times 10^{-4}$ and $2 \times 10^{-2}$ mol/L. These same experiments were then run at 75°C. This approach doubled the number of measured dissolution rates with minimal extra effort. The dissolution rates were quite high during the first few days of each experimental run and dropping significantly thereafter. Such unexpectedly high time-dependent early-dissolution rates are being examined to assure that they represent true dissolution rates and are not experimental artifacts.

4) **WBS 1.2.2.3.1.1, Waste Form Testing - Spent Fuel:** Dry bath tests sponsored by LLNL continue to run at PNL. Transmission Electron Microscopy examination of a sample oxidized just past and oxygen-to-metal ratio of 2.4 has shown microcracking and possible amorphous phase formation on a fine scale within the $UO_{2.4}$ matrix. These microstructural changes observed at the onset of the next oxidation reaction above $UO_{2.4}$ appear consistent with X-ray peak broadening and peak intensity reductions observed in the partially completed X-Ray Diffraction analyses.

5) **WBS 1.2.2.3.1.2, Waste Form Testing - Glass:** The N2 (Defense Waste Production Facility, DWPF, actinide-doped glass) glass dissolution tests continue at ANL under

LLNL sponsorship; 102 months of exposure have occurred. For the June sampling, some of the colloidal materials have been analyzed. There has been a continual interaction between the sensitized 304L type stainless steel and the glass. A large number of agglomerates were found that were rich in iron; they were made up of round particles about 1 $\mu$m in diameter. In other regions, there was clay that was closely associated with iron particles and other elements including zinc. These clay phases were on the order of 100 nm in diameter. Calcium oxide particles on the order of 0.5 $\mu$m in diameter were also found. Several particles that were about 0.2 $\mu$m in size were isolated; they appear to be similar to the layers that form on the glass as it reacts. It appears that the reacted glass layer spalls from the glass surface as the water slowly drips over the glass.

6) **WBS 1.2.2.3.2, Metal Barriers:** As part of the LLNL activity to model pitting corrosion of waste package materials, simulations of potentiodynamic experiments are being conducted. For a steep exponential relationship between the pit birth probability and the applied (sweeping) electrical potential, a bi-linear behavior was exhibited on a plot of birth potential at which the first pit.is born vs the logarithm of the applied potential's sweep velocity. The deviation from a single slope line is related to the effects of embryo death prior to their reaching the critical age.

7) **WBS 1.2.2.3.2, Metal Barriers:** Thermogravimetric experiments are being conducted at LLNL to determine the humidity, temperature, and surface condition limits for aqueous corrosion of the waste package. The apparatus was modified to incorporate a humidity sensor positioned just below the test specimen. Initial shake-down tests using the humidity sensor revealed an unexpected problem; the relative humidity was higher than expected. Investigation of the cause of the anomalous humidity data revealed a lower than expected temperature region in the upper half of the furnace. This cold zone caused water vapor condensation in the upper half of the furnace and raised the relative humidity as the test progressed. In addition, it was found that the manufacturer-specified constant-temperature reaction zone did not exist, but rather that a temperature change of 20°C was found across this zone. The manufacturer is studying the furnace problem and will probably have to replace the furnace. In the meantime, two inexpensive band heaters will be integrated into the existing furnace control loop, and testing should resume shortly thereafter.

8) **WBS 1.2.2.3.3, Other Materials:** In preparation for FY95 work in the Other Waste Package Materials WBS element, LLNL staff met with a representative from the Boral Company which makes a borated aluminum product that could be used as a basket material in a multi-purpose canister (MPC). The basket material is needed to ensure long term criticality control, hence the addition of boron. LLNL expects to meet with industry representatives in August on the possible use of borated copper for this same purpose.

9) **WBS 1.2.3.10.3.1, Integrated Radionuclide Release:** The core-flow apparatus at LLNL for integrated testing of the waste forms, barrier materials, and surrounding environment, has been reassembled in a new glove box and in a new laboratory. Temperature and pressure controls have been tested. Interfacing to data acquisition computer remains to be done. A new core sample has been prepared for installation, and core porosity has been determined. The "protocol for the flow-through apparatus

experiments" milestone (MOL04) will be delayed until September 30, 1994 to allow a thorough shake-down of the device.

10) **WBS 1.2.3.12.1, Chemical and Mineralogical Properties of the Waste Package Environment:** LLNL work at the New Zealand natural process analog site is emphasizing evaluation of the way in which model validation activities can be conducted in the field. Data have been collected and compared against simulations which demonstrate that very good agreement can be achieved between the two. However, perfect matches are impossible due to inherent uncertainties in data values, thermodynamic property measurements, and limitations of conceptual models. As a result, attention is being focused on developing strategies that allow a more flexible approach to validation efforts. This will be important when validation efforts address characterization of processes and properties of the site.

11) **WBS 1.2.3.12.2, Hydrologic Properties of the Waste Package Environment:** LLNL continues to analyze the temperature and relative humidity conditions in the repository. Recent simulations address the impact of enhanced gas-phase diffusion and the sensitivity to matrix hydrological properties. Areal Mass Loadings of 55.3 to 150 MTU/acre were used, and five sets of recently published matrix property data for the Topopah Springs subunits were used and compared to results using the Reference Information Base (RIB). At high thermal loads only one of the five sets of LBL-USGS matrix property data resulted in substantially faster re-wetting, another case resulted in slightly faster re-wetting, and three cases resulted in slower re-wetting back to ambient humidity conditions (98.4%) in the repository. Enhanced vapor diffusion can increase the re-wetting rate for some regions of the repository and decrease it in other regions depending on the matrix properties and AML. In general, enhanced vapor diffusion enhances re-wetting rate only where the advective liquid-phase re-wetting rate is relatively slow to begin with (i.e., the cases with slow liquid-phase re-wetting rates and at the center of the repository). Enhanced vapor diffusion reduces the overall re-wetting rate where the advective liquid-phase re-wetting rate is fastest. Therefore, enhanced gas-phase diffusion may be thought to function somewhat as an equalizer of thermo-hydrological conditions, countering some of the effects of heating variability and heterogeneity in various hydrological properties. In one example, the repository temperature range when wet conditions returned locally was reduced from a 34°C spread to a 10°C spread by enhanced gas-phase diffusion.

12) **WBS 1.2.3.12.3, Hydrologic Properties of the Waste Package Environment:** LLNL conducted thermo-hydrological sensitivity studies to determine the impact of small bulk permeability on temperature and relative humidity (*RH*) conditions at the repository. Previous efforts have focused on identifying potentially adverse flow effects that may arise due to very large bulk permeability, $k_b$. For Areal Mass Loadings of 55.3 to 150 metric tons per acre, the temperature and relative humidity conditions were compared for bulk permeabilities ($k_b$) of l millidarcy and 280 millidarcy. A substantial reduction in $k_b$ can result in a substantial increase in gas-phase pressure, thereby suppressing the rate of vaporization and (possibly) dry-out. For low thermal load (55.3), a small $k_b$ can substantially throttle the rate of boiling, thereby reducing the duration of sub-ambient *RH* conditions. Relatively high temperatures coincide with humid conditions. A small $k_b$ also can substantially throttle boiling and dry-out for the 70- and 83.4-MTU/acre cases. The time to re-wet back to 70% *RH* at the repository center was reduced by factors of 2.5 and 1.8 for these two cases. Again, relatively

high temperatures coincide with relatively humid conditions. The impact of small $k_b$ on higher AMLs was found to be quite different (particularly in the inner 90% of the repository). The duration of sub-ambient *RH* conditions was actually greater at the center of the 110.5- and 150 MTU/acre repositories for the 1-millidarcy case. In general, for sufficiently small $k_b$, rather than facilitating rock dry-out, the unsaturated zone may function like a "pressure cooker" where high temperatures may also coincide with relatively humid conditions.

13) **WBS 1.2.3.12.2, Hydrological Properties of the Waste Package Environment:** One-dimensional imbibition data obtained previously on a core from the G-4 Hole were analyzed at LLNL. The propagation of the saturation front determined by electrical resistivity measurement was compared with an analytical model developed by Dr. John Reis (a summer participant), and the agreement was very good.

14) **WBS 1.2.3.12.3, Mechanical Attributes of the Waste Package Environment:** Work continued at LLNL on digitization of the map of the top of the Large Block; the map is approximately 50% digitized. Digitization of the map of fractures at a level two feet above the top of the block was completed, and the digital data describing discrete blocks were forwarded to collaborators at UC Berkeley and the M&O.

15) **WBS 1.2.3.12.4, Engineered Barrier System (EBS) Field Tests (Large Block Test):** Additional mercury (Hg), porosimetry measurements were made at LLNL There are now 34 Hg porosimetry measurements completed using the core sections from the vertical instrument holes. The average bulk matrix porosity is about 11.55 $\pm$ 2.28%, with a minimum value of 8.23% and a maximum value of 20.18%. There appears to be a systematic increase of porosity with depth. Preliminary results also indicate that porosity is a function of distance from a fracture: porosity increases with increasing distance from a fracture. Additional samples for using the wet-dry method of determining porosity have been prepared. These samples are drying.

16) **WBS 1.2.3.12.4, Engineered Barrier System (EBS) Field Tests (Large Block Test):** Engineering analysis at LLNL of the proposed modifications to retrofit the frame continues. Preliminary results indicate that moving the holes connecting each section of the frame closer to the center of the frame will greatly improve the design performance. Agreement was reached with Aircraft Engineering Corporation (AEC) that

- AEC will complete the dome and four sections of the cylindrical part of the frame,
- the remaining 8 sections of the cylindrical part will be welded at LLNL, and
- the original contract cost will be reduced.

Two of the eight sections have arrived at LLNL. The remaining six sections will be shipped to LLNL in August. The welding at LLNL will begin in August.

17) **WBS 1.2.5.3.4, Geologic and Engineering Materials Bibliography of Chemical Species (GEMBOCHS):** The GEMBOCHS/JEWEL/FACET update that permits multiple data references for supcrt92 species was completed.

## LLNL Deliverables Met
(July 1994)

| Milestone | WBS 1.2. | Planned Date | Completion Date | Description | Comment |
|---|---|---|---|---|---|
| MOL24 | 3.12.1 | 07/29/94 | 07/27/94 | Manuscript & Field Data of Preliminary Results of New Zealand Field Studies and Simulations | Met by four reports |

## LLNL Deliverables Not Met
(July 1994)

| Milestone | WBS 1.2. | Planned Date | Projected Date | Description | Comment |
|---|---|---|---|---|---|
| MOL45 | 2.3.2 | 01-31-94 | 08-19-94 | Submit updated Metal Barriers SIP | Delayed by TPR & NWTRB preparation |
| MOL94 | 2.3.2 | 07-29-94 | 08-15-94 | Eng. Materials Characterization Report | |
| MOL59 | 3.4.2 | 06-01-94 | 08-17-94 | Certify EQ3 V.7.0 | In review |
| MOL04 | 3.10.3.1 | 01-12-94 | 09-30-94 | Document core flow experiment protocol | Equip. now rebuilt and moved to new facility |
| MOL03 | 3.10.3.1 | 03-31-94 | 08-22-94 | Report on colloid characterization | Delayed by equip.malfunction related to MOL04 |
| MOL26 | 3.12.1 | 03-31-94 | 08-15-94 | Topical Report on Near Field Geochemistry | Delayed by TPR & NWTRB preparation |
| MOL31 | 3.12.2 | 07-29-94 | 08-31-94 | Impact of Heterogeneity on Heat Pipes and Buoyant Vapor Flow | |
| MOL15 | 3.12.4 | 03-31-94 | 09-30-94 | Large Block Excavated and Small Blocks Delivered to LLNL | Delayed by construction planning |
| MOL34 | 3.12.4 | 06-30-94 | 08-31-94 | Pre-Test Calculations on Large Block Test | Will not impact LBT schedule |
| MOL73 | 3.12.5 | 05-31-94 | 08-12-94 | Stability of Organic Compounds | Delayed by new ESF work |
| MOL91 | 5.4.2 | 03-31-94 | 08-08-94 | Submit plan for code qualification | Individual Software Plan is currently in technical review |
| MOL89 | 5.4.2 | 06-30-94 | 08-31-94 | YMIM Release, including User Manual | In final review |

## LLNL Deliverables Scheduled for the Next Reporting Period
(August 1994)

| Milestone | WBS 1.2. | Planned Date | Projected Date | Description | Comment |
|---|---|---|---|---|---|
| MOL57 | 2.3.5 | 08/01/94 | 08/01/94 | Draft Rpt on Non-Metallic Barrier Materials Literature Survey | |
| MOL76 | 3.12.3 | 08/10/94 | 08/10/94 | Progress Rpt on Simulation LBT | |
| MOL55 | 3.10.3.2 | 08/30/94 | 08/30/94 | Complete US Contribution to NEA | |
| MOL60 | 3.4.2 | 08/30/94 | 09/30/94 | Complete V.8.0 of Code Package | |
| MOL79 | 3.10.2 | 08/30/94 | 08/30/94 | Rates and Magnitudes of changes in Hydrological Prop. associated with Recrystallization | |
| MOL30 | 3.12.2 | 08/31/94 | 08/31/94 | Rpt. summarizing state of knowledge on Repository-Heat-Driven-Alteration | |

Yucca Mountain Site Characterization Project
Variance Analysis Report
Status Thru: 29-JUL-94

PARTICIPANT: LLNL PEM: SMITH WBS: 1.2.2.3.1.1

WBS TITLE: WASTE FORM TESTING - SPENT FUEL

P&S ACCOUNT: 0L2311

| FY 1994 Cumulative to Date | | | | | | | | | FY 1994 at Completion | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BCWS | BCWP | ACWP | SV | SV% | SPI | CV | CV% | CPI | BAC | EAC | VAC | VAC% | IEAC | TCPI |
| 1485 | 1516 | 1241 | 31 | 2.1 | 102.1 | 275 | 18.1 | 122.2 | 1785 | 1654 | 131 | 7.3 | 1461 | 65.1 |

## Analysis

**Cumulative Cost Variance:**
The cost variance is due to two FY93 summary accounts being carried over into FY94 awaiting completion of milestones. The milestones required reports from PNL that were delayed by 30 days and as a result were not received by LLNL until mid October. These reports were immediately processed by LLNL and submitted to the Project Office for review. No actual costs were incurred but earned value was calculated upon closing of these summary accounts. These FY93 accounts were not removed during the FY93 Close-Out exercise in PACs and will continue to contribute an inaccurate $120k to both the cost and schedule variance. The correct cost variance is 155. See below for cost variance analysis.

**Cumulative Schedule Variance:**
Same as above. The correct schedule variance is -91.

**Variance At Complete:**
The variance at complete is due to a hot cell-chemical analysis building #325 being temporarily closed in late April '94 at Battelle Pacific National Laboratory in Richland, WA; however the expectations were that it would reopen within the following month. The reopening date is now expected in October 1994. This has impacted the spending rate and will result in less experimental testing work than originally planned for FY94. Plans to redirect workscope and funding allocation were made, and are awaiting approval by DOE-YMP.

Roy B. Stout Aug 18, 94
P&S ACCOUNT MANAGER DATE

Roy B. Stout for W Clarke Aug 18, 94
TPO DATE

Yucca Mountain Site Characterization Project
Variance Analysis Report
Status Thru: 29-JUL-94

**PARTICIPANT:** LLNL **PEM:** TYNAN **WBS:** 1.2.3.11.3

**WBS TITLE:** GEOPHYSICS-ESF SUPPORT SUBSURFACE GEOPHYSICAL TSTG

**P&S ACCOUNT:** 9L3B3

| FY 1994 Cumulative to Date | | | | | | | | | FY 1994 at Completion | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BCWS | BCWP | ACWP | SV | SV% | SPI | CV | CV% | CPI | BAC | EAC | VAC | VAC% | IEAC | ICPI |
| 145 | 145 | 77 | 0 | 0.0 | 100.0 | 68 | 46.9 | 188.3 | 180 | 112 | 68 | 37.8 | 96 | 100.0 |

**Analysis**

**Cumulative Cost Variance:**

**Cumulative Schedule Variance:**

**Variance At Complete:**
$20k has been taken via CCB action. However, some of the funds will be used to offset a shortfall in WBS 1.2.3.5.2.2 which was only allocated $25k. The proper accounts will be charged; 1.2.3.11.3 will underrun and 1.2.3.5.2.2 will overrun; the total costs will be $205k, but with a different distribution than anticipated by YMSCO. These actions are by direction of the YMSCO Asst. Manager for Sci. Programs.

17 Au-94
P&S ACCOUNT MANAGER DATE

17 A-94
TPO DATE

Yucca Mountain Site Characterization Project
Variance Analysis Report
Status Thru: 29-JUL-94

PARTICIPANT: LLNL PEM: SIMMONS WBS: 1.2.3.12.1

WBS TITLE: CHEMICAL AND MINERALOGIC. PROP. OF WASTE PACKAGE

P&S ACCOUNT: 0L3C1

| FY 1994 Cumulative to Date | | | | | | | | | FY 1994 at Completion | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BCWS | BCWP | ACWP | SV | SV% | SPI | CV | CV% | CPI | BAC | EAC | VAC | VAC% | IEAC | TCPI |
| 534 | 533 | 640 | -1 | -0.2 | 99.8 | -107 | -20.1 | 83.3 | 610 | 722 | -112 | -18.4 | 732 | 93.9 |

**Analysis**

**Cumulative Cost Variance:**
The cumulative cost variance is due to unanticipated costs for meetings, field studies and transfer of funds. Also, an overestimation of actuals occurred and will be adjusted to reduce variance but not eliminate.

**Cumulative Schedule Variance:**

**Variance At Complete:**
An overrun at complete will be due to unanticipated costs for Program Review meetings, unmatched expenses for field studies in which equipment had to be fabricated, rather than purchased, and the transfer of funds to accomodate external collaborations, as per Project Office changes.

8/18/94
P&S ACCOUNT MANAGER DATE

8/18/94
TPO DATE

Yucca Mountain Site Characterization Project
Variance Analysis Report
Status Thru: 29-JUL-94

PARTICIPANT: LLNL PEM: SIMMONS WBS: 1.2.3.12.4

WBS TITLE: ENGINEERED BARRIER SYSTEM (EBS) FIELD TESTS

P&S ACCOUNT: 0L3C4

| FY 1994 Cumulative to Date | | | | | | | | | FY 1994 at Completion | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BCWS | BCWP | ACWP | SV | SV% | SPI | CV | CV% | CPI | BAC | EAC | VAC | VAC% | IEAC | TCPI |
| 2191 | 2245 | 2165 | 54 | 2.5 | 102.5 | 80 | 3.6 | 103.7 | 3070 | 3170 | -100 | -3.3 | 2960 | 82.1 |

Analysis

Cumulative Cost Variance:

Cumulative Schedule Variance:

Variance At Complete:
The variance at complete is not accurate and ETC's are being revised to include recent information. There will not be an overrun in WBS 1.2.3.12.4 at the completion of FY94.

8/18/94 (for) 8/18/94
P&S ACCOUNT MANAGER DATE TPO DATE

| Participant LLNL | Yucca Mtn. Site Char. Project-Planning & Control System<br>PACS Participant Work Station (PPWS)<br>WBS Status Sheet (WBS02) | 01-Jul-94 to 31-Jul-94<br>Page - 1 |
|---|---|---|
| Prepared - 08/17/94:15:22:47 | | Inc. Dollars in Thousands |

| | | | |
|---|---|---|---|
| WBS No. | - 1.2 | WBS Manager | - |
| WBS Title | - YUCCA MOUNTAIN PROJECT | | |
| Parent WBS No. | - | Parent WBS Manager | - |
| Parent WBS Title | - | | |

Statement of Work

See the current WBS Dictionary

Cost/Schedule Performance

| | | Current Period | | | | | FY1994 Cumulative to Date | | | | | FY1994 at Completion | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Id | Description | BCWS | BCWP | ACWP | SV | CV | BCWS | BCWP | ACWP | SV | CV | BAC | EAC | VAC |
| 1.2.1 | SYSTEMS ENGINEERING | 13 | 13 | 19 | 0 | -6 | 133 | 133 | 125 | 0 | 8 | 160 | 158 | 2 |
| 1.2.2 | WASTE PACKAGE | 309 | 304 | 154 | -5 | 150 | 2867 | 2934 | 2649 | 67 | 285 | 3445 | 3308 | 137 |
| 1.2.3 | SITE INVESTIGATIONS | 512 | 728 | 727 | 216 | 1 | 5543 | 5495 | 5484 | -48 | 11 | 7048 | 7275 | -227 |
| 1.2.5 | REGULATORY | 145 | 155 | 146 | 10 | 9 | 1262 | 1227 | 1238 | -35 | -11 | 1545 | 1543 | 2 |
| 1.2.9 | PROJECT MANAGEMENT | 112 | 112 | 92 | 0 | 20 | 1059 | 1059 | 1083 | 0 | -24 | 1282 | 1304 | -22 |
| 1.2.11 | QUALITY ASSURANCE | 55 | 55 | 63 | 0 | -8 | 541 | 541 | 457 | 0 | 84 | 650 | 632 | 18 |
| 1.2.12 | INFORMATION MANAGEMENT | 22 | 22 | 23 | 0 | -1 | 209 | 209 | 204 | 0 | 5 | 250 | 251 | -1 |
| 1.2.13 | ENVIRONMENT, SAFETY, & HEA | 3 | 3 | 1 | 0 | 2 | 22 | 22 | 13 | 0 | 9 | 25 | 21 | 4 |
| 1.2.15 | SUPPORT SERVICES | 33 | 33 | 26 | 0 | 7 | 319 | 319 | 271 | 0 | 48 | 382 | 360 | 22 |
| Total | | 1204 | 1425 | 1251 | 221 | 174 | 11955 | 11939 | 11524 | -16 | 415 | 14787 | 14852 | -65 |

Resource Distributions by Element of Cost

Fiscal Year 1994
Budgeted Cost of Work Scheduled

| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LBRHRS | 8281 | 7278 | 7559 | 7931 | 7764 | 7742 | 8066 | 8000 | 7990 | 8072 | 8624 | 8332 | 95609 |
| LABOR | 762 | 654 | 658 | 749 | 711 | 720 | 731 | 749 | 728 | 751 | 768 | 768 | 8749 |
| SUBS | 109 | 298 | 264 | 233 | 315 | 269 | 218 | 206 | 226 | 200 | 142 | 169 | 2649 |
| OTHER | 155 | 193 | 147 | 199 | 175 | 189 | 217 | 279 | 265 | 253 | 387 | 598 | 3057 |
| CAPITAL | 0 | 0 | 11 | 21 | 146 | 59 | 7 | 81 | 7 | 0 | 0 | 0 | 332 |
| Total BCWS | 1026 | 1145 | 1080 | 1202 | 1347 | 1237 | 1173 | 1315 | 1226 | 1204 | 1297 | 1535 | 14787 |

Participant LLNL
Prepared - 08/17/94:15:22:47

Yucca Mtn. Site Char. Project-Planning & Control System
PACS Participant Work Station (PPWS)
WBS Status Sheet (WBS02)

01-Jul-94 to 31-Jul-94
Page - 2
Inc. Dollars in Thousands

WBS No. - 1.2 -YUCCA MOUNTAIN PROJECT

Resource Distributions by Element of Cost

Fiscal Year 1994
Actual Cost of Work Performed

| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LBRHRS | 8301 | 6113 | 5630 | 6247 | 6390 | 7092 | 7097 | 7530 | 8036 | 7536 | 0 | 0 | 69972 |
| LABOR | 762 | 413 | 383 | 497 | 513 | 552 | 513 | 558 | 594 | 504 | 0 | 0 | 5289 |
| SUBS | 114 | 303 | 254 | 233 | 315 | 246 | 218 | 101 | 135 | 104 | 0 | 0 | 2023 |
| OTHER | 152 | 385 | 243 | 355 | 388 | 452 | 388 | 456 | 532 | 643 | 0 | 0 | 3994 |
| CAPITAL | 0 | 0 | 11 | 21 | 138 | 33 | 15 | 0 | 0 | 0 | 0 | 0 | 218 |
| Total ACWP | 1028 | 1101 | 891 | 1106 | 1354 | 1283 | 1134 | 1115 | 1261 | 1251 | 0 | 0 | 11524 |

Resource Distributions

| Fiscal Year 1994 | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BCWS | 1026 | 1145 | 1080 | 1202 | 1347 | 1237 | 1173 | 1315 | 1226 | 1204 | 1297 | 1535 | 14787 |
| BCWP | 1188 | 1062 | 944 | 1048 | 1810 | 1177 | 1079 | 1048 | 1158 | 1425 | 0 | 0 | 11939 |
| ACWP | 1028 | 1101 | 891 | 1106 | 1354 | 1283 | 1134 | 1115 | 1261 | 1251 | 0 | 0 | 11524 |
| ETC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1642 | 1686 | 3328 |

Fiscal Year Distribution

| | Prior | FY1994 | FY1995 | FY1996 | FY1997 | FY1998 | FY1999 | FY2000 | FY2001 | FY2002 | FY2003 | Future | At Complete |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BCWS | 11048 | 14787 | 32074 | 30997 | 41636 | 30909 | 20762 | 13287 | 9289 | 3689 | 823 | 705 | 210006 |
| BCWP | 10882 | 11939 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| ACWP | 10846 | 11524 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| ETC | 0 | 3328 | 31988 | 30976 | 41555 | 30909 | 20726 | 13398 | 9316 | 3689 | 823 | 7574 | 216652 |

## YMP PLANNING AND CONTROL SYSTEM (PACS)

### MONTHLY COST/FTE REPORT

PARTICIPANT: LLNL
DATE PREPARED: 8/10/94

FISCAL MONTH/YEAR: JULY, 1994

| WBS ELEMENT | CURRENT MONTH END ACTUAL COSTS | PARTICIPANT FTES | PARTICIPANT HOURS | SUBCONTRACT HOURS | PURCHASE COMMITMENTS | SUBCONTRACT COMMITMENTS | ACCRUED COSTS# | CAP EQPT ACCURAL | FISCAL YEAR APPROVED BUDGET | CURRENT FY94 AFP | CUMULATIVE COSTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.2.1.5 | 19,400 | 1.20 | 160 | | 0 | 0 | | | 160,000 | | 124,200 |
| SUBT 1.2.1 | 19,400 | 1.20 | 160 | 0 | 0 | 0 | 0 | 0 | 160,000 | 122,061 | 124,200 |
| | | | | | | | | | | | |
| 1.2.2.1 | 19,900 | 1.20 | 172 | | 58 | 0 | 0 | | 400,000 | | 336,600 |
| 1.2.2.3.1.1 | 127,004 | 1.20 | 176 | 483 | 119 | 275,817 | 0 | | 1,785,000 | | 835,100 |
| 1.2.2.3.1.2 | 3,200 | 0.20 | 33 | | 330 | 6,043 | 0 | | 280,000 | | 130,500 |
| 1.2.2.3.2 | 72,700 | 3.00 | 416 | | 9,363 | 17,644 | 0 | | 880,000 | | 712,800 |
| 1.2.2.3.5 | 13,500 | 0.90 | 120 | | 0 | 0 | 0 | | 100,000 | | 94,500 |
| CAPITAL EQUIP. | 15,552 | | | | 1,954 | 0 | 0 | 0 | **** | 91,000 | 133,823 |
| SUBT 1.2.2 | 251,856 | 6.50 | 917 | 483 | 11,824 | 299,504 | 0 | 0 | 3,445,000 | 7,664,034 | 2,243,323 |
| | | | | | | | | | | | |
| 1.2.3.12.1 | 12,300 | 1.10 | 150 | | 4,447 | 77,263 | | | 610,000 | | 590,200 |
| 1.2.3.12.2 | 66,000 | 2.80 | 470 | | 2,327 | 0 | 10,000 | | 861,000 | | 656,900 |
| 1.2.3.12.3 | 25,500 | 0.90 | 129 | | 35 | 0 | 16,300 | | 230,000 | | 179,100 |
| 1.2.3.12.4 | 442,300 | 11.90 | 1,787 | | 1,299 | 233,689 | 72,092 | | 2,530,000 | | 1,777,300 |
| 1.2.3.12.5 | 51,200 | 1.80 | 253 | | 3,477 | 14,760 | 10,709 | | 248,000 | | 266,000 |
| 1.2.3.10.3.1 | 42,700 | 1.90 | 272 | | 9,230 | 0 | 4,050 | | 392,000 | | 243,800 |
| 1.2.3.10.3.2 | 15,600 | 0.60 | 188 | | 156 | 0 | 49,994 | | 301,000 | | 156,100 |
| 1st SUBT 1.2.3* | 655,600 | 21.00 | 3,248 | 0 | 20,971 | 325,712 | 163,645 | 0 | 5,172,000 | | 3,869,400 |
| | | | | | | | | | | | |
| 1.2.3.1 | 19,200 | 1.10 | 155 | | 0 | 0 | 0 | | 245,000 | | 226,300 |
| 1.2.3.4.2 | 32,200 | 1.40 | 276 | | 34 | 0 | 0 | | 381,000 | | 279,800 |
| 1.2.3.5.2.2 | 5,200 | 0.30 | 48 | | 0 | 0 | 0 | | 25,000 | | 64,000 |
| 1.2.3.10.1 | -1,300 | 0.00 | 0 | | 0 | 0 | 0 | | 75,000 | | 90,200 |
| 1.2.3.10.2 | 6,600 | 0.60 | 84 | | 0 | 0 | 0 | | 175,000 | | 180,000 |
| 1.2.3.11.3 | 200 | 0.00 | 0 | | 36,525 | 0 | 0 | | 180,000 | | 24,200 |
| CAPITAL EQUIP. | 16,650 | 0.00 | 0 | | 0 | 0 | 0 | | *** | 15,000 | 0 |
| 2nd SUBT 1.2.3 | 78,750 | 3.40 | 563 | 0 | 36,559 | 0 | 0 | 0 | 1,081,000 | 1,116,109 | 864,500 |
| | | | | | | | | | | | |
| 1.2.5.1 | 17,900 | 1.20 | 164 | | 0 | 0 | 0 | | 150,000 | | 113,300 |
| 1.2.5.2.2 | 15,500 | 0.90 | 124 | | 0 | 0 | 9,785 | | 240,000 | | 278,400 |
| 1.2.5.3.4 | 15,400 | 1.20 | 171 | | 3,696 | 0 | 0 | | 342,000 | | 219,000 |
| 1.2.5.3.5 | 9,200 | 0.70 | 96 | | 0 | 0 | 0 | | 50,000 | | 45,000 |
| 1.2.5.4.2 | 85,900 | 4.10 | 738 | | 280 | 0 | 0 | | 660,000 | | 595,000 |
| 1.2.5.5.2 | 100 | 0.00 | 0 | | 0 | 0 | 0 | | 20,000 | | 6,900 |
| CAPITAL EQUIP. | 0 | | | | 0 | 0 | | 0 | ** | 34,000 | 0 |
| SUBT 1.2.5 | 144,000 | 8.10 | 1,293 | 0 | 3,976 | 0 | 9,785 | 0 | 1,462,000 | 1,294,237 | 1,257,600 |

## YMP PLANNING AND CONTROL SYSTEM (PACS)

### MONTHLY COST/FTE REPORT

PARTICIPANT: LLNL

DATE PREPAREC 8/10/94

FISCAL MONTH/YEAR: JULY,1994

| WBS ELEMENT | CURRENT MONTH END: ACTUAL COSTS | PARTICIPANT FTES | PARTICIPANT HOURS | SUBCONTRACT HOURS | PURCHASE COMMITMENTS | SUBCONTRACT COMMITMENTS | ACCRUED COSTS# | CAP EQPT ACCURAL | FISCAL YEAR: APPROVED BUDGET | CURRENT FY94 AFP | CUMULATIVE COSTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.2.9.1.2 | 44,300 | 2.60 | 171 | | 94 | 190 | 0 | | 621,000 | | 510,000 |
| 1.2.9.2.2 | 47,100 | 4.90 | 643 | | 868 | 0 | 900 | | 601,000 | | 570,300 |
| SUBT 1.2.9 | 91,400 | 7.50 | 814 | 0 | 962 | 190 | 900 | 0 | 1,222,000 | 1,057,812 | 1,080,300 |
| 1.2.11.1 | 62,900 | 2.00 | 285 | | 0 | 0 | 0 | | 650,000 | | 455,300 |
| SUBT 1.2.11 | 62,900 | 2.00 | 285 | 0 | 0 | 0 | 0 | 0 | 650,000 | 609,812 | 455,300 |
| | | | | | | | | | | (FUNDED UNDER 1.2.16) | |
| 1.2.12.2.2 | 9,200 | 0.30 | 41 | | 0 | 0 | 0 | | 116,000 | | 91,000 |
| 1.2.12.2.3 | 13,300 | 0.30 | 37 | | 0 | 0 | 0 | | 134,000 | | 111,700 |
| SUBT 1.2.12 | 22,500 | 0.60 | 78 | 0 | 0 | 0 | 0 | | 250,000 | 215,606 | 202,700 |
| | | | | | | | | | | (FUNDED UNDER 1.2.17) | |
| 1.2.13.2.5 | 900 | 0.00 | 7 | | 0 | 0 | 0 | | 25,000 | | 11,800 |
| SUBT 1.2.13 | 900 | 0.00 | 7 | 0 | 0 | 0 | 0 | 0 | 25,000 | 18,750 | 11,800 |
| 1.2.15.2 | 19,000 | 2.60 | 348 | | 99 | 0 | 0 | | 290,000 | | 203,800 |
| 1.2.15.3 | 7,600 | 0.20 | 24 | | 0 | 0 | 0 | | 92,000 | | 66,800 |
| SUBT 1.2.15 | 26,600 | 2.80 | 372 | 0 | 99 | 0 | 0 | 0 | 382,000 | 300,010 | 270,600 |
| TOTAL LLNL | 1,353,906 | 53 | 7,737 | 483 | 74,391 | 625,406 | 174,330 | 0 | 13,849,000 | 12,538,431 | 10,379,723 |

* This work was moved to WBS 1.2.3; however, funding for this work remains in Budget and Report Category DB010202 in the AFP.

**** Capital equipment budgets are included in the individual WBS Elements.

\# Per instructions letter dated 4/27/93 V.F. Iorii to W. L. Clarke

## Issues and Concerns

None at this time.

TECHNICAL SUMMARY

## 1.2.1. SYSTEMS ENGINEERING

### 1.2.1.1 Systems Engineering Coordination and Planning

No significant activities.

### 1.2.1.5 Special Studies

J. Blink participated in the Functional Analysis/Concept of Operations exercise in July.

In order to augment the thermo-hydrological calculation support of the thermal loading systems study, our calculations in the near-field/altered zone hydrology WBS element (1.2.3.12.2) use the same set of thermal loading assumptions. A Youngest Fuel First spent nuclear fuel (SNF) receipt scenario is assumed with a 10-yr cut-off for the youngest fuel [referred to as YFF(10)]. We account for the emplacement of BWR waste packages (WPs) containing 40 assemblies per WP, and PWR WPs containing 21 assemblies per WP. The waste receipt schedule was supplied by J. King of the M&O. Areal Mass Loadings (AMLs) of 24.2, 35.9, 55.3, 70, 83.4, 100, 110.5, and 150 metric ton of uranium per acre (MTU/acre) have been analyzed assuming the matrix hydrological properties given in the Reference Information Base (RIB) and Klavetter and Peters (1986). LLNL staff are also considering the impact of more recent matrix hydrological property data given in a recent draft report (Pruess and Tsang, 1994), and which are based on measurements by Flint and others (1983). This month, we also continued the investigation of the impact of enhanced gas-phase diffusion on dry-out and re-wetting behavior.

Additional thermo-hydrological information is presented in section 1.2.3.12.2 of this report.

<u>The Impact of Enhanced Gas-Phase Diffusion and Matrix Hydrological Properties on Temperature and Relative Humidity Conditions in the Repository</u>

This month's near-field/altered zone hydrology progress report discusses the sensitivity of temperature and relative humidity behavior to enhanced gas-phase diffusion and the matrix hydrological properties assumed for the TSw1 and Tsw2. Repository-scale calculations were repeated for the five sets of matrix properties for the Topopah Spring welded tuff (Table 7 in section 1.2.3.12.2) that are listed in Pruess and Tsang (1994) and based on Flint et al. (1993). Rather than repeat the details of that section, we focus here on the relative humidity, *RH*, conditions at the end of the boiling period.

Table 1 summarizes the duration of the boiling period at various repository locations and the *RH* attained at the end of the boiling period for the "reference" case [based on the matrix hydrological properties obtained from the RIB and Klavetter and Peters (1986)] for AMLs of 70, 83.4, 110.5, and 150 MTU/acre and for values of the binary gas-phase diffusion tortuosity factor, $\tau_{eff}$, of 0.2 and 2.0. The bulk permeability, $k_b$, is 280 millidarcy in these calculations. Table 2 summarizes the same information for the five sets of recent matrix property data listed in Pruess and Tsang (1994) for AMLs of 110.5 and 150 MTU/acre, and for $\tau_{eff} = 2.0$. A comparison of Tables 1b and 2 indicates that the duration of the boiling period, $t_{bp}$, is insensitive to the range of matrix hydrological properties considered. However, a comparison of Tables 1a and b indicates that because enhanced vapor diffusion enhances the rate of heat loss from the repository, it has the effect of modestly decreasing $t_{bp}$, particularly for the inner 75% of the repository.

Table 1: TSw1 and TSw2 matrix properties from Klavetter and Peters (1986)
Duration of the boiling period at various repository locations and the relative humidity attained at the end of the boiling period for 22.5-yr-old SNF, various Areal Mass Loadings, and $k_b$ = 280 millidarcy. The locations are identified as the percentage of the repository area enclosed, with 0 percent corresponding to the repository center, and 100 percent corresponding to the outer perimeter

Table 1a: gas-phase diffusion tortousity factor, $\tau_{eff}$ = 0.2

| Fraction of repository area enclosed (%) | Duration of the boiling period (yr) and the relative humidity (%) at the end of the boiling period for the indicated AMLs | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 70 MTU/acre | | 83.4 MTU/acre | | 110.5 MTU/acre | | 150 MTU/acre | |
| 50 | 2610 yr | 68% | 3870 yr | 57% | 6130 yr | 44% | 9590 yr | 47% |
| 75 | 2000 yr | 72% | 2740 yr | 73% | 4290 yr | 51% | 7210 yr | 45% |
| 90 | 1090 yr | 81% | 1700 yr | 77% | 2870 yr | 68% | 5010 yr | 54% |
| 97 | 410 yr | 96% | 990 yr | 93% | 2150 yr | 87% | 3960 yr | 67% |

Table 1b: $\tau_{eff}$ = 2.0

| Fraction of repository area enclosed (%) | Duration of the boiling period (yr) and the relative humidity (%) at the end of the boiling period for the indicated AMLs | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 70 MTU/acre | | 83.4 MTU/acre | | 110.5 MTU/acre | | 150 MTU/acre | |
| 50 | 2650 yr 6. | 67% | 3430 yr | 55% | 5400 yr | 45% | 8780 yr % | 44% |
| 75 | 1940 yr | 70% | 2550 yr | 63% | 3960 yr | 50% | 6530 yr 7% | 45% |
| 90 | 1040 yr | 77% | 1680 yr | 73% | 2710 yr | 64% | 4510 yr % | 52% |
| 97 | 360 yr | 87% | 930 yr | 85% | 2030 yr | 78% | 3550 yr % | 61% |

Table 2: Gas-phase diffusion tortuousity factor, $\tau_{eff}$ = 2.0
Duration of the boiling period at various repository locations and the relative humidity attained at the end of the boiling period for 22.5-yr-old SNF, $k_b$ = 280 millidarcy and matrix properties for the TSw1 and TSw2 obtained from the indicated sources. The locations are identified as the percentage of the repository area enclosed, with 0 percent corresponding to the repository center, and 100 percent corresponding to the outer perimeter

Table 2a: AML = 110.5 MTU/acre

| Fraction of repository area enclosed (%) | Duration of the boiling period (yr) and the relative humidity (%) at the end of the boiling period for the indicated source of TSw1 and TSw2 matrix properties | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LBL-USGS 3.2 | | LBL-USGS 3.5 | | LBL-USGS 3.1/3.6 | | LBL-USGS 3.4 | | LBL-USGS 3.3 | |
| 50 | 5630 yr | 57% | 6110 yr | 44% | 5140 yr | 40% | 5110 yr | 38% | 5050 yr | 37% |
| 75 | 3930 yr | 69% | 4100 yr | 51% | 3870 yr | 48% | 3860 yr | 46% | 3860 yr | 45% |
| 90 | 2560 yr | 86% | 2710 yr | 66% | 2690 yr | 64% | 2700 yr | 61% | 2700 yr | 59% |
| 97 | 1860 yr | 96% | 1990 yr | 85% | 2020 yr | 81% | 2040 yr | 77% | 2050 yr | 75% |

Table 2b: AML = 150 MTU/acre

| Fraction of repository area enclosed (%) | Duration of the boiling period (yr) and the relative humidity (%) at the end of the boiling period for the indicated source of TSw1 and TSw2 matrix properties | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LBL-USGS 3.2 | | LBL-USGS 3.5 | | LBL-USGS 3.1/3.6 | | LBL-USGS 3.4 | | LBL-USGS 3.3 | |
| 50 | 8940 yr | 56% | 8840 yr | 42% | 8240 yr | 39% | 8270 yr | 37% | 8190 yr | 36% |
| 75 | 6550 yr | 65% | 6550 yr | 44% | 6220 yr | 41% | 6220 yr | 39% | 6110 yr | 37% |
| 90 | 4210 yr | 79% | 4490 yr | 54% | 4380 yr | 50% | 4370 yr | 47% | 4330 yr | 45% |
| 97 | 3130 yr | 91% | 3470 yr | 65% | 3470 yr | 61% | 3480 yr | 58% | 3470 yr | 56% |

A comparison of Tables 1a and b also indicates that the effect of enhanced vapor flow is to reduced *RH* at the end of the boiling period. This reduction in *RH* is particularly pronounced at the repository edge where it ranges from 5.7 to 9.0%. A comparison of Tables 1b and 2 also indicates that with the exception of LBL-USGS 3.2, the remaining four LBL-USGS cases and the reference case result in very similar *RH* conditions at the end of the boiling period. Both of these observations apply to all AMLs. Because LBL-USGS 3.2 results in a substantially faster liquid-phase re-wetting rate, it results in more humid conditions by the end of the boiling period.

A comparison of Tables 1b and 2 shows that, relative to the reference case, the following observations apply to the end of the boiling period for the 110.5- and 150-MTU/acre repositories:

- LBL-USGS 3.2 results in more humid conditions and
- LBL-USGS 3.5, LBL-USGS 3.1/3.6, LBL-USGS 3.4, and LBL-USGS 3.3 result in less humid conditions, particularly for the inner 75% of the repository.

In general, relative humidity behavior during the above-boiling period is much less sensitive to the matrix property data than during the post-boiling period.

It should be emphasized that Tables 1 and 2 are based on the smeared-heat-source, repository-scale model. Consequently, the listed value of *RH* is applicable to average liquid saturation conditions. Had a discrete representation of WPs been done, we would find that the local liquid saturation conditions surrounding the emplacement drift are generally drier than the average saturation conditions. In that regard, the repository-scale model indicates an *RH* that is wetter than the local value of *RH* in the emplacement drift. It should also be noted that thermo-hydrological heterogeneity and variability in the heat output among the WPs will cause local behavior to deviate from average behavior.

<u>Analysis of the Impact of Enhanced Gas-Phase Diffusion on Temperature and Relative Humidity Conditions in the Repository</u>

We have been investigating the sensitivity of dry-out and re-wetting behavior to a range of parameters and boundary conditions. Dry-out behavior is the net result of processes that drive water vapor away from the repository and the processes that cause water to return to the repository. Processes that drive water away from the repository include:

- binary gas-phase diffusion of air and water vapor
- advective gas-phase flow driven by
  - boiling conditions
  - buoyant gas-phase convection
- advective liquid-phase flow of
  - condensate drainage down the flanks of the dry-out zone
  - condensate drainage below the dry-out zone

Processes that return water to the repository include:

- binary gas-phase diffusion of air and water vapor
- advective liquid-phase flow driven by
  - natural infiltration
  - condensate drainage above the dry-out zone
  - matrix imbibition, generally occurring from high to low liquid saturation

Buoyant gas-phase convection can enhance the buildup of condensate above the dry-out zone, thereby increasing the return condensate flux above the dry-out zone. Buoyant gas-phase convection can also enhance the rate of vaporization. Gas-phase convection driven by boiling can suppress the impact of buoyant gas-phase convection.

As is evident, there are many interrelated processes impacting dry-out and re-wetting behavior. Because of the decaying nature of the repository heat source, there is generally an initial period during which the dry-out zone increases in spatial extent, followed by a much longer period during which re-wetting processes dominate dry-out, causing the dry-out zone to re-wet back to ambient conditions. As we have been illustrated in previous monthly reports, dry-out and re-wetting behavior vary substantially between the center and edge of the repository.

Table 3 lists the time required to attain indicated values of relative humidity, *RH*, and the temperature at which that value of *RH* is attained for three values of the binary, gas-phase diffusion tortuosity factor, $\tau_{eff}$, (0.2, 1.0, and 2.0) and an AML of 83.4 MTU/acre. In general, for this range of $\tau_{eff}$, the dependence of temperature and relative humidity behavior on $\tau_{eff}$ is seen to be relatively minor.

For the 83.4-MTU/acre case (Table 3), enhanced gas-phase diffusion tends to:

- modestly decrease the time required to re-wet to *RH* = 70 and 80% for the inner 50% of the repository,
- modestly increase the time required to re-wet to *RH* = 95% for the inner 75% of the repository, and
- modestly increase the time required to re-wet to *RH* = 70, 80, 90, and 95% for the outer 10% of the repository.

The relationship between temperature and *RH* is relatively insensitive to the magnitude of gas-phase diffusion over this range of $\tau_{eff}$ for the inner 75% of the repository. For a given value of *RH*, enhanced gas-phase diffusion results in lower temperatures for the outer 25% of the repository.

The June monthly report examined the impact of enhanced vapor diffusion for AMLs of 110.5 and 150 MTU/acre by considering a range in $\tau_{eff}$ of 0.2 to 2.0. This month's report increases the range of $\tau_{eff}$ to 4.0 for an AML of 150 MTU/acre (Table 4). The impact of a 40-fold increase in $\tau_{eff}$ is to increase the re-wetting time throughout the repository. The decrease in re-wetting rate is particularly pronounced at the repository edge where the time to attain the four values of *RH* increased by factors of 1.6 to 2.6, respectively. The impact of enhanced vapor diffusion is also addressed in the WBS element 1.2.3.12.2 section of this report.

Table 3: AML 83.4 MTU/acre
The time required to attain the indicated relative humidity at various repository locations and the temperature at which that value of relative humidity is attained for 22.5-yr-old SNF and $k_b$ = 280 millidarcy. The locations are identified as the percentage of the repository area enclosed, with 0 percent corresponding to the repository center, and 100 percent corresponding to the outer perimeter

Table 3a: Gas-phase diffusion tortousity factor, $\tau_{eff}$ = 0.2;

| Fraction of repository area enclosed (%) | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 8110 | 17,710 | 29,290 | 38,360 | 76 | 58 | 48 | 43 |
| 75 | 3910 | 8250 | 13,820 | 19,040 | 86 | 70 | 59 | 53 |
| 90 | 1240 | 2030 | 3530 | 4800 | 104 | 91 | 78 | 72 |
| 97 | 370 | 590 | 890 | 1140 | 107 | 103 | 98 | 94 |

Table 3b: $\tau_{eff}$ = 1.0

| Fraction of repository area enclosed (%) | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 7410 | 14,710 | 31,490 | 46,360 | 77 | 62 | 45 | 40 |
| 75 | 3660 | 8020 | 17,790 | 27,700 | 86 | 69 | 54 | 46 |
| 90 | 1340 | 2160 | 4630 | 7780 | 102 | 89 | 72 | 64 |
| 97 | 400 | 660 | 1120 | 1630 | 106 | 101 | 94 | 87 |

Table 3c: $\tau_{eff}$ = 2.0

| Fraction of repository area enclosed (%) | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 7800 | 15,040 | 33,920 | 54,310 | 73 | 59 | 43 | 37 |
| 75 | 3930 | 8930 | 21,380 | 33,710 | 82 | 65 | 49 | 42 |
| 90 | 1470 | 2400 | 6230 | 11,440 | 99 | 86 | 65 | 56 |
| 97 | 440 | 740 | 1340 | 2100 | 105 | 99 | 90 | 81 |

Table 4: AML = of 150.0 MTU/acre
The time required to attain the indicated relative humidity at various repository locations and the temperature at which that value of relative humidity is attained for 22.5-yr-old SNF and $k_b$ = 280 millidarcy.
The locations are identified as the percentage of the repository area enclosed, with 0 percent corresponding to the repository center, and 100 percent corresponding to the outer perimeter.

Table 4a: Gas-phase diffusion tortousity factor, $t_{eff}$ = 0.2

| Fraction of repository area enclosed (%) | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 20,630 | 34,850 | 50,920 | 64,120 | 68 | 52 | 45 | 41 |
| 75 | 16,400 | 24,520 | 32,700 | 43,360 | 70 | 59 | 51 | 46 |
| 90 | 8660 | 12,090 | 16,520 | 19,780 | 81 | 72 | 64 | 59 |
| 97 | 4330 | 6020 | 8180 | 10,060 | 93 | 84 | 77 | 72 |

Table 4b: $\tau_{eff}$ = 4.0

| Fraction of repository area enclosed (%) | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 21,960 | 31,810 | 55,690 | 75,460 | 63 | 52 | 42 | 38 |
| 75 | 18,010 | 27,310 | 43,510 | 55,600 | 64 | 54 | 44 | 40 |
| 90 | 11,730 | 18,190 | 28,870 | 37,320 | 70 | 59 | 49 | 44 |
| 97 | 6950 | 11,380 | 18,870 | 26,600 | 77 | 66 | 55 | 49 |

### 1.2.1.6 Configuration Management

Affected document notices (ADN's) were completed for CRs 94/171, 94/181, 94/209, 94/216, 94/219, and 94/241. No LLNL documents were affected.

J. Blink reviewed the minutes of the July ICWG meeting.

## 1.2.2. WASTE PACKAGE

### 1.2.2.1 Waste Package Coordination and Planning

LLNL staff prepared bottoms-up cost estimates for the FY95 planning process.

### 1.2.2.2 Waste Package Environment

This work is now being reported in WBS 1.2.3.12.

### 1.2.2.3 Waste Form and Materials Testing

#### 1.2.2.3.1 Waste Form

##### 1.2.2.3.1.1 Waste Form Testing - Spent Fuel

Spent Fuel Dissolution

A revised FY94 workscope has been written due to the shutdown of all radiological work in PNL Building 325. Due to the decreased need for scientific staff time, resulting from the shutdown, efforts have been redirected toward the preparation of a more comprehensive progress report at the end of FY94 than originally anticipated.

Flow-through tests will be started, as previously planned, on oxidized ($U_4O_{9+z}$) and unoxidized ATM-104 (PWR) spent fuel specimens after resumption of radiological activities and replacement of the liquid waste tank. Other flow-through tests will be started on ATM-103 (PWR) spent fuel at low pH (3 to 6) for comparison with results from drip tests being conducted at Argonne National Laboratory.

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

Tests under unsaturated conditions at 90°C are in progress at Argonne National Laboratory (ANL) to evaluate the long-term performance of spent fuel in the potential Yucca Mountain repository. These tests examine the leach/dissolution behavior of two types of well-characterized irradiated PWR fuels, ATM-103 and ATM-106, in three types of tests: two with a saturated water vapor atmosphere, two with a drip rate of 0.075 mL/3.5 d, and two with a drip rate of 0.75 mL/3.5 d. A control test without fuel but with a 0.075 mL/3.5 d drip rate is also included. EJ-13 water for the tests came from well J-13 and was equilibrated with volcanic tuff for approximately 80 days at 90°C. The seven tests have undergone 22 months of testing at 90°C by the end of July.

Preparation to receive spent fuel from the Materials Characterization Center (MCC) are in progress. Considerable correspondence has occurred between Pat Finn (ANL) and Walt Gray (PNL). Copies of all correspondence have been sent to LLNL.

This month's report discusses the results derived from alpha and gamma counting data for aliquots from the leachate, strip solutions, and filtered solutions and from the filters used in the sampling done in April 1994, after 581 days of exposure. These values will be verified by comparing them with those from inductively coupled plasma-mass spectrometry (ICP-MS).

The actinide content (from electroplated samples) and the cesium content for the two high drip-rate tests are shown in Table 5 in order to compare their relative release rates. The table lists the content for the leachate, the strip solution, the wash, the total material collected in the test interval, the unprecipitated fraction, and the maximum fraction. The unprecipitated fraction is the fraction of the released material that is not deposited on the vessel walls; it includes all dissolved material. The maximum fraction is the ratio between the total amount of isotope released in a given test interval and the expected amount of the isotope in the fuel under test. The leachate from the high drip-rate tests contains the most cesium, being four orders of magnitude greater than that in the low drip-rate and the vapor tests.

For the ATM-106 PWR sample, most of the actinides had precipitated except for neptunium, and most of the cesium was in solution. The order of the released fraction for the actinides was Np $\sim$ Cm $>$ Am $>$ Pu. The cesium maximum fraction was two to three orders of magnitude greater than the actinide fractions. For the ATM-103 PWR sample, a large fraction of the plutonium had not precipitated. The order of the maximum fractions was Np $>$ Cm $\sim$ Am $>>$ Pu. The neptunium fraction was the same order of magnitude as cesium's. The ATM-103's cesium fraction was also the same order of magnitude as the ATM-106's cesium fraction. Thus, the behavior of the ATM-103 PWR fuel's actinides appears to be significantly different than that of the ATM-106's PWR actinides.

The maximum fraction for the actinides and cesium are shown in Table 6 for the four cumulative time intervals tested. For the ATM-106 fuel, the amount of cesium released increased with time; the amount of the actinides released does not appear to increase as a function of time. There is a spread of two orders of magnitude in the maximum fractions for the actinides, with plutonium being the species with the minimal release. For the ATM-103 fuel, the amount of cesium released increased substantially in the fourth interval as did all the actinide releases. There is greater than a two order of magnitude range in the actinides' maximum fractions. However, the plutonium maximum fraction for ATM-103 is an order of magnitude greater than that for ATM-106.

Several series of filters (1000, 100, and 50 nm) were used in sequence on the high drip-rate test solutions in order the determine the elemental content of the species. Cesium passed through all three filters. There were two similarities and two differences for the actinide behavior for the two different fuels. The two similarities are that the leachate of both fuels had the same bimodal distribution for curium species with 50% $>$1000 nm and 50% being $<$50 nm. For both fuels' leachates, the neptunium species were $<$100 nm in size. The two differences in the leachates were that both the americium and the plutonium species were < 100 nm in size in the ATM-103 test and > 100 nm in size for the ATM-106 test.

The results for the high drip-rate tests indicate that the fuel fragments are being leached at a consistent rate during the first year and a half of continuous testing. The materials which are leached have a high proportion of americium and curium, relative to the plutonium content. The size distribution of the actinides in the colloidal fraction appears to be unique for each fuel.

Table 5. Actinide[a] and Cesium Content of the High Drip-Rate Tests

| Isotope | Leachate, g | Strip, g | Wash, g | Total, g | Unprec. Fraction, % | Maximum Fraction, % |
|---|---|---|---|---|---|---|
| ATM-106 | | | | | | |
| Am-241[b] | 3(-11) | 2(-9)[c] | 1(-10) | 2(-9) | 2 | 4(-5) |
| Am-243 | -- | 6(-10) | -- | 6(-10) | -- | 4(-5) |
| Cm-244 | 5(-12) | 4(-10) | 7(-12) | 4(-10) | 1 | 1(-4) |
| Np-237 | 5(-9) | 2(-8) | -- | 2(-8) | 25 | 7(-4) |
| Pu-239 | 8(-11) | 4 -9) | 1(-9) | 5(-9) | 2 | 1(-5) |
| Cs-137 | 1(-6) | 7(-8) | -- | 1(-6) | 94 | 2(-2) |
| ATM-103 | | | | | | |
| Am-241[b] | 5(-10) | 6(-8)[c] | 3(-10) | 6(-8) | <1 | 1(-3) |
| Am-243 | -- | 1(-8) | -- | 1(-8) | -- | 2(-3) |
| Cm-244 | 1(-10) | 4(-9) | 3(-11) | 4(-9) | 2 | 4(-3) |
| Np-237 | 2(-7) | 6(-7) | 6(-10) | 8(-7) | 25 | 3(-2) |
| Pu-239 | 2(-8) | 1(-8) | 4(-9) | 3 (-8) | 59 | 9(-5) |
| Cs-137 | 1(-6) | 5(-8) | -- | 1 (-6) | 96 | 2(-2) |

[a]The values are alpha results from electroplated samples. In some cases, higher counts were found for evaporated samples. The format has the exponent in parentheses, i.e., 3(-11) is $3\mathrm{x}10^{-11}$.
[b]The americium content is an estimate of its contribution since the Pu-238 and the Am-241 peaks cannot be separated.
[c]This is the measured value.

Table 6. Maximum Fraction at Successive Time Intervals

| ATM-106 Cumulative Days | First 113 | Second 217 | Third 482 | Fourth 581 |
|---|---|---|---|---|
| Am-241 | 2(-5) | 7(-5) | 6(-5) | 4(-5) |
| Am-243 | 2(-5) | 1(-4) | 7(-5) | 4(-5) |
| Cm-244 | 2(-5) | 2(-4) | 1(-4) | 1(-4) |
| Np-237 | N.A. | N.A. | 2(-3) | 7(-4) |
| Pu-239 | 8(-6) | 2(-5) | 5(-5) | 1(-5) |
| U-238 | 7(-6) | 4(-5) | N.A. | N.A. |
| Cs-137 | 1(-4) | 1(-3) | 9(-3) | 2(-2) |
| ATM-103 Cumulative Days | First 120 | Second 275 | Third 482 | Fourth 581 |
| Am-241 | 6(-4) | 2(-6) | 7(-6) | 1(-3) |
| Am-243 | 1(-3) | 1(-5) | 1(-5) | 2(-3) |
| Cm-244 | 8(-3) | 2(-5) | 2(-5) | 4(-3) |
| Np-237 | N.A. | N.A. | 7(-4) | 3(-2) |
| Pu-239 | 1(-6) | 2(-7) | 8(-7) | 9(-5) |
| U-238 | 1(-5) | 1(-6) | N.A. | N.A. |
| Cs-137 | 5(-4) | 1(-4) | 8(-4) | 2(-2) |

For the ATM-106, high drip-rate test, the residue on the Zircaloy filter was examined by optical microscopy. Several different materials were present; i.e., yellow material which may be schoepite, white material which may be an uranium silicate, black material which may be fuel grains. The identity of the materials will be determined with scanning electron microscopy (SEM) and transmission electron microscopy (TEM) examinations.

The release behavior of the actinides and cesium in the four other fuel tests was characterized. To date, the actinide release rate for the low drip-rate tests is two orders of magnitude lower than that found in the high drip-rate tests. For the vapor test on ATM-103, no release appears to have occurred. For the vapor test with ATM-106 fuel, the amount of actinide found in the vessel strip was an order of magnitude greater than that in any of the three other tests. For both low drip-rate tests, equivalent amounts of material were released, but the maximum fraction of americium and curium released in the ATM-103 test was an order of magnitude greater than that in the ATM-106 test. This difference in release behavior for the two fuels was also noted in the high drip-rate tests but its cause has not been determined.

D-20-49.1, Unsaturated Dissolution Tests with Spent Fuel and $UO_2$

The objective of this Task 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 tests are designed to examine the dissolution behavior of $UO_2$, formation of alteration phases, release rates, and mechanisms of uranium release, and to serve as a pilot study for similar tests with spent nuclear fuel.

Tests are continuing at ANL, with no scheduled sampling activities occurring during the past month.

D-20-53(a), Experiments

At LLNL an initial four schoepite ($UO_3 \bullet H_2O$) dissolution experiments at room-temperature and 20% oxygen were completed. They consisted of the four combinations of pH 8 and 10 combined with total carbonate concentrations of $2 \times 10^{-4}$ and $2 \times 10^{-2}$ mol/L. These same experiments were then run at 75°C. This approach doubled the number of measured dissolution rates with minimal extra effort.

As previously reported, very preliminary measurements had indicated that uranium dissolution rates of the $UO_3 \bullet H_2O$ at room temperature were similar to $UO_2$. These early results were based on one day's sampling after about two weeks into the runs, a time that is within the normal steady-state dissolution period experienced with $UO_2$. Timely uranium analysis was delayed by repairs on the kinetic phosphorescence analyzer. Analysis of additional samples from several other days was performed with an Inductively Coupled Plasma Mass Spectrometer (ICP-MS). These results indicate that dissolution rates were quite high during the first few days of each experimental run and dropping significantly thereafter. Such unexpectedly high time-dependent early-dissolution rates are being examined to assure that they represent true dissolution rates and are not experimental artifacts.

The empirical modeling effort to fit the existing LLNL $UO_2$ dissolution data was expanded to include models having solid-liquid interface and chemical potential terms. These models differ from the original ones that were based on the classic empirical chemical rate equation for homogeneous solutions. The regression fits with these more phenomenological models for solid dissolution have not been as robust as the earlier chemical rate equation or pure polynomial fits.

Spent Fuel Oxidation

Dry Bath Testing

The drybaths continue to run without incident at Pacific Northwest Laboratory (PNL). All drybaths at PNL are scheduled to be shut down during August. An interim weighing of samples will be conducted.

Because the X-ray diffraction (XRD) analysis of spent fuel oxidized above an oxygen-to-metal (O/M) ratio of 2.4 has been delayed by a continuing hold of radiological work in PNL Building 325, the focus of this effort to identify higher oxidation reactions of the $UO_{2.4}$ phase has shifted to transmission electron microscopy (TEM). TEM examination of a sample oxidized just past O/M = 2.4 has shown microcracking and possible amorphous phase formation on a fine scale within the $UO_{2.4}$ matrix. These microstructural changes observed at the onset of the next oxidation reaction above $UO_{2.4}$ appear consistent with X-ray peak broadening and peak intensity reductions observed in the partially completed XRD analyses. Intensive efforts are continuing to produce suitable TEM specimens from fuels that reached O/Ms as high as 2.56 in the drybath ovens without significantly forming $U_3O_8$.

Thermogravimetric Apparatus (TGA)

No tests were conducted this month due to the closure of PNL Building 325. Revision of the Radiation Work Permit is in progress.

Materials Characterization Center (MCC) Hot Cell Activities

Plans to ship fuel to Argonne National Laboratory (ANL) are in progress. Projections indicate that approximately three shipments will be made to ANL using the BCL-3 cask. Due to the tight scheduling of the hot cell technicians that will be necessary to perform this activity; it is anticipated that only one of these shipments will be made prior to the end of this fiscal year. The remaining shipments will have to be completed in FY95.

**1.2.2.3.1.2 Waste Form Testing - Glass**

J. Bates (ANL) attended the Nuclear Waste Technical Review Board meeting on 7/11/94. The subject was colloids and migration. R. Stout and J. Bates met briefly with A. Simmons (YMSCO) to discuss the study of colloids generated from the unsaturated tests being performed on glass and spent fuel.

D-20-27, Unsaturated Testing of WVDP and DWPF Glass

The N2 tests (Defense Waste Production Facility, DWPF, actinide-doped glass) glass dissolution tests continue at ANL as scheduled and have reached 102 months in length.

For the N2 tests that were sampled on 6/20/94, the analysis has been completed of colloidal material collected during sampling. The sampling is done by passing 0.05 mL of test solution through a "holey" (perforated) carbon grid. The solution passes through the grid and a random collection of particulate and colloidal material remains on the grid. The sample is then analyzed using analytical electron microscopy (AEM). This is a method to identify some of the phases that are in the solution but is neither a full examination of the colloidal properties of the particulates nor a method to study all of the colloids that may be in solution. However, it does provide compositional and structural information for the particles trapped on the grid, and these data can be correlated with the solution data.

For the N2 test series, there has been a continual interaction between the sensitized 304L type stainless steel and the glass. This interaction shows up in the colloidal material in solution. A large number of agglomerates were found that were rich in iron. The agglomerates were made up of round particles of about 1 $\mu$m in diameter. In other regions, there was clay that was closely associated with iron particles and other elements including zinc. These clay phases were on the order of 100 nm in diameter. Calcium oxide particles on the order of 0.5 $\mu$m in diameter were also found. Several particles that were about 0.2 $\mu$m in size were isolated; they appear to be similar to the layers that form on the glass as it reacts. It appears that the reacted glass layer spalls from the glass surface as the water slowly drips over the glass. The radionuclide content of each of these phases can be determined using radiography, if funds are available in FY 95.

The N3 (West Valley ATM-10 glass) tests N3#9, N3#10, N3#12, plus the blank test N3#11 were sampled as scheduled on 7/14/94. Specimens from the solution were collected for anion, cation, alpha spectrometry (transuranics), and pH. Additionally, filtered specimens (1 $\mu$m and 15 nm filters) were prepared for alpha spectrometry, and the filters themselves submitted for counting. Analytical electron microscopy samples were also prepared for colloid analysis. A quality assurance surveillance on the sampling was performed, and no deviations from approved procedures were noted.

The solution analysis results for all the sample periods since the tests began have been verified and updated through the January 1994 sampling. These data are now in an updated data base format and will be presented in full along with the July data in the annual report.

D-20-70, Parametric Studies of WVDP and DWPF Glass

Sixteen tests continue with some in progress for up to 8 years. The samples collected during June are undergoing analysis.

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, but the tests will remain ongoing.

### 1.2.2.3.2 Metal Barriers

The purpose of the metallic barrier task is to characterize the behavior and determine corrosion rates and corrosion mechanisms, including the interaction between the metal containment barriers and the surrounding environment. Tests, modeling, and investigations 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 teams, as well as to performance assessment.

Task Management and Quality Assurance (PACS OL232JCD)

Detailed planning in anticipation of a significant budget increase for FY-95 continues, and estimates for acquiring test specimens and equipment in which to conduct long-term tests have been obtained. Input was provided for budget request submissions to YMSCO. Metal Barrier personnel met with QA personnel on July 13 to discuss procurement of test specimens for a number of different activities. A major concern was identifying a commercial source who could meet the quality assurance requirements, since it is anticipated that many of these activities will be determined to be quality affecting. There is a source in Alabama whose sole business is preparation of test specimens, particularly those for corrosion testing, and they have available a very large variety of alloys and specimen types. G. Gdowski and R. Monks are planning a site visit in August to determine whether this company can be placed on the YMP list of approved suppliers. A considerable number of metal specimen purchases are contemplated for FY-95.

R. Van Konynenburg presented a talk at the July 12 meeting of the Nuclear Waste Technical Review Board. His talk was entitled "Potential Effects of Engineered Barriers on Radionuclide Migration". It focused on identification and discussion of the corrosion products that will be produced on the various metal barrier materials (and other components in the waste package, such as the pour canister for defense waste, multi-purpose container for spent fuel, and the basket material) and how these corrosion products will interact with the various radionuclides that will be present. Certain metals and corrosion products will sorb certain radionuclides, and the beneficial interaction was discussed with respect to the regulatory requirement for controlled release following the period of substantially complete containment.

D. McCright spoke with R. Moller of the Nickel Development Institute (NiDI) on July 26. NiDI is planning to host a workshop on the utilization of nickel and nickel-containing alloys. The workshop is tentatively scheduled for November 2-4 in Toronto, Ontario, where NiDI is headquartered.

Prepare Planning Documents (PACS OL232LFF)

The purpose of this activity is to update the planning documents for the Metal Barriers Task, particularly the Scientific Investigation Plan (SIP) and subordinate activity plans, to account for changes in the multi-purpose container, waste package, and repository design. The current SIP was written for the Conceptual Design phase, but the candidate materials and configuration of barriers proposed for the Advanced Conceptual Design are significantly different, necessitating an extensive revision of the SIP.

Revision of the SIP is in progress. The projected completion date for the draft is some time in August.

Degradation Mode Surveys (PACS OL232LFA, Activity E-20-13)

The purpose of a degradation mode survey is to amass previously published information about a candidate material and its performance in a number of environments and applications, and to interpret this body of information in the context of a potential repository in Yucca Mountain. In many cases, the degradation mode survey indicates the ways in which a material can degrade and serves to indicate the rate and kind of degradation in environments that have some similarity to what a metal barrier may experience in the Yucca Mountain setting. Lack of information suggests what work will be required to determine the behavior of the candidate material in Yucca Mountain environments.

The degradation mode survey on carbon steels and other iron-based candidate materials is being revised according to review comments.

Performance Tests and Model Development (PACS OL232LFB. Activity E-20-16)

The purpose of model development is to develop a predictive tool that will enable use of experimental data and analyses to draw long-term assessment of the performance of candidate container materials under Yucca Mountain conditions. This work will ultimately describe the performance of the multiple barrier waste package container. As a first step in that direction, the modeling work has focused on pitting of a highly corrosion resistant barrier, such as one of the nickel-base or titanium-base candidate materials. While pitting corrosion is usually governed by electrochemical, chemical, and occasionally metallurgical parameters, an important aspect of pitting is "stochastic". Much of the modeling work is aimed at developing the stochastic aspect of pitting within the electrochemical and chemical parameters.

Details of the Modeling: Exponential Birth Probability

The P.I., G. Henshall has continued to simulate the potentiodynamic "sweep" experiment often used to determine the pitting potential. Results obtained this month show that the "PIGS" model predicts more complex behavior than a simple "birth-only" analytical model for the case in which the birth probability depends exponentially upon the applied potential.

Details of the Modeling: Potentiodynamic Pitting Experiment Simulation

Simulations of the potentiodynamic experiment used to determine the pitting potential continue. As described in the June 1994 report, the potentiodynamic experiment typically involves sweeping the applied potential, $E_{app}$, from a low value, $E_o$, toward higher values at a constant velocity, $v$:

$$E_{app} = E_o + v\,t\,, \tag{1}$$

where $t$ is time. The potential at the time the first pit is detected is designated as the pitting potential, $E_p$. As discussed in detail by Shibata and Takeyama [1-3], the stochastic theory of pitting predicts that $E_p$ is a distributed quantity for any given $v$. From a simple algebraic stochastic theory based on birth processes only, Shibata and Takeyama [1,3] deduced the most probable value of the pitting potential, $\bar{E}$ , as a function of $v$. The form of this relationship depends on the equation relating the birth probability, $\lambda$, and $E_{app}$, of which both linear and exponential forms have been observed [1-3]. This month, the exponential relationship between $\lambda$ and $E_{app}$ was explored:

$$\lambda - \alpha\exp(\beta E_{app}), \tag{2}$$

where $\alpha$ and $\beta$ are constants. From the algebraic "birth-only" model, in which embryo death and a critical age are not considered, eq. (2) leads to [1,3]:

$$\bar{E} = [1/(\alpha\beta)\ \ln(v/\alpha). \tag{3}$$

Thus, a plot of $\bar{E}$ vs. $\log(v)$ should yield a straight line. In contrast, as described in the June 1994 report, a linear relationship between $\lambda$ and $E_{app}$ leads to a linear dependence of $\bar{E}$ on $v^{1/2}$.

Following the procedures described in the June 1994 report, PIGS simulations were performed using equation (2). Figure 1 presents the results of such calculations for a relatively mild (small $\beta$) exponential dependence of $\lambda$ on $E_{app}$. The median pitting potential, $<E_p>$, and $\bar{E}$ are plotted as a function of $v^{1/2}$ in Fig. 1a. Unlike the results presented last month using the linear dependence of $\lambda$ on $E_{app}$, simple linear behavior is not predicted. This result is not unexpected since equation (2) was used in the calculations. A plot of the same results using a logarithmic scale in $v$ is expected from the analytical model, eq. (3), to yield a straight line. However, Fig. 1b shows that linear behavior is exhibited only over a limited range. Thus, compared with the simple analytical model the behavior of the PIGS model, which includes pit embryo death below a critical age, is relatively complex.

Another set of simulations was performed using a somewhat more severe exponential relationship between $\lambda$ and $E_{app}$ by increasing $\beta$ in eq. (2) (while decreasing $\alpha$ to provide similar values of $\lambda$ at large $E_{app}$). The results of these calculations are shown in Fig. 2. In this case, the pitting potentials are clearly non-linear in $v^{1/2}$, Fig. 2a, which is consistent with the simple birth-only model [3]. Less predictably, bi-linear behavior is exhibited on the logarithmic plot, Fig. 2b. The deviation from the simple linear behavior of eq. (3) is related to the effects of embryo death prior to their reaching the critical age. Therefore, it would be useful to repeat the same set of simulations using a different death probability in hopes of sorting out the influences of embryo birth and death on the potentiodynamic pitting potential.

Figure 1a: Dependence on square root of potentiodynamic sweep velocity.

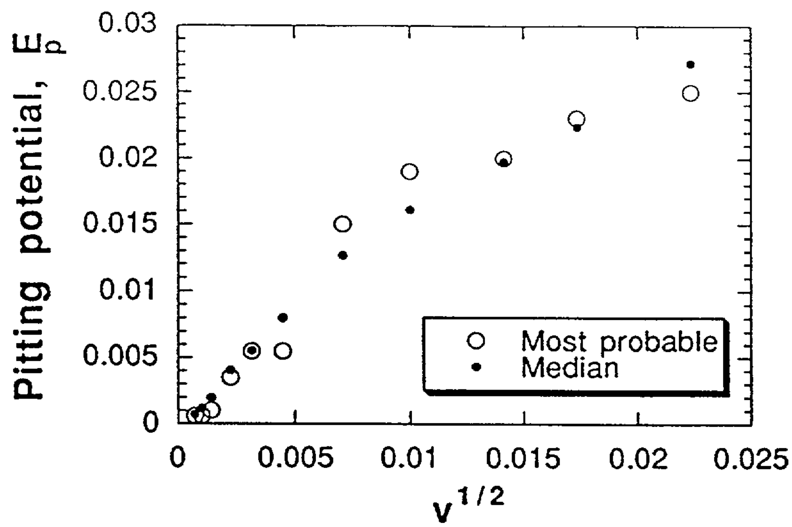



**Figure 1b: Dependence on the logarithm of the potentiodynamic sweep velocity.**

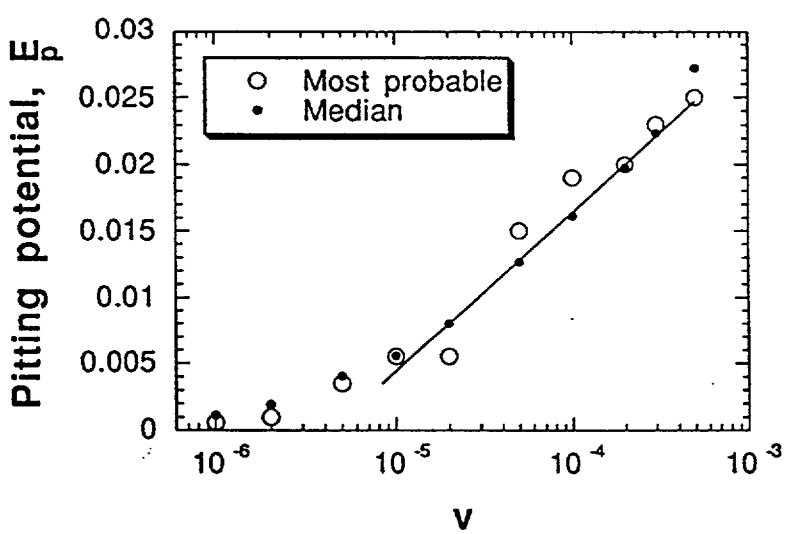



**Figure 1. PIGS predictions of the most probable pitting potential, $\bar{E}$, and the median pitting potential, $<E_p>$, as a function of the potentiodynamic sweep velocity for $\beta$ = 202.1.**

Figure 2a: Dependence on square root of potentiodynamic sweep velocity.

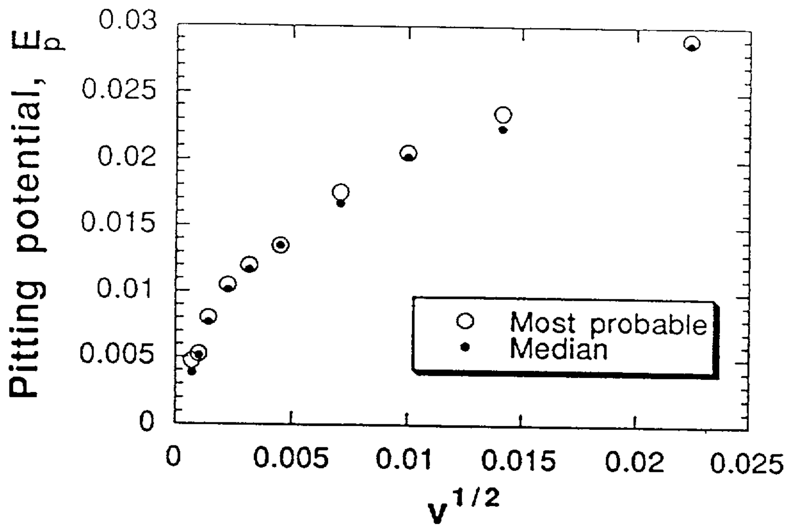



Figure 2b: Dependence on the logarithm of the potentiodynamic sweep velocity.

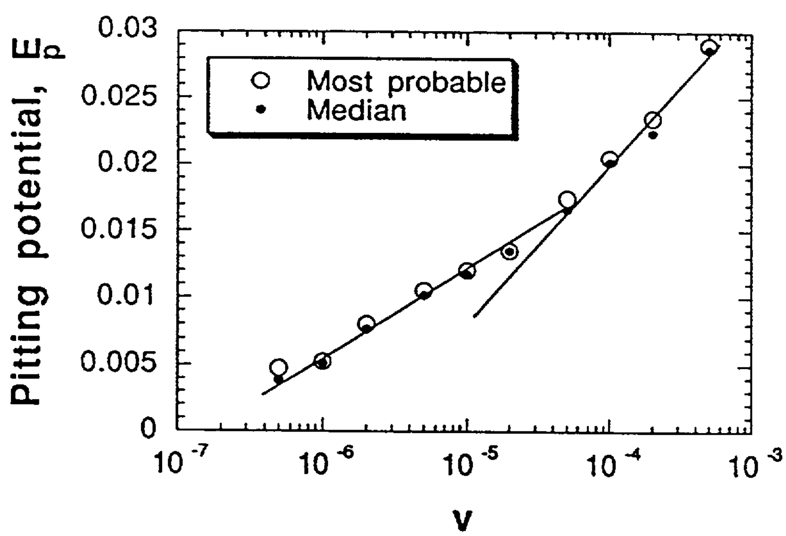



**Figure 2. PIGS predictions of the most probable pitting potential, $\bar{E}$ , and the median pitting potential, $<E_p>$, as a function of the potentiodynamic sweep velocity for $\beta$ = 321.0.**

**References**


1. T. Shibata and T. Takeyama, *Corr.* **33** (1977) 243.

2. T. Shibata, *Corr. Sci.* **31** (1990) 413.

3. T. Shibata and T. Takeyama, in Proc. Second Japan-U.S.S.R. Corrosion Seminar, JSCE (1980) pp. 178.

Parameter Tests and Metal Degradation (PACS OL232LFC, Activity E-20-17)

There are currently active two parametric studies, one on thermogravimetric analysis and the other on corrosion sensor development, including support to the "large block test".

## Thermogravimetric Analysis

The purpose of thermogravimetric analysis work is determination of the limits where aqueous corrosion processes occur after emplacement of the waste package. These limits have special significance in an unsaturated zone repository, because the extent of degradation of the candidate materials becomes much greater when aqueous corrosion processes initiate. The key parameters appear to be humidity, temperature, and surface condition; the experimental work aims to determine the interrelationship among these parameters. Thermogravimetric analysis (TGA) is a particularly sensitive technique for using a micro-analytical balance to measure very small changes in weight gain as a material reacts with the environment.

Much of July was spent on equipment modification of the TGA unit (Cahn TG-131). The apparatus was modified to incorporate a humidity sensor (Hy-Cal Engineering). The sensor is positioned just below the test specimen and provides the experimenter with real-time relative humidity measurements. Initial shake-down tests using the humidity sensor revealed an unexpected problem. The relative humidity was higher than expected. Investigation of the cause of the anomalous humidity data revealed a lower than expected temperature region in the upper half of the furnace. This cold zone caused water vapor condensation in the upper half of the furnace and raised the relative humidity as the test progressed. In addition, it was found that the manufacturer-specified constant-temperature reaction zone did not exist, but rather that a temperature change of 20°C was found across this zone.

The manufacturer was sent the furnace temperature profile data that we obtained. The manufacturer is studying the furnace problem and will probably have to replace the furnace. In the meantime, two relatively inexpensive band heaters ($60/each) have been ordered and will be integrated into the existing Cahn TG-131 furnace control loop. The heaters will be installed soon, and testing should resume shortly thereafter. We have made some inquiries with Cahn, Inc. for an integrated Data/Acquisition and control system that will take real-time data of weight, gas flow, relative humidity, and temperature. In addition, the new software will come with unlimited time-of-test capability - a true need for some longer term experiments. We are currently limited to a 168 hour test by the software.

## Corrosion Sensor Development - Support to Large Block Test

The purpose of this activity is to develop sensors and methods to monitor atmospheric corrosion phenomena for prospective container materials, and also to investigate the rates and mechanisms of microbiologically-induced corrosion (MIC). Past work has centered on measurements in the liquid phase. Relatively little work has been done, relevant to the Yucca Mountain Site Characterization Project, on the application of electrochemical methods (and other sensors) in the gas phase, which is a more realistic corrosion environment for the repository. Our current efforts center around the development of microelectrode arrays for corrosion potential/rate measurements in the gas phase, initially to be used in the Large Block Test, and the use of the quartz crystal microbalance for studying MIC processes.

July activity will be discussed in a later report.

Crack Growth Tests (PACS OL232LFD, Activity E-20-18F)

The purpose of this work is to determine the stress corrosion susceptibility of candidate container materials under a variety of environmental, metallurgical, and mechanical stress conditions relevant to the repository. Stress corrosion is an important degradation mode that can affect both corrosion allowance and corrosion resistant materials. Work to date has focused on the corrosion resistant materials. A sensitive crack growth measurement apparatus, which operates under the principle of measuring minute changes in the electrical resistance of the test specimen as a crack propagates, is in use at Argonne National Laboratory (ANL) to measure crack growth on pre-cracked compact tension specimens.

Work continues at ANL on determination of crack growth rates in candidate metal barrier waste container materials. Crack growth rate determinations are being made of 304L and 316L stainless steels and Incoloy 825 under high stress ratios. In addition, tests are being conducted under low stress ratio conditions on Ti Grade 12, Hastelloy C-4 and a different heat of Incoloy 825. All six of the alloys to be tested have been purchased. The alloys are in the form of plate and it was confirmed that the chemical compositions of the alloys meet specifications. Four 1T-compact tension specimens were machined from each of the plates. Fatigue pre-cracking of the 1T-compact tension specimens is being performed to introduce a sharp started crack before the SCC tests. Six specimens have completed pre-cracking, two each from the Titanium Grade 12, Hastelloy C-4, and Hastelloy C-22. The fatigue cracking was performed in air at room temperature under a cyclic load with triangular load shape, load ratio of R = 0.1 to 0.25 and frequency of 1 Hz.

A quality assurance audit of the ANL work, including that which supports the Metal Barrier Task, is scheduled for early September. E. Dalder will represent the Metal Barrier Task Leader.

Engineered Materials Characterization Report - EMCR (PACS OL232LFE)

The purpose of preparing the materials characterization report is to compile and synthesize information on the cogent properties of the candidate materials for the Waste Package and other Engineered Barrier System components. This report is planned to incorporate information on the important physical, mechanical, and chemical properties of the candidate materials, plus an outline of the long range and short range testing planned during ACD. Much of the long range testing plans were discussed in the Planning Documents Section above. The Engineered Materials Characterization Report (EMCR) will serve as input to the Basis For Design document for Waste Package design.

D. Jones (UNR) and R. Van Konynenburg are working to complete the first draft of the Engineered Materials Characterization Report in August.

#### 1.2.2.3.3 Other Materials

This WBS element has not been funded in FY94.

In preparation for FY95 work in this WBS element, R. Van Konynenburg met with J. Griffith from the Boral Company on July 1. The company makes a borated aluminum product that could be used as a basket material in a multi-purpose canister (MPC) used for interim storage of spent fuel and which could be emplaced inside the disposal container for the repository. The basket material is needed to ensure long term criticality control, hence the addition of boron. We expect to meet with industry representatives in August on the possible use of borated copper for this same purpose.

#### 1.2.2.3.4 Integrated Testing

This WBS element has been moved to WBS element 1.2.3.10.3; progress is reported in that element.

#### 1.2.2.3.5 Non-Metallic Barrier Concepts

(PACS OL235JGD and OL235KKA)

The purpose of the non-metallic barriers task is to characterize the behavior of non-metallic materials, such as ceramics, and to determine degradation rates and mechanisms, including the interaction between the barrier and the surrounding environment. The work in the non-metallic barriers task parallels that in the metallic barriers task. One of the multiple barriers of the waste package container may be fabricated from a non-metallic material. A primary objective of this task is determination of the feasibility of making a non-metallic barrier as part of a waste package.

During July, K. Wilfinger completed a draft report entitled "Ceramic Package Fabrication for YMP Nuclear Waste Disposal". The draft report is currently undergoing technical review, and milestone MOL57 will be complete when the internal document review is complete and it is submitted to YMSCO.

### 1.2.2.4 Design, Fabrication, and Prototype Testing

#### 1.2.2.4.3 Container/Waste Package Interface Analysis

This WBS element has not been funded in FY94.

## 1.2.3 SITE INVESTIGATIONS

### 1.2.3.1 Site Investigations Coordination and Planning

J. Blink worked with D. Boak of the ESF TCO to update LLNL sampling needs.

B. Viani, S. Blair, C. Bruton, W. Lin, and C. Palmer, participated in the GIT Model Validation meeting held in Denver, July 19-21. Model validation working groups were formed to address basic questions concerning validation of

- thermomechanical-mineralogical models,
- hydrothermal-hydrological processes (non-isothermal),
- thermal-geochemical-transport processes (non-isothermal),
- geochemical transport processes (isothermal)

D. Wilder, W. Halsey, and S. Blair attended the ESF Thermal Test planning meeting (chaired by H. Kalia) in Las Vegas on July 13.

LLNL staff prepared bottoms-up cost estimates for the FY95 planning process.

## 1.2.3.2 Geology

### 1.2.3.2.1.2.1 Natural Analogue of Hydrothermal Systems in Tuff

This WBS element has not been funded in FY94. After discussion with the YMSCO WBS manager, it has been decided to incorporate the elements of this study into two other LLNL studies and to eliminate the study plan. In August, LLNL will submit a letter to YMSCO with details of this decision and will also generate a change request for the Site Test and Design Requirements Document (ST& DRD) which contains the YMSCO study objectives. That change request will also ensure the ST& DRD study and activity objectives align with the existing five LLNL study plans (four of which are in the YMSCO review cycle) and the planned sixth study plan for the altered zone characterization.

## 1.2.3.4 Geochemistry

### 1.2.3.4.2 Geochemical Modeling

July activity will be discussed in a later report.

## 1.2.3.5 Drilling

### 1.2.3.5.2.2 Engineering, Design, and Drilling Support

Three logging sessions were conducted. Downhole runs to perform drillhole inspections were made at USW SD9 and USW SD12 on July 6 and again at USW SD9 on July 25.

## 1.2.3.10 Altered Zone Characterization

### 1.2.3.10.1 Characterization Techniques for the Altered Zone

No significant activity.

### 1.2.3.10.2 Characterization of Thermal Effects on the Altered Zone Performance

Experiments to examine rock-water interaction in relevant lithologic units continue.

The Study Plan for this WBS is being written and is expected to be ready for internal LLNL review in August.

### 1.2.3.10.3 Integrated Testing

#### 1.2.3.10.3.1 Integrated Radionuclide Release: Tests and Models

The purpose of the Integrated Radionuclide Release Task is to characterize and model the integrated behavior of the waste forms, barrier materials, and surrounding environment.

G20-8 Management and planning, planning documents, and QA

B. Viani met with A. Simmons (YMSCO) and S. Nelson (M&O) on July 7 to discuss and plan integration of Integrated Test activities with those of Geochemistry, Hydrology, Man Made Materials, and Waste Form Testing.

G-20-2 Determination of elemental profiles in rocks, minerals, and glasses using the ion microscope:

S. Roberts, a new LLNL-YMP staff member, will perform the diffusion experiments.

Electron microprobe analyses have begun on the previously mounted single crystals of clinoptilolite.

G-20-3 Interactions of actinide-bearing solutions with rock core samples:

The core-flow apparatus at LLNL for integrated testing of the waste forms, barrier materials, and surrounding environment, has been reassembled in a new glove box and in a new laboratory. Temperature and pressure controls have been tested. Interfacing to data acquisition computer remains to be done. A new core sample has been prepared for installation and core porosity has been determined. The protocol for the flow-through apparatus experiments milestone (MOL04) will be delayed until September 30, 1994 to allow a thorough shake-down of the device.

#### 1.2.3.10.3.2 Thermodynamic Data Determination

June activities will be reported in a later monthly progress report.

## 1.2.3.11 Integrated Geophysical Testing for Site Characterization

### 1.2.3.11.3 Geophysics - ESF Support, Subsurface Geophysical Testing

No significant activity. The work will resume when the capital and non-capital procurements have been received.

## 1.2.3.12 Waste Package Environment Testing

This WBS element was created from WBS element 1.2.2.2. Reporting and PACS have been converted to the new system, and funds transfer to WBS 1.2.2 is expected in late August.

### 1.2.3.12.1 Chemical and Mineralogical Properties of the Waste Package Environment

The revised Study Plan 8.3.4.3.4.1 for Waste Package Geochemistry and Mineralogy has been reformatted and sent to YMSCO.

LLNL work at the New Zealand natural process analog site is emphasizing evaluation of the way in which model validation activities can be conducted in the field. Data have been collected and compared against simulations which demonstrate that very good agreement can be achieved between the two. However, perfect matches are impossible due to inherent uncertainties in data values, thermodynamic property measurements, and limitations of conceptual models. As a result, attention is being focused on developing strategies that allow a more flexible approach to validation efforts. This will be important when validation efforts address characterization of processes and properties of the site.

Two reports have been written by LLNL-YMP and two by the Institute of Geological and Nuclear Sciences (IGNS) in New Zealand. These reports constitute the completion of milestone MOL24 - Manuscript and Field Data of Preliminary Results of New Zealand Field Studies and Simulations:

- "Testing Geochemical Modeling Codes Using New Zealand Hydrothermal Systems", by C. Bruton, was published in the FOCUS '93 Site Characterization and Model Validation Proceedings, p. 240-245.
- "Field-based Tests of Geochemical Modeling Codes Using New Zealand Hydrothermal Systems" by C. Bruton, (UCRL-ID-118009) is an LLNL internal publication and is currently being reviewed.
- "Client Reports 1 and 2 of the EQ3-EQ6 Code Validation Contract" by the IGNS describe the petrology and geochemistry of rocks, fluids and minerals at the Wairakei and Kawerau geothermal fields and at the TePuia and Waiotapu hydrothermal features (IGNS Client Reports 722305.15A and B) by A. Reyes, W. Giggenbach and B. Christenson.

### 1.2.3.12.2 Hydrologic Properties of the Waste Package Environment

Thermo-Hydrological Calculations

In order to augment the thermo-hydrological calculation support of the thermal loading systems study, we have been conducting the calculations in the near-field/altered zone hydrology task with the same set of thermal loading assumptions. We assume a Youngest Fuel First SNF receipt scenario with a 10-yr cut-off for the youngest fuel [referred to as YFF(10)] and account for the emplacement of BWR waste packages (WPs) containing 40 assemblies per WP, and PWR WPs containing 21 assemblies per WP. The waste receipt schedule was supplied by J. King of the M&O. In the WBS 1.2.1.5 section, we reported on the impact of enhanced gas-phase diffusion on humidity and temperature and on the sensitivity of humidity at the end of boiling to matrix hydrological property data. In this section, we continue the sensitivity study to include temporal and spatial distributions of temperature and humidity.

Areal Mass Loadings (AMLs) of 24.2, 35.9, 55.3, 70 83.4, 100, 110.5, and 150 metric tons of uranium per acre (MTU/acre) have been analyzed assuming the matrix hydrological properties given in the Reference Information Base (RIB) and in Klavetter and Peters (1986). This month we investigated:

- the impact of enhanced gas-phase diffusion (see also section 1.2.1.5 of this report),
- the impact of more recent matrix hydrological property data given in a recent draft report (Pruess and Tsang, 1994), and which are based on measurements by Flint and others (1983), and
- how reduced bulk permeability, $k_b$, can limit the extent of reduced relative humidity, *RH*, conditions.

Before discussing the details of this month's study, it is useful to review some fundamental concepts involved in the drying and re-wetting behavior of the repository.

<u>The Role of Vapor Diffusion in Repository Drying</u>

The movement of water vapor away from the repository occurs by

- advective transport of water vapor to regions of condensation driven by gas-phase pressure buildup from the generation of steam,
- advective vapor transport driven by buoyant, gas-phase convection, and
- molecular diffusion of water vapor from regions of high to low mole fractions of water vapor.

As discussed in past reports, buoyant, gas-phase convection causes rock dry-out to occur primarily below the repository and condensation primarily above. If $k_b$ is sufficiently large ($k_b > 1$ darcy), this mechanism can be important whether or not boiling occurs. The focus of the present discussion is diffusive gas-phase transport.

The mole fraction of water vapor is considerably greater at the repository in response to higher temperatures there. The mole fraction, $n_v$, of water vapor under conditions of local thermodynamic equilibrium within the rock is a function of liquid saturation $S_\ell$, absolute temperature, $T$, and gas-phase pressure, $P_g$, and is given by the formula

$$n_v = [P_{sat}(T) / P_g] \exp[-\psi M_w / (\rho_\ell RT)] \qquad (4)$$

which is a generalization of Kelvin's law to porous media. Here, $P_{sat}(T)$ is the saturation pressure, $\psi = \psi(S_\ell, T)$ is matric potential, $M_w$ is molecular weight of water, $\rho_\ell$ is the density of liquid water, and $R$ is the universal gas constant. Note that the matric potential is a function of $S_\ell$ and $T$. For ambient saturation conditions at the repository horizon ($S_\ell \approx 60$ to 80%), the matric potential is sufficiently small such that the exponential term is essentially unity. Only at very low $S_\ell$ does the matric potential increase enough for the exponential factor to have a significant effect on $n_v$.

As temperatures rise in the repository, the equilibrium amount of water vapor in the gas phase increases because of the increase in $P_{sat}(T)$. As temperatures reach the boiling point of water, $P_{sat}$ approaches $P_g$ and the mole fraction of water vapor approaches unity (i.e., the gas phase becomes 100% water vapor). The water in the rock near the fractures also starts to boil, causing the gas-phase pressure in the fractures and the rock matrix to rise, which leads to the advective transport of water vapor as long as steam is being generated. Gas-phase advection is likely to be the dominant mechanism carrying water vapor from the boiling zone to the condensation zone except for a rock mass where $k_b$ is sufficiently small to substantially throttle gas-phase advection and the rate of boiling. Beyond the condensation zone, vapor diffusion is the dominant mechanism of vapor movement except where $k_b$ is sufficiently large for buoyant gas-phase convection to dominate. Because temperatures in the vicinity of the condensation zone are close to the boiling point, the water vapor mole fraction according to Eq. (4) is nearly unity, whereas for the region farther away from the repository (i.e., beyond the condensation zone), the temperatures are cooler and the mole fractions are much less (approximately 2% at ambient conditions). This gradient in mole fraction leads to diffusive fluxes that carry water away from the condensation zone. Diffusive vapor fluxes can dominate over convective vapor fluxes around the repository if the vapor generation rate is very low or if temperatures are close to, but below, the boiling point.

The Role of Vapor Diffusion in Repository Re-wetting

As the repository heat generation decays, water vapor continues to diffuse away from the repository because of the higher temperatures there. This diffusion of water vapor contributes to latent heat transport, thereby enhancing cooling of the repository. If $S_\ell$ in the dry-out zone is very low, the matric potential will be substantially higher than in the surrounding wetter rock. The exponential factor in Eq. (4) reduces the value of $n_v$ in the dry-out zone, and as temperatures decline, the value of $n_v$ in the dry-out zone will become smaller than that in the wetter rock away from the repository, even though temperatures are somewhat greater in the dry-out zone. Thus, vapor diffusion can occur from cooler to hotter regions that have lower $S_\ell$. In general, water vapor diffuses away from the repository until repository temperatures have cooled enough so that the temperature effect (that drives water vapor away from the repository) in Eq. (4) can no longer overcompensate for the vapor pressure lowering effect (that drives water vapor back towards the repository). This "vapor pressure lowering" effect on $n_v$ is significant only at lower $S_\ell$, which, for Topopah Springs tuff, occurs for $S_\ell$ less than 20 to 30%. Consequently, vapor diffusion will only significantly contribute to re-wetting the dry-out zone up to $S_\ell$ of about 20 to 30%. For $S_\ell$ greater than 20 to 30%, re-wetting of the dry-out zone will be dominated by liquid-phase advection driven by matric potential gradients and gravity. Note that the range of liquid saturation over which vapor pressure lowering is not important depends strongly on the curve of matric potential versus $S_\ell$. The length of the time period during which diffusive vapor transport dominates re-wetting behavior depends on

- how dry the dry-out zone becomes,
- the range of $S_\ell$ that is associated with high matric potential and,
- how fast repository temperatures decline.

The longer the dry-out zone remains dry, the higher the value of $S_\ell$ limit for which vapor pressure lowering dominates re-wetting behavior. The faster repository temperatures decrease while still in the high-matric-potential regime, the longer the duration of significant gas-phase diffusion of water vapor back to the dry-out zone.

Analysis of the Impact of Enhanced Gas-Phase Diffusion and Matrix Hydrological Properties on Temperature and Relative Humidity Conditions in the Repository

Last month, we conducted several suites of repository-scale calculations for Areal Mass Loadings (AMLs) of 55.3, 110.5, and 150 MTU/acre, assuming for the TSw1 and TSw2 five different sets of matrix property data (Table 7) that are listed in Pruess and Tsang (1994) and based on Flint et al. (1993). Because the calculations were not considering the possibility of enhanced binary gas-phase diffusion, a "nominal" value of 0.2 was used for the binary gas-phase diffusion tortuosity factor, $\tau_{eff}$. This month, those calculations were repeated for the two high AMLs for the case of enhanced binary gas-phase diffusion, by assuming $\tau_{eff}$ = 2.0. As reported last month, the value of matrix porosity, $\phi_m$, was adjusted in order to yield roughly the same initial liquid water content in the TSw1 and TSw2. Accordingly, a value of $\phi_m$ = 0.11 was assumed for the three cases that yielded lower initial liquid saturation, $S_\ell$, (reference case, LBL-USGS 3.4, and LBL-USGS 3.3), and a value of $\phi_m$ = 0.10 was assumed for the three cases that yielded higher initial $S_\ell$ (LBL-USGS 3.5, LBL-USGS 3.2, and LBL-USGS 3.1/3.6).

Table 7
Matrix hydrological property data for the TSw1 and TSw2

| Sample name | $S_r$ | $f_m$ | $k_{m,sat}$ ($m^2$) | $\alpha$ ($10^{-5}$ $Pa^{-1}$) | m |
|---|---|---|---|---|---|
| Reference case | 0.08 | 0.11 | $1.9 \times 10^{-18}$ | 0.058 | 0.4438 |
| LBL-USGS 3.2 | 0.0 | 0.10 | $4.0 \times 10^{-16}$ | 0.125 | 0.18 |
| LBL-USGS 3.5 | 0.0 | 0.10 | $5.0 \times 10^{-18}$ | 0.133 | 0.25 |
| LBL-USGS 3.1/3.6 | 0.0 | 0.10 | $1.0 \times 10^{-18}$ | 0.067 | 0.29 |
| LBL-USGS 3.4 | 0.0 | 0.11 | $5.0 \times 10^{-18}$ | 0.067 | 0.25 |
| LBL-USGS 3.3 | 0.0 | 0.11 | $4.0 \times 10^{-18}$ | 0.2 | 0.22 |

Table 8 summarizes the time required to attain the indicated relative humidity, *RH*, at various repository locations and the temperature at which that value of *RH* is attained for the "reference" matrix property case based on the RIB and Klavetter and Peters data for AMLs of 110.5 and 150 MTU/acre and for $\tau_{eff}$ = 2.0. It should be emphasized that the relative humidity calculations are based on the smeared-heat-source, disk-shaped model of the repository. Therefore, the relative humidity is based on average liquid saturation. It should also be noted that thermo-hydrological heterogeneity and variability in the heat output among the WPs will cause local behavior to deviate from average behavior.

For the five sets of LBL-USGS matrix property data and AMLs of 110.5 and 150 MTU/acre, Tables 9 and 10 summarize the same relative humidity and temperature information given in Table 8 for the reference matrix property case. Note that, although these cases have different values of saturated matrix permeability, $k_{m,sat}$, they all share the same bulk permeability, $k_b$, of 280 millidarcy.

Table 8: Matrix properties from Klavetter and Peters (1986) for the TSw1 and TSw2
The time required to attain the indicated relative humidity at various repository locations and the temperature at which that value of relative humidity is attained for 22.5-yr-old SNF, a gas-phase diffusion tortousity factor, $t_{eff}$, of 2.0, and $k_b$ = 280 millidarcy. The locations are identified as the percentage of the repository area enclosed, with 0 percent corresponding to the repository center, and 100 percent corresponding to the outer perimeter.

**Table 8a: AML = 110.5 MTU/acre**

| Fraction of repository area | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| enclosed (%) | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 14,260 | 23,850 | 42,270 | 59,750 | 70 | 57 | 44 | 38 |
| 75 | 10,180 | 17,870 | 33,350 | 47,150 | 72 | 59 | 46 | 41 |
| 90 | 3920 | 7730 | 16,040 | 26,640 | 85 | 71 | 57 | 48 |
| 97 | 1490 | 2240 | 4490 | 8130 | 104 | 93 | 76 | 65 |

**Table 8b: AML = 150 MTU/acre**

| Fraction of repository area | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| enclosed (%) | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 19,470 | 29,380 | 48,260 | 64,180 | 69 | 56 | 45 | 41 |
| 75 | 15,390 | 23,380 | 36,100 | 45,900 | 71 | 59 | 48 | 44 |
| 90 | 9610 | 14,520 | 23,170 | 29,140 | 76 | 66 | 55 | 50 |
| 97 | 5310 | 8420 | 13,500 | 18,330 | 84 | 74 | 64 | 57 |

For an AML of 110.5 MTU/acre, relative to the reference matrix property case, one of the LBL-USGS matrix property cases results in substantially faster re-wetting, while one case results in slightly faster re-wetting, and three cases result in slower re-wetting back to ambient humidity conditions (98.4%) in the repository. A comparison of Tables 8a and 9a shows that LBL-USGS-3.2 results in substantially faster re-wetting back to humid conditions. Consequently, temperatures are significantly greater with respect to *RH* than the reference case. For example, the center of the repository has a temperature of 87°C when *RH* = 70% is attained as compared with 70°C in the reference case. For enhanced gas-phase diffusion ($\tau_{eff}$ = 2.0), LBL-USGS-3.2 results in slower re-wetting than the case with $\tau_{eff}$ = 0.2 (see Table 9a in the June progress report). With $\tau_{eff}$ = 2.0, re-wetting to *RH* = 70 and 95% (for the inner half of the repository) takes 7590 and 16,690 yr, respectively, while for $\tau_{eff}$ = 0.2 it takes only 5970 and 8740 yr, respectively. Because $k_{m,sat}$ for LBL-USGS-3.2 is two orders of magnitude larger than in any of the other cases, advective liquid-phase re-wetting proceeds much more quickly. This faster liquid-phase re-wetting drives $S_\ell$ beyond the $S_\ell$ range associated with the high matric potential regime (i.e., where the vapor-pressure-lowering effect in Eq. 4 is important) while the repository is still relatively hot with respect to the temperature effect in Eq. (4). Therefore, throughout the period that gas-phase diffusion is important, the temperature effect in Eq. (4) dominates over the vapor-pressure-lowering effect. Consequently, for LBL-USGS-3.2, the primary contribution of enhanced vapor diffusion is to enhance drying, while having little effect on gas-phase re-wetting.

Table 9: AML = 110.5 MTU/acre
The time required to attain the indicated relative humidity at various repository locations and the temperature at which that value of relative humidity is attained for 22.5-yr-old SNF, a gas-phase diffusion tortousity factor, $\tau_{eff}$, of 2.0, and $k_b$ = 280 millidarcy.
The locations are identified as the percentage of the repository area enclosed, with 0 percent corresponding to the repository center, and 100 percent corresponding to the outer perimeter.

**Table 9a: Matrix properties for LBL-USGS sample 3.2 for the TSw1 and TSw2**

| Fraction of repository area enclosed (%) | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 7590 | 9440 | 12,060 | 16,690 | 87 | 81 | 74 | 66 |
| 75 | 4000 | 4880 | 6490 | 8670 | 95 | 89 | 83 | 76 |
| 90 | 1860 | 2280 | 2760 | 3760 | 105 | 99 | 94 | 85 |
| 97 | 870 | 1170 | 1520 | 1800 | 107 | 103 | 99 | 97 |

**Table 9b: Matrix properties for LBL-USGS sample 3.5 for the TSw1 and TSw2**

| Fraction of repository area enclosed (%) | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 14,610 | 23,000 | 36,210 | 46,260 | 69 | 57 | 47 | 42 |
| 75 | 9340 | 14,790 | 24,090 | 30,120 | 75 | 64 | 53 | 48 |
| 90 | 3080 | 5490 | 10,040 | 14,690 | 92 | 78 | 67 | 59 |
| 97 | 1190 | 1680 | 2560 | 4160 | 106 | 100 | 89 | 78 |

**Table 9c: Matrix properties for LBL-USGS sample 3.1 and 3.6 for the TSw1 and TSw2**

| Fraction of repository area enclosed (%) | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 17,290 | 30,120 | 61,960 | 99,580 | 63 | 49 | 38 | 34 |
| 75 | 11,690 | 22,050 | 44,490 | 69,530 | 68 | 53 | 41 | 36 |
| 90 | 4070 | 9370 | 22,480 | 36,080 | 84 | 66 | 50 | 42 |
| 97 | 1220 | 1930 | 5290 | 12,620 | 106 | 97 | 72 | 57 |

**Table 9d: Matrix properties for LBL-USGS sample 3.4 for the TSw1 and TSw2**

| Fraction of repository area enclosed (%) | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 17,640 | 30,050 | 60,100 | 102,350 | 62 | 49 | 38 | 34 |
| 75 | 12,320 | 22,860 | 45,340 | 73,170 | 66 | 52 | 40 | 36 |
| 90 | 4950 | 10,870 | 25,310 | 39,660 | 79 | 63 | 47 | 40 |
| 97 | 1510 | 2520 | 8360 | 17,600 | 104 | 90 | 64 | 51 |

**Table 9e: Matrix properties for LBL-USGS sample 3.3 for the TSw1 and TSw2**

| Fraction of repository area enclosed (%) | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 17,940 | 30,420 | 68,620 | 149,230 | 61 | 48 | 37 | 31 |
| 75 | 12,980 | 24,460 | 52,390 | 103,200 | 65 | 51 | 38 | 33 |
| 90 | 5800 | 13,010 | 32,010 | 59,600 | 75 | 60 | 43 | 36 |
| 97 | 1620 | 3240 | 13,740 | 29,650 | 103 | 83 | 55 | 43 |

Table 10: AML = 150 MTU/acre
The time required to attain the indicated relative humidity at various repository locations and the temperature at which that value of relative humidity is attained for 22.5-yr-old SNF, a gas-phase diffusion tortousity factor, $\tau_{eff}$, of 2.0, and $k_b$ = 280 millidarcy. The locations are identified as the percentage of the repository area enclosed, with 0 percent corresponding to the repository center, and 100 percent corresponding to the outer perimeter.

**Table 10a: Matrix properties for LBL-USGS sample 3.2 for the TSw1 and TSw2**

| Fraction of repository area | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| enclosed (%) | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 11,790 | 13,940 | 17,810 | 22,390 | 86 | 80 | 72 | 65 |
| 75 | 7260 | 8640 | 10,930 | 13,650 | 93 | 88 | 81 | 74 |
| 90 | 3570 | 4260 | 5670 | 7200 | 101 | 96 | 89 | 83 |
| 97 | 2120 | 2490 | 2990 | 4020 | 106 | 102 | 97 | 90 |

**Table 10b: Matrix properties for LBL-USGS sample 3.5 for the TSw1 and TSw2**

| Fraction of repository area | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| enclosed (%) | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 20,720 | 30,360 | 44,280 | 55,940 | 67 | 56 | 47 | 43 |
| 75 | 15,270 | 22,040 | 30,860 | 39,420 | 71 | 61 | 52 | 47 |
| 90 | 8750 | 12,680 | 18,420 | 25,440 | 79 | 70 | 60 | 53 |
| 97 | 4250 | 6690 | 10,440 | 14,050 | 90 | 79 | 70 | 63 |

**Table 10c: Matrix properties for LBL-USGS sample 3.1 and 3.6 for the TSw1 and TSw2**

| Fraction of repository area | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| enclosed (%) | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 24,020 | 38,160 | 72,900 | 119,100 | 61 | 49 | 38 | 34 |
| 75 | 18,990 | 31,390 | 58,600 | 89,100 | 63 | 50 | 40 | 35 |
| 90 | 11,590 | 19,780 | 36,860 | 53,670 | 71 | 57 | 45 | 39 |
| 97 | 5910 | 10,810 | 21,280 | 32,270 | 81 | 68 | 53 | 45 |

**Table 10d: Matrix properties for LBL-USGS sample 3.4 for the TSw1 and TSw2**

| Fraction of repository area | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| enclosed (%) | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 25,430 | 38,420 | 73,620 | 129,110 | 64 | 51 | 39 | 34 |
| 75 | 19,590 | 31,890 | 59,570 | 95,320 | 62 | 50 | 40 | 35 |
| 90 | 12,540 | 21,500 | 39,160 | 59,060 | 69 | 56 | 44 | 38 |
| 97 | 6970 | 12,400 | 24,890 | 37,160 | 77 | 65 | 51 | 43 |

**Table 10e: Matrix properties for LBL-USGS sample 3.3 for the TSw1 and TSw2**

| Fraction of repository area | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| enclosed (%) | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 25,830 | 38,820 | 84,630 | 204,630 | 63 | 51 | 37 | 31 |
| 75 | 20,150 | 33,150 | 70,500 | 142,420 | 61 | 49 | 38 | 33 |
| 90 | 13,570 | 24,230 | 48,240 | 88,390 | 67 | 53 | 41 | 35 |
| 97 | 8040 | 14,690 | 31,250 | 53,880 | 74 | 61 | 46 | 38 |

A comparison of Tables 8a and 9b shows LBL-USGS-3.5 results in slightly faster re-wetting than the reference case for 110.5 MTU/acre. Consequently, the temperatures are slightly higher with respect to *RH*. A comparison of Table 9b with Table 9b of the June progress report shows that enhanced vapor diffusion slightly increases the re-wetting rate for the inner 75% of the repository, and slightly decreases the re-wetting rate for the outer 25%.

For 110.5 MTU/acre, tables 8a, 9c, and 9d show that LBL-USGS-3.1/3.6 and LBL-USGS-3.4 result in similar re-wetting rates that are slower than the reference case in the inner 75% of the repository (particularly for $RH > 80\%$). For the outer 10% of the repository, these three cases have similar re-wetting rates for $RH < 80\%$. For the outer 10% of the repository and $RH > 80\%$, these cases re-wet substantially more slowly than the reference case. A comparison of Tables 9c and 9d with Tables 9c and 9d in the June progress report shows that enhanced vapor diffusion increases the re-wetting rate for the inner 75% of the repository and for $RH < 95\%$, while it decreases the re-wetting rate for the outer 10% of the repository. Because liquid-phase re-wetting is slower for the inner 75% of LBL-USGS-3.1/3.6 and LBL-USGS-3.4 than in the reference case, repository temperatures decline while the repository is still relatively dry. Consequently, the temperature effect in Eq. (4) can no longer compensate for the vapor-pressure-lowering effect and gas-phase diffusion contributes to re-wetting longer than in the reference matrix property case. Therefore, enhanced vapor diffusion enhances re-wetting more substantially for LBL-USGS-3.1/3.6 and LBL-USGS-3.4 than in the reference case.

Table 9e indicates that LBL-USGS-3.3 has a much slower re-wetting rate than all of the other cases for 110.5 MTU/acre. A comparison of Table 9e with Table 9e of the June progress report shows that enhanced vapor diffusion increases the re-wetting rate for the inner 75% of the repository, and slightly decreases the re-wetting rate for the outer 25%. Because the advective liquid-phase re-wetting rate is much slower for the inner 75% of USGS-LBL-3.3 than in the other cases, repository temperatures decline more quickly with respect to liquid saturation. Consequently, the vapor-pressure-lowering effect significantly impacts re-wetting much longer than in the other cases, and enhanced vapor diffusion enhances re-wetting more substantially for LBL-USGS-3.3 than in any of the other cases.

For 110.5 MTU/acre and for the inner 75% of the repository, LBL-USGS-3.1/3.6, LBL-USGS-3.4, and LBL-USGS-3.3 have similar relationships between temperature and *RH*. In general, with the exception of LBL-USGS-3.2, there is not a great degree of variability in the relationship between temperature and *RH*. For all six matrix property cases, the outer 3% of the repository has a similar temperature versus *RH* relationship. Regardless of case, the outer 3% of the 110.5-MTU/acre repository is relatively hot (103 to 107°C at the time that $RH = 70\%$ is attained). With the exception of LBL-USGS-3.2, the inner 75% of the repository has cooled to relatively cool temperatures (61 to 72°C) at the time that $RH = 70\%$ is attained.

Relative to the reference 150-MTU/acre case, one of the LBL-USGS matrix property cases results in substantially faster re-wetting, while one case results nearly the same re-wetting rate, and three cases result in slower re-wetting back to ambient humidity conditions at the repository. A comparison of Tables 8b and 10a shows that LBL-

USGS-3.2 results in much faster re-wetting back to ambient humidity conditions than the reference case. Consequently, temperatures are significantly greater with respect to *RH*.

For 150 MTU/acre and $\tau_{eff}$ = 2.0, LBL-USGS-3.2 results in slower re-wetting than the case with $\tau_{eff}$ = 0.2 (see Table 10a in the June progress report). For $\tau_{eff}$ = 2.0, re-wetting to *RH* = 70 and 95% takes 11,790 and 22,390 yr, respectively, while for $\tau_{eff}$ = 0.2 it takes only 8960 and 12,030 yr, respectively. As was observed for the 110.5-MTU/acre case, while the repository is still relatively hot, faster advective liquid-phase re-wetting drives $S_\ell$ beyond the $S_\ell$ range where the vapor-pressure-lowering effect is important. Therefore, throughout the period that gas-phase diffusion is important, the temperature effect in Eq. (4) dominates over the vapor-pressure-lowering effect. Consequently, for LBL-USGS-3.2, the primary contribution of enhanced vapor diffusion is to enhance drying, while having little effect on gas-phase re-wetting.

A comparison of Tables 8b and 10b shows that LBL-USGS-3.5 results in nearly the same re-wetting rate as the reference case at 150 MTU/acre. Consequently, there is a similar relationship between temperature and *RH*. An examination of Tables 8b, 10c, and 10d shows that LBL-USGS-3.1/3.6 and LBL-USGS-3.4 result in very similar re-wetting rates that are substantially slower than the reference case. A comparison between Tables 10b, c and d with Tables 10b, c, and d of the June progress report shows that enhanced vapor diffusion increases the re-wetting rate for the inner 50% of the repository and *RH* < 90%. For the outer 10% of the repository, enhanced vapor diffusion decreases the re-wetting rate, particularly for *RH* > 80%.

Table 10e indicates that LBL-USGS-3.3 has a slower re-wetting rate at any given repository location than any of the other cases. A comparison of Table 10e with Table 10e of the June progress report shows that enhanced vapor diffusion increases the re-wetting rate for the inner 75% of the repository, and substantially decreases the re-wetting rate for the outer 3%. Because the advective liquid-phase re-wetting rate is slower for the inner 75% of USGS-LBL-3.3 than in the other cases, repository temperatures decline quickly with respect to liquid saturation. Consequently, the vapor-pressure-lowering effect significantly impacts re-wetting longer than in the other cases, and enhanced vapor diffusion enhances re-wetting more substantially for LBL-USGS-3.3 than in any of the other cases.

Unlike the 110.5-MTU/acre case, the slower re-wetting rates for LBL-USGS-3.1/3.6, LBL-USGS-3.4, and LBL-USGS-3.3 at 150 MTU/acre allow the outer 3% to decline to somewhat cooler temperatures (74 to 81°C) as *RH* = 70% is attained. With the exception of LBL-USGS-3.2, the inner 75% of the repository has declined to relatively cool temperatures (61 to 71°C) as *RH* = 70% is attained. With the exception of LBL-USGS-3.2, the inner 75% of the repository has declined to even cooler temperatures (49 to 61°C) as *RH* = 80% is attained.

In general, enhanced vapor diffusion enhances re-wetting rate only where the advective liquid-phase re-wetting rate is relatively slow to begin with (i.e., the cases with slow liquid-phase re-wetting rates and at the center of the repository). Enhanced vapor diffusion reduces the overall re-wetting rate where the advective liquid-phase re-wetting rate is fastest (i.e., LBL-USGS-3.2 and at the edge of the repository). Therefore, enhanced gas-phase diffusion may be thought to function somewhat as an equalizer of thermo-hydrological conditions, countering some of the effects of heating variability and heterogeneity in various hydrological properties. For the 150-MTU/acre case and $\tau_{eff}$ = 0.2, (see Table 10e in the June progress report) as $RH$ = 70% is attained, temperatures range from 49 to 83°C from the 50 to 97% repository location (resulting in a 34°C spread). For $\tau_{eff}$ = 2.0, as $RH$ = 70% is attained, the temperature range is only 63 to 74°C from the 50 to 97% repository location (resulting in only an 11° spread).

See section 1.2.1.4 of this report for recent results in an ongoing study of the impact of gas-phase diffusion.

<u>The Impact of Small Bulk Permeability on Temperature and Relative Humidity Conditions at the Repository</u>

For much of this study, considerable effort has been made in identifying potentially adverse flow effects that may arise due to very large bulk permeability, $k_b$. In this section we consider the potentially adverse effects of very small $k_b$. For AMLs of 55.3, 70, 83.4, 110.5, and 150 MTU/acre and a binary gas-phase tortuosity factor, $\tau_{eff}$ , of 0.2, we compared the temperature and relative humidity conditions for the "reference-$k_b$ case" where $k_b$ = 280 millidarcy (Table 11) with a "low- $k_b$ case" where $k_b$ = 1 millidarcy (Table 12). As found in past work, a substantial reduction in $k_b$ can result in a substantial increase in gas-phase pressure, $P_g$. An increase in $P_g$ results in an increase in $T_{sat}(P_g)$ (equivalent to the boiling point of water), thereby suppressing the rate of vaporization and (possibly) dry-out.

Table 11: $k_b$ = 280 millidarcy
The time required to attain the indicated relative humidity at various repository locations and the temperature at which that value of relative humidity is attained for 22.5-yr-old SNF, a gas-phase diffusion tortousity factor, $\tau_{eff}$, of 0.2.
The locations are identified as the percentage of the repository area enclosed, with 0 percent corresponding to the repository center, and 100 percent corresponding to the outer perimeter.

**Table 11a: AML = 55.3 MTU/acre**

| Fraction of repository area enclosed (%) | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 670 | 1660 | 3330 | 4630 | 107 | 97 | 80 | 72 |
| 75 | 410 | 940 | 1610 | 2280 | 107 | 99 | 89 | 81 |
| 90 | NA | 200 | 380 | 490 | NA | 103 | 97 | 95 |
| 97 | NA | NA | NA | NA | NA | NA | NA | NA |

**Table 11b: AML = 70 MTU/acre**

| Fraction of repository area enclosed (%) | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 3350 | 8700 | 16,150 | 23,560 | 91 | 69 | 56 | 49 |
| 75 | 1940 | 4080 | 7630 | 10,450 | 97 | 77 | 66 | 61 |
| 90 | 630 | 1030 | 1760 | 2460 | 105 | 97 | 85 | 78 |
| 97 | 80 | 170 | 290 | 390 | 107 | 103 | 99 | 96 |

**Table 11c: AML = 83.4 MTU/acre**

| Fraction of repository area enclosed (%) | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 8110 | 17,710 | 29,290 | 38,360 | 76 | 58 | 48 | 43 |
| 75 | 3910 | 8250 | 13,820 | 19,040 | 86 | 70 | 59 | 53 |
| 90 | 1240 | 2030 | 3530 | 4800 | 104 | 91 | 78 | 72 |
| 97 | 370 | 590 | 890 | 1140 | 107 | 103 | 98 | 94 |

**Table 11d: AML = 110.5 MTU/acre**

| Fraction of repository area enclosed (%) | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 15,960 | 27,910 | 40,990 | 49,980 | 68 | 54 | 45 | 42 |
| 75 | 9540 | 15,520 | 24,950 | 32,590 | 76 | 64 | 53 | 48 |
| 90 | 3190 | 4890 | 7460 | 9890 | 93 | 82 | 73 | 68 |
| 97 | 1410 | 1810 | 2360 | 2890 | 106 | 101 | 93 | 88 |

**Table 11e: AML = 150 MTU/acre**

| Fraction of repository area enclosed (%) | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 20,630 | 34,850 | 50,920 | 64,150 | 68 | 52 | 45 | 41 |
| 75 | 16,400 | 24,520 | 32,700 | 43,360 | 70 | 59 | 51 | 46 |
| 90 | 8660 | 12,090 | 16,520 | 19,780 | 81 | 72 | 64 | 59 |
| 97 | 4330 | 6020 | 8180 | 10,060 | 93 | 84 | 77 | 72 |

Table 12: $k_b$ = 1 millidarcy
The time required to attain the indicated relative humidity at various repository locations and the temperature at which that value of relative humidity is attained for 22.5-yr-old SNF, a gas-phase diffusion tortousity factor, $\tau_{eff}$, of 0.2.
The locations are identified as the percentage of the repository area enclosed, with 0 percent corresponding to the repository center, and 100 percent corresponding to the outer perimeter.

**Table 12a: AML = 55.3 MTU/acre**

| Fraction of repository area enclosed (%) | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | NA | NA | 1450 | 2520 | NA | NA | 101 | 86 |
| 75 | NA | NA | 880 | 1410 | NA | NA | 103 | 93 |
| 90 | NA | NA | NA | 340 | NA | NA | NA | 99 |
| 97 | NA | NA | NA | NA | NA | NA | NA | NA |

**Table 12b: AML = 70 MTU/acre**

| Fraction of repository area enclosed (%) | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 1340 | 3220 | 10,610 | 18,700 | 119 | 92 | 65 | 53 |
| 75 | 930 | 1810 | 4790 | 8030 | 117 | 99 | 74 | 65 |
| 90 | NA | 440 | 900 | 1280 | NA | 111 | 101 | 93 |
| 97 | NA | NA | NA | 200 | NA | NA | NA | 103 |

**Table 12c: AML = 83.4 MTU/acre**

| Fraction of repository area enclosed (%) | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 3690 | 12,750 | 28,680 | 41,540 | 98 | 66 | 47 | 40 |
| 75 | 1800 | 4510 | 11,060 | 17,790 | 110 | 82 | 64 | 54 |
| 90 | 690 | 1160 | 1960 | 2900 | 118 | 106 | 92 | 82 |
| 97 | NA | 180 | 400 | 650 | NA | 116 | 108 | 103 |

**Table 12d: AML = 110.5 MTU/acre**

| Fraction of repository area enclosed (%) | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 17,090 | 34,680 | 54,130 | 71,600 | 65 | 47 | 40 | 37 |
| 75 | 7140 | 15,500 | 27,320 | 38,160 | 83 | 63 | 50 | 44 |
| 90 | 1840 | 2860 | 5300 | 8130 | 113 | 98 | 81 | 72 |
| 97 | 790 | 1250 | 1760 | 2250 | 121 | 112 | 103 | 96 |

**Table 12e: AML = 150 MTU/acre**

| Fraction of repository area enclosed (%) | Time required to attain the indicated relative humidity (yr) | | | | Temperature at which the indicated relative humidity is attained (°C) | | | |
|---|---|---|---|---|---|---|---|---|
| | 70% | 80% | 90% | 95% | 70% | 80% | 90% | 95% |
| 50 | 31,880 | 47,700 | 68,200 | 81,410 | 54 | 45 | 40 | 37 |
| 75 | 19,770 | 31,770 | 44,530 | 55,010 | 64 | 51 | 44 | 41 |
| 90 | 6200 | 9840 | 15,310 | 23,650 | 91 | 78 | 66 | 55 |
| 97 | 2490 | 3480 | 4960 | 6780 | 112 | 101 | 90 | 82 |

A comparison of Tables 11a and 12a illustrates how a small $k_b$ can result in an increase in $T_{sat}$ that substantially throttles the rate of boiling, thereby reducing the duration of sub-ambient *RH* conditions for the 55.3-MTU/acre case. While much of the repository in the 280-millidarcy case has a period during which $RH < 70\%$, none of the repository in the 1-millidarcy case has a period during which $RH < 80\%$, and the outer 10% of the repository never gets as dry as $RH = 90\%$. Note the relatively high temperatures that coincide with these humid conditions. A maximum temperature of 116°C was attained when a minimum *RH* of 85% occurred.

A comparison of Tables 11b and c with Tables 12b and c also illustrates how a small $k_b$ can substantially throttle boiling and dry-out for the 70- and 83.4-MTU/acre cases. The time to re-wet back to $RH = 70\%$ at the repository center is reduced by factors of 2.5 and 1.8 for these two cases, respectively. The time required to attain $RH = 95\%$ at the repository center is less affected. The effect of boiling suppression is seen to be greatest at the outer 10% of the repository, where the time to re-wet to any given value of *RH* is found to be substantially reduced for the 1-millidarcy case. Note the relatively high temperatures that coincide with relatively humid conditions. For the 70-MTU/acre case, a maximum temperature of 137°C was attained when a minimum *RH* of 68% occurred.

The impact of small $k_b$ on higher AMLs is found to be quite different (particularly in the inner 90% of the repository). A comparison of Tables 11d and e with Tables 12d and e shows that the duration of sub-ambient *RH* conditions is actually greater at the center of the 110.5- and 150 MTU/acre repositories for the 1-millidarcy case. For the 150-MTU/acre repository, the sub-ambient *RH* duration is increased for the inner 75% of the repository. High-AML repositories that are capable of generating high repository temperatures are much less susceptible to the low-$k_b$ throttling effect on boiling and dry-out. Moreover, buoyant, gas-phase convection is a mechanism whereby water vapor generated in the lower region of the dry-out zone can be transported to the upper dry-out front where it condenses, thereby enhancing the rate of condensate buildup above the dry-out front. Even for small-to-medium $k_b$ (1 millidarcy to 1 darcy), the impact of buoyant, gas-phase convection can measurably impact the rate of advective liquid-phase re-wetting. Consequently, the 1-millidarcy case has less enhancement of the upper condensate bank than the 280-millidarcy case, and re-wetting the center of the repository back to ambient (humid) conditions takes longer for the 1-millidarcy case. Because edge cooling effects do not allow the edge of the repository to attain such high temperatures, a small $k_b$ does reduce the duration of sub-ambient *RH* at the repository edge. Consequently, relatively high temperatures coincide with relatively humid conditions at the repository edge. Because of the higher temperatures attained there, the edge of the 150-MTU/acre repository is much less susceptible to the effects of boiling and dry-out suppression than the 110.5-MTU/acre repository.

In general, for sufficiently small $k_b$, rather than facilitating rock dry-out, the unsaturated zone may function like a "pressure cooker" where high temperatures may also coincide with relatively humid conditions. This issue is addressed by the third of our seven major hypotheses. The seven major hypotheses concern:

- whether heat conduction dominates heat flow
- whether above-boiling temperatures correspond to a reduction in relative humidity and the absence of mobile liquid water at the WP environment

- whether fracture density and connectivity are sufficient to promote a reduction in relative humidity due to boiling
- whether re-wetting the reduced relative humidity zone back to humid conditions lags significantly behind the boiling period
- whether mountain-scale, buoyant, gas-phase convection may eventually dominate moisture movement in the UZ
- whether sub-repository-scale, buoyant, gas-phase convection dominates moisture movement at the repository
- whether heterogeneity results in focusing enough vapor flow and condensate drainage to cause persistent local liquid flow at the WP environment

Laboratory Experiments

Electrical Impedance as a Function of Moisture Content

Additional samples were prepared from the G-4 hole and the LBT cores to complete the measurements at 95°C. These samples are being dried. The complex nonlinear least square method is being used to fit the electrical impedance vs saturation data. The parameters derived from these fits can distinguish different phases of the water wetting/drying processes.

Characteristic Curves of Tuff

For the experiment of determining the moisture retention curve and one-dimensional imbibition using G-4 core, we continued the moisture retention experiments at high temperatures. Measurement at 95°C in the drying phase was started. The samples are at 95°C and 85% relative humidity.

The one-dimensional imbibition data obtained previously on a core from the G-4 Hole were analyzed. The propagation of the saturation front determined by electrical resistivity measurement was compared with an analytical model developed by Dr. John Reis (summer participant working with D. Chesnut). The agreement was very good.

The Effect of Confining Pressure on Fracture Healing

We continued the experiment to determine the effect of confining pressure on fracture healing, as observed previously by Lin and Daily. A fractured Topopah Spring tuff sample from the G-4 hole is being used. We have completed the permeability measurements at an effective pressure of 1.5 MPa (2.0 MPa confining pressure and 0.5 MPa pore pressure) and temperatures from 25 to 150°C and back to 25°C. The permeability decreased by about 50% during the heating and cool-down cycle at the effective pressure of 1.5 MPa. The sample is currently at an effective pressure of 2.5 MPa (3.0 MPa confining pressure and 0.5 MPa pore pressure) and 25°C.

**1.2.3.12.3 Mechanical Attributes of the Waste Package Environment**

Management and Integration

An abstract describing geomechanical studies on the Large Block Test was submitted to the second international conference on Mechanics of Jointed and Faulted Rock

(MJFR-II) to be held in Vienna in April, 1995. The paper will describe work being reported in this section of the monthly reports.

Laboratory

Four small block samples were received for laboratory testing of geomechanical properties at intermediate scales. These blocks are approximately 45x45x75 cm (18"x18"x30") in size. Efforts continued in the purchasing of various experimental systems for laboratory and field geomechanical measurements.

Support of the Large Block Test (LBT): Modeling

Work continued on digitization of the map of the top of the large block; the map is approximately 50% digitized. Digitization of the map of fractures at a level two feet above the top of the block was completed, and the digital data describing discrete blocks were forwarded to collaborators at UC Berkeley and the M&O.

**1.2.3.12.4 Engineered Barrier System (EBS) Field Tests**

Revisions to the Engineered Barrier System Field Tests (EBSFT) Study Plan 8.3.4.2.4.4 are in progress based on the comment resolution meeting.

Large Block Test (LBT)

Matrix Bulk Porosity

Additional mercury (Hg), porosimetry measurements were made. There are now 34 Hg porosimetry measurements completed using the core sections from the vertical instrument holes. The average bulk matrix porosity is about 11.55 $\pm$ 2.28%, with a minimum value of 8.23% and a maximum value of 20.18%. There appears to be a systematic increase of porosity with depth. Preliminary results also indicate that porosity is a function of distance from a fracture: porosity increases with increasing distance from a fracture.

Additional samples for using the wet-dry method of determining porosity have been prepared. These samples are drying.

Fracture Mapping

We continued the evaluation of Earth Vision and other software as a tool to display the fracture data of the large block in 3-D.

Excavation

The excavation work continued. The area 1 m away from the block was excavated to about 3.6 to 4 m below the top of the block. The first run of collecting smaller blocks, from a depth range of 1.5 to 2.5 m, was completed. The excavation has slowed because the rock has become more competent.

SNL continued the mapping of the fracture flow visualization test areas along with the excavation. No more blue stain was observed at the site near the north-west corner of the block. Blue color is still visible at the sites at the south-west and north-east corners of the block. However, the extent of the stained rock is much less than at shallower depths.

Small Block Tests in the Laboratory

Tests on the performance of the Kapton heaters (to be used as guard heaters for the large block and as heaters for the small block experiments), the potential insulation materials, and the thermal controller for the guard heaters, all under a 5 MPa stress continue. Copper plates may be used to distribute heat from the guard heaters. Tests to evaluate the lateral temperature distribution on the surface of a copper plate opposite to the heater continue. Thermal conduction model calculations continue to help design the guard heaters.

Drying of small samples of the tuff obtained from Fran Ridge, for estimating the initial moisture content, is almost complete.

X-ray imaging to determine water saturation is in progress. A fractured sample from Fran Ridge has undergone a dry, background x-ray test. Water doped with KI was added to the top of the sample and radiographs are being taken as a function of time to try to determine the distribution of water content.

The Load Retaining Frame

Engineering analysis of the proposed modifications to retrofit the frame continues. Preliminary results indicate that moving the holes connecting each section of the frame closer to the center of the frame will greatly improve the design performance.

Agreement was reached with Aircraft Engineering Corporation (AEC) that

- AEC will complete the dome and four sections of the cylindrical part of the frame,
- the remaining 8 sections of the cylindrical part will be welded at LLNL, and
- the original contract cost will be reduced.

Two of the eight sections have arrived at LLNL. The remaining six sections will be shipped to LLNL in August. The welding at LLNL will begin in August.

Loading Devices

The engineering design of the bladder support/housing devices continues.

Other Items

Procurement of instruments continues.

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

A. Meike is in the process of preparing two reports
- "Diesel Exhaust" and
- "Hydrous Pyrolysis of Diesel Fuel".

Completion of the second report will constitute milestone (MOL73).

## 1.2.5 REGULATORY

### 1.2.5.1 Regulatory Coordination and Planning

LLNL staff prepared bottoms-up cost estimates for the FY95 planning process.

### 1.2.5.2 Licensing

#### 1.2.5.2.2 Site Characterization Program

LLNL staff member D. Chesnut, completed his technical review of Study Plan 8.3.1.2.2.4.4, "Characterization of the Yucca Mountain Unsaturated Zone in the ESF". The checklist and comments were sent to YMSCO on July 27.

J. Blink attended the NWTRB meeting in Denver on July 12.

### 1.2.5.3 Technical Data Management

#### 1.2.5.3.4 Geologic and Engineering Materials Bibliography of Chemical Species (GEMBOCHS)

The first draft of a new Individual Software Plan (ISP) for the GEMBOCHS software library was completed; this ISP is written in conformance with YMP-QP3.2, Rev. 2, and will supersede earlier ISPs written for CNGBOCHS, FACET (formerly named DBAPP), and JEWEL (formerly DOOUT).

Work began on incorporating into GEMBOCHS two large databases recently acquired on disk: CHEMVAL 5.0 and the NIST database of critical stability constants for metal complexes.

The GEMBOCHS/JEWEL/FACET update that permits multiple data references for supcrt92 species was completed.

A feasibility study was completed on transferring GEMBOCHS from its current Sun platform to SGI hardware. The conclusion is that this transfer would be advantageous.

A feasibility study was completed on the possible transfer of GEMBOCHS from Ingres to another commercial Relational Data Base Management System (RDBMS) such as Oracle, Sybase, or Informix. The conclusion is that this transfer would not be advantageous at this time.

#### 1.2.5.3.5 Technical Data Base Input

B. Bryan and J. Blink reviewed backlogged and recent data acquisition/development. Several draft TDIFs were prepared, and were informally submitted to the M&O for review. Workstation training was scheduled to permit the TDIFs to be entered into ATDT in August.

### 1.2.5.4 Performance Assessment

#### 1.2.5.4.2 Waste Package Performance Assessment

July activities will be reported in a later monthly progress report.

### 1.2.5.5. Special Projects

#### 1.2.5.5.1 Integrated Test Evaluation (ITE)

This activity has not been funded in FY94.

#### 1.2.5.5.2 Energy Policy Act Support

No significant activity.

## 1.2.9 PROJECT MANAGEMENT

### 1.2.9.1 Management and Coordination

#### 1.2.9.1.2 Technical Project Office Management

W. Clarke, J. Blink, and J. Podobnik participated in the YMSCO Monthly Management Meeting in Las Vegas on July 28 and 29.

J. Blink obtained a truck load of LESSON kit materials at LLNL and transported them to Las Vegas. SAIC-Public Outreach arranged for the van.

### 1.2.9.2 Project Control

#### 1.2.9.2.2 Participant Project Control

Actual schedule progress and costs were submitted to the PACS reporting system via the PACS workstation. Variance analysis explanations were developed.

Participant Planning Guidance was received from YMSCO. Consultations with the LLNL technical staff, to develop a bottoms-up costing for the workscope, are in progress. This work is in preparation for the August PACS upload and for the TPO briefing to YMSCO.

## 1.2.11 QUALITY ASSURANCE

Quality Assurance Coordination and Planning

No significant activity.

Quality Assurance Program Development

On July 15, LLNL-YMP completed its review of YMP Quality Procedures and a complete set was sent to YMQAD on July 18. Input into the RTN matrix was also completed by July 15, and is in the process of being reviewed by QATSS.

YM TIPs 10, 11, 13, 14, 15, 16, 18, 19 and 20 were decontrolled on July 19, 1994. The TIPs were replaced by QP 3.2, Software Quality Assurance. All LLNL QA Grading Reports and Training Requirements are being reviewed so that they can be updated to reflect the changes in the software procedure numbering system.

Quality Assurance Verification

Quality Assurance Verification - Audits

Audit 94-06, Performance Analysis, was conducted July 6-29, 1994. One adverse finding and three observations were identified as a result of this audit. One CAR, LLNL-034, was issued due to lack of documentation and grading of activities associated with YMIM.

CAR LLNL-033 was issued on July 7, 1994. Corrective action was completed and verified and the CAR was closed on July 28, 1994.

Quality Assurance Verification - Surveillance

No significant activity.

Field Quality Assurance/Quality Control

No significant activity.

Quality Assurance - Quality Engineering

YMP-QA issued an updated Approved Suppliers List on July 18, 1994. The following organizations were added based on the qualification of these organizations by the OCRWM, OQA:

- Reynolds Electrical & Engineering Co., Inc. (REECo) Calibration Laboratory
- Raytheon Services Nevada (RSN), Materials Test Laboratory and Field Survey Services
- Primary Standards Laboratory (PSL) Sandia National Laboratory (SNL)

## 1.2.12 INFORMATION MANAGEMENT

### 1.2.12.2 Records Management

#### 1.2.12.2.2 Local Records Center Operations (LRC)

LLNL-YMP Document Control issued four revisions and no change notices. Follow up continues on previously distributed documents.

#### 1.2.12.2.3 Participant Records Management

A total of 114 items were logged into the LLNL-YMP tracking system. This includes 9 records/records packages that were processed through to the CRF. Nine action items were closed in July

#### 1.2.12.2.5 Document Control

LLNL received no funding under this WBS element for FY94. Work performed to complete LLNL's obligation in this WBS element is funded under WBS 1.2.12.2.2.

## 1.2.13.2 SAFETY AND OCCUPATIONAL HEALTH

#### 1.2.13.2.5 Occupational Safety and Health

J. Blink reviewed the Safety Committee minutes for July and distributed appropriate items to LLNL personnel.

## 1.2.15 SUPPORT SERVICES

### 1.2.15.2 Administrative Support

No significant activity.

### 1.2.15.3 Yucca Mountain Site Characterization Project (YMP) Support for the Training Mission

Currently there are 108 participants on the project who are to be trained and/or tracked. Five new participants and one re-start were added in July.

Creation of a new training database program is in progress. Programming has been completed; however, the database needs to be tested and implemented. The projected completion date is now August.

B. Bryan and J. Sippel attended an OCRWM Records meeting in Albuquerque on July 19 and 20.

**LLNL PROJECT STATUS REPORT EXTERNAL DISTRIBUTION**

July 1994

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IN REPLY REFER TO:

INFORMATION ONLY

September 16, 1994

Vince Iorii
Yucca Mountain Site Characterization
Project Office
U. S. Department of Energy
P.O. Box 98608
Las Vegas, Nevada 89193-8608

SUBJECT: Yucca Mountain Project Branch - U.S. Geological Survey (YMPB-USGS) Progress Report, August 1994

Dear Vince:

Attached is the USGS progress report in the required format for the month of August, 1994.

If you have any questions or need further information, please call me or Raye Ritchey at (303)236-0516.

Sincerely,

for Raye E. Ritchey
Larry R. Hayes
Technical Project Officer
Yucca Mountain Project Branch
U.S. Geological Survey

Enclosure:

cc: R. Crawley, DOE/Las Vegas
J. Dlugosz, DOE/Las Vegas
R. Dyer, DOE/Las Vegas
S. Jones, DOE/Las Vegas
W. Kozai, DOE/Las Vegas
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R. Spence, DOE/Las Vegas
T. Sullivan, DOE/Las Vegas
M. Tynan, DOE/Las Vegas
D. Williams, DOE/Las Vegas
P. Justus, NRC/Las Vegas (2 copies)
P. Burke, M&O/Las Vegas
R. St. Clair, M&O/Las Vegas
D. Appel, USGS/Denver
G. Bodvarsson, LBL/Berkeley
M. Chornak, USGS/Denver
R. Craig, USGS/Las Vegas
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D. Gillies, USGS/Denver
R. Luckey, USGS/Denver
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R. Ritchey, USGS/Denver
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J. Stuckless, USGS/Denver
J. Whitney, USGS/Denver

#210-A

ENCLOSURE 6

aug. sum

U.S. Geological Survey
**EXECUTIVE SUMMARY**
August 1994

## WBS 1.2.3.1 - Coordination and Planning

United States Geological Survey-Yucca Mountain Project Branch (USGS-YMPB) is currently processing 76 hydrologic-related scientific publications, 57 geologic and climate-related scientific publications, 14 YMP-LBL hydrologic-related scientific publications, and 96 abstracts.

## WBS 1.2.3.2 - Geology

Work on the 3-D site-scale model, Topopah surface, continued with the preparation of the fault surfaces and cross sections from the Lynx model for model verification and review. ARC/INFO and AWK programs, which automatically convert Ghost Dance fracture data base to graphical ARC/INFO or AutoCAD drawings were completed. LYNX model output was visually inspected for possible input errors with WAVEFRONT's Data Visualizer on the Silicon Graphics machine; errors were noted and corrected in the Lynx model. New Ghost Dance fault maps were created with an updated data base, and the North Ramp of Yucca Mountain is being calibrated with the Lynx model.

Current seismicity data were recorded by CUSP for all sites in August, except for 50 minutes of downtime. All of the 1994 SGBSN stations have been calibrated except for those on Nellis AFB--KRN, CTS, TCN, SPR, and BLT; Station GMR was calibrated on August 10. All seismic events through August 10, have been located; events have been checked through August 20.

In stratigraphic studies, preparation of the graphical lithologic log of borehole USW SD-9 from the surface to 453.2 m (present drilled depth) was completed, reviewed, and revised. Revisions of both the table and the graphical lithologic log for the borehole from the surface to the base of the Paintbrush Group.

Data collection for the graphical lithologic log of borehole USW SD-12 continued, describing units from about 305 to 381 m and compilation of the data into graphical format. Core from the borehole between about 381 to 426 m (deepest core recovered) to selected contacts were examined, and collection of detailed lithologic logging data began. This borehole has now penetrated into the crystal-poor, nonwelded zone of the Topopah Spring Tuff.

As part of the geologic mapping of structural features studies, a geochemical data base of major and trace elements was compiled with data obtained from whole-rock analyses of samples of tuffs and lavas procured from boreholes USW G-1, G-3, and GU-3. Graphs were made to illustrate major and trace-element concentrations with respect to stratigraphic position.

Studies to evaluate the age and recurrence of movement on Quaternary faults at Yucca Mountain continued in various trench studies. On Whaleback Ridge, cleaning of trench GDF-71 was begun. An internal field review of preliminary logs and interpretations was conducted for trench CF1. On the Paintbrush Canyon fault at Alice Ridge, the walls were cleaned and features identified and flagged on both walls of trench A1; the pins were shot in with total station, and data have been reduced. The preliminary log was completed for trench SCF-T1 on the Solitario Canyon fault; units in the trench have been described, and walls of exposure SCF-E1 are being cleaned and flagged (75 percent complete). Preliminary work was begun in trench SCF-72.

## WBS 1.2.3.3 - Hydrology

The work to analyze regional precipitation using geostatistical techniques was completed. Up to 108 individual data sites were included, and data from 38 storms in FY92 and 31 storms from FY93 were used. Synoptic weather types for the two fiscal years continue to be analyzed; these will be correlated with the storm events to develop a table of synoptic patterns that are responsible for precipitation in the Yucca Mountain region.

Collection of synoptic weather data continued in the form of weather charts and weather satellite images. Lightening data also are being collected during storms. One significant storm was recorded at Yucca Mountain on August 13; a maximum of 0.93 cm was measured between Fran Ridge and Yucca Mountain. Weather stations in the network continue to collect wind, temperature, relative humidity, solar radiation, and barometric pressure data.

Precipitation totals for monitoring sites on the Nevada Test Site ranged from 0.00 to about 0.51 cm. There was no runoff recorded or reported at any of the Yucca Mountain streamflow-monitoring sites on the Nevada Test Site. The Amargosa River at Tecopa, California continued to maintain a base flow of about 0.07-0.08 $ft^3/s$ for the month. Data loggers and stage-sensing devices were installed at three new streamflow gaging stations on selected washes along the eastern slopes of Yucca Mountain. Geodetic levels were run to the sites and all equipment and site checks completed to make the stations fully operational.

In unsaturated zone, surface-based studies, three pipe sizes were tested to evaluate mixing, pumping, emplacement, and tagging procedures in USW UZ#16. About 91 m of 17.8-cm casing was grouted up from about 366 m in the hole; grout samples were tested for viscosity, density, temperature buildup, and compressive strength, and the casing was then pulled. The casing will be cut and grout, sand, and poly bead lays will be evaluated during the first week in September.

Air-permeability testing continued in USW NRG-7/7A. Air-injection testing was conducted on over 60 test intervals in the Topopah Spring upper lithophysal zone using the 8.9-cm packer assembly. In late August, the 8.9-cm packer assembly was removed and a 12.7-cm packer assembly installed to conduct testing in the upper, larger-diameter section of the hole where the rock is part of the nonwelded tuffs. Effects of the well-bore skin seems to be more of an influence in the nonwelded tuffs.

In USW UZ-14 studies, five PQ-size, crushed core samples were compressed by high-pressure, one-dimensional compression for testing. Eleven core samples from the Calico Hills unit in the borehole were prepared for one-dimensional compression; water obtained will be analyzed for chemical content and $^{14}C$ dating. Four core samples that had been previously squeezed were distilled; 13 cores were distilled from non-squeezed samples. The extracted pore-water will be analyzed for tritium, $^{18}O/^{16}O$, and D/H. Video logs of drill core from the hole down to a depth corresponding to the bottom of the hole as of September, 1993 were viewed and annotated.

The large-block, prototype ESF percolation experiment was restarted in August. Currently, water is flowing continuously through the block fractures at a rate less than 1 $cm^3/hr$. Average water pressure along the block top is between -26 and - 20 cm of water. Measurements of water pressure in the block matrix and fracture are being made with tensiometers. Pressures along the top will be decreased until water flow stops, then increased until flow begins again to determine any hysteretic behavior that may affect water flow in fractures.

As part of percolation in the unsaturated zone studies at the ESF, air-permeability testing in the radial boreholes was begun. More than 60 gas-injection tests were completed in the alcove boreholes 1 and 2. Rock in the alcove is Tiva Canyon welded tuff and is very fractured. Tests show the tuff to be very permeable with numerous fast pathways. The high permeability displayed is probably due to the shallow depth of the unit in this area.

Gas sampling in the ESF was delayed due to lack of access to the radial boreholes caused by the air-permeability testing. However, three, 304-m tubing bundles were prepared for use in sampling the radial boreholes in Alcove #1 when the testing is completed.

Monitoring of perched water in the ESF by other investigators was completed. To date, the starter tunnel has been drill and blasted to about 61 m. Alcove #1 has been excavated to final depth. Drilling of the three radial boreholes has been completed. No natural water flows have been encountered. Development of the conceptual model for the ESF continued with the compilation of geologic and hydrologic data from USW UZ-1, 14, and 16, USW NRG-7/7A, and USW SD-9; geologic cross-section data along the ESF North Ramp were obtained to determine possible scenarios for perched water.

Gaseous-phase chemical investigations in the unsaturated zone continued. Data summaries were completed for the physical data from December 1992 to March 1994 and included pressure, temperature, and flow data from USW UZ-6s; downhole flow data from UE-25 UZ#16, and shut-in pressure test data from UE-25a #4, USW UZ-6, 6s, and 13, UE-25 UZ#16, and USW NRG-6. Shut-in pressure testing at USW NRG-4 was continued.

As part of the aqueous-phase chemical investigations in the unsaturated zone, three core samples from USW NRG-6, which had previously been squeezed, and six unsqueezed cores samples from UE-25 UZ#16 and 13 core samples from USW UZ-14 were distilled. The extracted pore water will be analyzed for tritium, $^{18}O/^{16}O$, and D/H. Eight borehole water vapor samples from UE-25 UZ#16 were analyzed for tritium.

In unsaturated-zone modeling and synthesis studies, hypothesis testing of the 2-D models continued; topographic and stratigraphic information was compiled and used to create a computational mesh compatible with TOUGH input requirements for a 3-D numerical model of gas circulation in the Yucca Crest area around boreholes USW UZ-6 and 6s. Several simulations were run on a simplified 2-D mesh employing average annual temperature conditions to observe temperature-induced, buoyancy-driven flow; results were qualitatively compared with gas isotope data to check for consistency and indicate: rapid transport within the Tiva Canyon; effectiveness of the PTn in segregating the flow system into shallow (TCw) and deeper (TSw) portions; and the mixing of deep gases at USW UZ-6 due to the formation of convection cells.

At the Raymond Quarry site in California, two tracer tests were conducted jointly by the USGS and LBL; a multiple-well convergent tracer test and a two-well recirculating test. Tracers used were: fluorescein, deuterium, fluorescent macrospheres, and potassium iodide.

As part of the evaluation of site potentiometric levels, 19 water-level zones were monitored in 17 wells on a monthly basis (manually) and 17 zones in 12 wells on an hourly basis (transducers). Continuous analog water-level data were obtained in four zones in two wells in order to monitor water-level responses to seismic events. Real-time data were obtained from 17 zones in 12 wells using DCP's. Three manual water-level measurements were made at USW UZ-14 and two measurements at USW SD-9.

In saturated zone, analysis of single- and multiple-well hydraulic stress-test studies, work on the 3-D equivalent-porous-medium (EPM) model progressed; the geologic structure of the modeled area was reviewed and it was concluded that a 2-layer model will offer a simple, acceptable representation of the geohydrologic setting of the C-holes. An areal grid and input files for the 2-layer model were created.

## WBS 1.2.3.6 - Climatology

As part of Paleoclimate studies of lake, playa, and marsh deposits, prepared five samples from Estancia Basin in support of effort to establish climate boundary conditions during the last hydrologic cycle. Processed and prepared samples from the black Rock long core for ostracodes and related materials; data will be used to establish a geological (million year) scale climate reference section to compare with the long-term history of fracture flow within the mountain.

Completed processing additional strata from a pack rat midden covering the last 34,000 years; middens have been sorted and analyzed. Continued collection and analysis of pollen samples from Summer Lake, Oregon and Fish Lake Valley in the central Great Basin.

## WBS 1.2.13.4 - Water-Resources Monitoring

Ground-water levels were measured at 28 sites. Discharge was measured at one flowing well and five springs. Ground-water data collected during July were checked and filed.

## USGS LEVEL 3 MILESTONE REPORT
OCTOBER 1, 1993 - AUGUST 31, 1994
Sorted by Baseline Date

| Deliverable | Due Date | Expected Date | Completed Date | Comments |
|---|---|---|---|---|
| G300: FINAL RPT, CROSS-HOLE PROTOTYPE TESTING<br>Milestone Number: 3GUT004M | 03/31/93 | 09/30/94 | | |
| PUBLICATION: RAILROAD VALLEY ANALOG<br>Milestone Number: 3GNR02AM | 09/30/93 | 11/03/94 | | |
| PUBLICATION: DEVELOPMENT OF 1-D COMPRESSION<br>Milestone Number: 3GUH045M | 01/31/94 | 09/09/94 | | |
| ANALYSIS PAPER: UZ-16 COMPLETION REPORT (P013)<br>Milestone Number: 3GUP066M | 02/01/94 | 09/30/94 | | |
| ANLYS PAPER: LAB MEASUREMENT OF UNSATURATED FLOW<br>Milestone Number: 3GUS034M | 02/04/94 | 09/30/94 | | |
| ANALYSIS PPR: DATA-STARTER TUNNEL & NORTH PORTAL<br>Milestone Number: 3GGF012M | 02/28/94 | 09/16/94 | | |
| CRITERIA LETTER: TECH SUPPORT FOR X-HOLE TESTING<br>Milestone Number: 3GWF086M | 02/28/94 | 09/30/94 | | |
| ANLYS PPR: MAG/GRAV INTERP YUC WASH/MDWAY VALLEY<br>Milestone Number: 3GGU463M | 03/31/94 | 09/22/94 | | |
| ANLYS PPR: MAPS SOUTH-CNTRL GHOST DANCE FAULT<br>Milestone Number: 3GGF122M | 03/31/94 | 09/20/94 | | |
| PUB: STRUCTURAL FLOW-PATH ANLYS W/TRANSPT & CHEM<br>Milestone Number: 3GFH009M | 03/31/94 | 09/30/94 | | |
| PUBLICATN: RESULTS - ZERO OFFSET & WALKAWAY DATA<br>Milestone Number: 3GUP086M | 03/31/94 | 09/30/94 | | |
| PUBLICATION: GEOPHYSICAL STUDY/WINDY WASH FAULT<br>Milestone Number: 3GPF039M | 04/15/94 | 11/30/94 | | |



Printed: 09/15/94 11:35

| Deliverable | Due Date | Expected Date | Completed Date | Comments |
|---|---|---|---|---|
| ANALYSIS PPR: MAG/GRAV ACROSS GHOST DANCE FAULT<br>Milestone Number: 3GGU440M | 04/29/94 | 09/30/94 | | |
| PUBLICATION: ASSESS LITTLE SKULL MTN EQ<br>Milestone Number: 3GSM149M | 04/29/94 | 09/30/94 | | |
| PUBLICATION: INFILT STUDY; DEVELOPMENT/TESTING<br>Milestone Number: 3GUI636M | 04/29/94 | 09/30/94 | | |
| PUBLICATION: 1-D AND 2-D MATRIX MODELS<br>Milestone Number: 3GPA006M | 04/29/94 | 09/30/94 | | |
| ANLYS PPR: ISOTOPIC PARAMETERS- DRILLCORE SECTNS<br>Milestone Number: 3GGU22BM | 05/31/94 | 09/28/94 | | |
| ANLYS PPR: MAP-GHOST DANCE FAULT PAVEMENT<br>Milestone Number: 3GGF202M | 05/31/94 | 09/30/94 | | |
| PUBLICATION: FINAL SUMMARY RPT - MIDWAY VALLEY<br>Milestone Number: 3GFP029M | 05/31/94 | 09/30/94 | | |
| PUBLICATION: MAP - CALICO HILLS<br>Milestone Number: 3GTD018M | 05/31/94 | 12/30/94 | | |
| PUBLICATION: MAP- EAST OF BEATTY QUADRANGLE<br>Milestone Number: 3GTD028M | 05/31/94 | 09/30/94 | | |
| ANLYS PPR: SCARP DEGRADATION/EVOL N. WINDY WASH<br>Milestone Number: 3GPF034M | 05/31/94 | 09/30/94 | | |
| PUBLICATION: STAGE COACH RD FAULT<br>Milestone Number: 3GPF118M | 05/31/94 | 09/30/94 | | |
| PUBLICATION: STREAMFLOW CHAOS JOURNAL ARTICLE<br>Milestone Number: 3GRG023M | 06/30/94 | 03/31/95 | | |
| PUBLICATION: HISTORICAL NEUTRON HOLE DATA<br>Milestone Number: 3GUI050M | 06/30/94 | 09/30/94 | | |

| Deliverable | Due Date | Expected Date | Completed Date | Comments |
|---|---|---|---|---|
| PUB: PROJECTION MOIRE METHOD - FRACT-SURF CHAR<br>Milestone Number: 3GUS024M | 06/30/94 | 09/30/94 | | |
| PUBLICATION: ORIGIN OF SURFACE DEPOSITS<br>Milestone Number: 3GQH019M | 06/30/94 | 09/30/94 | | |
| ANLYS PPR:ALTERATIONS IN CORE FROM UZ-14 & UZ-16<br>Milestone Number: 3GNR020M | 06/30/94 | 09/30/94 | | |
| ANLYS PPR: 3-D SITE-SCALE MODEL/TOPOPAH-SURFACE<br>Milestone Number: 3GGU135M | 07/29/94 | 09/28/94 | | |
| ANALYSIS PAPER: SEISMIC REFLECTION PROFILE EVAL<br>Milestone Number: 3GGU256M | 07/29/94 | 11/29/94 | | |
| ANALYSIS PAPER: PRELIMINARY WT/UZ-14 MAG RESULTS<br>Milestone Number: 3GGU399M | 07/29/94 | 09/30/94 | | |
| ANALYSIS PPR: PROGRESS GEOCHEM REFERENCE SECTION<br>Milestone Number: 3GGF206M | 07/29/94 | 09/30/94 | | |
| ANLYS PPR:LITH\CHEM PROP WELD/BEDDED PBRUSH\TUFF<br>Milestone Number: 3GGF207M | 07/29/94 | 09/30/94 | | |
| PUBLICATION: CATALOG OF SEISMIC EVENTS -CY 1993<br>Milestone Number: 3GSM025M | 07/29/94 | 09/30/94 | | |
| ANLYS PPR: BASALTIC VOLC. BARE MTN-CRATER FLAT<br>Milestone Number: 3GTD025M | 07/29/94 | 09/30/94 | | |
| PUBLICATION: FY92 SYNOPTIC/REG/SITE MET DATA<br>Milestone Number: 3GMM038M | 07/29/94 | 09/30/94 | | |
| PUBLICATION: FY93 SYNOPTIC/REG/SITE MET DATA<br>Milestone Number: 3GMM041M | 07/29/94 | 09/30/94 | | |
| ANLYS PPR: MAP-REGIONAL VARIATION-TIVA CYN TUFFS<br>Milestone Number: 3GNR032M | 07/29/94 | 09/16/94 | | |

| Deliverable | Due Date | Expected Date | Completed Date | Comments |
|---|---|---|---|---|
| ANALYSIS PAPER: BOREHOLE COMPLETION DATA REPORT<br>Milestone Number: 3GUP302M | 07/30/94 | 09/30/94 | | |
| PUBLICATION: BOW RIDGE FAULT<br>Milestone Number: 3GPF120M | 08/31/94 | 09/30/94 | | |
| PUBLICATION: MAP OF DEATH VALLEY AREA<br>Milestone Number: 3GTE072M | 08/31/94 | 09/30/94 | | |
| ANALYSIS PAPER: PERCHED WATER<br>Milestone Number: 3GUS021M | 08/31/94 | 09/30/94 | | |
| PUB: SECTION OF PERC & IMBIBITION TEST RESULTS<br>Milestone Number: 3GUF022M | 08/31/94 | 09/30/94 | | |
| ANALYSIS PAPER: GEOCHRONOLOGICAL STUDIES<br>Milestone Number: 3GQH023M | 08/31/94 | 09/30/94 | | |
| DATA TO TDB: GEOCHEMICAL & ISOTOPIC DATA<br>Milestone Number: 3GQH024M | 08/31/94 | 09/30/94 | | |
| PUB: METEOROLOGICAL DATA FY92-94, ARID-ZONE INFL<br>Milestone Number: 3GQH001M | 08/31/94 | 08/30/94 | 08/30/94 | |
| ANLYS PPR: RADIOGENIC/STABLE ISOTOPE STUDIES<br>Milestone Number: 3GNR034M | 08/31/94 | 09/27/94 | | |
| PUBLICATION: HYDROGEOLOGY OF WELL JF-3<br>Milestone Number: 3GWR032M | 08/31/94 | 01/17/95 | | |
| SUBMIT STUDY PLAN TO DOE<br>Milestone Number: 3GSH001M | 09/30/94 | 09/30/94 | | |
| PUBLICATION: WATER RESOURCES MONITOR THRU 1993<br>Milestone Number: 3GWR045M | 09/30/94 | 09/30/94 | | |



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**USGS LEVEL 4 MILESTONE REPORT**
OCTOBER 1, 1993 - AUGUST 31, 1994
Sorted by Baseline Date

| Deliverable | Due Date | Expected Date | Completed Date | Comments |
|---|---|---|---|---|
| PROV. RESULTS:ISOTOPE DATING/EOLIAN SANDS/SOIL<br>Milestone Number: 3GCH161M | 08/31/93 | 09/06/94 | | |
| PRELIMINARY SUMMARY PALEOFLOOD STUDIES<br>Milestone Number: 3GQH010M | 09/30/93 | 09/30/94 | | |
| REVIEW DRAFT: SUMMARY REPORT - MIDWAY VALLEY<br>Milestone Number: 3GFP028M | 01/20/94 | 09/09/94 | | |
| DATA TO LRC: TRENCH LOGS<br>Milestone Number: 3GFP017M | 02/21/94 | 09/30/94 | | |
| REVIEW DRAFT: TRENCHES STAGE COACH RD FLT<br>Milestone Number: 3GPF117M | 03/15/94 | 09/09/94 | | |
| REVIEW DRAFT: CATALOG OF EVENTS CAL YEAR 1993<br>Milestone Number: 3GSM024M | 03/31/94 | 08/30/94 | 08/30/94 | |
| DATA TO LRC: SEISMIC DATA<br>Milestone Number: 3GSM24AM | 03/31/94 | 08/31/94 | | |
| DATA TO LRC: FRACTURE LOGS DATA<br>Milestone Number: 3GUP305M | 03/31/94 | 11/30/94 | | |
| DATA TO LRC: GAS/H20 VAPOR DATA-UZ#16/NRG-6/UZ-1<br>Milestone Number: 3GUH022M | 03/31/94 | 09/30/94 | | |
| SELECT SEISMIC CONTRACTOR(S)<br>Milestone Number: 3GGU265M | 04/29/94 | 09/30/94 | | |
| DATA TO LRC:FY93 SYNOPTIC/REGIONAL/SITE MET DATA<br>Milestone Number: 3GMM039M | 04/29/94 | 09/30/94 | | |
| DATA TO LRC: FY93 MATRIX PROPERTIES DATA<br>Milestone Number: 3GUP034M | 04/29/94 | 09/30/94 | | |



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| Deliverable | Due Date | Expected Date | Completed Date | Comments |
|---|---|---|---|---|
| TECHNICAL MEMO: APR-1 FRACTURE DATA<br>Milestone Number: 3GGF120M | 05/23/94 | 09/15/94 | | |
| REVIEW DRAFT: MAP- BIG DUNE QUADRANGLE<br>Milestone Number: 3GTD029M | 05/31/94 | 09/30/94 | | |
| DATA TO LRC: QUADRILATERAL SURVEY<br>Milestone Number: 3GTL009M | 06/30/94 | 11/30/94 | | |
| MEMO TO TPO: INSTUMENTATION CERTIF FOR NRG-6<br>Milestone Number: 3GUP072M | 06/30/94 | 12/15/94 | | |
| DATA TO LRC: AXIAL FRACTURE BLANK TEST RESULTS<br>Milestone Number: 3GUS032M | 06/30/94 | 09/30/94 | | |
| DATA TO LRC: 1ST & 2ND QTR FY94 GAS FLOW DATA<br>Milestone Number: 3GGP03M | 06/30/94 | 09/30/94 | | |
| DATA TO LRC: 1ST & 2ND QTR FY94 GAS SAMPLE DATA<br>Milestone Number: 3GGP05M | 06/30/94 | 09/30/94 | | |
| DATA TO LRC: 1ST & 2ND QTR FY94 TRACER TEST DATA<br>Milestone Number: 3GGP07M | 06/30/94 | 08/09/94 | 08/09/94 | |
| DATA TO LRC: HYDRAULIC DATA<br>Milestone Number: 3GWF020M | 06/30/94 | 09/30/94 | | |
| PREP: TBM MAPPING PREPARATION (LEVEL 4)<br>Milestone Number: 3GGF50BM | 07/29/94 | 09/30/94 | | |
| REVIEW DRAFT: STRUCT CONTROLS/BASALTIC VOLCANISM<br>Milestone Number: 3GTW015M | 07/29/94 | 09/30/94 | | |
| DATA TO LRC:PRELIM TBL FLT PARAMS REL EQs-V. IV<br>Milestone Number: 3GSS114M | 07/29/94 | 09/30/94 | | |
| PROV RESULTS: CONFERENCE ON GROUND MOTION<br>Milestone Number: 3GES006M | 07/29/94 | 09/30/94 | | |

| Deliverable | Due Date | Expected Date | Completed Date | Comments |
|---|---|---|---|---|
| DATA TO LRC: ROCK VALLEY TRENCH LOGS<br>Milestone Number: 3GTN016M | 07/29/94 | 10/31/94 | | |
| PROV RESULTS: HISTORY OF FATIGUE WASH FAULT<br>Milestone Number: 3GPF105M | 07/29/94 | 09/30/94 | | |
| PROVISIONAL RESULTS: COSMOGENIC DATING RESULTS<br>Milestone Number: 3GPF116M | 07/29/94 | 09/30/94 | | |
| STREAM-GAGE INSTALLATION MEMO<br>Milestone Number: 3GRS018M | 07/29/94 | 08/31/94 | 08/31/94 | |
| DRAFT REPORT: HYDROGEOLOGIC MAP OF DEATH VALLEY<br>Milestone Number: 3GRM043M | 07/29/94 | 09/30/94 | | |
| MEMO TO TPO: INSTALLATION/INITIAL TEST OF INSTRU<br>Milestone Number: 3GUP096M | 07/29/94 | 11/15/94 | | |
| AXIAL INTACT FRACTURE SAMPLING METHODS (TP)<br>Milestone Number: 3GUS029M | 07/29/94 | 09/30/94 | | |
| DATA TO LRC: SINGLE-HOLE REDUCED DATA<br>Milestone Number: 3GUS422M | 07/29/94 | 09/30/94 | | |
| REVIEW DRAFT: TRACER-GAS SORPTION ON STEM/TUFF<br>Milestone Number: 3GUH027M | 07/29/94 | 09/30/94 | | |
| PROV RLTS: HYDRAULIC X-HOLE TEST PROGRAM TO DATE<br>Milestone Number: 3GWF012M | 07/29/94 | 03/22/95 | | |
| PROVISIONAL RESULTS: DUPLICATE ANALYSIS COMPARSN<br>Milestone Number: 3GCL120M | 07/29/94 | 08/30/94 | 08/30/94 | |
| PROVISIONAL RESULTS: RADIOCARBON DATING RESULTS<br>Milestone Number: 3GCL130M | 07/31/94 | 08/29/94 | 08/29/94 | |
| PROV RESULTS: SAMPLES-TRENCHES & DRILL HOLES<br>Milestone Number: 3GQH026M | 07/31/94 | 09/30/94 | | |

| Deliverable | Due Date | Expected Date | Completed Date | Comments |
|---|---|---|---|---|
| REVIEW DRAFT: EFFECTS OF SITE GEOL ON GRND MOTN<br>Milestone Number: 3GSG002M | 08/15/94 | 09/09/94 | | |
| DATA TO LRC: THERMOLUMINESCENCE DATA<br>Milestone Number: 3GSE002M | 08/21/94 | 08/30/94 | 08/30/94 | |
| TECH PROC: MOD GCP-3 FOR URAINIUM SERIESM DATING<br>Milestone Number: 3GQH870M | 08/26/94 | 09/27/94 | | |
| REVIEW DRAFT: THERMOBAROMETRY/LOWER PLATE<br>Milestone Number: 3GTD021M | 08/29/94 | 09/30/94 | | |
| REVIEW DRAFT: GAS PHASE TRACER TEST<br>Milestone Number: 3GGP007M | 08/30/94 | 10/19/94 | | |
| PROV. RESULTS: SCENARIOS-TECTONICS EFFECTS- HYDR<br>Milestone Number: 3GTW016M | 08/31/94 | 09/30/94 | | |
| MEMO TO TPO: PROGRESS OF FIELD MEASUREMENTS<br>Milestone Number: 3GAT046M | 08/31/94 | 09/12/94 | | |
| REVIEW DRAFT: HISTORICAL & CURRENT SEISMICITY<br>Milestone Number: P107 | 08/31/94 | 08/30/94 | 08/30/94 | |
| REVIEW DRAFT: SEIS-TECT DEATH VALLEY-FURNACE CRK<br>Milestone Number: 3GTQ012M | 08/31/94 | 08/30/94 | 08/30/94 | |
| REVIEW DRAFT: AGE AND ACTIVITY BARE MTN FAULT<br>Milestone Number: 3GTQ061M | 08/31/94 | 08/30/94 | 08/30/94 | |
| PROV RESULTS:STRUCT. HISTORY- MINE MTN FAULT SYS<br>Milestone Number: 3GTN010M | 08/31/94 | 09/30/94 | | |
| PROV RESULTS: EVAL OF POSS DETACHMENT FAULTS<br>Milestone Number: 3GTD014M | 08/31/94 | 08/30/94 | 08/30/94 | |
| DATA TO LRC: NUMERICAL AGE DETERMINATIONS DATA<br>Milestone Number: 3GTD027M | 08/31/94 | 09/30/94 | | |

| Deliverable | Due Date | Expected Date | Completed Date | Comments |
|---|---|---|---|---|
| PROV RESULTS: HISTORY OF GHOST DANCE FAULT<br>Milestone Number: 3GPF104M | 08/31/94 | 09/30/94 | | |
| PROVISIONAL RESULTS: ALICE RIDGE TRENCH STUDY<br>Milestone Number: 3GPF109M | 08/31/94 | 09/30/94 | | |
| PROVISIONAL RESULTS: HISTORY SOLITARIO CYN FLT<br>Milestone Number: 3GPF113M | 08/31/94 | 09/30/94 | | |
| DATA TO LRC: NRG-7a AIR-K DATA<br>Milestone Number: 3GUP041M | 08/31/94 | 09/30/94 | | |
| DATA TO LRC: GAS/WATER VAPOR DATA FROM USW UZ-14<br>Milestone Number: 3GUP312M | 08/31/94 | 07/03/95 | | |
| MEMO TO TPO: DRAWINGS FOR HIGH PRESSURE VESSEL<br>Milestone Number: 3GUS035M | 08/31/94 | 09/30/94 | | |
| MEMO TO TPO: COMPLETE BH MONITOR ANISOTROPY SYS<br>Milestone Number: 3GUS410M | 08/31/94 | 10/28/94 | | |
| TECH PROC: BOREHOLE PRESSURE CELL & EXTENSOMETER<br>Milestone Number: 3GUS008M | 08/31/94 | 11/30/94 | | |
| MEMO TO TPO: ESF HYDROCHEM SAMPLING METHODOLOGY<br>Milestone Number: 3GUS404M | 08/31/94 | 01/03/95 | | |
| DATA TO LRC: AQUEOUS-PHASE DATA<br>Milestone Number: 3GUH031M | 08/31/94 | 09/30/94 | | |
| REVIEW DRAFT: PARTICLE TRACKING ALGORITHM<br>Milestone Number: 3GUM016M | 08/31/94 | 09/30/94 | | |
| CRITERIA LET: REHABILITATING WELLS H-4/H-6/b#1<br>Milestone Number: 3GWF076M | 08/31/94 | 08/17/94 | 08/17/94 | |
| PROVISIONAL RESULTS: TRACER INJECTION SYS STATUS<br>Milestone Number: 3GWF085M | 08/31/94 | 09/09/94 | | |

| Deliverable | Due Date | Expected Date | Completed Date | Comments |
|---|---|---|---|---|
| MEMO TO TPO: STATUS OF HYDROCHEM DATA REPORT<br>Milestone Number: 3GWH003M | 08/31/94 | 09/12/94 | | |
| PROVISIONAL RESULTS: PALEONTOLOGIC/ISOTOPE DATA<br>Milestone Number: 3GCL118M | 08/31/94 | 08/30/94 | 08/30/94 | |
| REV DRAFT: MAP OF SURF DEPOSITS, S CRATER FLAT<br>Milestone Number: 3GQH020M | 08/31/94 | 09/30/94 | | |
| REV DRAFT: SUMMARY -GROUND WATER TRACER STUDIES<br>Milestone Number: 3GQH028M | 08/31/94 | 09/30/94 | | |
| PROV RESULTS: SR,PB,& S ISO ANLYS YM GRND WATER<br>Milestone Number: 3GNR036M | 08/31/94 | 08/30/94 | 08/30/94 | |
| DATA TO PDA: AQUEOUS-PHASE DATA - USW UZ-14<br>Milestone Number: 3GUP313M | 09/30/94 | 10/28/94 | | |
| STATUS REPORT: CURRENT CONCEPTUAL MODELS<br>Milestone Number: 3GUM013M | 09/30/94 | 09/30/94 | | |
| ANNOTATED OUTLINE: PREL RPT ON CROSS-HOLE TEST<br>Milestone Number: 3GWF038M | 09/30/94 | 03/22/95 | | |
| PROV RESULTS:U-SERIES DATING W/MASS SPECTROMETRY<br>Milestone Number: 3GQH872M | 09/30/94 | 09/19/94 | | |

Participant USGS

Prepared - 09/15/94:13:47:18

Yucca Mtn. Site Char. Project-Planning & Control System
PACS Participant Work Station (PPWS)
WBS Status Sheet (WBS02)

01-Aug-94 to 31-Aug-94

Inc. Dollars in Thousands

WBS No. - 1.2

WBS Title - YUCCA MOUNTAIN PROJECT

Parent WBS No. -

Parent WBS Title -

Element ID - ZZ

Statement of Work

See the current WBS Dictionary

## Cost/Schedule Performance

| Id | Description | Current Period BCWS | BCWP | ACWP | SV | CV | FY1994 Cumulative to Date BCWS | BCWP | ACWP | SV | CV | FY1994 at Completion BAC | EAC | VAC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.2.1 | SYSTEMS ENGINEERING | 5 | 5 | 7 | 0 | -2 | 56 | 56 | 62 | 0 | -6 | 62 | 66 | -4 |
| 1.2.3 | SITE INVESTIGATIONS | 2031 | 1807 | 1408 | -224 | 399 | 18500 | 17017 | 17478 | -1483 | -461 | 21331 | 21391 | -60 |
| 1.2.5 | REGULATORY | 106 | 87 | 46 | -19 | 41 | 1098 | 1063 | 967 | -35 | 96 | 1206 | 1128 | 78 |
| 1.2.9 | PROJECT MANAGEMENT | 121 | 121 | 137 | 0 | -16 | 1104 | 1104 | 996 | 0 | 108 | 1225 | 1129 | 96 |
| 1.2.11 | QUALITY ASSURANCE | 158 | 158 | 143 | 0 | 15 | 1740 | 1740 | 1762 | 0 | -22 | 1900 | 1911 | -11 |
| 1.2.12 | INFORMATION MANAGEMENT | 71 | 71 | 40 | 0 | 31 | 487 | 487 | 454 | 0 | 33 | 530 | 530 | 0 |
| 1.2.13 | ENVIRONMENT, SAFETY, & HEA | 53 | 53 | 37 | 0 | 16 | 430 | 430 | 431 | 0 | -1 | 440 | 474 | -34 |
| 1.2.15 | SUPPORT SERVICES | 24 | 24 | 18 | 0 | 6 | 263 | 263 | 256 | 0 | 7 | 287 | 280 | 7 |
| Total | | 2569 | 2326 | 1836 | -243 | 490 | 23678 | 22160 | 22406 | -1518 | -246 | 26981 | 26909 | 72 |

## Resource Distributions by Element of Cost

Fiscal Year 1994

Budgeted Cost of Work Scheduled

| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LBRHRS | 17618 | 18011 | 18747 | 20608 | 20170 | 21181 | 25516 | 29668 | 29646 | 28025 | 26464 | 26355 | 282009 |
| LABOR | 971 | 1037 | 1207 | 1272 | 1273 | 1368 | 1634 | 1648 | 1613 | 1530 | 1578 | 1532 | 16663 |
| SUBS | 588 | 624 | 696 | 790 | 758 | 667 | 770 | 746 | 733 | 710 | 991 | 694 | 8767 |
| CAPITAL | 0 | 0 | 197 | 41 | 0 | 0 | 0 | 49 | 97 | 90 | 0 | 1077 | 1551 |
| Total BCWS | 1559 | 1661 | 2100 | 2103 | 2031 | 2035 | 2404 | 2443 | 2443 | 2330 | 2569 | 3303 | 26981 |

Actual Cost of Work Performed

| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LBRHRS | 11856 | 12411 | 12139 | 14734 | 18465 | 18096 | 16085 | 15265 | 16439 | 13920 | 16004 | 0 | 165414 |
| LABOR | 713 | 832 | 1588 | 1272 | 1102 | 1284 | 1597 | 1240 | 1561 | 1613 | 999 | 0 | 13801 |
| SUBS | 583 | 652 | 685 | 782 | 664 | 809 | 755 | 799 | 833 | 789 | 827 | 0 | 8178 |
| CAPITAL | 4 | 0 | 185 | 29 | 23 | 0 | 1 | 32 | 145 | -2 | 10 | 0 | 427 |
| Total ACWP | 1300 | 1484 | 2458 | 2083 | 1789 | 2093 | 2353 | 2071 | 2539 | 2400 | 1836 | 0 | 22406 |

Participant USGS

Prepared - 09/15/94:13:47:18

Yucca Mtn. Site Char. Project-Planning & Control System
PACS Participant Work Station (PPWS)
WBS Status Sheet (WBS02)

01-Aug-94 to 31-Aug-94

Inc. Dollars in Thousands

WBS No. - 1.2 -YUCCA MOUNTAIN PROJECT

Resource Distributions

| Fiscal Year 1994 | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BCWS | 1559 | 1661 | 2100 | 2103 | 2031 | 2035 | 2404 | 2443 | 2443 | 2330 | 2569 | 3303 | 26981 |
| BCWP | 1532 | 1647 | 1943 | 2116 | 1764 | 2134 | 2209 | 2230 | 2242 | 2017 | 2326 | 0 | 22160 |
| ACWP | 1300 | 1484 | 2458 | 2083 | 1789 | 2093 | 2353 | 2071 | 2539 | 2400 | 1836 | 0 | 22406 |
| ETC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4503 | 4503 |

Fiscal Year Distribution

| | Prior | FY1994 | FY1995 | FY1996 | FY1997 | FY1998 | FY1999 | FY2000 | FY2001 | FY2002 | FY2003 | Future | At Complete |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BCWS | 24644 | 26981 | 43294 | 9365 | 219 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 104503 |
| BCWP | 23158 | 22160 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| ACWP | 23430 | 22406 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| ETC | 0 | 4503 | 43780 | 9365 | 219 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 103703 |

YMP PLANNING AND CONTROL SYSTEM (PACS)

Participant U.S. Geological Survey
Date Prepared 09/16/94 10:46

**MONTHLY COST/FTE REPORT**

Fical Month/Year AUGUST 1994
Page 1 of 1

| | CURRENT MONTH END | | | | | | FISCAL YEAR | | |
|---|---|---|---|---|---|---|---|---|---|
| WBS ELEMENT | ACTUAL COSTS | PARTICIPANT HOURS | SUBCON HOURS | PURCHASE COMMITMENTS | SUBCON COMMITMENTS | ACCRUED COSTS | APPROVED BUDGET | APPROVED FUNDS | CUMMULATIVE COSTS |
| 1.2.1 | 7 | 96 | 0 | 0 | 19 | | 62 | | 61 |
| 1.2.3 | 1389 | 12636 | 11460 | 189 | 1162 | | 20635 | | 17058 |
| 1.2.5 | 47 | 1557 | 584 | 0 | 30 | | 1175 | | 947 |
| 1.2.9 | 137 | 1182 | 843 | 0 | 43 | | 1225 | | 998 |
| 1.2.11 | 144 | 833 | 1193 | 0 | 75 | | 1900 | | 1763 |
| 1.2.12 | 40 | 0 | 1289 | 0 | 57 | | 530 | | 454 |
| 1.2.13 | 37 | 184 | 0 | 0 | 0 | | 483 | | 430 |
| 1.2.15 | 18 | 0 | 346 | 0 | 25 | | 287 | | 256 |
| TOTALS | 1819 | 16488 | 15715 | 189 | 1411 | | 26297 | 0 | 21967 |

U.S. GEOLOGICAL SURVEY

ESTIMATED COSTS FOR 10/1/93 - 08/31/94

| | | OCT EST | NOV EST | DEC EST | JAN EST | FEB EST | MAR EST | APR EST | MAY EST | JUN EST | JUL EST | AUG EST | SEP EST | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0G1194B | Q-List Development and Maintenance | 0.6 | 1.5 | 9.2 | 1.3 | 7.0 | 5.1 | 7.2 | 6.0 | 11.2 | 5.5 | 6.7 | 0.0 | 61.3 |
| 1.2.1.10 | | 0.6 | 1.5 | 9.2 | 1.3 | 7.0 | 5.1 | 7.2 | 6.0 | 11.2 | 5.5 | 6.7 | 0.0 | 61.3 |
| *1.2.1.1 | | 0.6 | 1.5 | 9.2 | 1.3 | 7.0 | 5.1 | 7.2 | 6.0 | 11.2 | 5.5 | 6.7 | 0.0 | 61.3 |
| **1.2.1 | | 0.6 | 1.5 | 9.2 | 1.3 | 7.0 | 5.1 | 7.2 | 6.0 | 11.2 | 5.5 | 6.7 | 0.0 | 61.3 |
| 0G3194B1 | Branch Coordination and Planning | 31.0 | 41.7 | 59.2 | 29.3 | 44.0 | 36.5 | 85.4 | -30.8 | 37.2 | 62.9 | 35.0 | 0.0 | 431.4 |
| 0G3194B2 | M&I - Branch Administrative Services | 28.7 | 14.7 | 81.4 | 12.5 | 18.8 | 56.2 | 48.1 | 36.2 | 45.2 | 14.7 | 43.6 | 0.0 | 400.1 |
| 0G3194G1 | Geologic Studies Program Management | 22.9 | 27.8 | 38.5 | 58.0 | 58.3 | 5.4 | 19.3 | 26.6 | 35.3 | 23.3 | 38.0 | 0.0 | 353.4 |
| 0G3194G2 | QA Implementation GSP | 20.5 | 21.3 | 16.2 | 20.9 | 16.1 | 23.1 | 20.4 | 22.5 | 19.3 | 17.9 | 16.3 | 0.0 | 214.5 |
| 0G3194H1 | Hydrology Program Management | 35.2 | 33.3 | 88.0 | 40.2 | 36.3 | -4.5 | 54.3 | 103.5 | 57.0 | 42.8 | 39.0 | 0.0 | 525.1 |
| 0G3194H2 | QA Implementation, Hydrology | 13.0 | 13.5 | 20.5 | 8.6 | 10.8 | 17.4 | 15.2 | 9.6 | 31.7 | 13.5 | 5.0 | 0.0 | 158.8 |
| 0G3194H3 | Computer Operation & Data Mgmt Hydrology | 26.3 | 28.0 | 53.7 | 31.8 | 28.8 | 35.7 | 35.5 | 43.7 | 34.7 | 43.2 | 29.0 | 0.0 | 390.4 |
| 0G3194H4 | Scientific Rpts/Proj Documents Hydrology | 7.1 | 8.4 | 11.6 | 6.1 | 7.1 | 7.1 | 6.5 | 6.9 | 9.3 | 8.4 | 31.4 | 0.0 | 109.9 |
| 1.2.3.1 | | 184.7 | 188.7 | 369.1 | 207.4 | 220.2 | 176.9 | 284.7 | 218.2 | 269.7 | 226.7 | 237.3 | 0.0 | 2583.6 |
| *1.2.3.1 | | 184.7 | 188.7 | 369.1 | 207.4 | 220.2 | 176.9 | 284.7 | 218.2 | 269.7 | 226.7 | 237.3 | 0.0 | 2583.6 |
| 0G32211A94 | Surface/Subsurface Stratigraphic Studies | 52.3 | 61.2 | 82.3 | 77.7 | 75.0 | 128.0 | 87.3 | 49.2 | 136.8 | 135.4 | 47.9 | 0.0 | 933.1 |
| 0G32211B94 | Surface-Based Geophysical Surveys | 0.0 | 0.9 | 1.5 | 53.9 | 26.6 | 23.4 | 15.9 | 0.6 | 9.7 | 13.7 | 6.6 | 0.0 | 152.8 |
| 0G32211C94 | Borehole Geophysical Surveys | 0.0 | 0.0 | 6.4 | 58.9 | 21.4 | 16.8 | -29.4 | -2.0 | 38.0 | -24.2 | 15.7 | 0.0 | 101.6 |
| 1.2.3.2.2.1.1 | | 52.3 | 62.1 | 90.2 | 190.5 | 123.0 | 168.2 | 73.8 | 47.8 | 184.5 | 124.9 | 70.2 | 0.0 | 1187.5 |
| 0G32212A94 | Geologic Mapping of Zonal Features | 61.7 | 83.1 | 80.1 | 77.8 | 64.3 | 79.5 | 54.3 | 87.2 | 73.0 | 55.7 | 55.3 | 0.0 | 772.0 |
| 0G32212B94 | Surface-fracture Network Studies | 0.0 | 0.0 | 13.9 | 0.6 | 21.7 | 1.1 | 6.5 | 6.3 | 4.5 | 6.2 | 0.5 | 0.0 | 61.3 |
| 0G32212D94 | Geologic Mapping of the ES and Drifts | 31.5 | 30.6 | 65.4 | 44.9 | 49.7 | 60.5 | 56.5 | 57.2 | 58.7 | 63.4 | 82.7 | 0.0 | 601.1 |
| 1.2.3.2.2.1.2 | | 93.2 | 113.7 | 159.4 | 123.3 | 135.7 | 141.1 | 117.3 | 150.7 | 136.2 | 125.3 | 138.5 | 0.0 | 1434.4 |
| 0G32531A94 | Tectonic Effects | 4.0 | 2.0 | 7.4 | -3.3 | 0.6 | 3.8 | -0.2 | 0.3 | 5.1 | 3.0 | 6.5 | 0.0 | 29.2 |
| 1.2.3.2.5.3.1 | | 4.0 | 2.0 | 7.4 | -3.3 | 0.6 | 3.8 | -0.2 | 0.3 | 5.1 | 3.0 | 6.5 | 0.0 | 29.2 |
| 0G32552C94 | Heat Flow at Yucca Mountain | 0.0 | 0.0 | 0.0 | 21.9 | 0.0 | 0.0 | 26.1 | 0.0 | 0.4 | 32.8 | 34.0 | 0.0 | 115.2 |
| 1.2.3.2.5.5.2 | | 0.0 | 0.0 | 0.0 | 21.9 | 0.0 | 0.0 | 26.1 | 0.0 | 0.4 | 32.8 | 34.0 | 0.0 | 115.2 |
| 0G32621A94 | Surface Facilities Exploration Program | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.6 | 0.0 | 0.0 | -3.1 | 7.9 | 0.0 | 9.4 |
| 1.2.3.2.6.2.1 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.6 | 0.0 | 0.0 | -3.1 | 7.9 | 0.0 | 9.4 |
| 0G32831A94 | Identify Relevant Earthquake Sources | 4.6 | 9.0 | 10.4 | -5.0 | 4.1 | 14.6 | 6.5 | 15.8 | 10.1 | 11.2 | 0.5 | 0.0 | 81.8 |
| 0G32831B94 | Characterize 10,000-yr Slip Earthquakes | 0.0 | 0.0 | 0.0 | 32.7 | -3.5 | 18.7 | -14.5 | 1.0 | 23.8 | 10.1 | -5.4 | 0.0 | 62.9 |
| 1.2.3.2.8.3.1 | | 4.6 | 9.0 | 10.4 | 27.7 | 0.6 | 33.3 | -8.0 | 16.8 | 33.9 | 21.3 | -4.9 | 0.0 | 144.7 |
| 0G32833A94 | Empirical Earthquake Model | 0.6 | 0.2 | -0.8 | 20.0 | 0.0 | 8.7 | 2.5 | 0.0 | 8.0 | 0.0 | 0.0 | 0.0 | 39.2 |
| 1.2.3.2.8.3.3 | | 0.6 | 0.2 | -0.8 | 20.0 | 0.0 | 8.7 | 2.5 | 0.0 | 8.0 | 0.0 | 0.0 | 0.0 | 39.2 |
| 0G32834A94 | Site Effects from Ground-Motion | 0.0 | 0.0 | 14.5 | 6.2 | -18.4 | 17.7 | 5.0 | 1.5 | 11.7 | 8.9 | 6.7 | 0.0 | 53.8 |
| 1.2.3.2.8.3.4 | | 0.0 | 0.0 | 14.5 | 6.2 | -18.4 | 17.7 | 5.0 | 1.5 | 11.7 | 8.9 | 6.7 | 0.0 | 53.8 |
| 0G32836A94 | Probabilistic Seismic Hazards Analysis | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.5 | 0.0 | 6.5 |
| 1.2.3.2.8.3.6 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.5 | 0.0 | 6.5 |

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| | | OCT EST | NOV EST | DEC EST | JAN EST | FEB EST | MAR EST | APR EST | MAY EST | JUN EST | JUL EST | AUG EST | SEP EST | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0G32841A94 | Compile Historical Earthquake Record | 0.8 | 0.0 | 1.0 | 2.6 | 1.0 | 28.6 | 15.0 | 2.4 | 28.7 | 17.3 | 13.8 | 0.0 | 111.2 |
| 0G32841B94 | Monitor Current Seismicity | 80.0 | 109.8 | 102.8 | 115.5 | 121.3 | 67.2 | 117.6 | 90.8 | 87.1 | 143.2 | 137.4 | 0.0 | 1172.7 |
| 1.2.3.2.8.4.1 | | 80.8 | 109.8 | 103.8 | 118.1 | 122.3 | 95.8 | 132.6 | 93.2 | 115.8 | 160.5 | 151.2 | 0.0 | 1283.9 |
| 0G32842B94 | Conduct Expl. Trenching in Midway Valley | 0.0 | 0.0 | 0.0 | 105.0 | 15.9 | 5.5 | 11.9 | 1.4 | -19.7 | 0.0 | 3.0 | 0.0 | 123.0 |
| 1.2.3.2.8.4.2 | | 0.0 | 0.0 | 0.0 | 105.0 | 15.9 | 5.5 | 11.9 | 1.4 | -19.7 | 0.0 | 3.0 | 0.0 | 123.0 |
| 0G32843B94 | Eval Quaternary faults w/i 100 km of YM | 13.2 | 26.4 | 14.6 | 6.0 | 37.7 | 22.6 | 10.8 | 26.7 | 13.5 | 9.7 | 1.9 | 0.0 | 183.1 |
| 0G32843D94 | Evaluate Bare Mountain Fault Zone | 21.6 | 26.3 | 25.5 | 13.1 | 8.7 | 16.0 | 2.6 | 10.2 | 3.4 | 0.7 | 0.9 | 0.0 | 129.0 |
| 1.2.3.2.8.4.3 | | 34.8 | 52.7 | 40.1 | 19.1 | 46.4 | 38.6 | 13.4 | 36.9 | 16.9 | 10.4 | 2.8 | 0.0 | 312.1 |
| 0G32844A94 | Evaluate the Rock Valley Fault System | 6.9 | 19.4 | 9.8 | 17.5 | -0.4 | -0.9 | 5.1 | 7.1 | 29.6 | 8.9 | 15.9 | 0.0 | 118.9 |
| 0G32844B94 | Evaluate the Mine Mountain Fault System | 0.0 | 6.8 | -6.8 | 1.0 | 0.0 | -1.0 | 4.3 | 1.9 | 2.6 | 3.5 | 1.7 | 0.0 | 14.0 |
| 1.2.3.2.8.4.4 | | 6.9 | 26.2 | 3.0 | 18.5 | -0.4 | -1.9 | 9.4 | 9.0 | 32.2 | 12.4 | 17.6 | 0.0 | 132.9 |
| 0G32845B94 | Evaluate Postulated Detachment Faults | 3.4 | 2.2 | 13.1 | 30.9 | -12.8 | 12.2 | 9.5 | 12.7 | 14.5 | 43.8 | 1.9 | 0.0 | 131.4 |
| 0G32845C94 | Evaluate Potential Relationship of Brecc | 0.0 | 0.0 | 2.6 | 0.8 | 5.7 | 1.3 | 0.8 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 11.5 |
| 0G32845D94 | Evaluate Postulated Detachment Faults | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.3 | 1.1 | 4.4 | 0.2 | 5.8 | 0.0 | 12.0 |
| 0G32845E94 | Eval Age of Detachment Faults - Radiomet | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.6 | 6.7 | 14.0 | -2.2 | 2.8 | 0.0 | 24.9 |
| 1.2.3.2.8.4.5 | | 3.4 | 2.2 | 15.7 | 31.7 | -7.1 | 13.7 | 14.2 | 20.6 | 32.9 | 41.9 | 10.6 | 0.0 | 179.8 |
| 0G32846B94 | Evaluate Age and Recurrence of Movement | 21.1 | 3.2 | 47.9 | 26.9 | 49.5 | 40.5 | 26.9 | 101.9 | 31.6 | 27.6 | 83.3 | 0.0 | 460.4 |
| 1.2.3.2.8.4.6 | | 21.1 | 3.2 | 47.9 | 26.9 | 49.5 | 40.5 | 26.9 | 101.9 | 31.6 | 27.6 | 83.3 | 0.0 | 460.4 |
| 0G3284AA94 | Relevel Base-Station Network, YM | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 2.0 | 15.0 | 13.0 | -15.6 | 0.0 | 17.4 |
| 1.2.3.2.8.4.10 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 2.0 | 15.0 | 13.0 | -15.6 | 0.0 | 17.4 |
| 0G3284CA94 | Eval Tectonic Process/Stability at Site | 0.0 | 0.0 | 2.2 | 10.1 | 15.6 | 6.4 | -14.7 | -7.7 | 2.0 | 0.5 | 2.7 | 0.0 | 17.1 |
| 0G3284CB94 | Evaluate Tectonic Models | 0.0 | 0.6 | 1.7 | -1.3 | 5.8 | 29.2 | 24.2 | 26.3 | 17.6 | 17.6 | 29.7 | 0.0 | 151.4 |
| 1.2.3.2.8.4.12 | | 0.0 | 0.6 | 3.9 | 8.8 | 21.4 | 35.6 | 9.5 | 18.6 | 19.6 | 18.1 | 32.4 | 0.0 | 168.5 |
| *1.2.3.2 | | 301.7 | 381.7 | 495.5 | 714.4 | 489.5 | 600.6 | 442.0 | 500.7 | 624.1 | 597.0 | 550.7 | 0.0 | 5697.9 |
| 0G33111A94 | Precipitation/Meteorological Monitoring | 10.7 | 12.7 | 24.7 | 12.7 | 7.0 | 18.7 | 23.5 | 36.5 | 11.6 | 38.5 | 3.4 | 0.0 | 200.0 |
| 1.2.3.3.1.1.1 | | 10.7 | 12.7 | 24.7 | 12.7 | 7.0 | 18.7 | 23.5 | 36.5 | 11.6 | 38.5 | 3.4 | 0.0 | 200.0 |
| 0G33112A94 | Surface-Water Runoff Monitoring | 25.3 | 33.2 | 37.2 | 33.8 | 32.0 | 24.6 | 21.8 | 20.7 | 103.7 | -33.5 | 74.1 | 0.0 | 372.9 |
| 1.2.3.3.1.1.2 | | 25.3 | 33.2 | 37.2 | 33.8 | 32.0 | 24.6 | 21.8 | 20.7 | 103.7 | -33.5 | 74.1 | 0.0 | 372.9 |
| 0G33113B94 | Regional Potentiometric Level Distributi | 5.4 | 6.7 | 4.1 | 7.9 | 4.0 | 3.0 | 3.9 | 4.2 | 8.9 | 2.2 | 5.7 | 0.0 | 56.0 |
| 0G33113C94 | Fortymile Wash Recharge Study | 5.6 | 5.2 | 8.7 | 3.4 | 5.7 | 6.0 | 5.6 | 5.7 | 5.8 | 6.7 | 6.5 | 0.0 | 64.9 |
| 1.2.3.3.1.1.3 | | 11.0 | 11.9 | 12.8 | 11.3 | 9.7 | 9.0 | 9.5 | 9.9 | 14.7 | 8.9 | 12.2 | 0.0 | 120.9 |
| 0G33114B94 | Subregional Two-Dimensional Areal Hydrol | 0.0 | 0.0 | 0.0 | 1.8 | 1.5 | 6.0 | 5.6 | 3.4 | -0.4 | 5.1 | 2.2 | 0.0 | 25.2 |
| 0G33114D94 | Regional 3-D Hydrology Modeling | 3.9 | 5.3 | 10.6 | 7.3 | 6.5 | 6.4 | 8.1 | 9.3 | 30.1 | 27.3 | 11.9 | 0.0 | 126.7 |
| 1.2.3.3.1.1.4 | | 3.9 | 5.3 | 10.6 | 9.1 | 8.0 | 12.4 | 13.7 | 12.7 | 29.7 | 32.4 | 14.1 | 0.0 | 151.9 |
| 0G33121A94 | Char Hydr Prop of Surficial Material | 25.7 | 28.0 | 20.0 | 20.5 | 9.7 | 21.4 | 24.5 | 10.6 | 36.4 | 39.9 | 12.4 | 0.0 | 249.1 |
| 0G33121B94 | Evaluation of Natural Infiltration | 5.1 | 49.7 | 52.5 | 19.2 | 26.3 | 51.5 | 40.6 | 28.6 | 27.0 | 60.8 | 8.2 | 0.0 | 369.5 |
| 0G33121C94 | Evaluation of Artificial Infiltration | 0.0 | 0.0 | 12.0 | 13.3 | 12.9 | 10.0 | 42.7 | 17.7 | 10.7 | 69.4 | -1.3 | 0.0 | 187.4 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.2.3.3.1.2.1 | 30.8 | 77.7 | 84.5 | 53.0 | 48.9 | 82.9 | 107.8 | 56.9 | 74.1 | 170.1 | 19.3 | 0.0 | 806.0 |
| 0G33123A94 Matrix Hydrologic-Properties Testing | 13.1 | 29.9 | 38.7 | 59.0 | -29.3 | 41.3 | 43.4 | 23.0 | 17.5 | 42.7 | 24.7 | 0.0 | 304.0 |
| 0G33123B94 Surface-Based Borehole Studies | 57.7 | 59.1 | 101.8 | 143.7 | 78.0 | 152.1 | 223.2 | 201.0 | 198.5 | 94.6 | 81.9 | 0.0 | 1391.6 |
| 0G33123C94 Vertical Seismic Profiling | 5.7 | 12.9 | 38.6 | -1.5 | 11.7 | 20.8 | 27.0 | 17.9 | 32.8 | 44.9 | 7.5 | 0.0 | 218.3 |
| 0G33123D94 Integrated Data Acquisition System | 24.3 | 26.8 | 27.1 | 19.7 | 38.3 | 24.3 | 28.4 | 35.8 | 13.1 | 24.6 | 29.4 | 0.0 | 291.8 |
| 0G33123E94 Air-Permeability/Gaseous-Tracer Testing | 16.8 | 19.7 | 22.4 | 28.9 | 60.0 | 27.1 | 52.0 | 9.8 | 29.6 | 28.3 | 8.4 | 0.0 | 303.0 |
| 0G33123F94 USW UZ-14 Support | 33.8 | 12.6 | 20.7 | 4.6 | 13.3 | 27.2 | 37.1 | 37.7 | 27.6 | 23.0 | -6.6 | 0.0 | 231.0 |
| 1.2.3.3.1.2.3 | 151.4 | 161.0 | 249.3 | 254.4 | 172.0 | 292.8 | 411.1 | 325.2 | 319.1 | 258.1 | 145.3 | 0.0 | 2739.7 |
| 0G33124A94 Prototype Testing of Intact Fractures | 22.0 | 32.4 | 36.7 | 37.3 | 27.8 | 37.8 | 45.5 | 40.5 | 31.3 | 73.3 | 21.8 | 0.0 | 406.4 |
| 0G33124B94 Prototype Infiltration Testing | 9.3 | 14.6 | 19.8 | 12.2 | 8.7 | 10.1 | 12.4 | 7.1 | 12.5 | 18.3 | 3.2 | 0.0 | 128.2 |
| 0G33124D94 Radial Borehole Testing | 0.0 | 0.0 | 8.6 | 32.0 | 40.6 | 23.0 | 114.1 | 46.6 | 26.9 | 92.6 | 1.0 | 0.0 | 385.4 |
| 0G33124E94 Prototype Excavation Effects Testing | 7.8 | 10.4 | 13.3 | 3.9 | 4.0 | 13.0 | 24.9 | 23.3 | 26.5 | 23.1 | 14.9 | 0.0 | 165.1 |
| 0G33124G94 Prototype Perched-Water Testing | 0.0 | 0.0 | 4.0 | 1.3 | 1.1 | 5.3 | 2.6 | 5.4 | 1.3 | 2.7 | 10.8 | 0.0 | 34.5 |
| 0G33124H94 Hydrochemistry tests in the ESF | 6.0 | 7.7 | 8.7 | 5.7 | 0.5 | 16.5 | 9.9 | 14.4 | 7.6 | 20.5 | 13.9 | 0.0 | 111.4 |
| 0G33124J94 Major Faults in the ESF | 9.8 | 7.4 | 17.7 | -3.0 | -1.6 | 4.7 | -2.4 | 0.0 | 0.0 | 2.9 | 2.8 | 0.0 | 38.3 |
| 1.2.3.3.1.2.4 | 54.9 | 72.5 | 108.8 | 89.4 | 81.1 | 110.4 | 207.0 | 137.3 | 106.1 | 233.4 | 68.4 | 0.0 | 1269.3 |
| 0G33126A94 Gaseous-Phase Circulation Study | 7.8 | 10.5 | 32.4 | 40.7 | 7.1 | 25.5 | 57.0 | -23.3 | 23.9 | 31.3 | 33.5 | 0.0 | 246.4 |
| 1.2.3.3.1.2.6 | 7.8 | 10.5 | 32.4 | 40.7 | 7.1 | 25.5 | 57.0 | -23.3 | 23.9 | 31.3 | 33.5 | 0.0 | 246.4 |
| 0G33127A94 Gaseous-Phase Chemical Investigations | 12.5 | 13.7 | 16.3 | 8.4 | 21.8 | 5.5 | 17.4 | 14.6 | 18.3 | 38.0 | 21.9 | 0.0 | 188.4 |
| 0G33127B94 Aqueous-Phase Chemical Investigations | 9.8 | 7.3 | 16.0 | 15.9 | 11.4 | 27.9 | 12.2 | 20.3 | 16.3 | 13.0 | 47.1 | 0.0 | 197.2 |
| 1.2.3.3.1.2.7 | 22.3 | 21.0 | 32.3 | 24.3 | 33.2 | 33.4 | 29.6 | 34.9 | 34.6 | 51.0 | 69.0 | 0.0 | 385.6 |
| 0G33128A94 Development of Conceptual and Numerical | 0.0 | 0.0 | 0.0 | 14.6 | 11.9 | 10.6 | 10.5 | 12.2 | 8.4 | 13.7 | 10.8 | 0.0 | 92.7 |
| 1.2.3.3.1.2.8 | 0.0 | 0.0 | 0.0 | 14.6 | 11.9 | 10.6 | 10.5 | 12.2 | 8.4 | 13.7 | 10.8 | 0.0 | 92.7 |
| 0G33129A94 Conceptualization of UZ Hydrogeologic Sy | 0.0 | 0.0 | 0.0 | 14.3 | 15.5 | 29.4 | 21.3 | 17.4 | 23.4 | 28.1 | 8.2 | 0.0 | 157.6 |
| 1.2.3.3.1.2.9 | 0.0 | 0.0 | 0.0 | 14.3 | 15.5 | 29.4 | 21.3 | 17.4 | 23.4 | 28.1 | 8.2 | 0.0 | 157.6 |
| 0G33131B94 Site Potentiometric-Level Evaluation | 30.9 | 31.1 | 56.4 | 46.5 | 33.9 | 38.4 | 72.9 | 42.6 | 109.9 | 49.8 | 46.2 | 0.0 | 558.6 |
| 0G33131C94 Anal Single/Mult-Well Hydraulic-Stress | 5.2 | 2.8 | 6.3 | 1.5 | 2.1 | 4.7 | -0.2 | 0.4 | 15.1 | 7.9 | 5.9 | 0.0 | 51.7 |
| 0G33131D94 Multiple-Well Interference Testing | 11.7 | 26.2 | 38.1 | 38.1 | 20.5 | 1.1 | 11.7 | -4.3 | 8.8 | 31.8 | 19.6 | 0.0 | 203.3 |
| 0G33131E94 Testing C-Hole Sites w/ Conserv Tracers | 5.0 | 8.1 | 13.1 | 8.5 | 16.7 | 9.6 | 8.8 | 3.8 | 9.1 | 7.5 | 2.5 | 0.0 | 92.7 |
| 1.2.3.3.1.3.1 | 52.8 | 68.2 | 113.9 | 94.6 | 73.2 | 53.8 | 93.2 | 42.5 | 142.9 | 97.0 | 74.2 | 0.0 | 906.3 |
| 0G33132B94 Hydrochem Char of Water - Upper Part SZ | 4.4 | 9.8 | 14.6 | 8.5 | 10.1 | 19.4 | 6.7 | 3.9 | -4.9 | 11.2 | 8.9 | 0.0 | 92.6 |
| 1.2.3.3.1.3.2 | 4.4 | 9.8 | 14.6 | 8.5 | 10.1 | 19.4 | 6.7 | 3.9 | -4.9 | 11.2 | 8.9 | 0.0 | 92.6 |
| 0G33133A94 Conceptualization of SZ Flow Models | 3.8 | 3.9 | 15.3 | 4.8 | 6.1 | 8.3 | 4.1 | 2.9 | 3.1 | 5.7 | 2.0 | 0.0 | 60.0 |
| 0G33133B94 Development of Fracture-Network Model | 5.3 | 5.8 | -0.1 | -0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 13.6 |
| 1.2.3.3.1.3.3 | 9.1 | 9.7 | 15.2 | 4.4 | 6.1 | 8.3 | 4.1 | 2.9 | 3.1 | 5.7 | 5.0 | 0.0 | 73.6 |
| *1.2.3.3 | 384.4 | 493.5 | 736.3 | 665.1 | 515.8 | 731.2 | 1016.8 | 689.7 | 890.4 | 945.9 | 546.4 | 0.0 | 7615.5 |
| 0G36212B94 Analysis of Stratigraphy - Sedimentology | 11.3 | 12.3 | 21.9 | 13.4 | 15.2 | 16.5 | 13.0 | 26.6 | 16.2 | 74.9 | 7.2 | 0.0 | 228.5 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.2.3.6.2.1.2 | 11.3 | 12.3 | 21.9 | 13.4 | 15.2 | 16.5 | 13.0 | 26.6 | 16.2 | 74.9 | 7.2 | 0.0 | 228.5 |
| 0G36213A94 Analysis of Pack Rat Middens | 0.0 | 0.0 | 36.3 | 1.4 | 4.5 | -3.0 | 0.1 | 2.2 | 4.2 | 30.4 | 2.6 | 0.0 | 78.7 |
| 1.2.3.6.2.1.3 | 0.0 | 0.0 | 36.3 | 1.4 | 4.5 | -3.0 | 0.1 | 2.2 | 4.2 | 30.4 | 2.6 | 0.0 | 78.7 |
| 0G36214B94 | 0.0 | 0.0 | 14.9 | 6.7 | 3.3 | 6.4 | 8.7 | 8.4 | 6.9 | 1.3 | 7.7 | 0.0 | 64.3 |
| 1.2.3.6.2.1.4 | 0.0 | 0.0 | 14.9 | 6.7 | 3.3 | 6.4 | 8.7 | 8.4 | 6.9 | 1.3 | 7.7 | 0.0 | 64.3 |
| 0G36221C94 Evaluation of Past Discharge Areas | 0.0 | 0.0 | 19.0 | 16.4 | 32.2 | 23.4 | 20.4 | 32.8 | 19.2 | 19.4 | 2.5 | 0.0 | 185.3 |
| 0G36221D94 Analog Recharge Sites | 7.6 | 4.4 | 6.8 | 3.6 | 7.9 | 6.2 | 7.2 | 0.0 | 0.0 | 0.4 | -0.1 | 0.0 | 44.0 |
| 0G36221E94 Analog Recharge Sites | 0.0 | 0.0 | 7.5 | -0.2 | 6.4 | 1.1 | 1.6 | 4.9 | 1.7 | 4.8 | 2.5 | 0.0 | 30.3 |
| 0G36221F94 Calcite and Opaline Silica Vein Deposits | 15.6 | 26.6 | 35.6 | 28.7 | 29.0 | 24.3 | 27.0 | 56.8 | 4.5 | 35.4 | 18.2 | 0.0 | 301.7 |
| 1.2.3.6.2.2.1 | 23.2 | 31.0 | 68.9 | 48.5 | 75.5 | 55.0 | 56.2 | 94.5 | 25.4 | 60.0 | 23.1 | 0.0 | 561.3 |
| *1.2.3.6 | 34.5 | 43.3 | 142.0 | 70.0 | 98.5 | 74.9 | 78.0 | 131.7 | 52.7 | 166.6 | 40.6 | 0.0 | 932.8 |
| 0G3721A94 Geochemical Assessment of YM in Relation | 2.3 | 7.7 | 8.1 | 33.6 | 40.3 | 26.3 | 23.3 | 15.0 | 39.8 | 17.8 | 14.4 | 0.0 | 228.6 |
| 1.2.3.7.2.1 | 2.3 | 7.7 | 8.1 | 33.6 | 40.3 | 26.3 | 23.3 | 15.0 | 39.8 | 17.8 | 14.4 | 0.0 | 228.6 |
| *1.2.3.7 | 2.3 | 7.7 | 8.1 | 33.6 | 40.3 | 26.3 | 23.3 | 15.0 | 39.8 | 17.8 | 14.4 | 0.0 | 228.6 |
| **1.2.3 | 907.6 | 1114.9 | 1751.0 | 1690.5 | 1364.3 | 1609.9 | 1844.8 | 1555.3 | 1876.7 | 1954.0 | 1389.4 | 0.0 | 17058.4 |
| 0G52294B1 NRC Interaction Support | 1.8 | 8.5 | 7.1 | 3.6 | 3.1 | 22.3 | 37.4 | 7.8 | 3.0 | 2.0 | -26.5 | 0.0 | 70.1 |
| 0G52294B2 Site Characterization Program | 22.6 | 5.1 | 23.8 | 18.4 | 15.1 | 34.3 | 11.1 | 33.6 | 22.4 | 28.4 | 31.3 | 0.0 | 246.1 |
| 0G52294B3 Study Plan Coordination | 1.0 | 19.7 | -17.1 | 0.1 | 1.0 | 5.9 | 2.0 | 1.5 | 3.3 | 1.4 | 0.0 | 0.0 | 1[illegible].8 |
| 0G52294B4 Technical Status Report | 2.7 | 0.0 | 0.0 | 0.0 | 0.0 | 9.7 | 1.6 | -1.7 | 3.4 | 0.0 | 0.0 | 0.0 | 15.7 |
| 0G52294B5 Issue Resolution | 0.0 | 0.0 | 0.0 | 0.0 | 1.7 | 0.0 | -1.7 | 1.7 | 0.3 | 0.4 | 0.1 | 0.0 | 2.5 |
| 1.2.5.2.2 | 28.1 | 33.3 | 13.8 | 22.1 | 20.9 | 72.2 | 50.4 | 42.9 | 32.4 | 32.2 | 4.9 | 0.0 | 353.2 |
| *1.2.5.2 | 28.1 | 33.3 | 13.8 | 22.1 | 20.9 | 72.2 | 50.4 | 42.9 | 32.4 | 32.2 | 4.9 | 0.0 | 353.2 |
| 0G53594B Technical Data Base Input | 24.2 | 32.2 | 28.8 | 26.1 | 24.3 | 31.0 | 30.1 | 37.0 | 31.2 | 28.8 | 26.4 | 0.0 | 320.1 |
| 0G53594H Technical Data Base Control and Input | 11.1 | 11.9 | 17.3 | 6.0 | 10.0 | 11.4 | 11.9 | 12.8 | 11.8 | 12.1 | 11.8 | 0.0 | 128.1 |
| 1.2.5.3.5 | 35.3 | 44.1 | 46.1 | 32.1 | 34.3 | 42.4 | 42.0 | 49.8 | 43.0 | 40.9 | 38.2 | 0.0 | 448.2 |
| *1.2.5.3 | 35.3 | 44.1 | 46.1 | 32.1 | 34.3 | 42.4 | 42.0 | 49.8 | 43.0 | 40.9 | 38.2 | 0.0 | 448.2 |
| 0G54494H Site Performance Assessment | 10.1 | 11.7 | 25.5 | 10.7 | 11.7 | 8.3 | 8.8 | 13.9 | 15.8 | 24.9 | 3.9 | 0.0 | 145.3 |
| 1.2.5.4.4 | 10.1 | 11.7 | 25.5 | 10.7 | 11.7 | 8.3 | 8.8 | 13.9 | 15.8 | 24.9 | 3.9 | 0.0 | 145.3 |
| *1.2.5.4 | 10.1 | 11.7 | 25.5 | 10.7 | 11.7 | 8.3 | 8.8 | 13.9 | 15.8 | 24.9 | 3.9 | 0.0 | 145.3 |
| **1.2.5 | 73.5 | 89.1 | 85.4 | 64.9 | 66.9 | 122.9 | 101.2 | 106.6 | 91.2 | 98.0 | 47.0 | 0.0 | 946.7 |
| 0G91294B Management and Integration (TPO) | 21.5 | 21.2 | 55.3 | 20.1 | 30.7 | 43.1 | 101.6 | 29.7 | 45.1 | -3.0 | 59.4 | 0.0 | 424.7 |
| 1.2.9.1.2 | 21.5 | 21.2 | 55.3 | 20.1 | 30.7 | 43.1 | 101.6 | 29.7 | 45.1 | -3.0 | 59.4 | 0.0 | 424.7 |
| *1.2.9.1 | 21.5 | 21.2 | 55.3 | 20.1 | 30.7 | 43.1 | 101.6 | 29.7 | 45.1 | -3.0 | 59.4 | 0.0 | 424.7 |
| 0G92294B Project Control | 52.9 | -7.4 | 114.1 | 37.5 | 45.4 | 45.0 | 41.3 | 64.1 | 46.4 | 55.8 | 77.9 | 0.0 | 573.0 |
| 1.2.9.2.2 | 52.9 | -7.4 | 114.1 | 37.5 | 45.4 | 45.0 | 41.3 | 64.1 | 46.4 | 55.8 | 77.9 | 0.0 | 573.0 |
| *1.2.9.2 | 52.9 | -7.4 | 114.1 | 37.5 | 45.4 | 45.0 | 41.3 | 64.1 | 46.4 | 55.8 | 77.9 | 0.0 | 573.0 |
| **1.2.9 | 74.4 | 13.8 | 169.4 | 57.6 | 76.1 | 88.1 | 142.9 | 93.8 | 91.5 | 52.8 | 137.3 | 0.0 | 997.7 |

U.S. GEOLOGICAL SURVEY

ESTIMATED COSTS FOR 10/1/93 - 08/31/94

| | OCT EST | NOV EST | DEC EST | JAN EST | FEB EST | MAR EST | APR EST | MAY EST | JUN EST | JUL EST | AUG EST | SEP EST | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0GB194Q QA-Coordination & Planning | 23.4 | 25.3 | 30.9 | 18.9 | 24.6 | 29.0 | 18.9 | 32.1 | 27.4 | 27.5 | 22.8 | 0.0 | 280.8 |
| 1.2.11.1 | 23.4 | 25.3 | 30.9 | 18.9 | 24.6 | 29.0 | 18.9 | 32.1 | 27.4 | 27.5 | 22.8 | 0.0 | 280.8 |
| *1.2.11.1 | 23.4 | 25.3 | 30.9 | 18.9 | 24.6 | 29.0 | 18.9 | 32.1 | 27.4 | 27.5 | 22.8 | 0.0 | 280.8 |
| 0GB294Q QA-Program Development | 33.4 | 31.3 | 46.5 | 29.9 | 52.8 | 46.4 | 39.3 | 37.8 | 33.1 | 39.8 | 40.1 | 0.0 | 430.4 |
| 1.2.11.2 | 33.4 | 31.3 | 46.5 | 29.9 | 52.8 | 46.4 | 39.3 | 37.8 | 33.1 | 39.8 | 40.1 | 0.0 | 430.4 |
| *1.2.11.2 | 33.4 | 31.3 | 46.5 | 29.9 | 52.8 | 46.4 | 39.3 | 37.8 | 33.1 | 39.8 | 40.1 | 0.0 | 430.4 |
| 0GB3194Q QA Verification-Audits | 60.3 | 50.9 | 60.7 | 48.3 | 48.1 | 68.1 | 61.3 | 55.7 | 73.2 | 64.1 | 68.0 | 0.0 | 658.7 |
| 1.2.11.3.1 | 60.3 | 50.9 | 60.7 | 48.3 | 48.1 | 68.1 | 61.3 | 55.7 | 73.2 | 64.1 | 68.0 | 0.0 | 658.7 |
| 0GB3294Q Quality Assurance Verification - Surveil | 9.1 | 28.9 | 15.2 | 21.5 | 23.7 | 22.1 | 18.7 | 17.7 | 11.4 | -1.7 | 2.1 | 0.0 | 168.7 |
| 1.2.11.3.2 | 9.1 | 28.9 | 15.2 | 21.5 | 23.7 | 22.1 | 18.7 | 17.7 | 11.4 | -1.7 | 2.1 | 0.0 | 168.7 |
| *1.2.11.3 | 69.4 | 79.8 | 75.9 | 69.8 | 71.8 | 90.2 | 80.0 | 73.4 | 84.6 | 62.4 | 70.1 | 0.0 | 827.4 |
| 0GB594B QA-Quality Engineering | 22.2 | 29.5 | 14.8 | 22.2 | 10.5 | 22.1 | 23.1 | 25.2 | 29.0 | 15.1 | 11.2 | 0.0 | 224.9 |
| 1.2.11.5 | 22.2 | 29.5 | 14.8 | 22.2 | 10.5 | 22.1 | 23.1 | 25.2 | 29.0 | 15.1 | 11.2 | 0.0 | 224.9 |
| *1.2.11.5 | 22.2 | 29.5 | 14.8 | 22.2 | 10.5 | 22.1 | 23.1 | 25.2 | 29.0 | 15.1 | 11.2 | 0.0 | 224.9 |
| **1.2.11 | 148.4 | 165.9 | 168.1 | 140.8 | 159.7 | 187.7 | 161.3 | 168.5 | 174.1 | 144.8 | 144.2 | 0.0 | 1763.5 |
| 0GC2294B Local Records Center Operations | 32.8 | 38.3 | 29.5 | 35.5 | 26.7 | 29.3 | 29.9 | 29.3 | 29.7 | 29.1 | 33.3 | 0.0 | 343.4 |
| 1.2.12.2.2 | 32.8 | 38.3 | 29.5 | 35.5 | 26.7 | 29.3 | 29.9 | 29.3 | 29.7 | 29.1 | 33.3 | 0.0 | 343.4 |
| 0GC2394B Participant Records Management | 3.6 | 8.7 | 6.6 | 7.2 | 8.1 | 7.3 | 7.1 | 6.7 | 41.8 | 7.0 | 7.0 | 0.0 | 111.1 |
| 1.2.12.2.3 | 3.6 | 8.7 | 6.6 | 7.2 | 8.1 | 7.3 | 7.1 | 6.7 | 41.8 | 7.0 | 7.0 | 0.0 | 111.1 |
| *1.2.12.2 | 36.4 | 47.0 | 36.1 | 42.7 | 34.8 | 36.6 | 37.0 | 36.0 | 71.5 | 36.1 | 40.3 | 0.0 | 454.5 |
| **1.2.12 | 36.4 | 47.0 | 36.1 | 42.7 | 34.8 | 36.6 | 37.0 | 36.0 | 71.5 | 36.1 | 40.3 | 0.0 | 454.5 |
| 0GD2594B Occupational Safety and Health | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 13.4 | 6.6 | 6.8 | 8.9 | 0.0 | 35.7 |
| 1.2.13.2.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 13.4 | 6.6 | 6.8 | 8.9 | 0.0 | 35.7 |
| *1.2.13.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 13.4 | 6.6 | 6.8 | 8.9 | 0.0 | 35.7 |
| 0GD4794H Water Resources | 32.9 | 27.8 | 32.9 | 29.7 | 32.4 | 32.7 | 27.8 | 32.1 | 65.5 | 53.1 | 27.8 | 0.0 | 394.7 |
| 1.2.13.4.7 | 32.9 | 27.8 | 32.9 | 29.7 | 32.4 | 32.7 | 27.8 | 32.1 | 65.5 | 53.1 | 27.8 | 0.0 | 394.7 |
| *1.2.13.4 | 32.9 | 27.8 | 32.9 | 29.7 | 32.4 | 32.7 | 27.8 | 32.1 | 65.5 | 53.1 | 27.8 | 0.0 | 394.7 |
| **1.2.13 | 32.9 | 27.8 | 32.9 | 29.7 | 32.4 | 32.7 | 27.8 | 45.5 | 72.1 | 59.9 | 36.7 | 0.0 | 430.4 |
| 0GF394B Training | 19.6 | 22.3 | 13.9 | 20.9 | 21.2 | 23.5 | 23.4 | 22.2 | 24.1 | 46.6 | 18.5 | 0.0 | 256.2 |
| 1.2.15.3 | 19.6 | 22.3 | 13.9 | 20.9 | 21.2 | 23.5 | 23.4 | 22.2 | 24.1 | 46.6 | 18.5 | 0.0 | 256.2 |
| *1.2.15.3 | 19.6 | 22.3 | 13.9 | 20.9 | 21.2 | 23.5 | 23.4 | 22.2 | 24.1 | 46.6 | 18.5 | 0.0 | 256.2 |
| **1.2.15 | 19.6 | 22.3 | 13.9 | 20.9 | 21.2 | 23.5 | 23.4 | 22.2 | 24.1 | 46.6 | 18.5 | 0.0 | 256.2 |
| 1.2 OPERATING | 1293.4 | 1482.3 | 2266.0 | 2048.4 | 1762.4 | 2106.5 | 2345.6 | 2033.9 | 2412.4 | 2397.7 | 1820.1 | 0.0 | 21968.7 |
| CAPITAL EQUIPMENT | 0.0 | 0.0 | 0.0 | 31.7 | 22.6 | 0.0 | 0.5 | 32.2 | 143.4 | -1.2 | 10.2 | 0.0 | 239.4 |
| GRAND TOTAL | 1293.4 | 1482.3 | 2266.0 | 2080.1 | 1785.0 | 2106.5 | 2346.1 | 2066.1 | 2555.8 | 2396.5 | 1830.3 | 0.0 | 22208.1 |
| FTEs | | | | | | | | | | | | | |
| FEDERAL | 87.2 | 91.5 | 89.4 | 108.4 | 135.5 | 134.3 | 118.2 | 111.5 | 120.2 | 101.8 | 117.9 | 0.0 | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CONTRACT | 55.4 | 89.0 | 82.4 | 97.7 | 89.3 | 101.1 | 100.6 | 107.0 | 105.5 | 99.4 | 107.9 | 0.0 |
| TOTAL | 142.6 | 180.5 | 171.8 | 206.1 | 224.8 | 235.4 | 218.8 | 218.5 | 225.7 | 201.2 | 225.8 | 0.0 |

* Fourth level WBS roll-up

** Third level WBS roll-up

**Yucca Mountain Site Characterization Project**
**Variance Analysis Report**
**Status Thru: August 31, 1994**

PARTICIPANT: USGS PEM: TYNAN WBS: 1.2.3.2.2.1.1

WBS TITLE: Vertical and Lateral Distribution of Stratigraphic Units in the Site Area

P&S ACCOUNT: OG32211

| FY 1994 Cumulative to Date | | | | | | | | | FY 1994 at Completion | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BCWS | BCWP | ACWP | SV | SV% | SPI | CV | CV% | CPI | BAC | EAC | VAC | VAC% | IEAC | ICPI |
| 1315 | 1287 | 1190 | -28 | -2.1 | 97.9 | 97 | 7.5 | 108.2 | 1420 | 2227 | -807 | -56.8 | 1312 | 12.8 |

## Analysis

Cumulative Cost Variance:

Not Applicable

Cumulative Schedule Variance:

Not Applicable

Variance At Complete:

Cause:

The variance at complete is due to the estimate to complete being modified to reflect additional scope/budget associated with running the seismic line. This EAC represents the actual cost incurred to award the acquisition portion of the seismic contract this fiscal year. The contract was awarded this FY at DOE direction using compensating underrun funds within this third level WBS element.

Impact:

This P&S account will overrun the planned budget due to award of the processing portion of the seismic contract. This was done at DOE direction.

Corrective Action:

None required. Funds are available within in this third level WBS due to underruns, primarily in the Hydrology Program due to delays in ESF, etc.

P&S ACCOUNT MANAGER DATE TPO DATE

# Yucca Mountain Site Characterization Project
## Variance Analysis Report
## Status Thru: August 31, 1994

PARTICIPANT: USGS    PEM: SULLIVAN    WBS: 1.2.3.2.8.4.6

WBS TITLE: Quaternary Faulting Within the Site Area

P&S ACCOUNT: OG32846

| FY 1994 Cumulative to Date | | | | | | | | | FY 1994 at Completion | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BCWS | BCWP | ACWP | SV | SV% | SPI | CV | CV% | CPI | BAC | EAC | VAC | VAC% | IEAC | TCPI |
| 411 | 340 | 461 | -71 | -17.3 | 82.7 | -121 | -35.6 | 73.8 | 430 | 478 | -48 | -11.2 | 583 | 529.4 |

Analysis

Cumulative Cost Variance:

Cause:

The cumulative cost variance is due to the need to hire a contract draftsperson to create final trench logs, which was not planned in the original budget. Also, in order to support final reports due in FY1995, a new initiative was undertaken to improve dates in fault trenches. Uranium series and thermoluminescence methods are being used to complete paleoseismic histories on the Windy Wash, Solitario Canyon, Fatigue Wash, and Paintbrush Canyon Faults. Deposits in stratigraphically important trenches also are being dated to facilitate correlation of units between trenches. This work was initiated at DOE request.

Impact:

This P&S account will overrun the planned budget due to additional work being undertaken.

Corrective Action:

None required. Funds are available within the geology program to cover this cost overrun. Use of underrun funds from other WBS elements was at DOE request.

Cumulative Schedule Variance:

Not Applicable

Variance At Complete:

Not Applicable

| | | | |
|---|---|---|---|
| P&S ACCOUNT MANAGER | DATE | TPO | DATE |

**Yucca Mountain Site Characterization Project**
**Variance Analysis Report**
**Status Thru: August 31, 1994**

PARTICIPANT: USGS PEM: PATTERSON WBS: 1.2.3.3.1.2.3

WBS TITLE: Percolation in the Unsaturated Zone - Surface-Based Study

P&S ACCOUNT: OG33123

| FY 1994 Cumulative to Date | | | | | | | | | FY 1994 at Completion | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BCWS | BCWP | ACWP | SV | SV% | SPI | CV | CV% | CPI | BAC | EAC | VAC | VAC% | IEAC | ICPI |
| 2758 | 1859 | 2760 | -899 | -32.6 | 67.4 | -901.0 | -48.5 | 67.4 | 3134 | 3046 | 88 | 2.8 | 4650 | 445.8 |

## Analysis

### Cumulative Cost Variance:

Cause:

All of the negative cost variance (indicating an overspent condition) is due to the behind-schedule condition. Other factors, which earlier in the year contributed to a cost variance beyond that due to the schedule variance, have now equilibrated with the baseline schedule.

Impact:

The P&S account will not be overspent at the end of FY1994 because the behind-schedule tasks cannot be completed by the end of FY1994 and funds associated with these tasks will not be spent. The variance at completion indicates that the P&S account will underspend by $88K. the projected underrun is associated primarily with the USW UZ-14 Support account.

Corrective Action:

None possible.

### Cumulative Schedule Variance:

Cause:

Several tasks involving testing, hydrologic instrumentation, and monitoring in recently drilled boreholes have been delayed as indicated below. These delays are all related to unexpected conditions encountered in the boreholes and the unavailability of drilling/workover crews, and are beyond the control of the USGS.

1) Both air-permeability testing and instrumentation of NRG-6 and NRG-7a have been delayed 3 to 6 months because of delays in drilling and necessary rework of these holes to prepare them for testing and instrumentation.

2) Geophone instrumentation of UZ-16 and the vertical seismic profiling production survey was delayed about 3.5 months due to the unavailability of a drilling/support crew. Time required for RSN to award a VSP data-acquisition contract has the potential to delay the production survey by another 3 months.

3) Tasks scheduled for UZ-14 are behind schedule 3 to 10 months because of the delay in completion of drilling of USW UZ-14 due to the perched water encountered therein. UZ-14 tasks behind schedule include geophysical logging, preliminary hydrogeologic analysis and fracture logging, gas sampling, preparation of data report, gas-phase testing, extraction and analysis of pore water, review of gas and water-vapor data, and air-permeability testing.

Impact:

1) The delay in instrumentation of NRG-6 will reduce the pre-TBM-excavation monitoring period for this borehole by about 5 months.

2) Delay of VSP survey of UZ-16 is acceptable because no near-term, high-priority YMP initiatives are impacted.

3) Although the overall YMP site-characterization schedule is impacted by delays at UZ-14, the delays are acceptable because no near-term, high-priority YMP initiatives are impacted.

Corrective Action:

1) USGS and DOE staff are working hard to maximize the scope and duration of pneumatic-pathways monitoring prior to excavation of the ESF north ramp by the TBM. To support this effort, USGS has agreed to change the priority order of borehole instrumentation so that two other boreholes can be instrumented in the near term in addition to NRG-6. Accordingly, NRG-7a will be instrumented instead of UZ-7, and SD-9 will be instrumented instead of SD-12. Individual task titles and work scopes have been revised in PACS to reflect these critical shifts in borehole-instrumentation priorities. In addition, because of continuing access problems in hole NRG-6, air-permeability testing of NRG-7a will be performed first, and was started during July.

2) USGS will continue to work closely with RSN staff to minimize the delay in award of the VSP data-acquisition contract.

3) Most remaining work in UZ-14 has been put on hold until FY 95 in order to support DOE's initiative to obtain pre-ESF-north-ramp-construction data from NRG and SD boreholes.

Variance At Complete:

Not Applicable

| P&S ACCOUNT MANAGER | DATE | TPO | DATE |
|---|---|---|---|

# Yucca Mountain Site Characterization Project
# Variance Analysis Report
# Status Thru: August 31, 1994

PARTICIPANT: USGS PEM: PATTERSON WBS: 1.2.3.3.1.2.4

WBS TITLE: Percolation in the Unsaturated Zone - ESF Study

P&S ACCOUNT: OG33124

| FY 1994 Cumulative to Date | | | | | | | | | FY 1994 at Completion | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BCWS | BCWP | ACWP | SV | SV% | SPI | CV | CV% | CPI | BAC | EAC | VAC | VAC% | IEAC | TCPI |
| 1657 | 1329 | 1286 | -328 | -19.8 | 80.2 | 43.0 | 3.2 | 103.3 | 2103 | 1791 | 312 | 14.8 | 2036 | 153.3 |

## Analysis

Cumulative Cost Variance:

Not Applicable

Cumulative Schedule Variance:

Cause:

Schedule variance is due to 1) 2-month delay in the conduct of single-hole air-permeability tests in the first Radial Boreholes alcove because of a drill rig blocking access to the boreholes, unavailability of required power and compressed air, lack of access to the alcove because of TBM construction, and temporary disconnection of the alcove ventilation system; 2) 2-month delay in design, construction, and testing of anisotropy borehole packer system, and 3) 7-month delay in extraction of pore water from ESF drill cores for the Hydrochemistry test because of delay in drilling of the radial boreholes and unavailability of equipment to squeeze cores; and 3) delay in procurement of capital equipment (high-pressure cell) for the prototype Intact Fracture test.

Impact:

ESF Radial Boreholes and Hydrochemistry tests are running behind schedule, but the delays are consistent with overall delays in the ESF schedule. The delays described are not controllable by the USGS.

Corrective Action:

Communicate problems to the ESF Testing Coordinator and request assistance with resolution.

Variance at Complete:

Cause:

Variance results from 1) yet to be billed charges for hydrochemical analyses from flow experiments conducted for the prototype intact fracture and percolation tests; 2) the cancellation of award of a contract to the U.S. Bureau of Mines for installation of pressure cells for the excavation effects test; and 3) unspent funds budgeted for chemical analysis of samples as part of the perched water and hydrochemistry tests.

Impact:

This P&S account probably will be underspent by about $250K at the end of FY 94. Major sources of the underrun include 1) delay to FY 95 of the award of a contract ($165 K) to the U.S. Bureau of Mines for installation of pressure cells for the Excavation Effects test and 2) unspent funds budgeted for equipment and chemical analysis of samples for the Perched Water and Hydrochemistry tests ($85K).

Corrective Action:

USGS already has identified potential FY 94 underrun to the YMSCO. Some funds already have been reprogrammed to other high-priority needs per direction from YMSCO.

| P&S ACCOUNT MANAGER | DATE | TPO | DATE |
|---|---|---|---|

# Yucca Mountain Site Characterization Project
# Variance Analysis Report
# Status Thru: August 31, 1994

PARTICIPANT: USGS PEM: PATTERSON WBS: 1.2.3.3.1.3.3

WBS TITLE: Saturated Zone Hydro. Sys. Synthesis and Modeling

P&S ACCOUNT: OG33133

| FY 1994 Cumulative to Date | | | | | | | | | FY 1994 at Completion | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BCWS | BCWP | ACWP | SV | SV% | SPI | CV | CV% | CPI | BAC | EAC | VAC | VAC% | IEAC | ICPI |
| 200 | 216 | 74 | 16 | 8.0 | 108.0 | 142 | 65.7 | 291.9 | 225 | 107 | 118 | 52.4 | 77 | 27.3 |

## Analysis

### Cumulative Cost Variance:

Cause:

The positive cost variance (indicating an underspent condition) is because the work for the Fracture-Network Modeling summary account is being accomplished by a former USGS employee on disability retirement who is continuing to work part time as a volunteer. This is why the summary account has accrued no costs since November 1993 and yet remains only slightly behind schedule.

Impact:

Budgeted funds are not being spent at the rate originally anticipated.

Corrective Action:

See "variance at completion."

### Cumulative Schedule Variance:

Not Applicable.

### Variance At Complete:

Cause:

See "cumulative cost variance."

Impact:

The P&S account probably will underrun by about $120 K by the end of FY 94 because no additional staff will be brought on board until FY 95. There are no programmatic impacts because work is still on schedule.

Corrective Action:

Some of the unspent funds are being reserved to support analytical-element modeling analysis of boundary conditions for a site-scale saturated-zone flow model. The remaining unspent funds will be made available for reprogramming to other high-priority YMP work.

| | | | |
|---|---|---|---|
| **P&S ACCOUNT MANAGER** | **DATE** | **TPO** | **DATE** |

# Yucca Mountain Site Characterization Project
## Variance Analysis Report
## Status Thru: August 31, 1994

PARTICIPANT: USGS PEM: SPENCE WBS: 1.2.11.3.1

WBS TITLE: Quality Assurance Verification - Audits

P&S ACCOUNT: OGB31

| FY 1994 Cumulative to Date | | | | | | | | | FY 1994 at Completion | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BCWS | BCWP | ACWP | SV | SV% | SPI | CV | CV% | CPI | BAC | EAC | VAC | VAC% | IEAC | ICPI |
| 586 | 586 | 659 | 0 | 0.0 | 100.0 | -73 | -12.5 | 88.9 | 640 | 707 | -67 | -10.5 | 720 | 112.5 |

### Analysis

**Cumulative Cost Variance:**

**Cumulative Schedule Variance:**

**Variance At Complete:**

Cause:
The projected variance at completion is primarily due to increased travel costs associated with both vendor audits and audits of USGS field activities. In addition, the budget reflected a planned decrease in contractor overhead costs which was to occur in June as a result of relocating personnel. The planned relocation did not occur until September.

Impact:
This P&S account will overrun the planned budget. However, this will be balanced by underruns in 1.2.11.1 and 1.2.11.2 resulting from decreased travel costs in these accounts. Also, money was reserved in these accounts to pay costs of moving QA offices due to a mandatory relocation of USGS offices. These costs were less than anticipated.

Corrective Action:
None required. The USGS will not overrun the total Quality Assurance budget. All projected overruns will be offset by underruns.

P&S ACCOUNT MANAGER DATE TPO DATE