dw3/disk13/nnwsirpt.157/BROWNING/LV

See Packet 12 for encl.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

WM DOCKET CONTROL CENTER

'86 NOV 18 A10:55

Reply to:
1050 East Flamingo Rd.
Suite 319
Las Vegas, Nevada 89119
Tel: (702) 388-6125
FTS: 598-6125

TO: Mr. Robert E. Browning, Director
Division of Waste Management

FROM: Paul T. Prestholt, Sr. On-Site Licensing Representative

DATE: November 14, 1986

SUBJECT: NNWSI PROJECT MONTHLY REPORT FOR SEPTEMBER 1986

Please find enclosed the above-referenced Report.

PTP:nan

cc: J. J. Linehan, w/enc.
K. Stablein, w/enc.
S. Wastler, w/enc.

[redacted]
8703 0045(F) H

WM Record File
WM Record 102

WM Project 11
Docket No.
PDR ✓
LPDR ✓

Distribution:
REB MJB
NSkill
(Return to WM, 623-SS)
X Linehan
X Stablein
X Wastler Sac

8612020146 861114
PDR WASTE
WM-11 PDR

1195

102

Encl. to memo to RRB for Prestholt 11/14/86

Department of Energy
Nevada Operations Office
P. O. Box 14100
Las Vegas, NV 89114-4100

NOV 10 1986

Stephen H. Kale, Associate Director, Office of Geologic Repositories, DOE/HQ (RW-20), FORS

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS (NNWSI) PROJECT MONTHLY REPORT FOR SEPTEMBER 1986

Enclosed is the NNWSI Project Monthly Report for September 1986 covering the technical activities and status of the NNWSI Project.

Donald L. Vieth, Director
Waste Management Project Office

WMPO:WRD-304

Enclosure:
NNWSI Project Monthly Report

U.S. DEPARTMENT OF ENERGY

OCRWM OGR

Nevada Nuclear Waste Storage Investigations PROJECT

YUCCA MOUNTAIN

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS PROJECT

MONTHLY REPORT

SEPTEMBER 1986

UNITED STATES DEPARTMENT OF ENERGY

NEVADA OPERATIONS OFFICE

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS PROJECT

MONTHLY REPORT

SEPTEMBER 1986

Prepared by Nevada Nuclear Waste Storage Investigations (NNWSI) Project participants as part of the Civilian Radioactive Waste Management Program. The NNWSI Project is managed by the Waste Management Project Office of the U.S. Department of Energy (DOE), Nevada Operations Office. NNWSI Project work is sponsored by the DOE Office of Civilian Radioactive Waste Management.

UNITED STATES DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE

TABLE OF CONTENTS

ABSTRACT

KEY ACTIVITIES

WBS 1.2.1 Systems

Based on results of a comparative analysis reconciliating meeting between the U.S. Department of Energy/Headquarters (DOE/HQ) and the three repository projects, resolution of a number of issues among the three DOE nuclear waste storage projects will affect Site Characterization Plan Conceptual Design Report cost estimates. The Nevada Nuclear Waste Storage Investigations (NNWSI) Project budget and cost plans for fiscal year 1987 were baselined at $147M. The Sandia National Laboratories (SNL) work plan for flow and radionuclide transport was approved by the DOE Waste Management Project Office (WMPO) and Level III activities have resumed. The draft letter report (SNL Milestone M870) describing the annual Performance Assessment Scientific Support interactions with Battelle Pacific Northwest Laboratories was submitted to WMPO.

WBS 1.2.2 Waste Package

Two Science Applications International Corporation milestones for the copper-based waste package were met by delivery of the "Fuel Report to Congress on the Feasibility of Copper-Based Waste Package" and the "Final Report on Feasibility Assessment of Copper-Based Waste Package" to the DOE Office of Geologic Repositories.

WBS 1.2.3 Site Investigations

The stop-work order for USGS remained in effect and almost all site characterization technical activities continued to be suspended. At Los Alamos National Laboratory (Los Alamos), the stop-work order for preclosure hazards of volcanism has been lifted, allowing the studies to resume. Work at Los Alamos on ground-water chemistry was placed on hold because of the anticipated budget reduction. WMPO approved the Los Alamos scientific investigation planning documentation for the following tasks: natural isotope chemistry, hydrothermal geochemistry, solubility determination, retardation sensitivity analysis, and sorption and precipitation, allowing work in these areas to resume. SAIC Milestone E459, the transportation tracking system, describes the need, basis, and implementation of an automated system for tracking transportation documents and was sent to WMPO for review. A topical report on population density for transportation risk calculations (SAIC Milestone E464), submitted to WMPO, documents the methodology used by the NNWSI Project in the final Environmental Assessment to estimate population density along Nevada transportation routes. The Preliminary Site Characterization Radiological Monitoring Plan was sent to WMPO for approval and the working draft of the Socioeconomic Monitoring and Mitigation Plan was submitted to DOE/HQ for review. Community services reports for Nye and Clark counties were sent to the printers and the final attitudes report was sent to WMPO for policy review.

WBS 1.2.4 Repository Investigations

Preparation of chapters of the SCP continued to require major efforts. SNL quality assurance level assignments were approved for pressurized slot testing. The document "Effects of Sample Size on the Mechanical Properties of Topopah Spring Tuff" (SAND85-0709) was published and the report "A Continuum Model for Water Movement in a Fractured Rock Mass" (SAND86-0517J) was sent to WMPO for approval. WMPO approved a conference paper, "Influence of Transverse Microfractures on the Imbibition of Water into Initially Dry Tuffaceous Rock" (SAND86-0420C) for presentation at the next American Geophysical Union meeting. SNL Milestone M295 was met when the report "An Assessment of the Feasibility of Disposing of Nuclear Waste in a Horizontal Configuration" was delivered to WMPO.

WBS 1.2.5 Regulatory and Institutional Investigations

The proposed schedule for NNWSI Project and NRC interactions was finalized and transmitted to DOE/HQ for approval. DOE/HQ requested that ground rules for these meetings be established before they take place. A Licensing Support System (LSS) Task Group was formed by DOE/HQ to develop conceptual architecture for the system. Until this concept is developed further, procurement of the Information Management Bridge Program equipment is on hold. The Permanent Internal Review Committees (PIRCs) continue to review and revise sections of the SCP. Project comments on the draft NRC generic technical positions (GTPs) for Q-list methodology, ground-water travel time, and the definition of the disturbed zone are being prepared. A revised draft discussion paper on the repository area designations, boundaries, and dose limits was transmitted to WMPO. Seven revised NNWSI Project Administrative Procedures that incorporate TPO and WMPO comments are in final review. The EA Administrative Record was reviewed for completeness, updated, and submitted to WMPO. Activities in this cost account ended September 30, 1986.

WBS 1.2.6 Exploratory Shaft Investigations

A revised draft of Appendix B to the Exploratory Shaft Facility Subsystems Design Requirements document was sent to the Principal Investigators for their review. Revised quality assurance level assignments for the ESF management, planning, and design review tasks were submitted to WMPO. The estimate for the cost of prototype testing, including both construction support of prototype testing and the actual prototype testing, was submitted to WMPO. Plans for future prototype testing were made at the Exploratory Shaft Test Plan Committee meeting. Quality assurance level assignments for the exploratory shaft test plan (ESTP) have been approved. Development of the ESTP is a QA Level III activity. An invited talk titled "In Situ Geochemical Measurements in the Exploratory Shaft at Yucca Mountain" was given at the National American Chemical Society symposium on Geochemical Analysis of Radioactive Waste Disposal. The final draft of the integrated data system requirements document is being prepared for submittal to WMPO.

WBS 1.2.7 Test Facilities

Comments on the G-Tunnel Prototype Testing Plan were forwarded to WMPO. The volume reduction equipment was delivered to E-MAD and is being setup for operation. Review and verification of E-MAD quality records was completed. Radiation sources not needed to continue with future programs were disposed of under direction from WMPO. The final Survey Report of Area Contamination was completed.

WBS 1.2.9 Project Management

The draft NNWSI Project Management Plan (PMP) is in WMPO review. The Exploratory Shaft Facility (ESF) design study work plans were submitted to WMPO. The installation of the Quality Assurance Records Management System is completed throughout the Project (Milestone M757) and maintenance responsibility was turned over to SAIC. The REECO Records Management Handbook is at WMPO and SAIC for review and approval. USGS working copies for the scientific investigation planning (SIP) documentation for all investigations identified in the SCP should be distributed by the end of October. Four budget scenarios consisted of a tabulation of activities according to levels of effort and were used to analyze the effects on site characterization for FY 87. Six of the 17 sections of the SNL Quality Assurance Program Plan (QAPP) were submitted to WMPO for approval. The WMPO approval quality assurance level assignments for 46 of the 53 SNL WBS elements and seven Los Alamos SIP documentations and quality assurance level assignments. Of the 22 USGS responses to the audit findings, 15 were accepted. Nine Los Alamos SIP documentations and quality assurance level assignments were approved. The FY 86 QA audit program and the FY 86 surveillance program were completed. An internal audit of the WMPO QAPP implementation was performed.

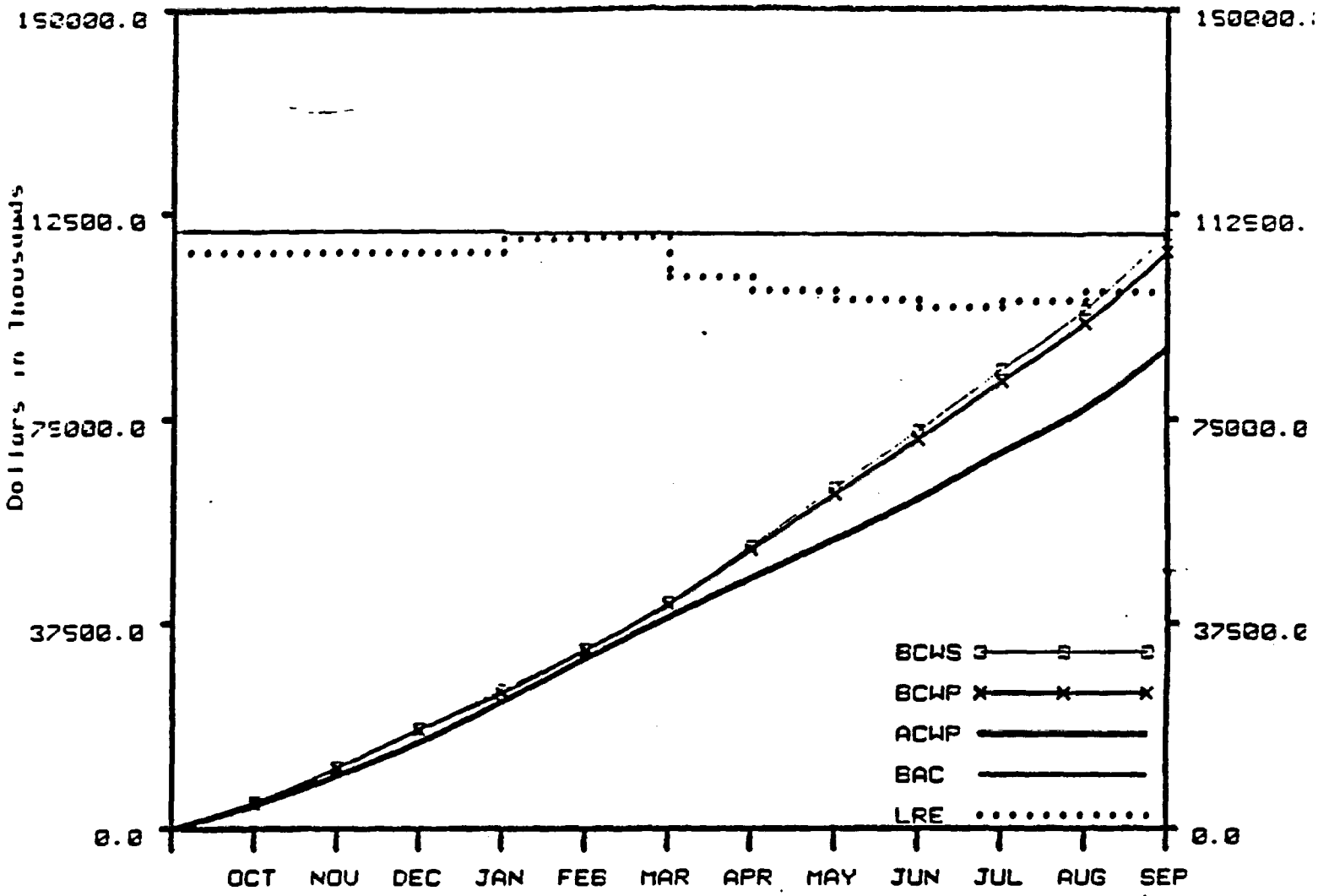
Funding Overview

The month-end estimated costs were $11,123,658 against a plan of $13,864,091 resulting in a cost underrun of $2,740,433.

The following are the year-to-date plans, costs, and variances:

		Plan ($000)	Cost ($000)	Variance	% Variance
WBS 1.2.1	Systems	$ 6,688	$ 6,077	$ 611	9
WBS 1.2.2	Waste Package	8,530	7,622	908	11
WBS 1.2.3	Site	34,225	25,375	8,850	26
WBS 1.2.4	Repository Investigations	14,665	12,540	2,125	15
WBS 1.2.5	Regulatory and Institutional Investigations	8,453	8,001	452	5
WBS 1.2.6	Exploratory Shaft Investigations	12,341	9,097	3,244	26
WBS 1.2.7	Test Facilities	1,061	945	116	11
WBS 1.2.9	Project Management	18,147	16,406	1,741	10
WBS 1.2.10	Financial and Technical Assistance	4,650	1,930	2,720	59
WBS 1.2	NNWSI Project	$108,760	$87,993	$20,767	19

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2



NNWSI - TOTAL	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	13864.1	108760.0
B. BUDGETED COST OF WORK PERFORMED (BCWP)	13078.1	105494.0
C. ACTUAL COST OF WORK PERFORMED (ACWP)	11123.7	87993.4
D. BUDGET AT COMPLETION (BAC)		108760.0
E. LATEST REVISED ESTIMATE (LRE)		98114.2

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	-3266.0	-3.00
G. COST VARIANCE (B-C)	17500.6	16.59
H. AT COMPLETION VARIANCE (D-E)	10645.8	9.79

NNWSI PROJECT BUDGET BASELINE

SEPTEMBER 1986

CONTRACTORS	($000) ORIGINAL FY 86 FUNDING	($000) CURRENT BASELINED BUDGET	($000) CHANGE
SNL	$25,309	$24,084	(1,225)
LLNL	12,620	12,495	(125)
Los Alamos	13,465	13,149	(316)
USGS	16,645	19,392	2,747
SAIC	14,891	17,524	2,633
REECo	17,476	10,113	(7,363)
H&N	1,153	2,298	1,145
F&S	3,014	2,860	(154)
WSI	221	208	(13)
PAN AM	52	49	(3)
State grant	2,600	4,650	2,050
DRI	160	160	--
EG&G	80	82	2
LBL	400	761	361
NTS allocation	1,314	935	(379)
SUBTOTAL	$109,400	$108,700	(640)
CAPITAL EQUIPMENT	5,400	6,800	1,400
TOTAL	114,800	115,560	760

U.S. DEPARTMENT OF ENERGY

OCRWM
OGR

Nevada
Nuclear
Waste
Storage
Investigations
PROJECT

YUCCA MOUNTAIN

PROJECT STATUS

1.2.1 SYSTEMS

OBJECTIVE

The objective of this task is to apply the concept of systems to the development and design of the repository, both the surface and subsurface facilities, and to the evaluation of the effectiveness of the geologic and hydrologic environment in isolating radionuclides.

ACTIVITIES

WBS 1.2.1.1 SYSTEMS MANAGEMENT AND INTEGRATION

WBS 1.2.1.1.2.1 Systems Description

Policy review comments on the systems requirements document were received at Sandia National Laboratories (SNL) from the Waste Management Project Office (WMPO) in late June 1986. Revision of this document in response to the comments started in late September 1986.

Work on the system description document (SNL Milestone M261) is about 80 percent complete. This document cannot be completed until the Office of Geologic Repositories (OGR) issues a common mined geologic disposal system structure for all repository development projects.

WBS 1.2.1.1.2.3 Cost Schedule

On September 11 and 12, 1986, a cost estimate analysis meeting was held for the site-specific Site Characterization Plan Conceptual Design Report (SCP-CDR) in San Francisco, California. Cost-estimating engineers from SNL, Bechtel National, Inc., Parsons Brinckerhoff Quade & Douglas, and R. F. Weston, Inc., attended. Weston personnel, who are performing the data collection and cost analysis support for the U.S. Department of Energy/Headquarters (DOE/HQ), organized the meeting as a Weston fact-finding session to improve their understanding of the basis and assumptions of the total-system-life-cycle cost estimate for the tuff repository. These costs include phase I, engineering and construction; phase II, emplacement and caretaking; and phase III, closure and decommissioning. A similar meeting was organized by Weston with each of the other repository projects at the respective architect/engineer offices.

On September 30 and October 1, 1986, a second meeting was held at DOE/HQ. It was an interproject comparative analysis reconciliation meeting attended by DOE field representatives and the cost estimating engineers from the three projects: Nevada Nuclear Waste Storage Investigations (NNWSI) Project, Basalt Waste Isolation Project (BWIP), and Salt Repository Project (SRP). Using the information obtained from the earlier meeting, Weston staff performed a very comprehensive comparative analysis. DOE/HQ, using this analysis, mediated the interproject reconciliation of a dozen issues that were site-specific design differences, misunderstanding of the guidelines, or Project-specific assumptions. Even though the NNWSI Project cost estimate was challenged the least, the resolution of the four issues will impact the tuff SCP-CDR cost estimate. The four issues are Performance Confirmation, Waste Package, Decommissioning, and Onsite Generated Waste.

WBS 1.2.1.2.4 Systems Engineering Integration

On September 2 through 5, 1986, participants attending a workshop held in Albuquerque, New Mexico, reviewed the draft Systems Engineering Management Plan (SEMP). Staff members from WMPO, Lawrence Livermore National Laboratory (LLNL), Science Applications International Corporation (SAIC), SNL, and the U.S. Geological Survey (USGS) participated in the review. The revised SEMP will be available for Technical Project Officer review by the end of September 1986.

A systems engineering meeting held by the DOE/HQ on September 9 and 10 at SAIC was attended by representatives from WMPO, Weston, BWIP, SNL, LLNL, Los Alamos National Laboratory (Los Alamos), USGS, and SAIC. The Yucca Mountain mined geologic disposal system requirements and subsystem design requirements were the primary subject of the meeting. Reports, as used or proposed by the OGR, covering the physical subsystem structure, design activities structure, and cost structure were discussed.

WBS 1.2.1.2.5 Configuration Management and Change Control

SAIC received comments from WMPO on the draft Configuration Management Plan (CMP), Milestone R046, which was submitted for review on May 29, 1986. The document has been distributed to Project participants for review and comment. Review comments are required to complete the final CMP, Milestone R047, which is scheduled for October 15, 1986.

SAIC staff members are developing drafts of administrative procedures (APs), as defined in the CMP, for implementation of the CMP. The following revised or new APs have been identified:

AP 3.1 Management Baseline - This is the existing Planning and Scheduling Baseline procedure which will be modified in terms of configuration management classifications for control in consonance with the CMP. The procedure will be retitled Management Baseline.

AP 3.3 Change Control Process - This current administrative procedure will be modified to account for additional review processes and baseline management methodology as a part of implementing the CMP. No title change is required.

AP 3.4 Technical Baseline - This procedure will define the implementation of the configuration management process for the technical baseline. Implementation of this document is dependent upon the completion and issuance of the NNWSI Project SEMP.

AP 3.5 Regulatory Baseline - This administrative procedure will define the methods to be used for implementing the process of the regulatory baseline.

In addition to these administrative procedures, internal procedures are being developed for use by the Technical and Management Support Services (T&MSS) organization. The internal procedures are required to implement the Configuration Management Branch internal operations. Procedures and guidelines are also required for the management and functioning of the Baseline Review Board.

The NNWSI Project SOP-03-01, Engineering, Construction, and Support Services at the Nevada Test Site, was issued in September.

The NNWSI Project budget and cost plans for FY 87 were baselined at $147M.

The organization of the Baseline Policy, Program, and Project Guidance document, which was approved by WMPO during July 1986, is being further developed at SAIC to include categories of content, distribution, and baselining processes.

WBS 1.2.1.3.1 Tuff Data Base

SNL personnel completed a preliminary logic diagram of an enhanced version of the tuff data base. The new design incorporates a relational model for the data structure. The enhanced data base, intended to be maintained on a VAX, will be more flexible than the System 2000 version. Prior to implementation, the design will be reviewed by SNL computer support personnel to ensure (1) consistency with the relational model and (2) efficient design relative to updates; retrievals; assurance of data base integrity and applications-dependent problems, such as the handling of null values (missing information); appropriate documentation; and possible alternative user views.

All drill hole names and related information contained in the tuff data base were checked by SNL staff and revised based on the most recent Holmes & Narver (H&N) survey sheets dated August 26, 1986. All drill hole information now exactly reflects the H&N listing, as requested in the DOE memorandum dated September 12, 1986. Almost all changes involved only minor alterations to the formats of the hole names.

WBS 1.2.1.3.2 Computer Graphics

Members of the SNL staff completed three illustrations using the Calma graphics system for inclusion in the SCP.

An SNL procedure has been established for direct transmittal of graphics design information from Parsons Brinckerhoff Quade & Douglas to the Interactive Graphics Information System. This ability to exchange graphics data should expedite communication between SNL design engineers and Parsons Brinckerhoff Quade & Douglas.

WBS 1.2.1.3.3 Reference Information Base

On September 4, 1986, SNL representatives met with members of the Systems Engineering Integration Group at SNL to discuss the effort to make the Reference Information Base a Project-wide activity. Members of the group will assist in making the Reference Information Base an integral component in the flow of data within the NNWSI Project.

WBS 1.2.1.4 TOTAL SYSTEMS PERFORMANCE ASSESSMENT

WBS 1.2.1.4.1 Flow and Radionuclide Transport

SNL staff members are revising and modifying the draft SCP Section 8.3.5.7 on the ground-water travel time performance issue. They are incorporating

comments from PIRC 3 and 12 reviews and will include the new Information Need 1.6.5, Definition of Disturbed Zone Boundaries.

All SNL reviews have been completed for a contractor report from Lawrence Berkeley Laboratory entitled "Hydrologic Mechanisms Governing Partially Saturated Fluid Flow in Fractured Welded Units and Porous Nonwelded Units at Yucca Mountain." Completion of this report will satisfy Milestone N117.

The SNL modified work plan to support quality assurance level assignments for this WBS task has been approved by WMPO. All Level III activities have been resumed, and the staff continued revising the analysis procedure requirements (Quality Assurance Procedure II-4) for Level I and Level II activities.

A consultant contract was placed by SNL to provide a broad-based, objective review of current activities for flow and transport analyses and to ensure that all relevant factors have been taken into account.

WBS 1.2.1.4.2 Radionuclide Source Term

The SNL documents entitled "Analysis of a Multiphase, Porous-Flow Imbibition Experiment in Fracture Tuff" (SAND86-1679C) and "Drying Analysis of a Multiphase, Porous-Flow Experiment in Fractured Volcanic Tuff" (SAND86-0722C) were submitted for line review.

Two SNL reports, "Proposed Definition of the Disturbed-Zone Boundary Appropriate for a Repository at Yucca Mountain," and "Proposed Definition for the Engineered-Barrier System Appropriate for Yucca Mountain," are being revised based on peer reviews.

On September 22, 1986, SNL and Lawrence Berkeley Laboratory representatives met to discuss two-phase flow topics and to determine the future direction of the code verification problem COVE 3. It was decided that the next stage of COVE 3 would be modeling a heat-pipe experiment for which there is a published semianalytical solution.

On September 14 through 17, 1986, SNL staff members attended a workshop on geochemical modeling sponsored by the OGR Repository Development Projects and the Physics Center for Geosciences at LLNL. The workshop was held at Lake Tahoe, California.

SNL personnel revised modified work plans and quality assurance level assignments for this task based on comments from the WMPO. The revised documents were resubmitted to the WMPO for review. This review indicated that some minor additional revisions were required.

WBS 1.2.1.4.4 Radionuclide Releases from Total System

Abstracts for two SNL papers have been accepted for the American Geophysical Union Fall Meeting, "Symposium on Flow and Transport Through Unsaturated, Fractured Rock," December 8 through 12, 1986, in San Francisco, California. The papers are "Radionuclide Transport in an Unsaturated, Fractured Medium," and "Measuring and Modeling Water Imbibition into Tuff."

SNL staff members are currently investigating whether the Total System Performance Assessment Code (TOSPAC) plus the currently available data can be used to predict accurately the water-weight gain time history of a piece of core that has one end in water. It appears that the weight gain predicted by TOSPAC using currently available data is not very accurate.

Members of the SNL staff continued work on the document entitled "Total System Performance Assessment Code (TOSPAC) Volume 1: Physical and Mathematical Basis" (SAND85-0002). A draft of the technical portions of this document will be available for peer review by October 31, 1986.

A COVE 2A meeting was held in Albuquerque, New Mexico, on September 11, 1986, to discuss the hydrologic benchmarking problem set currently being worked on by five teams from within the NNWSI Project and by a PASS team from Pacific Northwest Laboratory. Three of the teams had made significant progress in completing the 12 one-dimensional flow problems, and team members thought that they would complete work on this set by the next planned COVE 2A meeting in November 1986. The results of the calculations were presented and discussed, along with questions concerning the appropriate level of refinement for results, convergence criteria, and methods for comparing results obtained from different teams. The next set of benchmarking problems were presented and discussed. This set will investigate two-dimensional flow in near-horizontal tuff layers.

PLANNED WORK

Revision of the system description document will be completed during November 1986, and the systems requirements document will begin the SNL management review process.

The SCP-CDR cost estimate will be revised to include the DOE guidance and will be used as the base case for the fuel rod consolidation study, the SCP-CDR cost estimate report, and all other cost referencing, including the construction project data sheet.

SCP work during October and November 1986 at SNL will focus on the rewriting of the performance issue on pre-waste-emplacement ground-water travel time and on replying to comments from PIRCs 4 and 12 on Section 8.3.5. Modeling of the fluid flow and radionuclide transport through the Yucca Mountain site will continue.

In October 1986, SNL staff members will complete papers for the American Geophysical Union meeting, continue work on the imbibition experiments, finish the rough draft of TOSPAC Volume 1, continue to investigate methods for increasing the efficiency and speed of TOSPAC, and complete work on the COVE 2A benchmarking problems.

PROBLEM AREAS

The Systems Studies Register (SNL Milestone P126) will be delayed because of commitments to the SEMP.

MILESTONE PROGRESS

A first draft of the letter report (SNL Milestone M870) that describes annual Performance Assessment Scientific Support (PASS) interactions with Battelle Pacific Northwest Laboratories was sent to WMPO on September 17.

The new completion date for SNL Milestone M261, Yucca Mountain site-specific mined geologic disposal system description, is estimated to be December 15, 1986.

SNL Milestone P126, Systems Studies Register, has an estimated completion date of December 24, 1986.

SNL Milestone R058, a cost estimate of the Yucca Mountain repository based on design information developed for the SCP-CDR, has been delayed. The new estimated date of completion is April 1, 1987.

SNL Milestone M108, the systems engineering management plan (SEMP), has a new estimated completion date of November 1986, and SNL Milestone R074, systems engineering review of the NNWSI Project, has an estimated completion date of December 1986.

SNL Milestone R076, a summary report of data base interactions among NNWSI Project participants, has a new estimated completion date of October 31, 1986.

A CCB request for deletion is being prepared for SNL Milestone R089, a description of the organizational structure for the tuff data base.

Estimates for new completion dates for several other SNL milestones include: R078, the revised three-dimensional reference model of the NNWSI Project repository site, March 31, 1987; R079, technique for subterranean surface modeling for the NNWSI Project repository: software documentation, October 31, 1986; R080, the status report of NNWSI Project data base capabilities, October 30, 1986; M107, the NNWSI Project position paper describing the engineered barrier system and disturbed zone boundaries, December 19, 1987; M111, a report on the effect of heat and excavation on water flow in the vicinity of the waste package, June 30, 1987.

Additionally, the following SNL milestones will be delayed because of SCP commitments. New dates for completion are as follows:

M102, documentation of the total systems performance assessment (TOSPAC) volume 1: physical and mathematical, estimated date is March 2, 1987.

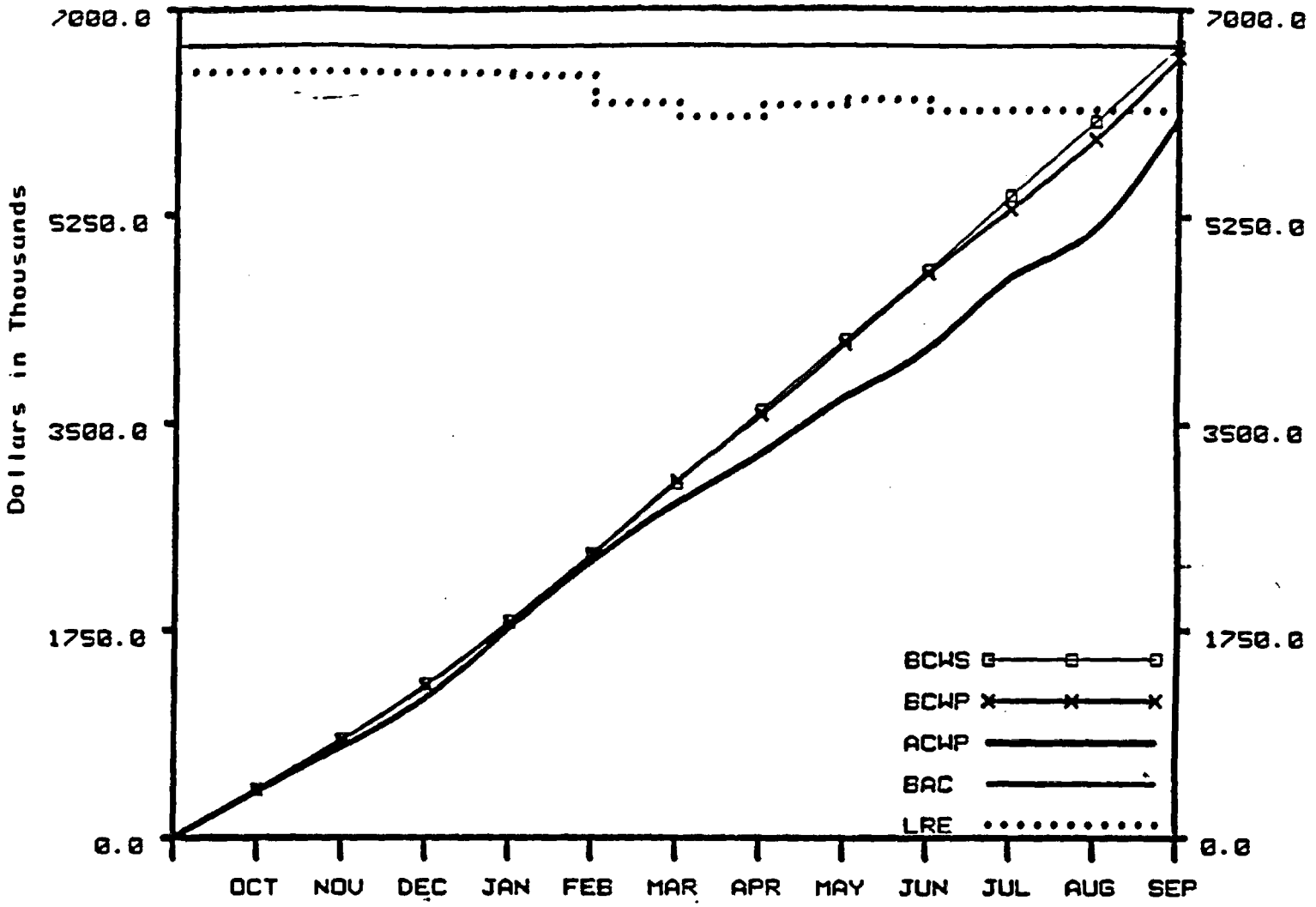
M104, a first survey of disruption scenarios for high-level waste repository at Yucca Mountain, estimated date is December 1, 1986.

M126, SAND report on NNWSI Project data priority study, estimated date is March 2, 1987.

M128, documentation of the TOSPAC volume 2: user's manual and sample, estimated date is September 30, 1987.

M142, SNL modifications to the TRACR3D code, estimated date is January 13, 1987.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.1



SYSTEMS	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	639.2	6688.0
B. BUDGETED COST OF WORK PERFORMED (BCWP)	689.0	6589.4
C. ACTUAL COST OF WORK PERFORMED (ACWP)	937.1	6076.5
D. BUDGET AT COMPLETION (BAC)		6688.0
E. LATEST REVISED ESTIMATE (LRE)		6140.0

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	-98.6	-1.47
G. COST VARIANCE (B-C)	512.9	7.78
H. AT COMPLETION VARIANCE (D-E)	548.0	8.19

COST PERFORMANCE REPORT
WBS LEVEL 4
U.S. DEPARTMENT OF ENERGY
NNWSI PROJECT

For: SEP 1986

Date: October 30, 1986

WBS NUMBER AND DESCRIPTION		YEAR TO DATE				
		BUD. COST OF WORK SCHEDULED	BUD. COST OF WORK PERFORMED	ACTUAL COST OF WORK PERFORMED	VARIANCES SCHEDULE	VARIANCES COST
1211	Systems Management and Integration	180.000	180.020	85.000	.020	95.020
1212	Systems Engineering	2,325.000	2,325.348	1,826.500	.348	498.848
1213	Technical Data Base Management	1,126.000	1,026.912	1,049.000	-99.088	-22.088
1214	Total Systems Performance Assessment	3,057.000	3,057.081	3,116.000	.081	-58.919
121	SYSTEMS	6,688.000	6,589.361	6,076 500	-98.639	512.861

MILE-STONE	RESP. AGENCY	WBS	MILESTONE DESCRIPTION	O	N	D	J	F	M	A	M	J	J	A	S	
M277	SNL	1.2.1.1	Annual PASS Program Interaction – (Letter Report) △ 9/85	◆												
M870	SNL	1.2.1.1	Annual PASS Program Interaction – (Letter Report)												△	◇ 10/86
M120	SNL	1.2.1.2	Yucca Mountain Mined Geologic Disposal System (MGSD) Requirements △ 11/85								◇			◇		◇ 1/87
M108	SNL	1.2.1.2	Systems Engineering Management Plan (SEMP)								△	◇		◇		◇ 11/86
M261	SNL	1.2.1.2	Draft Yucca Mountain Site – Specific Mined Geologic Disposal System (MGDS) Description												△	◇ 11/86

△ PLANNED MILESTONE COMPLETION DATE

◇ REVISED MILESTONE COMPLETION DATE

▲ COMPLETED AS SCHEDULED

◆ COMPLETED AS REVISED

1.2.2 WASTE PACKAGE

OBJECTIVE

The primary objective of this task is to develop a technical basis and engineering capability to design, test, and fabricate a waste package that is compatible with the hydrological conditions and geochemical environment in the unsaturated zone beneath Yucca Mountain.

ACTIVITIES

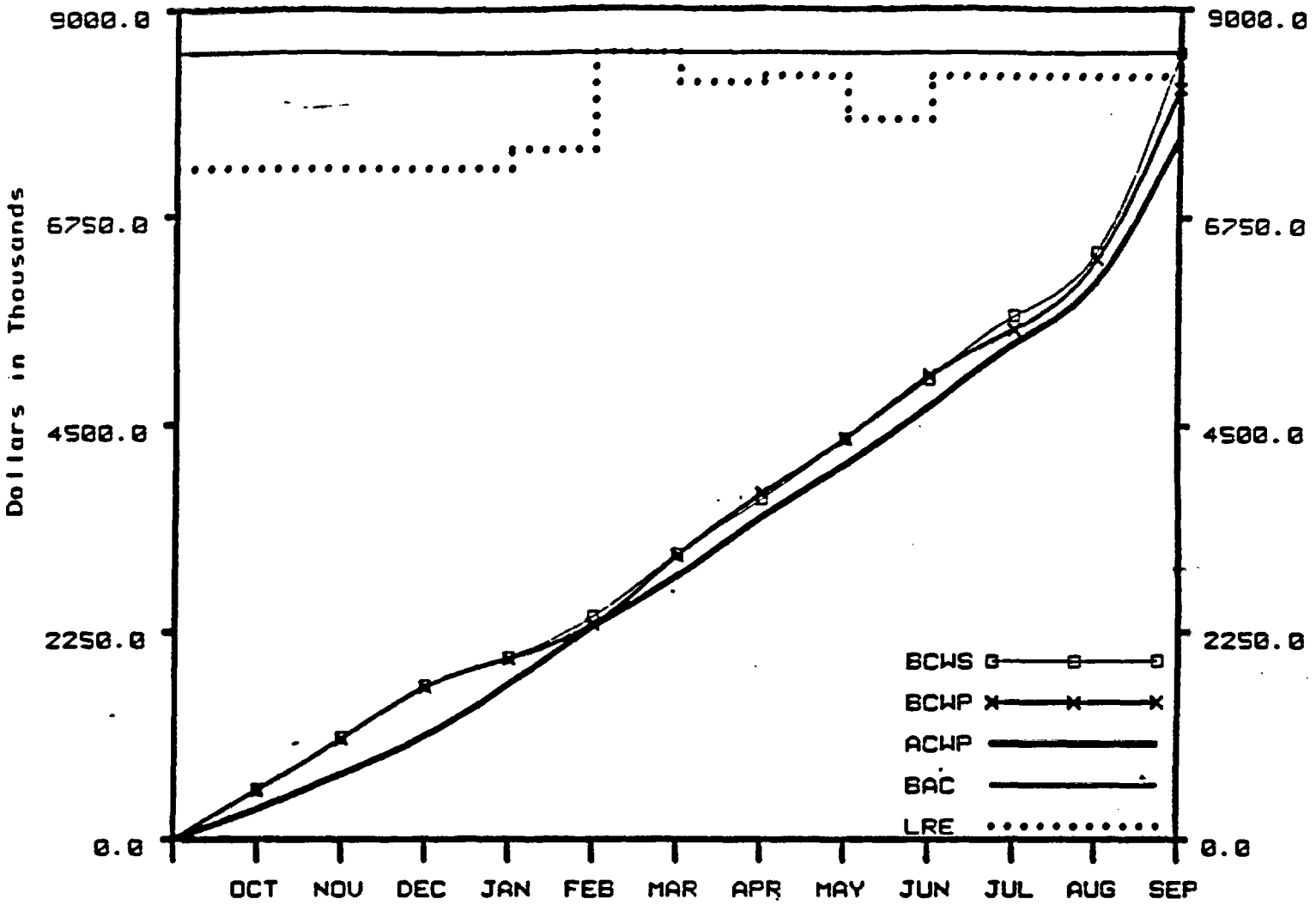
WBS 1.2.2.1 WASTE PACKAGE

Two SAIC milestones for the copper-base waste package were met by the delivery of the "Fuel Report to Congress on the Feasibility of Copper-Based Waste Package" and the "Final Report on Feasibility Assessment of Copper-Based Waste Package" to OGR through Weston. Both reports were approved by OGR.

SAIC staff members initiated the PIRC 7 review of SCP Chapter 7 and associated sections of Chapter 8. Sections 8.3.4 and 8.3.5 review comments should be completed for distribution by October 15, 1986.

The report on other activities for this task was not received this month.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.2



WASTE PACKAGE	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	2159.9	8529.8
B. BUDGETED COST OF WORK PERFORMED (BCWP)	1848.9	8142.8
C. ACTUAL COST OF WORK PERFORMED (ACWP)	1565.5	7622.1
D. BUDGET AT COMPLETION (BAC)		8529.8
E. LATEST REVISED ESTIMATE (LRE)		8270.0

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	-387.0	-4.54
G. COST VARIANCE (B-C)	520.7	6.39
H. AT COMPLETION VARIANCE (D-E)	259.8	3.05

COST PERFORMANCE REPORT
WBS LEVEL 4
U.S. DEPARTMENT OF ENERGY
NNWSI PROJECT

For: SEP 1986

Date: October 30, 1986

WBS NUMBER AND DESCRIPTION		YEAR TO DATE				
		BUD. COST OF WORK SCHEDULED	BUD. COST OF WORK PERFORMED	ACTUAL COST OF WORK PERFORMED	VARIANCES SCHEDULE	VARIANCES COST
1221	Management and Integration	509.800	509.801	403.300	.001	106.501
1222	Package Environment	970.000	971.000	1,048.200	1.000	-77.200
1223	Waste Form & Materials Testing	5,895.000	5,498.001	5,177.600	-396.999	320.401
1224	Design, Fabricate, and Prototype Testing	555.000	564.000	425.500	9.000	138.500
1225	Performance Assessment	600.000	600.000	567.500	.000	32.500
122	WASTE PACKAGE	8,529.800	8,142.802	7,622.100	-386.998	520.702

MILE-STONE	RESP. AGENCY	WBS	MILESTONE DESCRIPTION	O	N	D	J	F	M	A	M	J	J	A	S	
M222	LLNL	1.2.2.3	Input to DOE/HQ Report to Congress on Copper for Waste Packages △ 8/85	◆												
M233	LLNL	1.2.2.4	Initiate Waste Package Advanced Conceptual Design				△					◇			◇	◇ 1/87
M276	LLNL	1.2.2.5	Report on the System Model for Waste Package Performance Analysis									△	◇		◇	◇ 10/86
M236	LLNL	1.2.2.3	Progress Report on the Results of Testing Advanced Conceptual Design Metal Barrier Material under Relevant Environmental Conditions for a Tuff Repository							△					◇	◇ 1/87
M247	LLNL	1.2.2.3	Final Report on Feasibility of using Copper as a Waste Package Material												△	
M013	LLNL	1.2.2.4	Revised Draft Waste Package Subsystem Conceptual Design Requirements to DOE/HQ for Review						△		◇		◇		◇	◇ 11/86

△ PLANNED MILESTONE COMPLETION DATE
◇ REVISED MILESTONE COMPLETION DATE
▲ COMPLETED AS SCHEDULED
◆ COMPLETED AS REVISED

1.2.3 SITE INVESTIGATIONS

OBJECTIVE

The objective of this task is to determine whether Yucca Mountain is a suitable location for a high-level waste repository. The effort is divided into two areas of study. The first is understanding the characteristics of the rock mass that lies below the surface of Yucca Mountain. This encompasses the geology (structure and stratigraphy), hydrology (both saturated and unsaturated zone), geochemistry (chemical reactions that can be expected when waste is emplaced), and mineralogy and petrology (the study of the materials that will control the isolation and engineering characteristics of the rock). The second is understanding the processes and events that could occur in the area surrounding Yucca Mountain that could serve as potential disruptive forces. These efforts include the study of tectonics, seismicity, and volcanism, and the regional hydrologic, paleohydrologic, and paleoclimatologic systems.

ACTIVITIES

WBS 1.2.3.1 MANAGEMENT AND INTEGRATION

SAIC personnel compiled budget estimates and impacts for WBS 1.2.3, Site Investigations, from participant input. Four major budget scenarios were analyzed. A meeting was held on September 15 with WMPO, USGS, SAIC/Golden, and SAIC/Las Vegas representatives to define the scope of work in geology and hydrology under the four budget cases.

SAIC staff members continued to review scientific investigation planning (SIP) documentation and quality assurance level assignments. Comments on eight assignments for geochemistry and prototype testing were sent to WMPO.

The Site Integration Management Plan has undergone T&MSS review and comments were incorporated. The plan is scheduled for release to WMPO during the first week in October 1986.

Planning for the site atlas continued during the report period. Project representatives met with Airborne Systems Inc., a potential subcontractor for a new aerial survey of the Yucca Mountain area, to discuss the company's photogrammetry and computer graphics capabilities. In discussions with WMPO, it was decided to fund the site atlas in FY 87. A criteria letter was rewritten to reflect this decision; the letter was delivered to WMPO for signature on September 18.

The draft of the core storage facility (CSF) memorandum was completed at SAIC and presented to WMPO on September 17. Work continued on technical procedure outlines and the functional description of the CSF inventory control and tracking system. A draft activity plan for the NNWSI Project core sample curation was sent to quality assurance (QA) for review.

At SAIC, Chapter 1.7 of the SCP is nearly complete. Only references and figures remain to be finalized. Sections of the seismic-tectonics position

paper on induced seismicity and pore pressure are also complete. Only one section dealing with fault barriers to ground-water flow remains to be completed.

The stop-work order issued to USGS in March 1986 remained in effect through September and almost all site characterization technical activities continued to be suspended throughout the month.

WBS 1.2.3.2 GEOLOGY

WBS 1.2.3.2.1 Geologic Investigations

Experiment procedures and study plans for this task are being reviewed and redrafted at SNL as modified draft outlines become available.

Technical procedures for surface geologic mapping, trench-wall mapping, sample collection and control, and geologic age dating are being prepared for SNL by Golder Associates.

WBS 1.2.3.2.2 Geophysical Investigations

A representative from the USGS researched and submitted abstracts on "Structural Significance of the Isostatic Residual Gravity Map of the Nevada Test Site" for the Western American Geophysical Union meeting and on "Gravity and Teleseismic Investigations of the Timber Mountain Volcanic Complex," for the Hawaiian symposium on "How volcanoes work." USGS representatives also completed and submitted a report on absolute gravity measurements at the Nevada Test Site (NTS), based on a contract report. All USGS Project personnel attended DOE indoctrination on Nuclear Regulatory Commission (NRC) hearings at LLNL on September 9.

WBS 1.2.3.2.3 Site Stability

WBS 1.2.3.2.3.1 Tectonics and Volcanism

Los Alamos personnel are developing quality assurance procedures for volcanism studies for field geologic sampling and field measurements of the magnetic polarity of basaltic rocks. With the lifting of the stop-work order, the studies of the preclosure hazards of volcanism have resumed. The outline of the paper was started and literature data are being compiled on the Big Pine, Long Valley, and Mono Craters volcanic fields of the western Great Basin.

WBS 1.2.3.2.3.3 Seismicity and Strain

USGS personnel continued operation of the seismic network for recording natural seismic events in southern Nevada during September.

WBS 1.2.3.3 HYDROLOGY

WBS 1.2.3.3.1 Stream Flow

Stratigraphic analyses of the uppermost basin fill in the Indian Springs-Cactus Springs area and in Pahrump Valley have interesting transfer potential to the

vicinity of Yucca Mountain. An USGS researcher's review of the area indicates much interesting and important knowledge is available on the Quaternary hydrologic environment and on Quaternary sedimentation processes.

USGS staff members spent the last half of September cataloging previously collected hydrologic data from the Yucca Mountain vicinity and working on a report of the debris flood in Ophir Creek, northern Nevada, in May 1983. A routine maintenance visit to the stream flow and precipitation networks of the NNWSI Project study area was conducted by Las Vegas USGS personnel.

WBS 1.2.3.3.4 Unsaturated Zone Hydrology

Various USGS staff members attended meetings related to the prototype test preparation and Bureau of Reclamation involvement. There were no technical activities during September due to adherence to the stop-work order. All work was limited to the preparation of scientific investigation planning (SIP) documentation, SCP Chapter 3 (Hydrology) rewrite, and PIRC answers to comments and questions. The major activity was the preparation of the revised version of the prototype test plan and preparation for presentation of the plan to DOE on September 25 and 26 in Las Vegas. A rehearsal of the presentation was held on September 24 in Las Vegas.

H&N personnel continued work on calculations and data reduction on previously completed UZ-4 permeability tests; completed calculations on water flow and gas-drive permeability test data for the UZ-4 core samples; and sorted and organized for future reference rock and soil samples waiting to be tested.

Personnel at the H&N Materials Testing Laboratory (MTL) met with USGS personnel to discuss future test programs and test development methods using the ultracentrifuge. Five or six rock types with various permeabilities and porosities will be used for preliminary test runs for the ultracentrifuge. Berea sandstone samples were tested to develop test procedures. All NNWSI Project work performed at the H&N MTL since 1982 was entered into a data base file. All samples, reports, and files were organized and general information was included.

WBS 1.2.3.3.5 Future Hydrologic Conditions

A USGS representative conducted a briefing on the status of the USGS climate program on September 23 at the National Center for Atmospheric Research (NCAR) in Boulder, Colorado. The objectives and structure of the climate program were summarized, with emphasis on global and mesoscale modeling aspects. Members of the SCP PIRC 5 (Climatology) committee and interested parties from DOE, SAIC/ Las Vegas, NCAR, USGS, and several universities attended.

WBS 1.2.3.4 GEOCHEMISTRY

WBS 1.2.3.4.1.1 Ground-water Chemistry

Los Alamos work on the ground-water chemistry task will be placed on hold at the end of September because of the anticipated budget reduction.

WBS 1.2.3.4.1.2 Natural Isotope Chemistry

The WMPO approved the Los Alamos SIP documentation and the associated quality assurance level assignments that were submitted last month. Now work is under way both to determine chloride and chlorine isotope distributions in Yucca Mountain samples and to complete the Level II and Level III milestone reports pertaining to uranium disequilibrium measurements.

WBS 1.2.3.4.1.3 Hydrothermal Geochemistry

The Los Alamos SIP documentation and quality assurance level assignments for this task were approved late this month. A major goal of this task is to understand the role of aqueous silica activity in controlling mineral stability in Yucca Mountain and to quantify the rates of mineral transformations to determine if they are probable on the repository time scale. Kinetic data on the evolution of silica polymorphs and an understanding of the relationship between that evolution and the evolution of aqueous silica activity are particularly important for attaining this objective.

Infrared spectroscopy has been identified as a potentially useful technique for the investigation of the kinetics of silica polymorph evolution. A Los Alamos staff member took a course on Fourier transform infrared (FTIR) spectroscopy in early September. It appears that the FTIR technique may be very useful in these studies, particularly the technique of internal reflection FTIR.

WBS 1.2.3.4.1.4 Solubility Determination

The SIP documentation and quality assurance level assignments for the Los Alamos solubility determination task have been approved; this approval lifts the stop-work order for this task.

Two representatives of Los Alamos and LLNL attended a Geochemical Modeling Workshop at Fallen Leaf Lake, California, on September 14 through 17, 1986 and presented a talk describing the development of a consistent set of thermodynamic constants for aqueous species and compounds of americium (III) with hydroxyl and carbonate ligands.

Work at Los Alamos continued to measure the solubilities and oxidation-state distributions of neptunium-237, plutonium-239, and americium-243 in ground water from Well J-13 at 60 °C. A new filtration method for separating solids from solutions was developed and tested.

Los Alamos personnel also continued work on the characterization of the plutonium (IV)/citrate system for the determination of plutonium (IV) carbonate formation constants. Investigation of the plutonium (IV)/citrate system was extended into high acid range to facilitate the modeling of complexation.

WBS 1.2.3.4.1.5 Sorption and Precipitation

Los Alamos personnel completed counts on the samples from the desorption of neptunium batch samples on USW-G1-2233 using water from Well J-13.

A Los Alamos staff member prepared a microbiological paper for presentation at the Chapman Conference (October 1 through 3).

At Los Alamos the data files used for isotherm modeling have been checked for quality assurance. Detected errors have been rectified.

Researchers at Los Alamos are investigating the possible effect of precipitation on adsorption through the use of the MINEQL model to determine the solubilities of strontium and barium. Results indicate that for the chemical composition of the waters (J-13 well water and tuff systems) the sulfate minerals should control the solubilities of strontium and barium. The results also indicate that precipitation could have an effect on sorption at the higher concentrations of strontium and barium used in the adsorption experiments.

The SIP documentation for this Los Alamos task was revised and, along with quality assurance level assignments, accepted by WMPO on September 22, 1986. Official notification of the lifting of the stop-work order was received September 25, 1986.

Los Alamos personnel presented a paper at the Geochemistry of High-Level Waste Disposal Symposium at the American Chemical Society meeting, September 9 through 11.

Los Alamos researchers are examining dibenzoylmethane as a reagent in the determination of plutonium oxidation states in ground waters.

A chromatographic model is being tested at Los Alamos with MINEQL for the adsorption of nickel onto the surfaces of two sorbents (TiO_2 and geothite). The model considers microscopic processes on solid surfaces that can potentially lead to the breach of the isolation of a contaminant. A search is also under way to obtain strontium data input into MINEQL to evaluate the effect of changes in the microscopic processes on the remobilization of strontium as a contaminant. There appears to be a paucity of strontium data in the literature.

WBS 1.2.3.4.1.6 Dynamic Transport Process

Los Alamos researchers fit diffusion data for Topopah Springs tuff and Calico Hills samples to yield effective diffusivities for tritiated water and pertechnetate ion. The diffusion experiments are the only dynamic transport experiments exempted from the stop-work order for the Los Alamos dynamic transport process task.

The SIP documentation and quality assurance level assignments for the task were revised. It is anticipated that the stop-work order for the Los Alamos dynamic transport process task will be lifted on October 15, 1986.

WBS 1.2.3.4.1.7 Retardation Sensitivity Analysis

The revised SIP documentation for this Los Alamos task as well as the quality assurance level assignments and the quality level assignment criteria were approved by WMPO on September 22, 1986.

The work plan and the schedule for milestones for this Los Alamos task were revised because of an expected 43 percent reduction in the budget for the upcoming fiscal year. Work will be stopped on subtasks A (Geochemical Model) and C (Integrated Transport Calculations) and the level of effort will be

reduced on subtasks B (Significance of Transport Processes) and D (Benchmarking Activities). It will be necessary to delete Milestones R315, R316, and R748; and add to Milestones R543, R314, R346, and R529 one day for every day of the stop-work order. Milestone R582 will remain due on September 30, 1987.

Work at Los Alamos continues on the use of intrinsic random functions of order one as an alternative stochastic formulation for a structural model of Yucca Mountain.

WBS 1.2.3.4.2 Mineralogy and Petrology

During September, a rough draft was prepared for Los Alamos Milestone R319, an interim summary of mineralogic studies on samples from Trench 14 and from possible analog locations (springs, soils, sand ramps, and hydrothermal veins). This report will strengthen the evidence for mineralogic and petrographic similarity between the fault fillings and the sand ramps around Yucca Mountain and will suggest potential benefit in comparing individual phases (e.g., opal) from the various possible analog localities.

Los Alamos staff members prepared two abstracts for the December meeting of the American Geophysical Union; these abstracts are "Calderas of Southwestern Nevada - Evolution of Understanding, 1960-1986," and "Zeolite Fracture Filling Caught in the Act?" The second abstract describes the mineralogy of a gel that was collected several years ago from an unsaturated-zone fracture intersected by tunnel workings at the Nevada Test Site. This gel has since crystallized to produce an assemblage including clinoptilolite, suggesting that some fracture fillings are indeed young and have important implications for both transport and retardation.

Researchers at Los Alamos obtained preliminary data from the University of Missouri at Columbia to use in evaluating the possibility of electron spin resonance (ESR) dating of drusy quartz crystals from Trench 14. Large amounts of alpha damage in the drusy quartz suggest a very old age, but it will still be several months before actual ESR estimates of age can be made.

Revised drafts of the test plans 2.4 (Stratigraphy and Variability of the Devitrified Topopah Spring Member), 2.5 (Alteration History, Mineralogy, and Past Transport in the Basal Topopah and Upper Calico Hills Tuff), and 2.6 (Mineralogy of Fractures and Faults) were compiled at Los Alamos for external review as part of the Exploratory Shaft Test Plan.

A Los Alamos staff member gave a talk on September 10 at the 192nd National meeting of the American Chemical Society in the Symposium on Geochemical Aspects of Radioactive Waste Disposal. The title of the talk was "Mineralogic Studies of Tuff for High-Level Waste Disposal."

WBS 1.2.3.5 DRILLING

WBS 1.2.3.5.2 Drilling, Construction, Engineering

Test Hole UZ-8 remained at a temporary depth of 58 feet as all drilling continued to be suspended under the USGS stop-work order.

WBS 1.2.3.5.3 Field Geology/Hydrology

F&S staff members ran neutron moisture probes in UZ neutron access holes and are reviewing core fracture data and identifying areas that need to be checked following repeal of the stop-work order.

WBS 1.2.3.6 ENVIRONMENT

WBS 1.2.3.6.1 Environmental Surveys

At SAIC work continued on the Radiological Monitoring Plan and the Pre-Site-Characterization Radiological Monitoring Plan. A draft of the latter was forwarded to WMPO for review. Several review sessions were held with WMPO. Work continues to prepare the monitoring program procedures and instructions. A pathways analysis is also in progress to support development of the plan.

WBS 1.2.3.6.2 Transportation

SAIC Milestone E459, Transportation Issue Tracking System, was completed and a report was sent to WMPO. The report describes the need, basis, and implementation of an automated system for tracking transportation documents. The system will make maximum use of existing tracking systems to minimize overlap of information bases and allow faster and more comprehensive access to transportation information.

SAIC personnel submitted a topical report on population density for transportation risk calculations to WMPO to complete Milestone E464. The report documents the methodology used by the NNWSI Project in the final Environmental Assessment to estimate population density along Nevada transportation routes. The report compares results for Nevada to those used for national averages of population density and the fraction of routes traversing rural, suburban, and urban areas.

A letter was sent to WMPO from SAIC estimating the potential impact on transportation costs of a $9-per-car-mile charge for hazardous waste shipments proposed by the Union Pacific Railroad. If applied to the monitored retrievable storage (MRS) case the proposed charge could raise costs by $197M if 100-ton casks are used and by $112M for 150-ton casks. The progress of the proposal will be followed.

The final Preliminary Site Characterization Radiological Monitoring Plan was sent to WMPO for approval. Approval of the plan will allow initiation of a monitoring program to characterize radon and radioactive particulate releases from the site prior to the start of significant site characterization activities. This information will be used to more accurately characterize future impacts of site work than would be possible if all releases were attributed to the Project. Work is expected to begin in late October or November 1986.

WBS 1.2.3.7 SOCIOECONOMICS

The working draft of the Socioeconomic Monitoring and Mitigation Plan (SMMP) was submitted to DOE/HQ for review. The final community services reports for Nye and Clark counties were approved by WMPO and sent to the printers. The final attitudes report was sent to WMPO for policy review.

PLANNED WORK

Field work to be performed for SNL will begin following completion of planning documentation and negotiation of a contract. The anticipated start date for surface mapping is January 1987. Aerial photography could be accomplished in November or December 1986 if appropriate quality assurance documentation is complete.

The chloride content of cuttings from core hole USW UZN43 will be measured at Los Alamos to help decide whether these samples should be analyzed for chlorine-36.

Los Alamos staff members will resume summarizing and analyzing the literature on the kinetics of silica polymorph evolution.

Solubility and oxidation-state distribution studies at Los Alamos of the J-13 well water will be extended to include plutonium and americium. Analysis of the plutonium (IV)/citrate data is under way. Studies of the mixed carbonate/citrate complexation of plutonium (IV) will be initiated soon.

Los Alamos personnel working on the sorption and precipitation task are resuming the original work plan interrupted by the stop-work order.

Los Alamos researchers will quantify x-ray diffraction (XRD) measurement errors, implement kriged interpolation from small data sets as a routine alternative to the SNL structural modeling effort, continue evaluation of XRD data (in particular, comparison of data from the Topopah Spring Member of the Paintbrush Tuff with modal count data of the matrix), and review and summarize work on variance of stereological volume estimation.

In October, Los Alamos researchers will make initial studies of infrared spectral characteristics to see whether these data can be used to determine opal types from Trench 14 on a microscopic scale. Emphasis will be on the completion of Milestones R319, R345, and R323.

PROBLEM AREAS

Because of the delays caused by the stop-work order, the original Los Alamos milestone schedule for the sorption and precipitation task will not be met.

Los Alamos Milestones V325 and R343 (dated June 9, 1986) still do not have WMPO approval. These documents are to be turned into a paper for the Materials Research Society meeting, December 1986, and will need WMPO approval by October 15 ,1986.

Analytical work at Los Alamos is suffering temporary delays as the analytical facilities for mineralogy and petrology are being moved to a new building. The equipment for scanning electron microscopy (SEM), electron microprobe, and x-ray fluorescence analysis has been moved, and the SEM equipment is installed and operating. Equipment for x-ray diffraction and fluid inclusion analysis will not be moved until the other analytical facilities are operating in the new location.

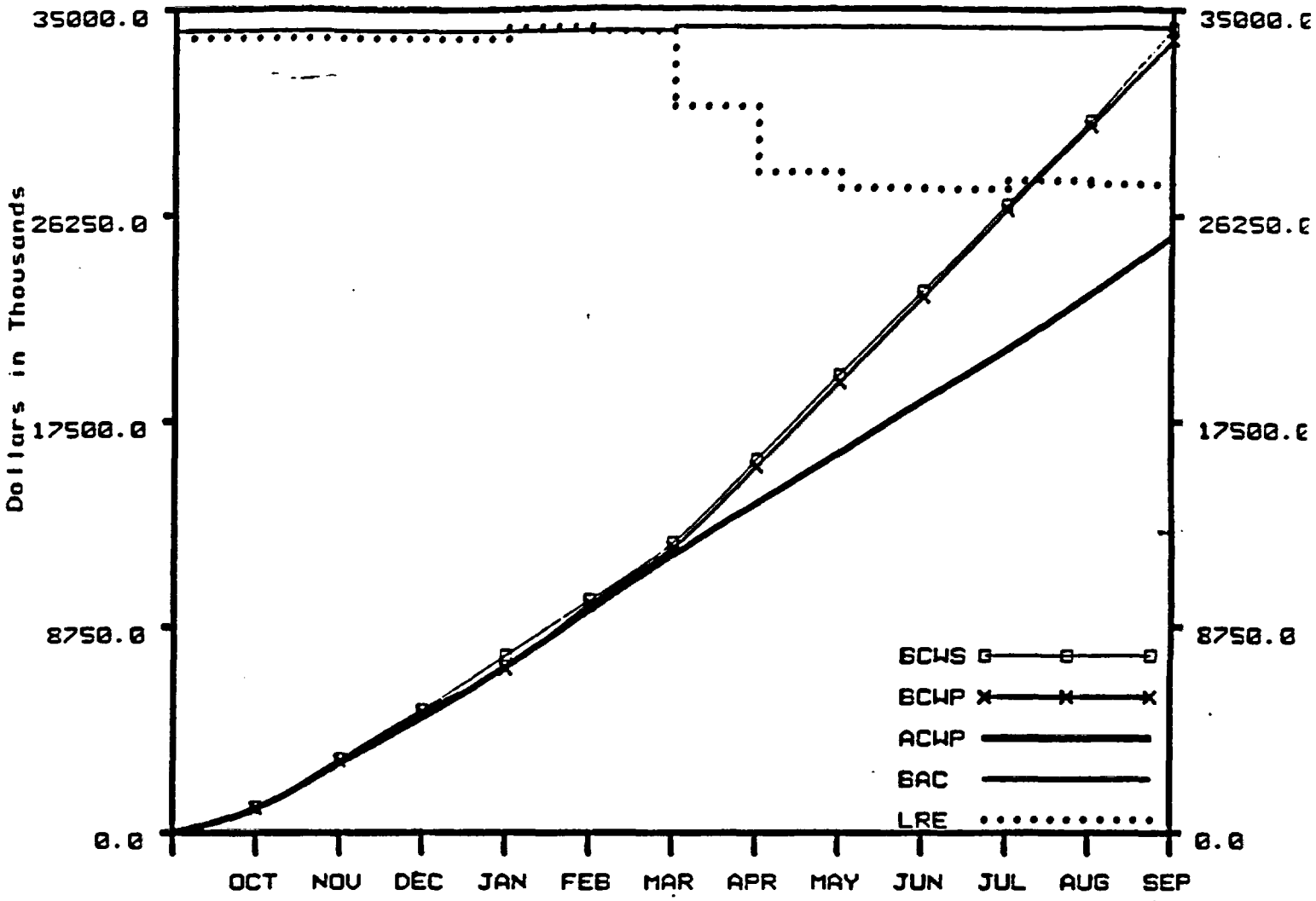
Currently no work, including the effort to finalize calculations (test data) and report to USGS on UE-25UZ-4, is being performed at H&N. Work will be initiated when the stop-work order has been lifted and appropriate approvals received.

MILESTONE PROGRESS

SNL Milestone N448, preliminary validation of fault and tectonic environment for repository surface facilities, is estimated to be completed on June 30, 1987.

A draft of Los Alamos Milestone M316, "A Progress Report on the Effect of Ground-water Composition on the Sorptive Behavior of Radionuclides," was completed.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.3



SITE INVESTIGATIONS	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	3984.2	34224.8
B. BUDGETED COST OF WORK PERFORMED (BCWP)	3687.7	33712.5
C. ACTUAL COST OF WORK PERFORMED (ACWP)	2505.7	25374.8
D. BUDGET AT COMPLETION (BAC)		34224.8
E. LATEST REVISED ESTIMATE (LRE)		27569.9

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	-512.3	-1.50
G. COST VARIANCE (B-C)	8337.7	24.73
H. AT COMPLETION VARIANCE (D-E)	6654.9	19.44

COST PERFORMANCE REPORT
WBS LEVEL 4
U.S. DEPARTMENT OF ENERGY
NNWSI PROJECT

For: SEP 1986

Date: October 30, 1986

WBS NUMBER AND DESCRIPTION		YEAR TO DATE				
		BUD. COST OF WORK SCHEDULED	BUD. COST OF WORK PERFORMED	ACTUAL COST OF WORK PERFORMED	VARIANCES SCHEDULE	VARIANCES COST
1231	Management & Integration	3,280.000	3,279.835	2,192.615	-.165	1,087.220
1232	Geology	7,191.000	7,191.035	6,253.685	.035	937.350
1233	Hydrology	5,451.300	5,451.192	4,928.930	-.108	522.262
1234	Geochemistry	6,095.000	5,837.092	5,895.400	-257.908	-58.308
1235	Drilling	9,511.800	9,511.807	3,681.624	.007	5,830.183
1236	Environment	970.400	927.763	935.913	-42.637	-8.150
1237	Socioeconomic	502.300	353.818	466 654	-148.482	-112.836
1238	Geochemical Modeling Code EQ3/6	1,223.000	1,160.000	1,020.000	-63.000	140.000
1239	Deferred Site Close Out	000	.000	.000	.000	.000
123	SITE INVESTIGATIONS	34,224.800	33,712.541	25,374.820	-512.259	8,337.721

MILE-STONE	RESP. AGENCY	WBS	MILESTONE DESCRIPTION	O	N	D	J	F	M	A	M	J	J	A	S
M364	WMPO	1.2.3.6	Implementation of Meteorological Monitoring Plan △ 6/85								◆				
M325	LANL	1.2.3.4	Report on Geochemistry Simulation of Yucca Mountain Using Best Available Data on Mineralogy, Water Chemistry, Flow Rates & Crack Statistics									△			◇ 11/86
M897	SAIC	1.2.3.6	Final Radiological Monitoring Plan Complete					△							◇ 2/87
P029	SAIC	1.2.3.7	Draft Socioeconomic Monitoring and Mitigation Plan									△			◆

△ PLANNED MILESTONE COMPLETION DATE

◇ REVISED MILESTONE COMPLETION DATE

▲ COMPLETED AS SCHEDULED

◆ COMPLETED AS REVISED

1.2.4 REPOSITORY INVESTIGATIONS

OBJECTIVE

The objective of this task is to develop the engineering capability to design, construct, operate, and decommission a repository in tuff. Four specific technical areas are involved that include (1) determination of the physical and mechanical properties of the rock matrix and rock mass that are important to the design and construction of an underground structure; (2) engineering analysis and evaluation of technical details that are important to the design and operation of a repository; (3) development of the techniques of sealing a repository as part of decommissioning; and (4) preparation of a site-specific design that will be accommodated within the development of the equipment to construct the repository, handle the waste and waste package, and transfer the waste package within the repository system.

ACTIVITIES

WBS 1.2.4.1 MANAGEMENT AND INTEGRATION

WBS 1.2.4.1.1 Management

SNL staff members have completed work on the FY 87 budget and milestone information for the management information system survey. Other activities scheduled for this SNL task during September 1986 were suspended because of the effort required for preparation of SCP Chapter 6 comment response.

WBS 1.2.4.1.2 Basis for Design

A system engineering meeting was held in Las Vegas, Nevada, to determine the extent of rewriting necessary to accomplish DOE/HQ guidance for the NNWSI Project requirements documents, including the SDR. On September 17, 1986, SNL staff members responded with a letter detailing a recommendation to meet the intent of the guidance with minimal adverse cost and schedule impacts.

The interface control drawing for the men and materials shaft was completed by Parsons Brinckerhoff Quade & Douglas.

WBS 1.2.4.1.3 Major Design Deliverables

The storyboard annotated outline for Chapters 6, 7, and 8 of the SCP-CDR has been developed, reviewed, and given to the authors for guidance in text development.

WBS 1.2.4.1.4 Engineering Design Support: Special Studies

SNL peer review has resumed for the contractor report by Bechtel National, Inc., entitled "An Engineering Study of the Impact on Costs and Schedules of Using a Monitored Retrievable Storage Facility in Conjunction with a Repository in Tuff at Yucca Mountain" (SAND85-7112). This document will satisfy Milestone R060. Reviewers comments are being addressed by discussion with the reviewers.

WBS 1.2.4.1.5 Management and Integration Support

SAIC staff members provided SCP Chapter 8 PIRC review comments with respect to performance assessment to WMPO and completed revision of SCP Section 8.7, Documentation and Decommissioning. In addition, they reviewed and provided comments on the OGR Work Breakdown Structure (WBS) Dictionary (OGD Baseline Document OGR/B-4).

SAIC personnel issued the ESF Design Interface Control Procedure to WMPO for review and distribution.

Members of the SAIC engineering staff visited the G-Tunnel facility to examine geotechnical work, excavation, and rock support techniques for application to the ESF design. They also inspected the underground facilities at the Climax Project facility and inspected ESF shaft locations in Coyote Wash at the NTS to see if major joints and fracture or breccia zones were present. No major geological defects were found.

WBS 1.2.4.2 DEVELOPMENT AND TESTING

WBS 1.2.4.2.1 Rock Mechanics

WBS 1.2.4.2.1.1 Rock Mass Analysis

Efforts by SNL staff to complete the four-year plan, task statement memorandum, and revision of SCP Chapters 6 and 8 continued and superseded all other work for this WBS task.

Work began on the analysis of the G-Tunnel heated block experiment ("Final Report--G-Tunnel Heated Block Experiment" (SAND84-2620)). The work involves retrieving the data tapes and plotting load and response histories for the block for ambient and thermal cycles. If this analysis is successful, it will form the basis for writing a problem-definition memo to analyze the experiment using finite-element methods.

Revision of the SNL draft of "Analysis for G-Tunnel Field Experiment Small-Diameter Heater" (SAND85-7115) received from RE/SPEC, Inc., has been delayed because of other commitments.

The effort by SNL staff members to summarize the results pertinent to Thermomechanics Analysis #7, "Near-Field Borehole Thermomechanical," was delayed because of other commitments. The results will be reviewed with the intention of combining all of the work into a report as a supporting reference to the SCP-CDR.

WBS 1.2.4.2.1.2 Field Testing

Quality assurance level assignments were approved on September 19, 1986, for SNL pressurized slot testing. High-pressure testing began on September 25, 1986. A flatjack pressure of 14 MPa was reached, and then a leak developed. The flatjack will be removed, inspected, and, if possible, repaired so that higher pressures can be reached.

WBS 1.2.4.2.1.3 Laboratory Properties

The SNL document entitled "Effects of Sample Size on the Mechanical Properties of Topopah Spring Tuff" (SAND85-0709) was published.

The SNL document entitled "Bulk, Thermal, and Mechanical Properties of the Topopah Spring Member of the Paintbrush Tuff, Yucca Mountain, Nevada" (SAND85-0762) was submitted for peer review. Submission of this report to WMPO will satisfy Milestone N403.

The remainder of SNL staff time in the laboratory properties task was devoted to preparation of portions of SCP Chapter 8 and on final work and reference verification on SCP Chapter 2.

WBS 1.2.4.2.1.4 Water-Migration Analysis

The SNL report entitled "A Continuum Model for Water Movement in a Fractured Rock Mass" (SAND86-0517J) has been sent to WMPO for approval.

In conjunction with staff of the USGS, SNL personnel modified sections of Chapter 3 of the SCP related to the hydrology in the unsaturated zone. The modifications were made to resolve comments from PIRC 3.

The SNL conference paper entitled "Influence of Transverse Microfractures on the Imbibition of Water into Initially Dry Tuffaceous Rock" (SAND86-0420C) was approved by WMPO. The paper will be presented at the next American Geophysical Union meeting.

WBS 1.2.4.2.2 Equipment and Instrumentation Development

SNL Milestone M295, Feasibility Analysis of Horizontal Emplacement and Retrieval was completed with the publication of an SNL letter report entitled "An Assessment of the Feasibility of Disposing of Nuclear Waste in a Horizontal Configuration." This report was transmitted to WMPO on September 3, 1986, and also satisfies WMPO Action Item 86-2039. When approval is granted by DOE/HQ, it is anticipated that the contract for the development prototype boring machine will be placed with the Robbins Co.

WBS 1.2.4.2.3 Sealing

WBS 1.2.4.2.3.2 Seal Materials Evaluation

At Los Alamos work continued on supporting documents for the Site Characterization Plan. Sealing materials evaluation conducted at Los Alamos and through Los Alamos at Pennsylvania State University will be terminated at the end of September. Current work is directed to complete the following three reports: "Preliminary Survey of the Stability of Silica-Rich Cementitious Mortars (82-22 and 84-12) with Tuff," "Reactivity of a Tuff-Bearing Concrete: CL-40 CON-14," and "Ancient Concrete Studies as Analogs of Cementitious Sealing Materials for a Tuff Repository."

Pennsylvania State University has also provided a summary of additional work that would be necessary if cementitious sealing materials are to be incorporated into a repository design. This work includes determination of the

physical properties of sealing materials that have undergone mineralogic alteration and determination of the stability of important cementitious mineral assemblages, particularly truscottite, truscottite plus quartz, and aluminum tobermorite plus quartz.

WBS 1.2.4.3 FACILITIES

WBS 1.2.4.3.2 Surface Facilities

Bechtel National, Inc., provided SNL with draft inputs to the OGR consolidation study. Work is progressing satisfactorily on the repository options study, site-generated waste study, and design margins philosophy. The draft reports on these studies from Bechtel are expected to be available for SNL review by mid-December 1986.

WBS 1.2.4.3.3 Shaft/Ramps

Preliminary work has been completed by SNL staff members on the trade-off study to investigate the type of hoists to be used, the shaft collar design, and the underground ventilation system interface at the shaft collar. This work will be reported in an SNL report.

WBS 1.2.4.3.4 Underground Excavations

An SNL underground design data sheet will provide information pertinent to the underground design in a summary format. Included will be information that is not recorded elsewhere: tons of rock mined, length of drifts, grades, elevations, construction material quantities, and ventilation flows. This data sheet will be used for design changes, and may be included in the Reference Information Base to provide a means of distribution and content control.

The SNL drawings for the underground portion of the repository have been compiled and will be submitted for approval. These drawings will be used in the SCP-CDR. The delay in the delivery of these drawings is a result of late changes in the waste package design that impact the waste emplacement geometry.

No underground design work will be undertaken at SNL until the location and size of the exploratory shaft have been determined. After location and sizes are finalized, the underground design will be modified.

WBS 1.2.4.3.5 Underground Service System

SNL staff members have completed the logic diagrams for underground waste handling and emplacement. These diagrams are to be included in the repository operations plan. They are the basis for determining personnel, equipment, and material needs.

WBS 1.2.4.4 OPERATIONS AND MAINTENANCE

Two progress review meetings were held at SNL in September 1986 to discuss the Reference Configuration Operations Plan. At these meetings, preliminary block flow diagrams, requirement allocation sheets, timeline diagrams, and organization charts were reviewed. The annotated outline was revised for clarification

of the tasks involved. A statement of assumptions was prepared to correct the criteria for the operations plan. The statement of assumptions will be included in a revised design investigation memo.

The SNL report on the NNWSI Project consolidation study was revised to incorporate the comments of the coauthors and SNL peer reviewers and was submitted for management review. The document is entitled "The Effect of Fuel Rod Consolidation on the Cost of Spent Fuel Disposal at the Yucca Mountain Repository" (SAND85-1694).

Preliminary repository life-cycle cost estimates for all four cases of the OGR consolidation study have been completed by Bechtel National, Inc., Parsons Brinckerhoff Quade & Douglas, and Los Alamos Technical Associates. Some minor inconsistencies between the Parsons Brinckerhoff Quade & Douglas estimates have resulted from confusion regarding last-minute changes in disposal container quantities, fuel loadings, and thermal power values. The importance of these inconsistencies will be determined following a cost resolution meeting at DOE/HQ at which the three repository projects will "fine-tune" the cost bases for the studies.

WBS 1.2.4.5 DECOMMISSIONING

Work at SNL on decommissioning will be postponed until the SCP and SCP-CDR are nearly completed.

WBS 1.2.4.6 REPOSITORY PERFORMANCE ASSESSMENT

WBS 1.2.4.6.1 Performance Code Development and Certification

Work at SNL to complete the four-year plan, task statement memorandum, and the revision of SCP Chapters 6 and 8 continued and superseded all other work in this WBS task.

The SNL Applied Mechanics Division staff is documenting the coding of the compliant joint model in the code JAC. Currently the link between the compliant joint material model and JAC is being documented. The work was described in a draft report entitled "A Computational Model for Jointed Media with Orthogonal Sets of Joints" (SAND86-1122). During September 1986, the report completed peer review and was submitted for line review.

RE/SPEC staff members initiated two new documentation tasks during September 1986. The contractor was asked to prepare documentation for the joint empirical model and the SPECTROM-31 User's Manual. The work will take about one year to complete. Both tasks were part of the work requested under the existing contract.

WBS 1.2.4.6.2 Design Analysis

During September 1986, a draft memo comparing the capacity of Yucca Mountain to the size of the underground facility was submitted for review. This memo reviews current information by considering the effects of areal power density,

uncertainty in the geology, and waste characteristics to determine the available area and compare it to the area required. Recommendations for site characterization and design are also included

An SNL problem-definition memo and a memo on the effects of porosity on emplacement drift stability were drafted. This work is preliminary to reevaluating the distinction between the high and low lithophysae portions of the Topopah Spring Member. The choice needs to be reevaluated considering actual design performance.

WBS 1.2.4.6.3 Preclosure Safety Analysis

Work on development of a Q-list for the SCP and SCP-CDR continued at SNL and is nearing completion. Progress review comments on all three sections (important to safety, retrievability, and waste isolation) have been sent to Bechtel National, Inc. The final report should be issued for approval during October 1986.

Comments from SNL and Bechtel on the NRC document entitled "Draft Generic Technical Position on Items and Activities in the High-Level Waste Geologic Repository Program Subject to 10 CFR Part 60 Quality Assurance Requirements" were sent to WMPO.

PIRC 8 is continuing with the member reviews of SCP radiation protection sections.

PLANNED WORK

SNL staff will continue refinement of the SDR according to directives from DOE/HQ on reformatting to a program-wide physical subsystem structure. Interface control drawings will be created during the fall of 1986.

During October 1986 at SNL, an intensive text-writing session will provide further text development for SCP-CDR Chapters 1 through 5 and initial text for Chapters 6, 7, and 8.

SNL authors writing text for the SCP-CDR will be called upon to provide review and perhaps revision for SCP Chapters 6 and 8 (as a result of PIRC reviews) during October 1986. This effort will require that the authors' time be diverted from the SCP-CDR as needed.

SCP Chapters 6 and 8 will be modified through the PIRC process, and this work will supersede all work planned at SNL for the rock mass analysis task. All schedules for work are expected to be delayed.

A problem definition memo will be written to define an analysis of the G-Tunnel mining evaluation experiment. The experiment was analyzed previously, but upon developing the drift, the stratigraphy was found to be different than had been envisioned. Also, the room shape was dimensional in accord with the current reference shape for the repository horizontal emplacement scheme.

The SNL report entitled "Analysis for G-Tunnel Field Experiment Small-Diameter Heater" will be revised. This report will satisfy Milestone R083.

Work will be initiated by staff at SNL on Thermomechanics Analysis #14, "Analysis of In Situ Stress at Yucca Mountain using a Compliant Joint Model."

During the period from October through December 1986, three SNL draft reports on properties of the Topopah Spring Member will be completed. The report subjects include thermal properties of lithophysae-rich material, a summary of mechanical properties of samples from USW G-2, and a summary of bulk, thermal, and mechanical properties of matrix material.

Work on SNL Milestone P404 will continue. The document should be submitted to peer review in October 1986. Work on the exploratory shaft performance analyses study will resume.

SNL staff commitments to review and rewrite SCP Chapters 6 and 8 will supersede all work planned for the performance code development and certification task. All schedules for work are expected to be delayed accordingly.

Work at SNL will continue on a verification and validation plan for thermal and mechanical codes to meet criteria in NNWSI Project SOP-03-02. A concentrated effort is being made to write a plan for documenting compliant joint material models.

During October 1986, SNL staff members will place major emphasis on work on the SCP-CDR. Work will continue on preparing reports of contractor work (Milestones N414 and N452) and other documentation required for support of the SCP.

PIRC 8 review of characterization issues related to radiation safety will begin. Comment Response Forms on all PIRC 8 sections are due by October 22, 1986, and a comment resolution meeting should take place near the end of October 1986.

SNL personnel will begin work on normal and accident conditions radiological safety analyses.

The SCP and SCP-CDR Q-list work will be completed by SNL staff members and the final report will be issued for approval.

Work on the sealing materials evaluation at Los Alamos will be terminated at the end of this month, with the exception of the publication of three reports.

PROBLEM AREAS

If the recommendations of the SNL letter dated September 17, 1986, are not agreed to by DOE/HQ, a major rewrite of the SDR will be required at a cost of two-to-three man-years and a delay of four-to-six months.

SNL editorial staff members working on review comments for the report on the impact on costs and schedules of the use of a monitored retrievable storage facility in conjunction with a Yucca Mountain repository will also be required to support upcoming intensive activities on the SCP-CDR. The estimated rescheduled date for Milestone R060 is January 16, 1987.

MILESTONE PROGRESS

The planned completion date for SNL Milestone P312 has been changed from August 1, 1987, to February 1, 1988.

SNL Milestone N430, to start the repository advanced conceptual design, has a new completion date estimated to be January 5, 1987.

SNL Milestones M444, the update on rockmass properties for conceptual design, and R083, numerical analysis of small-diameter heater experiments, have been delayed. New estimated completion dates are March 30, 1987, and March 28, 1987, respectively.

SNL Milestone N496, a report on properties of fractures in the Topopah Spring Member, has been delayed and the new estimated completion date is October 31, 1986.

SNL Milestone N498, the report on mercury intrusion results for tuffaceous materials from Yucca Mountain, is delayed because of SCP activities and the new estimated date of completion is October 30, 1986.

SNL Milestones N463 and N464 are delayed because of the time and manpower requirements of the SCP and SCP-CDR work. They have been rescheduled to June 30, 1988.

Completion dates for other delayed SNL milestones are as follows:

N406, horizontal waste emplacement equipment development plan, December 31, 1986.

N427, Initiate procurement of development prototype boring machine, November 1, 1986.

N440, vertical waste emplacement system conceptual design, November 30, 1986.

N450, Horizontal waste emplacement system conceptual design, October 31, 1986.

P131, report on an all-electric transporter for waste at the Yucca Mountain repository, November 15, 1986.

P404, prepare design-requirements and materials-recommendation report, January 15, 1987.

R036, analyses to evaluate the effect of the exploratory shaft on repository performance at Yucca Mountain, January 15, 1987.

R062, mechanical compatibility between select cementituous material and Topopah Spring Member tuff, January 31, 1987.

R063, development and application of a computer program for prediction of thermal loading due to the hydration of cement (SAND86-7007), January 31, 1987.

M462, sealing field test requirements letter report, January 31, 1987.

R037, modification of hydraulic conductivities surrounding a vertical excavation in tuff, January 15, 1987.

P129, report on the welded tuff mining demonstration performed at the G-Tunnel facility on the NTS, November 30, 1986.

P130, report on the effect of horizontal borehole length on the underground emplacement costs, December 15, 1986.

R266, draft report on spent fuel rod consolidation, November 30, 1986.

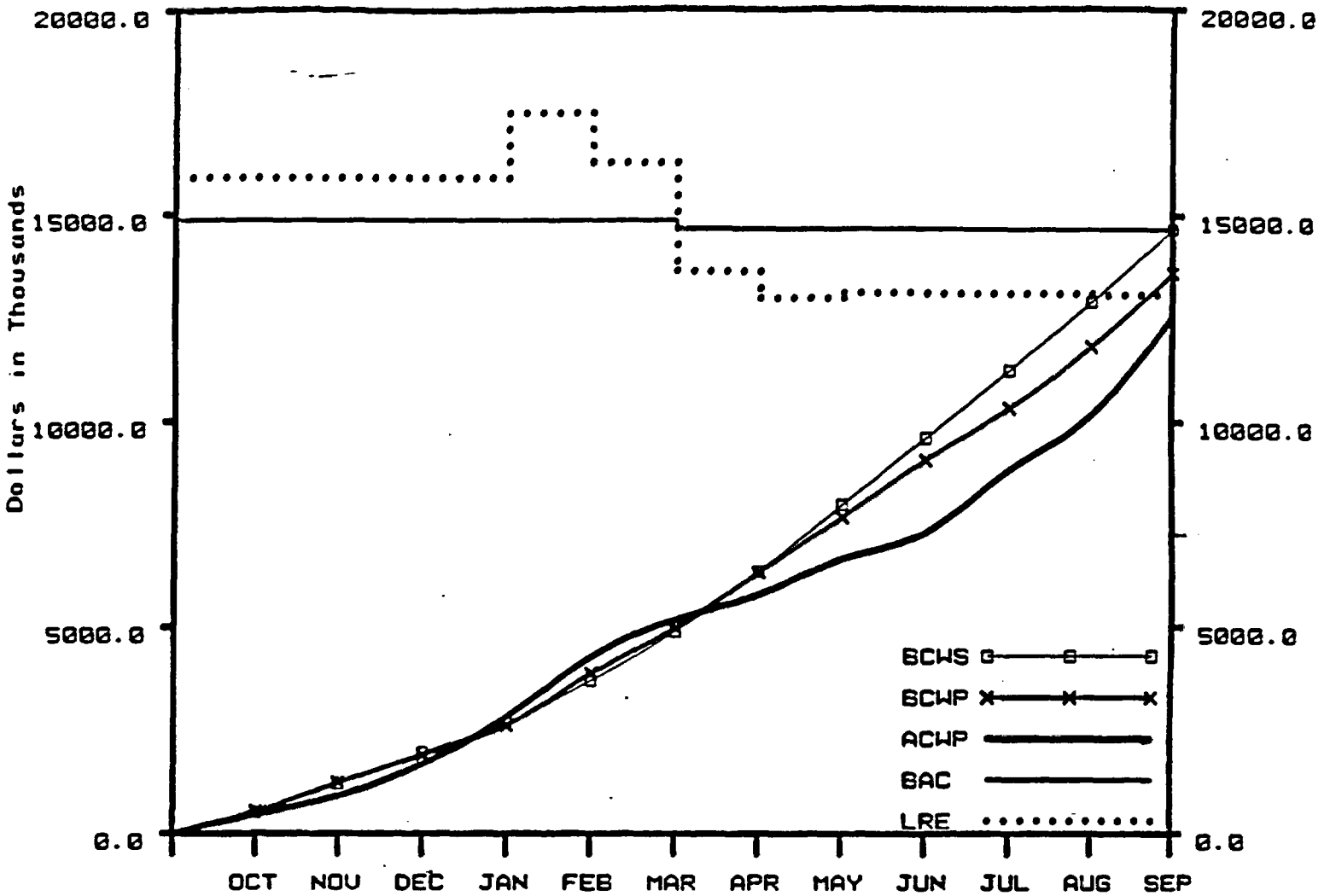
R267, final report on spent fuel rod consolidation, December 31, 1986.

N414, shaft versus ramp emplacement panel interaction, March 31, 1987.

SNL Milestone M491, the summary report on thermomechanical analysis as an SCP reference, will be deleted under current planning.

SNL Milestone N413, minimum borehole spacing, will be deleted by CCB action.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.4



REPOSITORY INVESTIGATIONS	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	1759.7	14664.6
B. BUDGETED COST OF WORK PERFORMED (BCWP)	1777.1	13596.8
C. ACTUAL COST OF WORK PERFORMED (ACWP)	2380.3	12540.3
D. BUDGET AT COMPLETION (BAC)		14664.6
E. LATEST REVISED ESTIMATE (LRE)		13067.0

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	-1067.8	-7.28
G. COST VARIANCE (B-C)	1056.6	7.77
H. AT COMPLETION VARIANCE (D-E)	1597.6	10.89

COST PERFORMANCE REPORT
WBS LEVEL 4
U.S. DEPARTMENT OF ENERGY
NNWSI PROJECT

For: SEP 1986

Date: October 30, 1986

WBS NUMBER AND DESCRIPTION		YEAR TO DATE				
		BUD. COST OF WORK SCHEDULED	BUD. COST OF WORK PERFORMED	ACTUAL COST OF WORK PERFORMED	VARIANCES SCHEDULE	VARIANCES COST
1241	Management and Integration	4,922.600	4,922.488	5,354.063	-.112	-431.576
1242	Development and Testing	5,096.000	4,029.078	3,828.200	-1,066.922	200.878
1243	Facilities	2,937.000	2,936.335	2,126.000	-.665	810.335
1244	Operations and Maintenance	441.000	441.014	430.000	.014	11.014
1245	Decommisioning	48.000	48.000	.000	.000	48.000
1246	Repository Performance Assessment	1,220.000	1,219.912	802.000	-.088	417.912
124	REPOSITORY INVESTIGATIONS	14,664.600	13,596.828	12,540.263	-1,067.772	1,056.564

MILE-STONE	RESP. AGENCY	WBS	MILESTONE DESCRIPTION	O	N	D	J	F	M	A	M	J	J	A	S	
N457	SNL	1.2.4.6	Preliminary Study of the Effects of Uncertain Geologic Data on Design of the Underground Facility											△		◇ 2/87
P404	SNL	1.2.4.2	Prepare Design Requirements & Materials Recommendation Report										△		◇	◇ 3/87
M802	SNL	1.2.4.1	Review of Concepts Developed by HEDL for Remote/ Automated Waste Handling Systems										△	◆		
M806	SNL	1.2.4.1	Assistance to HEDL in Defining Remote/Automated Waste Handling Systems	△											◇	◇ 10/86
N430	SNL	1.2.4.1	Start Repository Advanced Conceptual Design									△				◇ 1/87
N432	SNL	1.2.4.1	Repository Conceptual Design in Support of Site Characterization													△ 12/86 ◇ 5/87
N433	SNL	1.2.4.1	Initial Subsystem Design Requirement (SDR)				△									◇ 10/86
M295	SNL	1.2.4.2	Feasibility Analysis o Horizontal Emplacement & Retrieval - Letter Report	△											◆	
N406	SNL	1.2.4.2	Horizontal Waste Emplacement Equipment Development Plan							△						◇ 1/87
M455	SNL	1.2.4.2	Report on G-Tunnel Underground Facility (G-TUFF) Summary												△	◇ 1/87

△ PLANNED MILESTONE COMPLETION DATE
◇ REVISED MILESTONE COMPLETION DATE
▲ COMPLETED AS SCHEDULED
◆ COMPLETED AS REVISED

1.2.5 REGULATORY AND INSTITUTIONAL INVESTIGATIONS

OBJECTIVE

The objective of the regulatory and institutional investigations task is to provide the capability for interfacing with all the institutions and to meet the requirements identified in various laws and regulations pertaining to the siting, design, and construction of a nuclear waste repository and a test and evaluation facility. The principal laws and regulations which govern the licensing of these include the Atomic Energy Act of 1954, the National Environmental Policy Act (NEPA) of 1969, and the Nuclear Waste Policy Act (NWPA) of 1982, 10 CFR Part 60, and 40 CFR part 191.

ACTIVITIES

WBS 1.2.5.1 MANAGEMENT AND INTEGRATION

During the report period SAIC staff members completed task plan development and started assignments. Several budget cases were developed and analyzed for discussion in the TPO meeting. Budget cases (cost and impact analysis) for all participants for WBS 1.2.5 were integrated by staff members.

Other activities of SAIC personnel for this task included analysis of OGR/B-10 OCRWR Common Issues Hierarchy; preparing a presentation to DOE/HQ on the status of WMPO and Project participant interaction; revising the NNWSI Project SCP management plan to incorporate PIRC concepts; preparing a proposal for the Technical Oversite Committee (TOC) for SCP for WMPO review; reviewing proposed revisions to the SCP annotated outline OGR/B-2 for Sections 8.1 and 8.2 to incorporate the common Issues Hierarchy; and preparing presentation material for the Geosciences Coordinating Group meeting on October 1 and 2, 1986, on NNWSI Project responses to the disturbed zone and the Pre-Waste-Emplacement Ground-Water Travel Time Generic Technical Position.

WBS 1.2.5.2 LICENSING

WBS 1.2.5.2.1 Regulatory Interactions

SNL records and input for the following laboratory tests were submitted to the Data Records Management System:

1. Mineralogical studies of tuff from the University of New Mexico and Los Alamos National Laboratory.

2. Weapons test seismic studies.

3. G-Tunnel mining evaluations.

At SAIC the proposed schedule of NNWSI Project and NRC interactions was finalized in consultation with the TPOs. Schedules for Appendix 7 interactions were based on expected availability of various Site Characterization Plan (SCP)

sections in order to familiarize the NRC with the SCP and the NNWSI Project approach to the resolution. Several technical meetings were proposed to address major technical issues. These issues include methodology for seismic-tectonic design aspects of the advanced conceptual design, exploratory shaft design and construction, exploratory shaft testing, and vein deposits. One Appendix 7 meeting was also proposed to inform the NRC of Project plans for core and sample management. These interactions were to begin in October 1986 and be completed in January 1987. The proposed schedule also identified meeting prerequisites--those documents, decisions, or reviews which had to be completed prior to the interactions. The proposed schedule was submitted to DOE/HQ in August 1986. Informal communication with DOE/HQ subsequently notified the NNWSI Project that Project meetings would not be scheduled with the NRC until certain ground rules for such meetings have been established. It is expected that discussions of scheduling will begin in November 1986.

The NNWSI Project Technical Data Base Management Coordinating Group, established to coordinate the implementation of the NNWSI Project technical data base, held a planning meeting to identify the necessary activities. WMPO approval was received to prepare Project-level requirements procedures for the data base. All data to be used by the NNWSI Project for development of design, performance assessment, site selection, and the environmental impact statements will be managed by this system.

Comments are currently being prepared at SAIC for draft NRC generic technical positions (GTPs) on Q-list methodology, ground-water travel time, and the definition of the disturbed zone. Previously developed comments on the draft Qualification of Existing Data GTP were transmitted to DOE/HQ by WMPO.

A revised and expanded version of the draft discussion paper on repository area designations, boundaries, and dose limits was prepared and transmitted to WMPO. An earlier draft of the discussion paper was transmitted by WMPO to SNL for comment during September 1986 and comments received will be considered during subsequent revisions. The draft generic requirements for the exploratory shaft facility design construction and operation were reviewed and comments forwarded to WMPO.

SAIC staff members incorporated comments from the TPOs and WMPO staff members for seven NNWSI Project administrative procedures dealing with interactions with the NRC. The procedures were undergoing final review before transmittal to WMPO for approval. The procedures cover the following topics:

7.1 Conduct and Documentation of NRC Meetings.
7.2 Attendance at Technical Meetings with the NRC Conducted by Other Projects.
7.3 Scheduling and Preparation for NNWSI Project/NRC Technical Meetings.
7.4 Scheduling and Preparation for NNWSI Project/NRC Management Meeting.
7.5 Controlling Data Release.
7.6 Communications with the NRC.
7.7 NNWSI Project Interactions with the NRC Onsite Representative.

A Licensing Support System (LSS) Task Group has been formed by DOE/HQ to define and refine the requirements for the LSS and to develop a conceptual

architecture for the system. Two meetings of the task group were held in September. The first meeting was an organizational meeting and the second meeting focused on the LSS document collection process.

Procurement of Information Management Systems (IMS) Bridge Program Equipment was placed on hold by DOE/HQ pending further development of the LSS concept.

WBS 1.2.5.2.2 Site Characterization Plan

The process for completing the SCP is continuing through the use of the Permanent Internal Review Committee (PIRCs). The status of the PIRCs is as follows:

PIRC 1, Geology with Tectonics and Erosion. The Chapter 1 consolidated markup (Sections 1.0 through 1.6) was submitted for production September 18. Section 1.7 (Mineral and Hydrocarbon Resources) is being rewritten by SAIC and will be distributed in early October 1986. A comment resolution meeting (CRM) to discuss the issue resolution strategies (IRS) currently being developed is tentatively planned for October 1986.

PIRC 2, Geoengineering with Rock Characteristics. An editorial review of Chapter 2 took place September 22 through 24. Development of the IRS for preclosure and postclosure rock characteristics is continuing. Following their completion, another PIRC review and CRM will be scheduled.

PIRC 3, Hydrology with Ground-Water Travel Time (GWTT). Sections 3.0 Introduction), 3.9.4 (GWTT), 3.10 (Summary), and 3.6 (Regional Hydrology) are currently being rewritten and should be available in late October 1986. Chapter 8 comments will be addressed following preparation of the IRSs for geohydrology and preclosure hydrology issues, which are expected to be available in draft form in late October 1986. A PIRC review and CRM to discuss the revised and new material is tentatively scheduled for mid-November 1986.

PIRC 4, Geochemistry with Dissolution and Total Releases. An editorial review of Chapter 4 has begun, and a meeting is scheduled from October 7 through 9, 1986, to discuss comments. Preparation of the geochemistry IRS is continuing. A PIRC review and CRM is planned for late October 1986 to discuss the IRS and sections of Chapter 8 that are currently being revised.

PIRC 5, Climate and Meteorology. The revised Paleolakes section was distributed for review by PIRC members. A meeting was held on September 23 to discuss climatic modeling activities; plans for future climatic modeling are still unresolved. Chapter 8 comments have not been addressed since the climate-related IRSs have not been developed. The IRSs should be complete by late October 1986.

PIRC 6, Repository Design and Seals. Work on the consolidated markup is continuing, but faces delay due to scheduling conflicts with authors. Sections on items important to safety and isolation are still missing. Sections 6.0 through 6.2 and Sections 8.3.2.5 and 8.3.3 will be submitted to SAIC by SNL on October 9, 1986. The summary section is being reworked due to DOE/HQ-required format change. Several items still require resolution based on PIRC comments.

PIRC 7, Waste Package. Chapter 7 was distributed to PIRC members on September 10. A partial package of Chapter 8 sections has been received and is expected to be distributed in early October 1986. The schedule for distributing the remaining sections of 8.3.4 and 8.3.5 is unclear, although a CRM has been tentatively set for October 20 through 24, 1986.

PIRC 8, Radiological Safety. Characterization issue write-ups are currently being developed and should be distributed to PIRC members on October 8, 1986. A CRM is tentatively scheduled for October 27 through 31, 1986.

PIRC 9, Reference Verification. Efforts are ongoing for Chapters 1 and 2. A letter has been sent to DOE/HQ requesting support for this activity.

PIRC 10, Site Preparation and Decommissioning. Section 8.7 is in production and Section 8.4 is expected to be submitted on October 3, 1986. The scheduling of PIRC review and comment resolution meeting awaits resolution of ESF design problems.

PIRC 11, Schedules. This section is on hold until Section 8.3 matures and new information is available. A letter has been sent to DOE/HQ requesting support for this activity.

PIRC 12, Performance Assessment. A CRM was held on September 24 and 25. Major programmatic concerns with performance assessment were discussed including quantitative performance goals required by the NRC and the links required from performance assessment to site data needs. Partial sections of 8.3.5.9 (Containment) and 8.3.5.10 (EBS release) were submitted on September 25. Information needs for these sections are not yet available. A second PIRC review is to be scheduled after the package is complete.

PIRC 13, Higher-Level Findings (HLF). A CRM was held on September 22 and 23. Several issues will need to be revised to present a consistent logic in the approach to HLF. Additional work is also required on the siting criteria issue and the issue dealing with the 100,000-year release calculations. A second CRM will be scheduled in late October or early November 1986.

PIRC 14, Project Strategy and Issues Hierarchy. Distribution of the package has been delayed to October 17, 1986, as a result of the draft revised annotated outline that has been received from DOE/HQ for these sections.

PIRC 16, Editorial Consistency Review. This PIRC has reviewed Chapter 2 and held a CRM on September 15 through 17 to discuss comments. Chapter 4 is now in review and a CRM is planned for early October 1986.

PIRC 17, Quality Assurance. Final DOE/HQ guidance was received and the discussion of Q-list Methodology and graded QA can now be incorporated into the text. The PIRC package is expected to be distributed October 15, 1986.

Several problems and concerns have been identified as the PIRC process has progressed:

1. Conflicts among and between PIRCs have caused problems with the PIRC schedules. Some portions of text are not yet available, yet DOE/HQ continues to pressure the NNWSI Project to meet the December schedule. The Project will continue with a "best effort" as agreed with DOE/HQ.

2. There is a lack of consistency in the level of detail and scope of data and parameter lists in the characterization issues and data and parameters called for by some design and performance issues. PIRC 15 (internal consistency) will begin reviewing the document to resolve this problem as soon as all text, including characterization IRS, is available.

3. The plans presented in Section 8.3 are not consistent with the projected budget or WPAS. The Project has recognized the potential need for corrective actions and will work with DOE/HQ to resolve inconsistencies.

4. There is a need to consider the problem of the status of data obtained from cores and whether plans in Section 8.3 will change if limited data from existing core is useable for the licensing process.

5. There is a need to consolidate study plans and provide a list to DOE/HQ of the plans that will be available before and subsequently published with the SCP.

6. A summary of a DOE/HQ SCP management meeting held August 27 through 28, 1986, in Denver has not been received. The summary will provide the guidance for the NNWSI Project to combine information needs and "convert" them into investigations.

7. Proposed future climatic modeling activities have still not been agreed upon. This problem may need to be elevated to management level for a decision.

SAIC/Golden continued to respond to SCP PIRC comments and to participate in PIRC meetings. SAIC/Golden regulatory compliance staff members also initiated the development of an SCP computerized data base management system for use in analysis and revision of the SCP and supporting study plans.

WBS 1.2.5.3 ENVIRONMENTAL COMPLIANCE

WBS 1.2.5.3.1 Environmental Assessment

The EA Administrative Record was reviewed for completeness, updated, and submitted to WMPO. Activities in this cost account ended on September 30, 1986.

WBS 1.2.5.3.2 Environmental Impact Statement

Initial planning for the Environmental Impact Statement (EIS) support documents is underway. The EIS scoping will be delayed until August 1987. No EIS baseline monitoring will occur until FY 88.

WBS 1.2.5.3.3 Environmental Regulatory Interaction

WMPO personnel reviewed the draft Environmental Permit Plan and the Plan was revised in September. The revised plan will be ready for review in October 1986. Preparation of the permit applications continued during this report period.

The Environmental Monitoring and Mitigation Plan preparation continued at SAIC in September. Summary monitoring plans are being written for air quality, radiology, and load disturbance. DOE/HQ comments on the August 29, 1986, draft are due in October 1986.

SAIC staff members prepared a revised draft of the Issues Hierarchy Key Issue 3 and sent it to the NNWSI Project Issues Hierarchy Working Group for review. They also began work on the environmental study plans that will be needed in the SCP and on preparing the Environmental Program Plan (EPP) that will explain how issues and information needs will be resolved. A draft EPP Annotated Table of Contents was presented to WMPO for review. Staff members attended the DOE/HQ Key Issue 3 Working Group meeting on September 16 in Las Vegas.

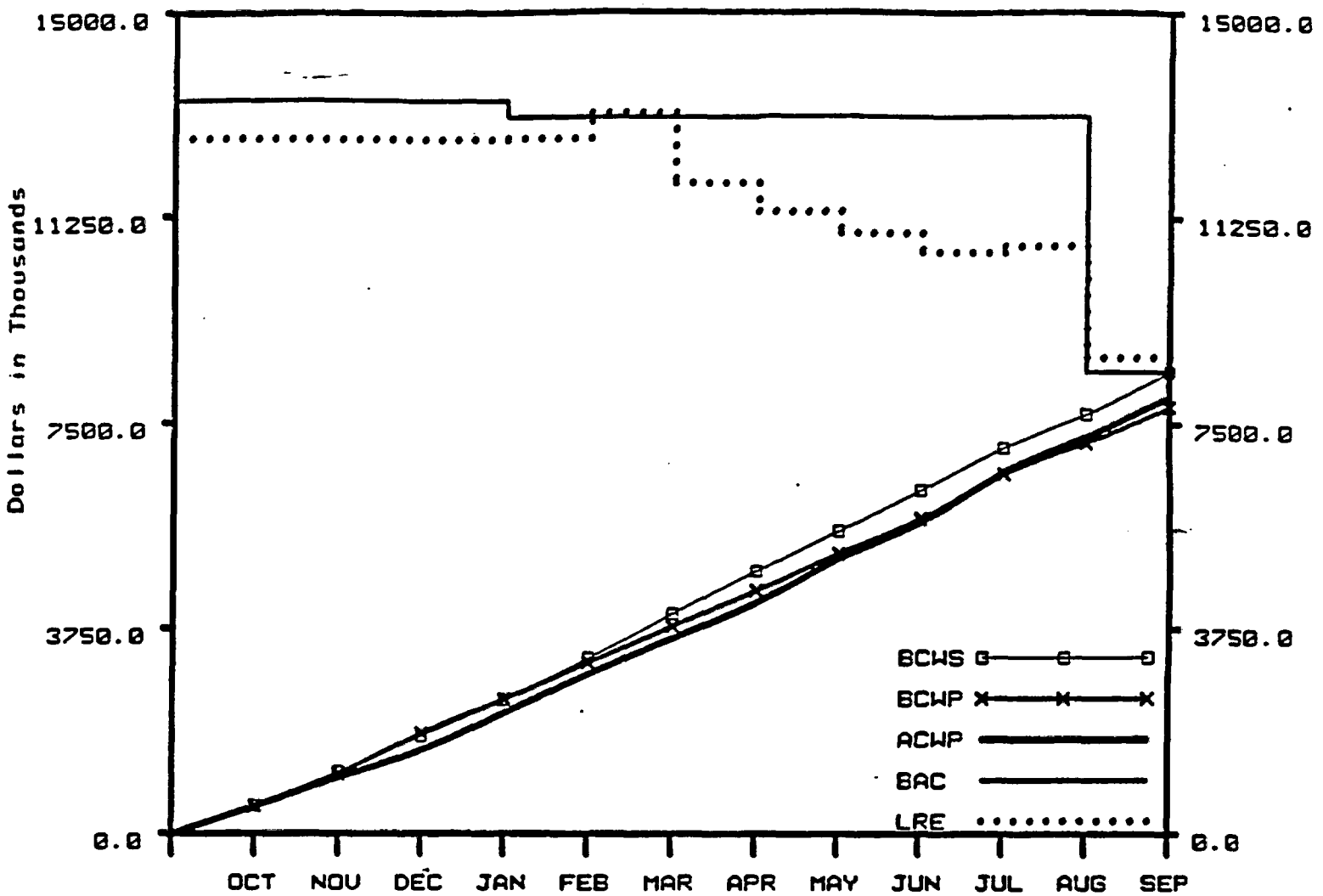
WBS 1.2.5.4.1 Institutional Studies

Staff members at SAIC presented a briefing to WMPO regarding the "NNWSI Project Facility Specific Outreach and Public Participation Plan" on September 8.

SAIC personnel accompanied WMPO representatives to a demonstration by DOE/HQ Office of Policy and Outreach of the staff OPO external interaction tracking system on September 11.

Members of the Institutional Studies staff at SAIC prepared news copy for possible inclusion in the State of Nevada Nuclear Waste Newsletter; reviewed and prepared comments on the Nevada Nuclear Waste Project Office information Fact Sheet #5; and coordinated review comments on the most recent edition of the State of Nevada's Nuclear Waste Project Office Newsletter.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.5



REGULATORY AND INSTITUTIONAL INUESTIGATIONS	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	771.0	8453.0
B. BUDGETED COST OF WORK PERFORMED (BCWP)	656.9	7812.6
C. ACTUAL COST OF WORK PERFORMED (ACWP)	734.7	8081.0
D. BUDGET AT COMPLETION (BAC)		8453.0
E. LATEST REVISED ESTIMATE (LRE)		8710.6

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	-640.4	-7.58
G. COST VARIANCE (B-C)	-188.4	-2.41
H. AT COMPLETION VARIANCE (D-E)	-257.6	-3.05

COST PERFORMANCE REPORT
WBS LEVEL 4
U.S. DEPARTMENT OF ENERGY
NNWSI PROJECT

For: SEP 1986

Date: October 30, 1986

WBS NUMBER AND DESCRIPTION		YEAR TO DATE				
		BUD. COST OF WORK SCHEDULED	BUD. COST OF WORK PERFORMED	ACTUAL COST OF WORK PERFORMED	VARIANCES	
					SCHEDULE	COST
1251	Management and Integration	762.400	762.400	773.128	.000	-10.727
1252	Licensing	6,001.000	5,396.236	5,719.146	-604.764	-322.909
1253	Environmental Compliance	1,397.600	1,361.964	1,250.530	-35.636	111.434
1254	Communication and Liaison	292.000	292.001	258.197	.001	33.803
1255	Technology and Financial Assistance	.000	.000	.000	.000	.000
125	REGULATORY AND INSTITUTIONAL INVESTIGATIONS	8,453.000	7,812.601	8,001.000	-640.399	-188.399

MILE-STONE	RESP. AGENCY	WBS	MILESTONE DESCRIPTION	O	N	D	J	F	M	A	M	J	J	A	S	
M521	SAIC	1.2.5.2	Draft Site Characterization Plan											△		◇ 11/86
M522	SAIC	1.2.5.2	Site Characterization Plan											△ 11/86		◇ 12/86
M504	SAIC	1.2.5.3	Final Environmental Assessment				▲									
M855	SAIC	1.2.5.2	Issue IMS Requirement Study to WMPO/NV for Review and Comment												△	◇ 12/86
P054	SAIC	1.2.5.3	Revised Camera-Ready Environmental Assessment/Comment Response Appendix							▲						

△ PLANNED MILESTONE COMPLETION DATE

◇ REVISED MILESTONE COMPLETION DATE

▲ COMPLETED AS SCHEDULED

◆ COMPLETED AS REVISED

1.2.6 EXPLORATORY SHAFT INVESTIGATIONS

OBJECTIVE

The objective of this task is to identify and plan the tests that need to be conducted at the repository horizon as a part of detailed site characterization and to design and construct the Exploratory Shaft (ES) and the underground test area in Yucca Mountain. The primary focus of this effort will be to establish the basis for evaluating the unsaturated zone in a welded tuff formation. In addition, an effort will be made to define the nature of the unsaturated zone with regard to water content and water movement, and the nature of the natural barriers between the repository horizon and the static water level.

ACTIVITIES

WBS 1.2.6.1 MANAGEMENT AND INTEGRATION

WBS 1.2.6.1.1 Exploratory Shaft Management, Planning, and Design Review

The REECo Contract Administration Department Manager attended a meeting on September 10, 1986, with representatives of WMPO and SAIC to discuss reporting requirements for cost and socioeconomic factors. REECo will prepare a sample format for the breakdown estimate to be submitted by the subcontractors for work on the NNWSI Project. When socioeconomic requirements have been drafted, REECo personnel will review them for feasibility and applicability to the construction subcontract requirements.

Los Alamos personnel completed a review of Appendix B to the ESF subsystems design requirements (SDR) document. Appendix B addresses testing needs for the ESF. This draft was then modified and sent to the Principal Investigators for their review. Comments will be solicited on Appendix B at the upcoming ES Test Plan Committee meeting. Appendix B is also being reviewed by Stearns-Catalytic.

The draft version of Appendix C to the ESF SDR document is nearing completion. Appendix C lists the core holes and boreholes that will be drilled in the ESF.

Appendix A has been reserved for the approved quality assurance level assignments for ESF design, construction, and operations. Appendix A is still being reviewed by WMPO.

Los Alamos personnel presented an estimate for the cost of prototype testing, including both construction support of prototype testing and the actual prototype testing, to WMPO and the Technical Project Officers.

Los Alamos staff members submitted revised quality assurance level assignments for the ESF management, planning, and design reviews task to WMPO on September 3, 1986. Interim assignments indicate that Title I design will be a QA Level II, at least until the detailed QALAS are submitted.

The Los Alamos Technical Engineering Support Group QA procedure for ESF design control and review was approved and distributed.

A meeting was held on September 10, to discuss the transfer of responsibility from the Los Alamos Technical Engineering Support Group to WMPO for activities associated with management, planning, and design review. The Los Alamos Technical Engineering Support Group will still participate in these activities but on an as-requested basis.

Work at Los Alamos has continued on developing a new budget for ESF activities. The new budget is required to meet a 43 percent cutback in projected funds for FY 87. Basically, the new budget will call for funding of prototype testing, completion of the ESF design, and maintenance of the key staff. Funds will not be requested for ESF construction and downhole testing.

WBS 1.2.6.1.2 Safety and Quality Assurance

Revision 4 of the REECo Quality Assurance Program Plan was amended to include WMPO directed changes, revisions, and comments.

REECo staff members resolved findings resulting from the WMPO audit during discussions with SAIC.

WBS 1.2.6.9 TESTING

WBS 1.2.6.9.1 Exploratory Shaft Test Plan

The principal focus of Los Alamos work this month was on completing the reviews of the proposed prototype tests and preparing the final recommendations for funding the work. A fourth budget and logic network were developed to correspond to the scope of work recommended to WMPO.

Three mineralogy and petrology plans (a subset of the geology testing under WBS 1.2.6.9.2.1) were prepared by Los Alamos investigators. The exploratory shaft test plan (ESTP) quality assurance level assignments were approved; development of the ESTP is QA Level III.

WBS 1.2.6.9.2 Exploratory Shaft Testing

WBS 1.2.6.9.2.1 Geologic Testing

USBR staff members held meetings to compile data and write scientific investigation planning (SIP) documentation for the shaft and drift wall mapping. Rough drafts have been completed.

WBS 1.2.6.9.2.2 Hydrologic Testing

Work continued at SNL on Thermomechanics Analysis #6, which is being performed in support of the sequential drift mining experiment proposed for the exploratory shaft. The calculations for the two-dimensional elevation-view analysis have been completed. Work continued on the "plan view." This analysis will be three dimensional to capture effects of the advancing

excavation front. Effort has been devoted to developing pre- and postprocessing capabilities to facilitate analysis of calculated results. Now that the capabilities have been developed, test problems are in progress.

SNL peer review of the slot strength test analysis report was completed, and the report was submitted for line review.

On September 9, 1986, the results and implications of all available pretest analyses (mining evaluation, demonstration breakout room, and shaft convergence test) for proposed exploratory shaft experiments were reviewed by SNL staff members.

Staff members at USBR completed a three-dimensional graphic of the G-Tunnel underground facility showing proposed hydrologic prototype test locations. Updates will be made as the prototype test plan is refined. They also prioritized prototype tests.

WBS 1.2.6.9.2.4 Geochemical Testing

The Los Alamos SIP documentation and associated quality assurance level assignments were modified in accordance with comments from the WMPO review and resubmitted for Los Alamos and WMPO approvals.

A Los Alamos staff member gave an invited talk titled "In Situ Geochemical Measurements in the Exploratory Shaft at Yucca Mountain" at the 192nd National American Chemical Society meeting, which was held in Anaheim, California, from September 7 through 12. This talk was part of a symposium on Geochemical Analysis of Radioactive Waste Disposal.

WBS 1.2.6.9.3 Shaft Integrated Data System

At Los Alamos staff members completed the draft integrated data system requirements document as well as technical and policy reviews. The document should be sent to WMPO during the week of October 6. The document will be baselined after revision and approval. The final draft of the document was given to affected Principal Investigators (PIs) at the September 25 and 26 meeting of the ESTP Committee.

WBS 1.2.6.9.4 Prototype Testing

On September 25 and 26, 1986, Project participants attended an Exploratory Shaft Test Plan Committee (ESTPC) meeting in Las Vegas, Nevada. Plans for future prototype testing were made.

PLANNED WORK

SNL personnel will continue work on the analysis of the proposed plate loading experiment and the sequential drift mining experiment. The sequential drift mining analysis will begin redirection to the "plan view" geometry.

Once the budget for prototype testing is approved, Los Alamos investigators will start detailed planning, including design work, schedules, work plans, and more integration of the tests.

Technical reviews of the ESTP by Los Alamos consultants will proceed, if there is funding to do so.

SIP documentation will be prepared for each of the Los Alamos geochemical tests proposed as part of the exploratory shaft work.

PROBLEM AREAS

The special study work plan budgets and schedules for F&S were predicated upon approval of the work plans by September 15, 1986. Schedule slippage because of this lack of study approvals will be evaluated and reflected in a new project schedule. While the schedule has apparently slipped three or more weeks, study data searches conducted in the interim should reduce schedule impact.

F&S needs quality level assignments for specific design items (study activities are presently being accomplished under Quality Level II), official definition of the NNWSI Project Exploratory Drilling Program for FY 87, layout of test repository drifts from Los Alamos to include total footage to be mined in the test bed, DOE-Approved Appendix B (Test Requirement Data Sheets) of the ESF Subsystems Design Requirement Document, and final approval of F&S Tulsa ESF Design Study Work Plans.

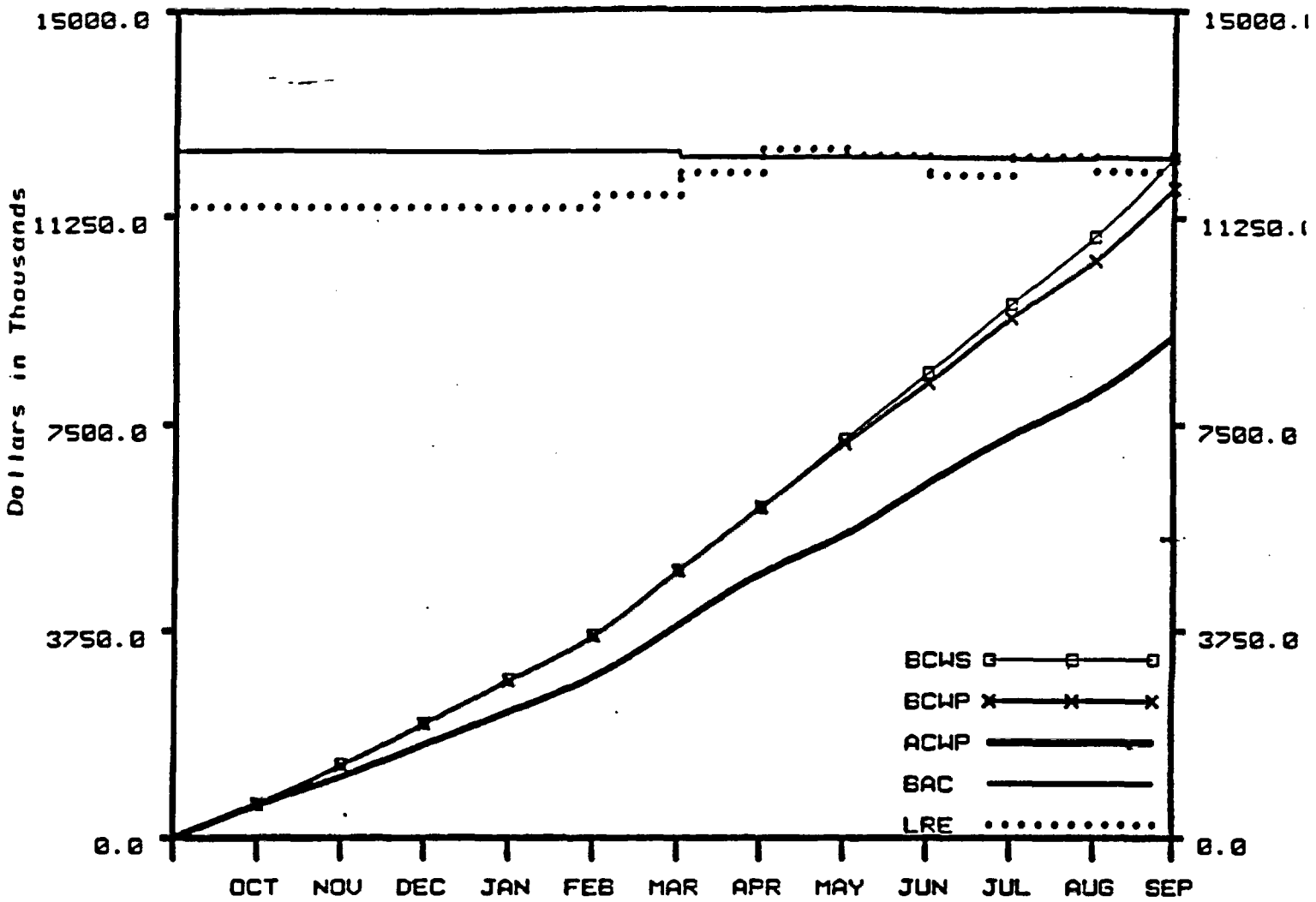
The budget uncertainty is making it difficult to do mid- to long-range planning for the ESTP and prototype testing. Los Alamos does not have sufficient staff to manage and coordinate both a full prototype testing program and the ESTP development work.

MILESTONE PROGRESS

SNL Milestone R085, geochemical input complete for exploratory shaft testing, is delayed; the new estimated date of completion is October 30, 1986.

SNL Milestone R086, definition of technical procedures required to be prepared for exploratory shaft testing, has been delayed until November 30, 1986.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.6



EXPLORATORY SHAFT INVESTIGATIONS	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	1449.8	12341.7
B. BUDGETED COST OF WORK PERFORMED (BCWP)	1318.2	11781.6
C. ACTUAL COST OF WORK PERFORMED (ACWP)	1032.8	9097.0
D. BUDGET AT COMPLETION (BAC)		12341.7
E. LATEST REVISED ESTIMATE (LRE)		12081.1

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	-560.1	-4.54
G. COST VARIANCE (B-C)	2684.6	22.79
H. AT COMPLETION VARIANCE (D-E)	260.6	2.11

COST PERFORMANCE REPORT
WBS LEVEL 4
U.S. DEPARTMENT OF ENERGY
NNWSI PROJECT

For: SEP 1986

Date: October 30, 1986

WBS NUMBER AND DESCRIPTION		YEAR TO DATE				
		BUD. COST OF WORK SCHEDULED	BUD. COST OF WORK PERFORMED	ACTUAL COST OF WORK PERFORMED	VARIANCES SCHEDULE	VARIANCES COST
1261	Management and Integration	2,930.500	2,930.447	2,858.693	-.053	71.754
1262	Site Preparation	111.300	111.300	124.800	-.000	-13.500
1263	Surface Facilities	21.200	21.200	14.200	.000	7.000
1264	First Shaft	114.400	114.400	277.487	.000	-163.087
1265	Second Shaft	31.000	31.000	70.614	.000	-39.614
1266	Subsurface Excavations	265.200	265.200	204.295	-.000	60.905
1267	Underground Service Systems	393.500	393.500	300 054	.000	93.446
1268	Operations	.000	.000	.000	.000	.000
1269	Testing	8,474.600	7,914.526	5,246.872	-560.074	2,667.654
126	EXPLORATORY SHAFT INVESTIGATIONS	12,341.700	11,781.574	9,097.015	-560.126	2,684.559

MILE-STONE	RESP. AGENCY	WBS	MILESTONE DESCRIPTION	O	N	D	J	F	M	A	M	J	J	A	S	
M022	LANL	1.2.6.1	ESF Shaft and Mining Subcontract Awarded						△							◇ 8/87
M243	LANL	1.2.6.1	Complete Exploratory Shaft Readiness Review					△								◇ 4/88
M652	LANL	1.2.6.1	Start First Shaft (ES-1) Construction							△						◇ 5/88
M645	LANL	1.2.6.2	Start ESF Site Preparation													△ 12/86 ◇ 12/87
M612	LANL	1.2.6.9	Begin ESF Testing													△ 5/87 ◇ 5/88

△ PLANNED MILESTONE COMPLETION DATE

◇ REVISED MILESTONE COMPLETION DATE

▲ COMPLETED AS SCHEDULED

◆ COMPLETED AS REVISED

1.2.7 TEST FACILITIES

OBJECTIVE

The major objective of this task is the design, construction, and operation of the test facilities that support technology development for other waste management programs and other geologic repository projects. The two major facilities operated under this WBS element are the Climax Spent Fuel Test Facility and the E-MAD Facility.

ACTIVITIES

WBS 1.2.7.1

REECo personnel began removing the inoperable flat jack from slot No. 1 in the small heated block alcove.

The G-Tunnel Prototype Testing Plan, compiled by Los Alamos, was reviewed by REECo, and comments on the plan were forwarded to WMPO on September 19.

WBS 1.2.7.2 TESTING

WBS 1.2.7.2.2 E-MAD

Members of the Westinghouse staff completed the September weekly checkouts of all rolling stock (three forklifts, L-3 locomotive, Warner/Swasey self-propelled hydraulic crane) required for future programs. They also charged the batteries on the MCC and completed a preoperational checkout for the MCC/EIV and moved it to the hot bay for storage.

Two transport containers were delivered to E-MAD containing the volume reduction equipment. Westinghouse staff unloaded the containers in the cold bay and stored them at E-MAD for the Defense Nuclear Agency before moving the equipment from the cold bay to the train shed where it is in process of setup for operation.

Westinghouse staff members removed the transport system tooling and equipment from the train shed and stored it in the storage container.

Westinghouse personnel pumped the contaminated waste water held in the rad waste tanks to a REECo transport tanker for disposal and collected all tools and tool boxes not in use for future programs and stored them in the bonded storage.

Westinghouse quality assurance personnel completed the review and verification of quality records.

The decontamination of the E-MAD shield areas and processing equipment was completed by Westinghouse staff in accordance with instructions from DOE/NV Health Physics.

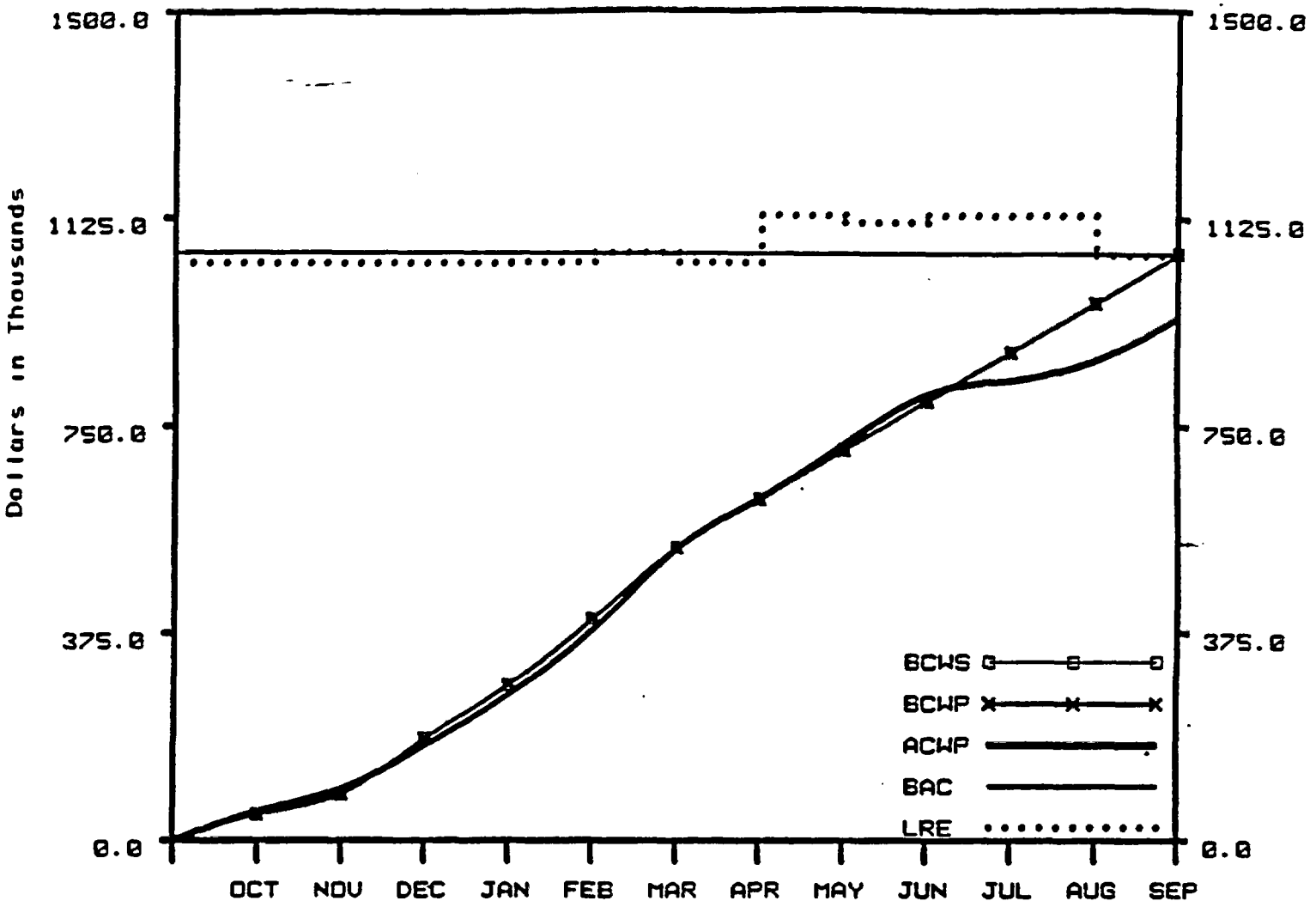
Those radiation sources not needed to continue with future programs were disposed of by Westinghouse personnel as directed by WMPO. Those radiation sources needed to continue E-MAD operations were retained.

Westinghouse staff members completed the "Final Survey Report of Area Contamination" and the terminal condition of the E-MAD Facility Spent Fuel Dry Storage Demonstration Test Location.

WBS 1.2.7.2.3 G-Tunnel

On September 26, 1986, the Director and the Chief Radiochemical Inspector of the Directorate of Waste Disposal, United Kingdom, and a representative of WMPO visited the G-Tunnel.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.7



TEST FACILITIES	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	89.5	1060.8
B. BUDGETED COST OF WORK PERFORMED (BCWP)	89.5	1060.8
C. ACTUAL COST OF WORK PERFORMED (ACWP)	75.7	944.9
D. BUDGET AT COMPLETION (BAC)		1060.8
E. LATEST REVISED ESTIMATE (LRE)		1057.0

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	0.0	0.00
G. COST VARIANCE (B-C)	115.9	10.93
H. AT COMPLETION VARIANCE (D-E)	3.8	0.36

COST PERFORMANCE REPORT
WBS LEVEL 4
U.S. DEPARTMENT OF ENERGY
NNWSI PROJECT

For: SEP 1986

Date: October 30, 1986

WBS NUMBER AND DESCRIPTION		YEAR TO DATE				
		BUD. COST OF WORK SCHEDULED	BUD. COST OF WORK PERFORMED	ACTUAL COST OF WORK PERFORMED	VARIANCES	
					SCHEDULE	COST
1271	Management and Integration	.000	.000	.000	.000	.000
1272	Testing	1,060.800	1,060.799	944.899	-.001	115.900
1273	New Facility Acquisitions	.000	.000	.000	.000	.000
127	TEST FACILITIES	1,060.800	1,060.799	944.899	-.001	115.900

MILE-STONE	RESP. AGENCY	WBS	MILESTONE DESCRIPTION	O	N	D	J	F	M	A	M	J	J	A	S
M708	LLNL	1.2.7.2	Final Report on the SFT-C					△				◇			
M279	SNL	1.2.7.2	Completion of Mining for G-Tunnel Welded Tuff Mining Evaluations								△	◆			

◇ 11/86

△ PLANNED MILESTONE COMPLETION DATE

◇ REVISED MILESTONE COMPLETION DATE

▲ COMPLETED AS SCHEDULED

◆ COMPLETED AS REVISED

1.2.8 LAND ACQUISITION

OBJECTIVE

The objective of this task is to maintain access to land adjacent to the Nevada Test Site that is controlled by the U.S. Air Force and the Bureau of Land Management and to protect land that could be used for a high-level waste repository and the surrounding buffer zones.

ACTIVITIES

None to report.

1.2.9 PROJECT MANAGEMENT

OBJECTIVE

The objective of this task is to manage all activities of the NNWSI Project by all participants. The five major areas identified are Project Management, Project Control, Interface Activities, Quality Assurance, and Generic Requirements Document (GRD) Support.

ACTIVITIES

WBS 1.2.9.1 MANAGEMENT

WBS 1.2.9.1.1 Management

At a meeting held on September 18, 1986, in Albuquerque, New Mexico, representatives of WMPO, SAIC, and SNL discussed long-range engineering planning and schedules, new architect/engineer contracts, and future participant responsibilities.

The Exploratory Shaft Project Management Plan (ESPMP) draft Revision 1 was sent to the revision task group for review on June 16, 1986. Organizational questions still remain to be resolved during the review process. Comments were due to SAIC on July 30, 1986, but had not been received from Los Alamos or WMPO. The projected completion date has been forecast for January 15, 1987.

The draft NNWSI Project Management Plan (PMP) was issued for WMPO and NNWSI Project review on June 26, 1986. Comments were due to SAIC on July 30, 1986. Comments have been received from SAIC, REECo, F&S, H&N, Los Alamos, LLNL, and USGS. The forecast date is now December 15, 1987. WMPO comments are still outstanding.

USBR staff members finalized the FY 87 incremental budget submission for prototype geologic and prototype geomechanical testing, and input was provided for prototype hydrologic testing.

F&S personnel prepared draft procedures for Procedure Format; Procedure Review, Approval, and Issue; Procedure Revision; and Document Control.

H&N staff members completed work on a longitude/latitude/NGC map of the NTS and continued work on setting up a drillhole data base.

WBS 1.2.9.1.4 Records Management

The status of the quality assurance records management system (QARMS) at SNL continues to be one of development for initial implementation of Q1 and Q2 records transmittal. There will be some changes in scope as the Information Management System evolves according to discussions in the Quality Assurance Records Management Committee (QARMC) meeting at Las Vegas, Nevada, on September 18, 1986.

The SNL Records Management staff received additional training on implementation procedures and software input by personnel of Effective Solutions, Inc., at the Oakland, California, office on September 22 through 23, 1986.

Project participants were informed that their QAPP and QA procedures should be revised where affected by the SOP-17-01, Revision 0, QA Records Management, and that new or revised procedures should be submitted to WMPO by December 1, 1986. In addition, QA record type lists and a retrofit schedule also must be submitted to WMPO by December 1, 1986.

The installation of the QARMS is complete throughout the NNWSI Project, completing Level 2 Milestone M757(B) on September 20 as scheduled. The Effective Solutions, Inc. (ESI), subcontract for QARMS development was completed and documentation of the QARMS was turned over to SAIC on September 30. SAIC personnel received extensive training in the maintenance of the QARMS data base from COSMOS, PC HELP, and ESI. This training will allow internal NNWSI Project support for the QARMS data base to replace that previously provided by ESI.

The QRMC met on September 18 at SAIC to discuss the QARMS user's guide and implementing procedure changes and updates. Presentations were also given on the Information Management System and microfilming operations at the Engineering Records Library.

The REECo QA Records Management Handbook was submitted to WMPO on September 15 for review and approval. The handbook will be printed and distributed to all departments within REECo pending WMPO concurrence.

WBS 1.2.9.2 PROJECT CONTROL

The SAIC Planning and Scheduling staff began creating an NNWSI Project master milestone network that depicts NNWSI Project progress.

A site integration meeting held in Las Vegas focused on the development of a philosophy to approach the analysis of four budget scenarios requested by WMPO. The outcome of the meeting consisted of a tabulation of activities according to levels of effort: critical staffing, continuing ongoing activities, long-term moderate-budget activities, and long-term large-budget activities. These levels of effort were combined to produce four budgets to be used to analyze the potentials for site characterization during FY 87. Preliminary impact statements categorize the relationship of dollars to activities. An analysis of the schedules and milestone list, directed by these data, completed the assessment of the impact.

SAIC personnel developed the FY 87 budget contingency matrix report, input participant data, and produced the FY 87 budget options currently being reviewed to determine the FY 87 budget. They also prepared the FY 86 replanning input from the NNWSI Project participants to match the Project's latest FIN Plan numbers.

SAIC has received informal direction from WMPO that formal testing of the Budget Data Entry System software will not be required. Formal communication of the directive is expected.

At SAIC staff members began development of the draft T&MSS integrated management control system description document, completing detailed procedural process flow charts and a summary flow chart. The summary flow chart depicts the interface relationships between DOE Project planning, budgeting, baselining, and reporting and similar and supporting processes at the participant contract levels. Other activities included completing the review of the proposal for engineering the exploratory shaft and developing estimating data for construction of the exploratory shaft and repository and for a milestone report on the exploratory shaft.

Microfilming and Archival Storage Service Facility personnel at H&N continued work on computer input and microfilming of Westinghouse records. Microfilming for Westinghouse and LLNL was delayed during the month due to incomplete disk information. Information was received and microfilming continues.

At USGS preparation of the working copies for the SIP documentation continued to progress toward completion for the majority by the end of October. Data from the SCP have been edited into the complete list of working copies. The only remaining information covers the application of results and the program interfaces. Working copies should be distributed for all investigations identified in the SCP by the end of October. A list of prepared plans will be distributed to the USGS management staff to verify that all investigations have been identified for inclusion in the process. Working copies cover all activities proposed by the USGS to start within the next six months.

At USGS the major emphasis shifted to support of the principal investigators in the review, update, and analysis of the SIP documentation and quality assurance level assignments. Several informal meetings occurred throughout the month in order to review progress and answer questions concerning the plans. Minor modifications characterize the changes to the plans in order to eliminate or add activities and to update the narrative on the basis of increased planning associated with the study.

Two USGS schedules were evaluated by SAIC/Golden with the principal investigators and prepared for input to the Project data base. The stream-flow input was entered into the VAX data base in Las Vegas. This schedule and an updated milestone list were submitted for review. The input for tectonics and volcanism was entered into the VAX data base.

An updated USGS milestone list was prepared by SAIC/Golden and submitted for typing. These updates are presently being conducted on a monthly basis to reflect changes being made in planning due to the stop-work order and SIP documentation. An update of major milestone modifications was also completed. This list was submitted to SAIC/Las Vegas so the changes may be made in the INGRES data base.

WBS 1.2.9.3 QUALITY ASSURANCE

Six of the 18 sections of the SNL NNWSI Project Quality Assurance Program Plan (QAPP) were submitted to WMPO for approval in September 1986. Nine other sections, as well as the introductory material (Introduction, Purpose and Scope, and Policy), had been approved earlier, leaving three sections to be submitted and approved to complete the document.

Quality assurance level assignments for the activities within 46 of the 53 SNL WBS elements had been approved by WMPO by the end of September 1986.

Six SNL department operating procedures, implementing aspects of the SNL NNWSI Project QAPP, were issued during September 1986.

Revisions by SAIC/Golden to the draft USGS QA Manual in response to formal WMPO review comments continued by SAIC/Golden at month end. These corrections must also be reviewed by WMPO before approval is given. In order to expedite the paperwork involved, WMPO has agreed to give tentative approval prior to the USGS initiating the internal approval process and making formal submission for WMPO review and approval. The date of preliminary WMPO approval of the QA Manual remains unspecified at month end, but the current major USGS effort is to get approval for the QA Manual. As a follow-up to that, the next major effort will be in preparation of the indoctrination and training program and its execution.

Meetings with Denver-based QA specialists resulted in the drafting of two USGS Nonconformance Reports (NCRs) concerning five items or activities that were continued without prior exemption from the stop-work order as identified by WMPO. Two preliminary dispositions concerning WMPO-initiated NCRs were also drafted by SAIC/Golden. An additional NCR was received concerning work being done at the test site without levels assignments.

USGS worker certification data were entered into a newly created computer tracking system. This system, when operational will provide reports to USGS management and the QA office. Work continues by SAIC/Golden on tracking systems and user's guides for NCRs, corrective action reports (CARs), audit findings, and other QA documents requiring response by the QA Office. Another computer tracking system is being developed for SIP documentation and QA level assignments, and for maintaining their necessary document control.

There are 50 USGS technical procedures in process with the SAIC/Golden office. A listing of the procedures and their status is being prepared for the QA Manager on a weekly basis.

Notice was informally given that 15 of the 22 responses to the USGS (Denver) audit findings were found to be acceptable, with the remaining seven being subject to further discussion and resolution.

USBR QA staff members established QA records handling and disposition procedures.

A wrap-up of functional and records transfer from the Los Alamos quality assurance group to Los Alamos Technical Associates (LATA), the new quality assurance support for the NNWSI Project, is essentially complete.

Draft revisions to the Los Alamos QAPP and one QA procedure were reviewed at SAIC. A meeting was held in Los Alamos on September 29 and 30 to discuss comments resulting from the review. Los Alamos will submit the subject documents for approval upon incorporation of the WMPO comments.

A review of Revision 2 to the Los Alamos ESF QALAS document was completed and comments were drafted and compiled for discussion and resolution with WMPO on September 3.

The following Los Alamos SIP documentation and quality assurance level assignments were reviewed and approved by WMPO:

Tectonics and Volcanism (volcanism)
Tectonics and Volcanism (rock varnish dating)
Natural Isotope Chemistry
Hydrothermal Geochemistry
Microbiology
Sorption
Solubility Determination
Prototype Air Coring
Retardation Sensitivity Analysis

WMPO also reviewed and approved quality assurance level assignments for the ESF Preliminary Design Phase and the ESTP preparation.

Corrective action was undertaken as a result of a Los Alamos Nonconformance Report (NCR) for the premature release of an abstract for a presentation at a professional meeting.

The committee to prepare QA guidance for the use of auxiliary software has prepared a draft appendix to NNWSI Project-SOP-03-02 for review.

The FY 87 Los Alamos audit and surveillance schedule was completed. This schedule, along with the Los Alamos NNWSI Project QA Audit Program Plan, was sent to WMPO.

Formal comments for the WMPO review of Revision 3 of the T&MSS QAPP and supporting procedures were received September 11 and are being incorporated as appropriate. Revisions to the QAPP and supporting procedures will be completed by T&MSS and reviewed by the T&MSS review committee in early October 1986. Upon completion of reviews, the revisions will be transmitted to WMPO and issued for implementation.

An independent audit of the T&MSS QAPP and supporting procedures was conducted September 15 through 19 by an SAIC consultant. One audit finding and ten observations were identified requiring responses and corrective action.

Formal WMPO comments were received on August 27, 1986, for the review of the QALAS submitted as corrective action on NCR WMPO-9. With the exception of two tasks, all QALAS and associated SIP documentation have been resubmitted in draft form to T&MSS QA for review and comment. A review meeting with WMPO has been tentatively set for the week of October 6, 1986.

NCR WMPO-042 was received by SAIC September 8 identifying that an SAIC La Jolla employee did not document an anomaly while conducting a quarterly performance audit of the meteorological monitoring system 10-meter tower at the Nevada Test Site. The T&MSS disposition of the NCR is to be documented and approved by October 8, 1986.

SAIC staff members revised the FY 87 QA task plans and budgets to meet the requirements established by WMPO. The budget is minimal and will not accommodate a more active role for the QA support contractor in the up-front

planning of technical activities by NNWSI Project participants as was previously anticipated. The revised budget also eliminates the one full-time equivalent employee for dedicated support to the WMPO Project quality manager.

Other administrative activities of quality assurance personnel at SAIC included providing input for a WMPO presentation to DOE/HQ on the status of support from USGS for the NNWSI Project from the standpoint of the USGS QA program and providing comments on several NRC generic technical position papers dealing with quality-related issues, including peer reviews and qualification of existing data.

The FY 86 QA audit program was completed on September 30. Five audits were conducted as scheduled during the period and, due to the stop-work orders issued by WMPO to the participating organizations in June 1986, all other scheduled audits were cancelled. This effort completes Milestone M755. The FY 87 schedule is currently being developed and will be submitted to WMPO by October 31, 1986.

Of the 15 audits conducted in FY 85, 8 audits remain open. However, additional corrective actions to findings have been implemented by the auditees and verified by WMPO.

The FY 86 QA surveillance program was completed on September 30. A total of 61 surveillances were conducted of the scheduled activities and 227 items or activities monitored. During this effort, 33 NCRs were recorded. Completing the surveillances reported satisfies milestone commitment M756. The FY 87 schedule is currently being developed and will be submitted to WMPO by October 31, 1986.

Draft revision number 5 of the NNWSI Project QAPP (NVO-196-17) was completed and distributed for internal QA review at SAIC. The draft procedure, which describes the revised WMPO deficiency reporting system, has been finalized and is ready for DOE review.

An in-depth internal audit was conducted of the WMPO QAPP implementation by the SAIC quality assurance personnel during the period September 8-12. The audit results were presented to D. Vieth and his staff on September 17. Corrective action responses to the audit findings are currently being formulated and will require several weeks for implementation.

The NNWSI Project Auxiliary Software QA Committee met in Menlo Park on September 3 and again in Albuquerque on September 11. This activity is making excellent progress and another meeting is scheduled in Las Vegas on October 22, 1986, at which time the final draft of SOP-03-02 should be finalized. The current draft is being reviewed and the committee members are expected to have all comments at the next meeting.

Several activities were evident this month that mark progress in completing the USGS QAPP review. Review comments on the QAPP were completed and summarized; a meeting to discuss them was held on September 5 with USGS and WMPO QA. Changes were completed by USGS and the plan was resubmitted on September 16. Additional changes in response to comments were made by USGS. A final package is expected by October 1, 1986, that should address all of the WMPO concerns.

The list of USGS activities given conditional approval to continue during the stop-work order period was received by WMPO on September 26.

A package of review comments were received from WMPO personnel on the five remaining QA level assignments submitted by USGS.

An SAIC review of ten LLNL QA procedures was completed. Comments were discussed at a meeting on September 18 with LLNL representatives. LLNL will incorporate these comments into their procedures and resubmit them as quickly as possible. Two additional LLNL procedures were subsequently reviewed.

Approximately 17 QA level assignment packages are awaiting review and approval by SAIC QA personnel. Most of these have been waiting for two to three weeks due to the inability to find a technical reviewer. The review should be completed the week of October 7, 1986, and the QALAS returned to SAIC.

PLANNED WORK

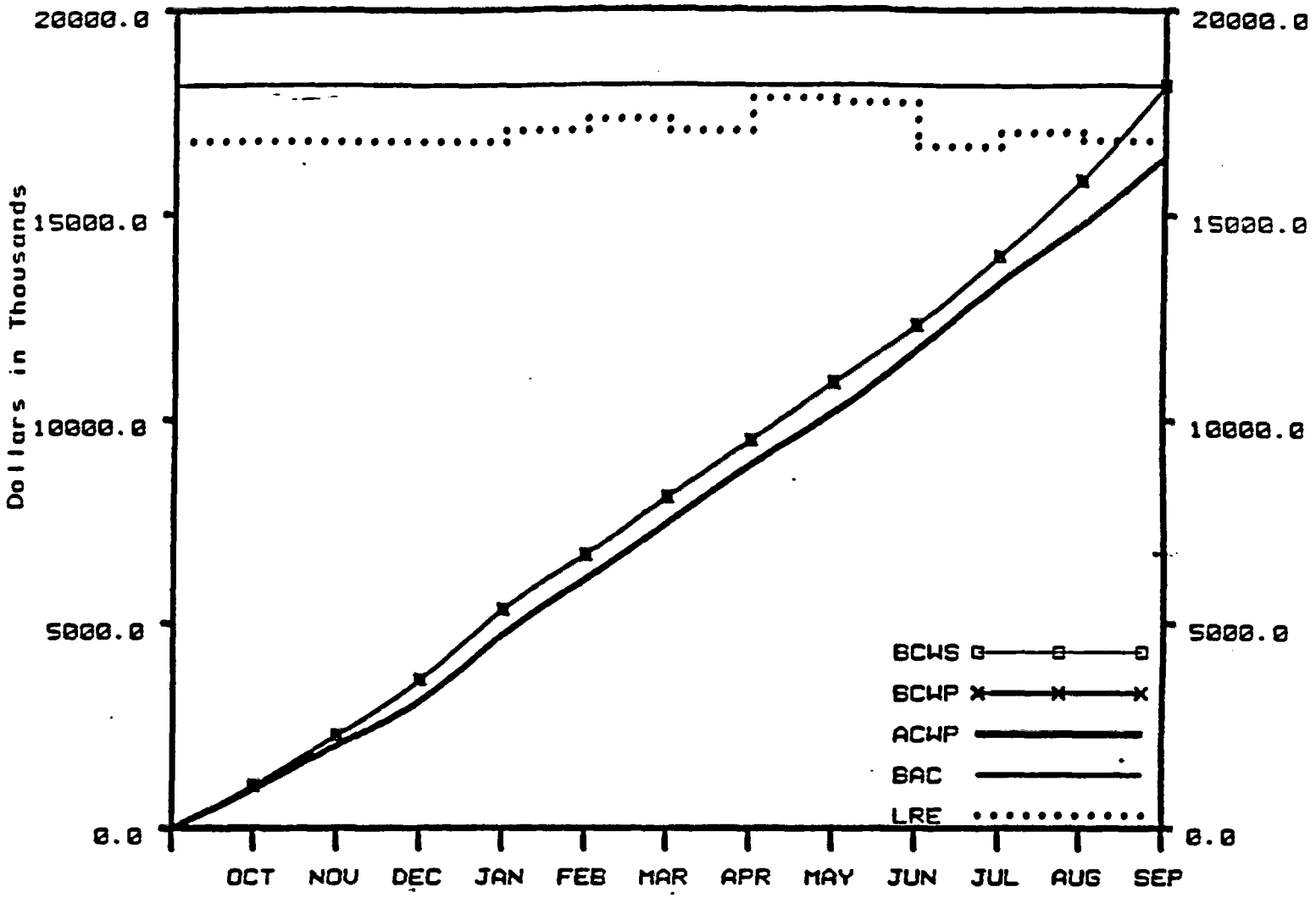
The remaining SIP documentation and QALAS for the Los Alamos quality assurance task should be completed and submitted for review and approval by WMPO.

Orientation and training sessions at Los Alamos will begin with a new group working on the sorption task.

PROBLEM AREAS

The review and approval of the quality assurance level assignments for the ESF design, construction, and operations have not been completed by WMPO. The work on this activity by the Los Alamos Technical Engineering Support Group over the past several years is reflected in the detailed quality assurance level assignments submitted in November, January, June, and September. None of the assignments from any of these submissions has been approved. This lag in the approval of appropriate quality level assignments is adding delays and costs to the ESF design effort.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.9



PROJECT MANAGEMENT	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	2324.9	18147.3
B. BUDGETED COST OF WORK PERFORMED (BCWP)	2324.9	18147.5
C. ACTUAL COST OF WORK PERFORMED (ACWP)	1664.2	16406.6
D. BUDGET AT COMPLETION (BAC)		18147.3
E. LATEST REVISED ESTIMATE (LRE)		16792.6

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	0.2	0.00
G. COST VARIANCE (B-C)	1741.0	9.59
H. AT COMPLETION VARIANCE (D-E)	1354.7	7.47

COST PERFORMANCE REPORT
WBS LEVEL 4
U.S. DEPARTMENT OF ENERGY
NNWSI PROJECT

For: SEP 1986

Date: October 30, 1986

WBS NUMBER AND DESCRIPTION		YEAR TO DATE				
		BUD. COST OF WORK SCHEDULED	BUD. COST OF WORK PERFORMED	ACTUAL COST OF WORK PERFORMED	VARIANCES SCHEDULE	VARIANCES COST
1291	Management and Integration	9,420.009	9,419.675	8,452.719	-.334	966.956
1292	Project Control	3,998.300	3,998.673	3,586.525	.373	412.148
1293	Quality Assurance	4,729.000	4,729.168	4,367.312	.168	361.856
129	PROJECT MANAGEMENT	18,147.309	18,147.516	16,406.556	.207	1,740.960

MILE-STONE	RESP. AGENCY	WBS	MILESTONE DESCRIPTION	O	N	D	J	F	M	A	M	J	J	A	S	
R448	SAIC	1.2.9.1	Final NNWSI Project Management Plan to WMPO/NV and DOE/HQ									△				◇ 12/86
M719	WMPO	1.2.9.1	Submit FY 88 Budget to DOE/HQ								◆					
M720	SAIC	1.2.9.2	Implementation of Phase I of Earned Value System (80 percent level of effort)		▲											
M893	SAIC	1.2.9.2	List of Project Office Controlled Milestones Complete			△										◇ 11/86
M722	SAIC	1.2.9.2	FY86 Project Budget Baseline Approved	△						◆						

△ PLANNED MILESTONE COMPLETION DATE

◇ REVISED MILESTONE COMPLETION DATE

▲ COMPLETED AS SCHEDULED

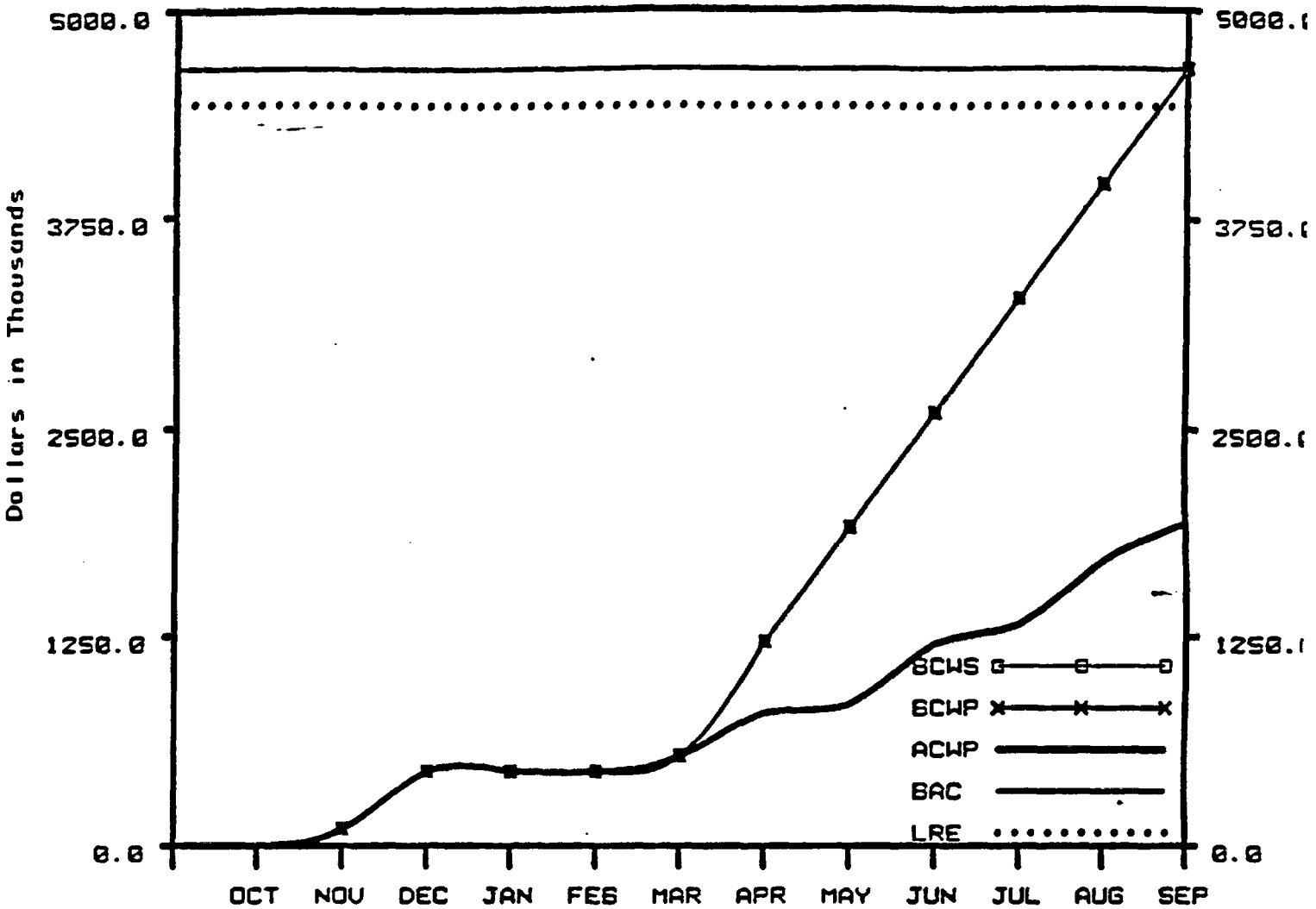
◆ COMPLETED AS REVISED

1.2.10 FINANCIAL AND TECHNICAL ISSUES

This WBS element includes grant assistance to the State of Nevada.

At the end of the FY 1986, there was a cost underrun of $2.7 million (59 percent under budget through September). This underrun will be carried over to FY 87.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.10



FINANCIAL & TECHNICAL ASSISTANCE	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	685.8	4650.0
B. BUDGETED COST OF WORK PERFORMED (BCWP)	685.8	4650.0
C. ACTUAL COST OF WORK PERFORMED (ACWP)	226.6	1930.2
D. BUDGET AT COMPLETION (BAC)		4650.0
E. LATEST REVISED ESTIMATE (LRE)		4426.0

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	0.0	0.00
G. COST VARIANCE (B-C)	2719.7	58.49
H. AT COMPLETION VARIANCE (D-E)	224.0	4.82

COST PERFORMANCE REPORT
WBS LEVEL 4
U.S. DEPARTMENT OF ENERGY
NNWSI PROJECT

For: SEP 1986

Date: October 30, 1986

WBS NUMBER AND DESCRIPTION		YEAR TO DATE				
		BUD. COST OF WORK SCHEDULED	BUD. COST OF WORK PERFORMED	ACTUAL COST OF WORK PERFORMED	VARIANCES	
					SCHEDULE	COST
12101	Financial & Technical Assistance	4,650.000	4,649.986	1,930.239	-.014	2,719.747
1210	FINANCIAL & TECHNICAL ASSISTANCE	4,650.000	4,649.986	1,930.239	-.014	2,719.747

U.S. DEPARTMENT OF ENERGY

OCRWM OGR

Nevada Nuclear Waste Storage Investigations PROJECT

YUCCA MOUNTAIN

PARTICIPANT

BUDGET vs COST

COST PERFORMANCE REPORT - LEVEL 3
WORK BREAKDOWN STRUCTURE (FORMAT 1)
U.S. DEPARTMENT OF ENERGY

CONTRACTOR	CONTRACT TYPE NO	PROJECT NAME/NUMBER:	REPORT YEAR AND MONTH:
NNWSI Project		NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS	SEP 1986
LOCATION P.O. Box 14100 Las Vegas, NV 89114			

WBS NUMBER AND DESCRIPTION		CURRENT PERIOD					YEAR TO DATE				
		BUD COST OF WORK SCHEDULED	BUD COST OF WORK PERFORMED	ACTUAL COST OF WORK PERFORMED	VARIANCES		BUD COST OF WORK SCHEDULED	BUD COST OF WORK PERFORMED	ACTUAL COST OF WORK PERFORMED	VARIANCES	
					SCHEDULE	COST				SCHEDULE	COST
(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
121	SYSTEMS	639 163	689 039	937 127	49 876	-248 089	6,688 888	6,589 361	6,876 500	-98.639	512.861
122	WASTE PACKAGE	2,159 988	1,848 987	1,566.588	-310 998	282 482	8,529 888	8,142.882	7,622.188	-386 998	528.782
123	SITE INVESTIGATIONS	3,984 193	3,687.691	2,585 893	-296.582	1,181.997	34,224 888	33,712.541	25,374.828	-512.259	8,337 721
124	REPOSITORY INVESTIGATIONS	1,759.717	1,777.888	2,388.346	17 363	-683 266	14,664 688	13,596.828	12,548.263	-1,867.772	1,856.564
125	REGULATORY AND INSTITUTIONAL INVESTIGATIONS	771 848	856 937	734.712	-114.183	-77 775	8,453 888	7,812.681	8,881.888	-648.399	-188.399
126	EXPLORATORY SHAFT INVESTIGATIONS	1,449 858	1,318 258	1,832 835	-131 688	285 415	12,341 788	11,781 574	9,897 815	-568.126	2,684.959
127	TEST FACILITIES	89 491	89 491	75 788	- 888	13 791	1,868 888	1,868 799	944.899	-.881	115.988
128	LAND ACQUISITION	888	888	.888	888	888	.888	888	888	.888	.888
129	PROJECT MANAGEMENT	2,324 898	2,324 889	1,664 195	- 881	668.694	18,147 389	18,147.518	16,486.556	.287	1,748.988
1210	FINANCIAL & TECHNICAL ASSISTANCE	685 847	685 847	226 558	888	459 297	4,658 888	4,649.986	1,938 239	-.814	2,719.747
12	NNWSI - TOTAL	13,864.881	13,878 125	11,123.658	-785 966	1,954.467	188,788 888	185,494.887	87,993.392	-3,266.882	17,588 615
	CAPITAL EQUIPMENT SUBTOTAL			148 179					1,739.928		
	OPERATING & CAPITAL - TOTAL			11,271.837					89,733.312		

COST PERFORMANCE REPORT - LEVEL 4
WORK BREAKDOWN STRUCTURE (FORMAT 1)
U.S. DEPARTMENT OF ENERGY

CONTRACTOR	CONTRACT TYPE NO:	PROJECT NAME/NUMBER:	REPORT YEAR AND MONTH:	SIC
NNPSI Project		NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS	SEP 1986	TIT
LOCATION: P.O. Box 14100 Las Vegas, NV 89114				DA

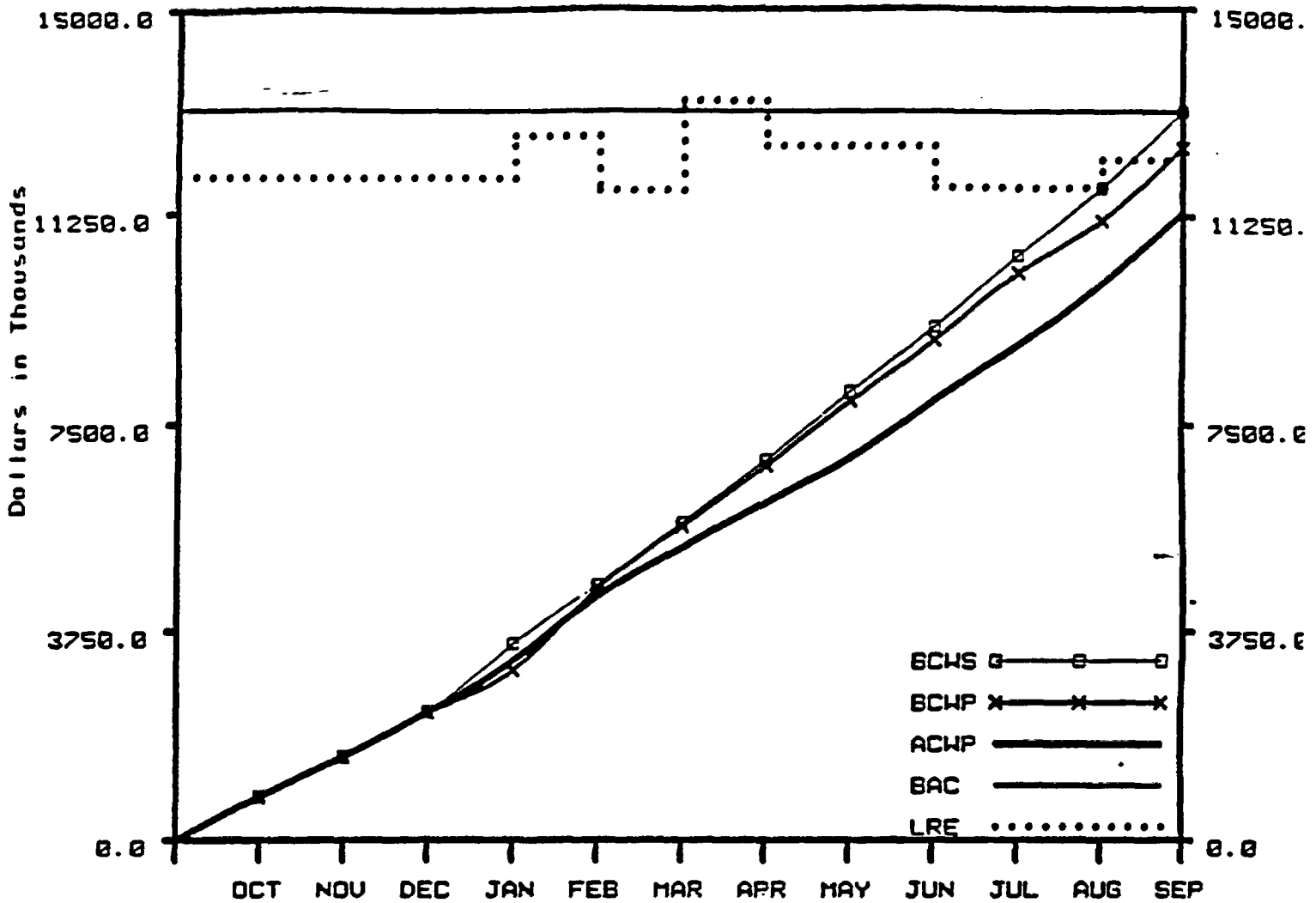
WBS NUMBER AND DESCRIPTION	CURRENT PERIOD					YEAR TO DATE				
	BUD COST OF WORK SCHEDULED	BUD COST OF WORK PERFORMED	ACTUAL COST OF WORK PERFORMED	VARIANCES SCHEDULE	VARIANCES COST	BUD COST OF WORK SCHEDULED	BUD COST OF WORK PERFORMED	ACTUAL COST OF WORK PERFORMED	VARIANCES SCHEDULE	VARIANCES COST
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1211 Systems Management and Integration	16.000	16 000	3 000	000	13 000	100 000	100 020	85 000	.020	95 020
1212 Systems Engineering	236 163	236 163	144 127	000	92 036	2,325 000	2,325 348	1,826 500	348	498 848
1213 Technical Data Base Management	92 000	141 876	178 000	49 876	-28 124	1,126 000	1,126 912	1,049 000	-99 088	-22 088
1214 Total Systems Performance Assessment	295 000	295 000	020 000	- 000	[illegible]	3,057 000	3,057 081	3,116 000	081	-58 919
121 SYSTEMS	639 163	689 039	937.127	49.876	-248 089	6,608 000	6,589 361	6,076 500	-98 639	512 861
1221 Management and Integration	171 900	171 000	57.200	000	114 700	509 000	509 081	403 300	.081	106 581
1222 Package Environment	214 000	114 000	111 600	-100 000	2 400	970 000	971 000	1,048 200	1.000	-77 200
1223 Waste Form & Materials Testing	1,441 000	1,257 002	1,262 300	-183 998	-5 298	5,895 000	5,498 001	5,177 600	-396 999	320 401
1224 Design, Fabricate, and Prototype Testing	189 000	162 000	39 400	-27 000	122 600	555 000	564 000	425 500	9 000	138 500
1225 Performance Assessment	144 000	144 000	96 000	.000	48 000	600 000	600 000	567 500	.000	32 500
122 WASTE PACKAGE	2,159 900	1,848 902	1,566 500	-310.998	282.402	8,529 000	8,142 002	7,622 100	-386 998	520 702
1231 Management & Integration	789 185	789 185	210 885	.000	578 500	3,200 000	3,270 835	2,192 615	-.165	1,087 220
1232 Geology	714 540	714 539	587 784	-.001	126 745	7,191 000	7,191 035	6,253 685	.035	937 350
1233 Hydrology	560 300	560 300	447 997	.001	112 302	5,451 300	5,451 192	4,928 930	-.108	522 262
1234 Geochemistry	520 100	534 600	700 300	8 500	-165 700	6,095 000	5,837 092	5,095 400	-257 908	-58 308
1235 Drilling	821 349	821 349	244 135	.000	577 214	9,511 000	9,511 007	3,681 824	.007	5,830 183
1236 Environment	93.981	99 968	135 908	6.067	-35 940	970 400	927.763	835 913	-42 637	-8.150
1237 Socioeconomic	41 730	14 661	39 874	-27 069	-24 413	502 300	353.818	466 854	-148.482	-112.036
1238 Geochemical Modeling Code EQ3/6	435 000	153 000	139.000	-282 000	13.200	1,223.000	1,160.000	1,020 000	-63.000	140.000
1239 Deferred Site Close Out	000	000	000	000	.000	000	000	000	000	.000
123 SITE INVESTIGATIONS	3,984 193	3,687.691	2,505 693	-296.502	1,181.997	34,224 000	33,712 541	25,374.820	-512.259	8,337.721
1241 Management and Integration	495 317	495 318	1,274 646	.001	-779 328	4,822 000	4,822 000	5,354.063	- 112	-431.576
1242 Development and Testing	622 400	639 762	531 700	17 362	108 062	5,096 000	4,829 078	3,828 200	-1,066.922	200.878
1243 Facilities	431 000	431 000	346 000	000	85 000	2,937 000	2,936 335	2,126 000	- 665	810 335
1244 Operations and Maintenance	53 000	53.000	113.000	- 000	-60.000	441 000	441.014	430 000	.014	11 014
1245 Decommissioning	7 000	7.000	.000	-.000	7.000	48 000	48 000	000	.000	48 000
1246 Repository Performance Assessment	151 000	151.000	115 000	-.000	36 000	1,220 000	1,219 912	802.000	-.088	417.912
124 REPOSITORY INVESTIGATIONS	1,759.717	1,777 080	2,380.346	17 363	-603 266	14,664 000	13,596 828	12,540 263	-1,067 772	1,056 564
1251 Management and Integration	62.268	62 268	57 471	.000	4 797	762.400	762 400	773 128	000	-10 727
1252 Licensing	8 4 673	474 852	585.255	-139 821	-110.403	6,001 000	5,396 236	5,718.146	-604 764	-322 909
1253 Environmental Compliance	69 744	94 462	67.903	25.718	26 478	1,397 000	1,361 964	1,250.530	-35 636	111 434
1254 Communication and Liaison	25 355	25 355	24 003	-.000	1.352	292.000	292.001	258.187	.001	33.803
1255 Technology and Financial Assistance	000	.000	.000	.000	.000	.000	000	.000	.000	.000
125 REGULATORY AND INSTITUTIONAL INVESTIGATIONS	771 040	656 937	734.712	-114.103	-77 775	8,453.000	7,812 601	8,001 000	-640 399	-188 399
1261 Management and Integration	295 883	295 883	480 714	.000	-185 831	2,930 500	2,930 447	2,858 693	- 053	71 754
1262 Site Preparation	1 825	1 825	.725	000	1 100	111 300	124 000	000	000	-13 500
1263 Surface Facilities	2 000	2 000	.100	000	1 900	21 200	21 200	14 200	000	7 000
1264 First Shaft	9 482	9 482	14 985	- 000	-5 503	114 400	114 400	277 487	000	161 087
1265 Second Shaft	3 006	3 006	682	000	3 124	31 000	31 000	70 614	000	-39 614
1266 Subsurface Excavations	36 504	36 504	24 014	.000	12 490	265 200	265 200	204 295	000	60 905
1267 Underground Service Systems	44 750	44 750	33 345	.000	11 405	393 500	393 500	300 054	000	93 446
1268 Operations	000	000	.000	.000	000	.000	000	000	000	000
1269 Testing	1,855 000	924.200	498.278	-131 600	425 938	8,474.000	7,914 526	5,246 872	-560 074	2,667 654
126 EXPLORATORY SHAFT INVESTIGATIONS	1,449.850	1,318 250	1,032.835	-131.600	285 415	12,341.700	11,781 574	9,097.815	-560 126	2,684 559
1271 Management and Integration	000	.000	.000	.000	.000	.000	000	.000	000	.000
1272 Testing	89 491	89.491	75.700	-.000	13.791	1,060.800	1,060.799	944 899	- 001	115 900
1273 New Facility Acquisitions	000	.000	.000	.000	.000	.000	000	.000	000	.000

COST PERFORMANCE REPORT - LEVEL 4
WORK BREAKDOWN STRUCTURE (FORMAT 1)
U.S. DEPARTMENT OF ENERGY

CONTRACTOR	CONTRACT TYPE NO	PROJECT NAME/NUMBER	REPORT YEAR AND MONTH:
MWMSI Project		NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS	SEP 1986
LOCATION P O Box 14100 Las Vegas, NV 89114			

WBS NUMBER AND DESCRIPTION		CURRENT PERIOD					YEAR TO DATE				
		BUD COST OF WORK SCHEDULED	BUD COST OF WORK PERFORMED	ACTUAL COST OF WORK PERFORMED	VARIANCES SCHEDULE	VARIANCES COST	BUD COST OF WORK SCHEDULED	BUD COST OF WORK PERFORMED	ACTUAL COST OF WORK PERFORMED	VARIANCES SCHEDULE	VARIANCES COST
(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
127	TEST FACILITIES	89 491	89 491	75 700	- 000	13 791	1,060 000	1,060 799	944 899	- 001	115 900
128	LAND ACQUISITION	000	.000	000	.000	000	000	000	.000	000	000
1291	Management and Integration	1,283 871	1,283 869	770 900	-.002	512 970	9,420 009	9,419 675	8,452 719	- 334	966 956
1292	Project Control	494 468	494 468	444.581	000	49 887	3,998 300	3,998 673	3,586 525	.373	412.148
1293	Quality Assurance	546 551	546.551	448.714	.000	97.837	4,729 000	4,729.168	4,367.312	.168	361.856
129	PROJECT MANAGEMENT	2,324.890	2,324.889	1,664 195	- 001	660 694	18,147.309	18,147.516	16,406 556	207	1,740.960
12101	Financial & Technical Assistance	685.847	685 847	226.550	.000	459.297	4,650 000	4,649.986	1,930.239	-.014	2,719 747
1210	FINANCIAL & TECHNICAL ASSISTANCE	685 847	685.847	226 550	000	459 297	4,650 000	4,649.986	1,930.239	- 014	2,719.747
12	MWMSI - TOTAL	13,864 891	13,878.125	11,123 658	-785 966	1,954.467	108,780 009	105,494 007	87,993 392	-3,266 002	17,500 615

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.A



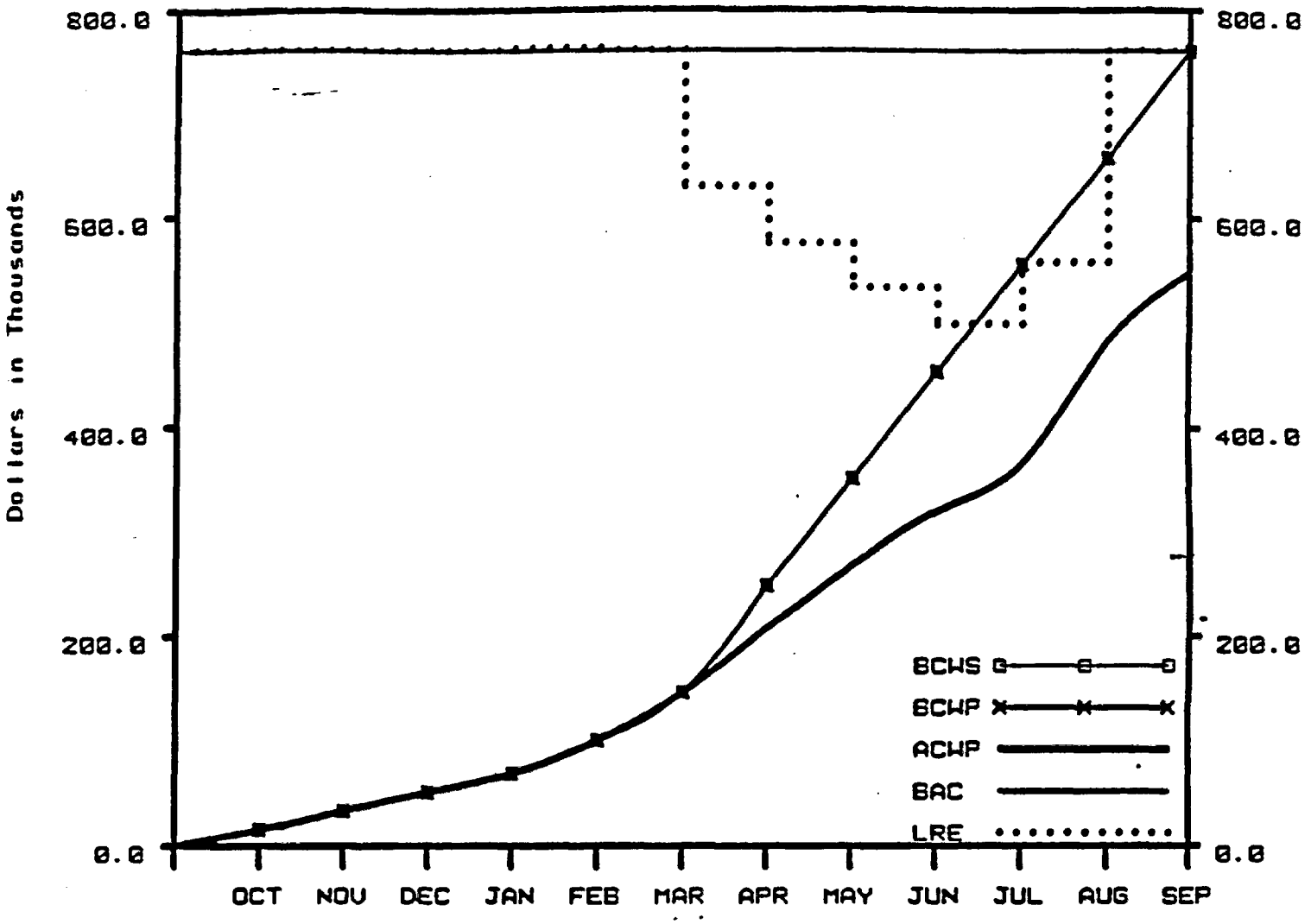
LOS ALAMOS - TOTAL	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	1392.4	13149.0
B. BUDGETED COST OF WORK PERFORMED (BCWP)	1331.3	12494.4
C. ACTUAL COST OF WORK PERFORMED (ACWP)	1300.1	11313.8
D. BUDGET AT COMPLETION (BAC)		13149.0
E. LATEST REVISED ESTIMATE (LRE)		12267.0

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	-654.6	-4.98
G. COST VARIANCE (B-C)	1180.6	9.45
H. AT COMPLETION VARIANCE (D-E)	882.0	6.71

Remarks:

Cost and schedule variances are under the 10% threshold. No analysis required.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.B



LBL - TOTAL

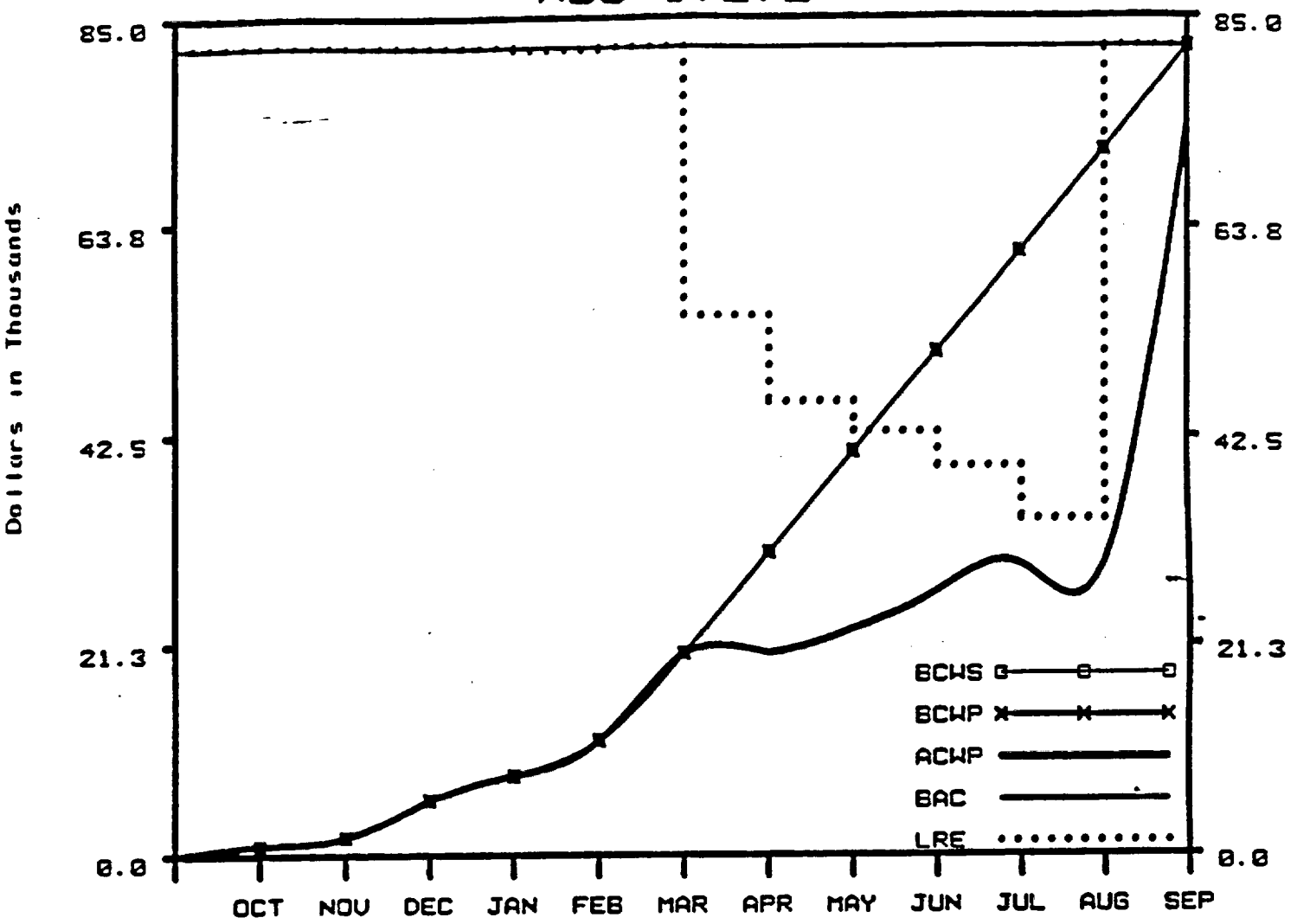
	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	103.0	761.0
B. BUDGETED COST OF WORK PERFORMED (BCWP)	103.0	760.9
C. ACTUAL COST OF WORK PERFORMED (ACWP)	65.7	548.3
D. BUDGET AT COMPLETION (BAC)		761.0
E. LATEST REVISED ESTIMATE (LRE)		761.0

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	-0.1	-0.01
G. COST VARIANCE (B-C)	212.6	27.94
H. AT COMPLETION VARIANCE (D-E)	0.0	0.00

Remarks:

Decreased work activity due to the stop-work order resulted in a cost underrun of $212.6K.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.E



EG&G - TOTAL

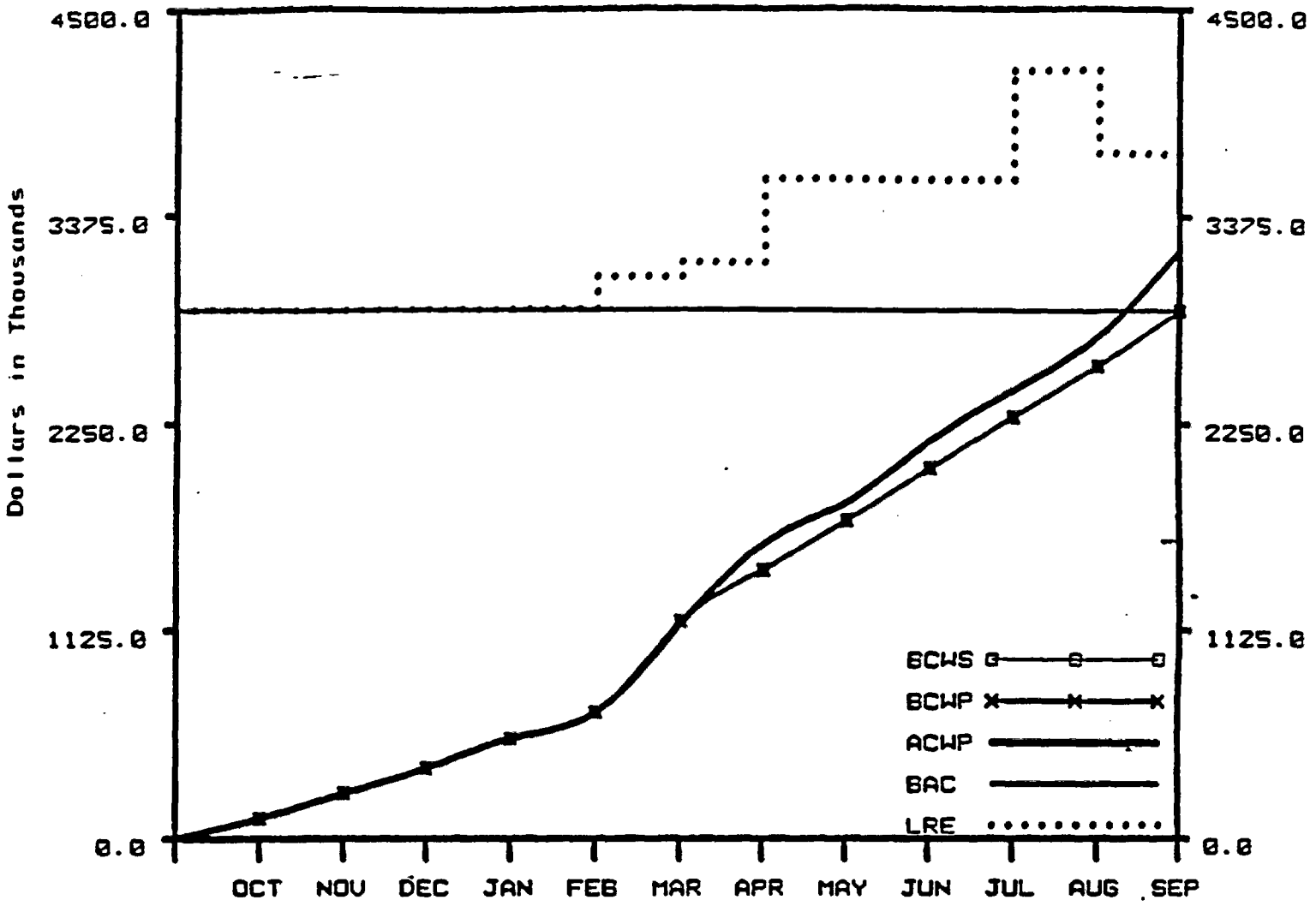
	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	10.5	82.0
B. BUDGETED COST OF WORK PERFORMED (BCWP)	10.5	82.0
C. ACTUAL COST OF WORK PERFORMED (ACWP)	44.6	74.2
D. BUDGET AT COMPLETION (BAC)		82.0
E. LATEST REVISED ESTIMATE (LRE)		82.0

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	0.0	0.00
G. COST VARIANCE (B-C)	7.8	9.52
H. AT COMPLETION VARIANCE (D-E)	0.0	0.00

Remarks:

Cost and schedule variances are under the 10% threshold. No analysis required.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.F



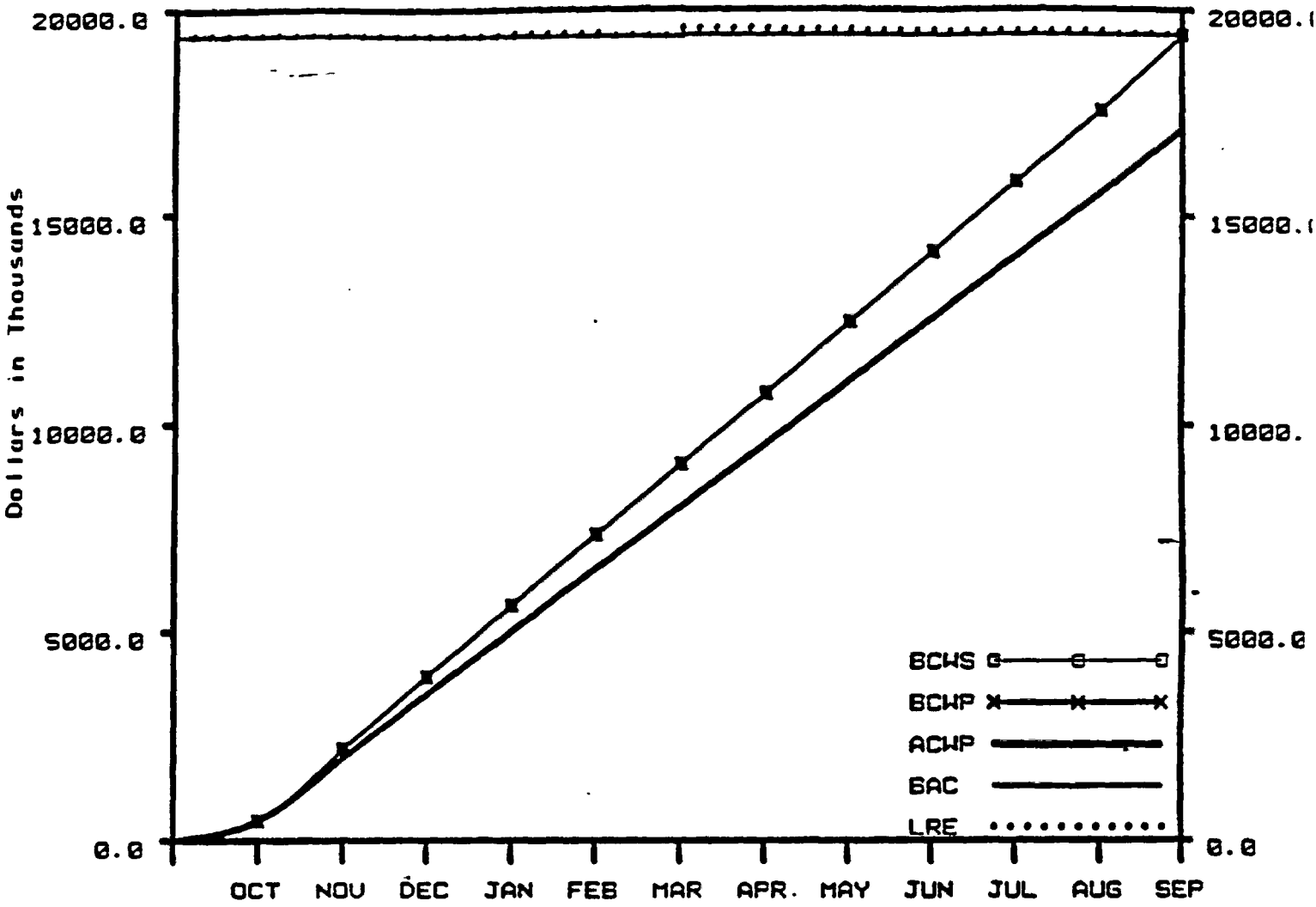
F&S - TOTAL	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	297.8	2860.2
B. BUDGETED COST OF WORK PERFORMED (BCWP)	297.8	2860.2
C. ACTUAL COST OF WORK PERFORMED (ACWP)	468.9	3187.5
D. BUDGET AT COMPLETION (BAC)		2860.2
E. LATEST REVISED ESTIMATE (LRE)		3716.0

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	0.0	0.00
G. COST VARIANCE (B-C)	-327.3	-11.44
H. AT COMPLETION VARIANCE (D-E)	-855.8	-29.92

Remarks:

Increased support for the exploratory shaft design resulted in a cost overrun of $327.3K.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.G



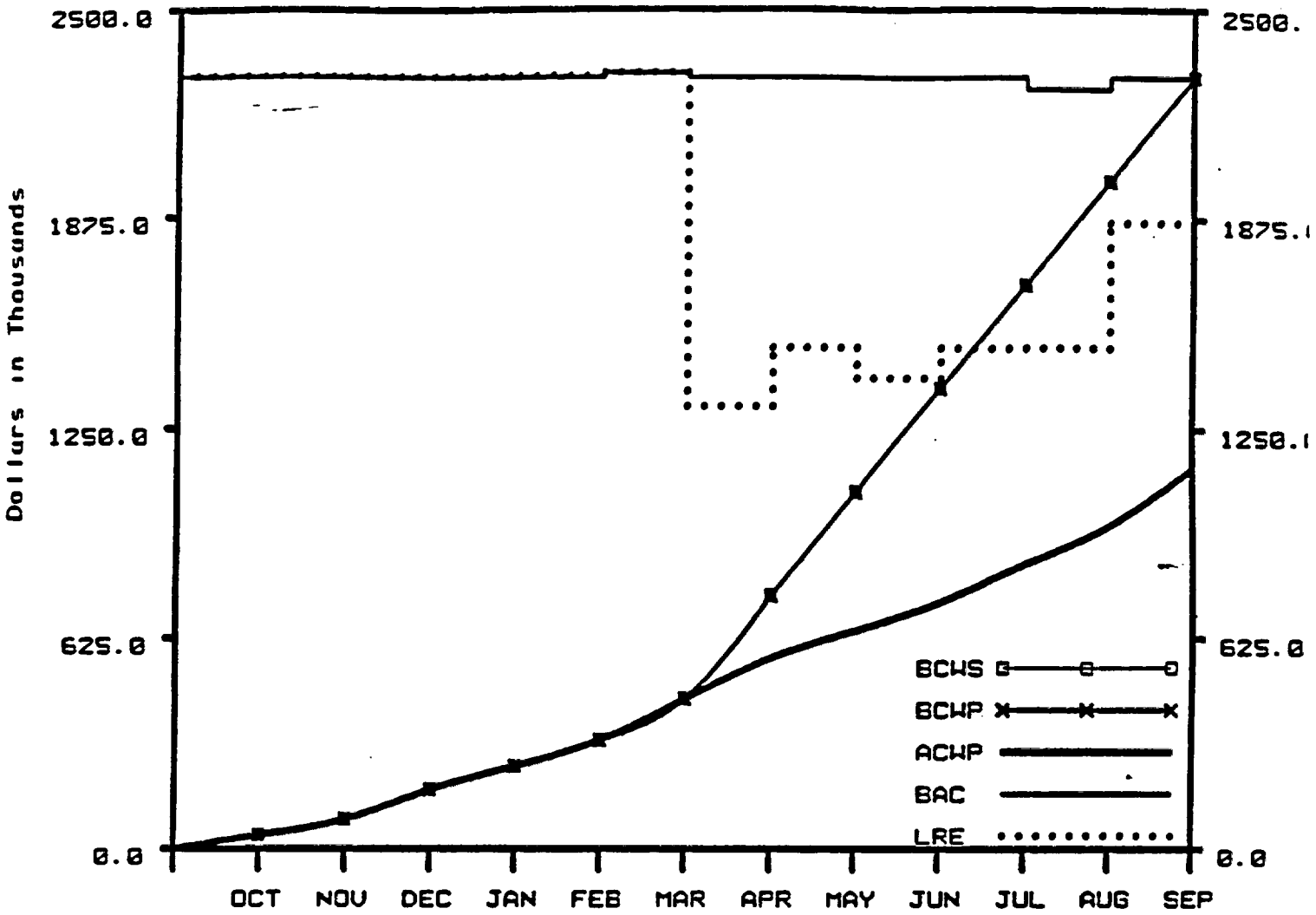
USGS - TOTAL	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	1827.8	19391.9
B. BUDGETED COST OF WORK PERFORMED (BCWP)	1827.8	19391.9
C. ACTUAL COST OF WORK PERFORMED (ACWP)	1522.0	17098.0
D. BUDGET AT COMPLETION (BAC)		19391.9
E. LATEST REVISED ESTIMATE (LRE)		19412.5

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	0.0	0.00
G. COST VARIANCE (B-C)	2293.9	11.83
H. AT COMPLETION VARIANCE (D-E)	-20.6	-0.11

Remarks:

Due to the stop-work order there was decreased technical and management support for Site Investigations, resulting in a cost underrun.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.H



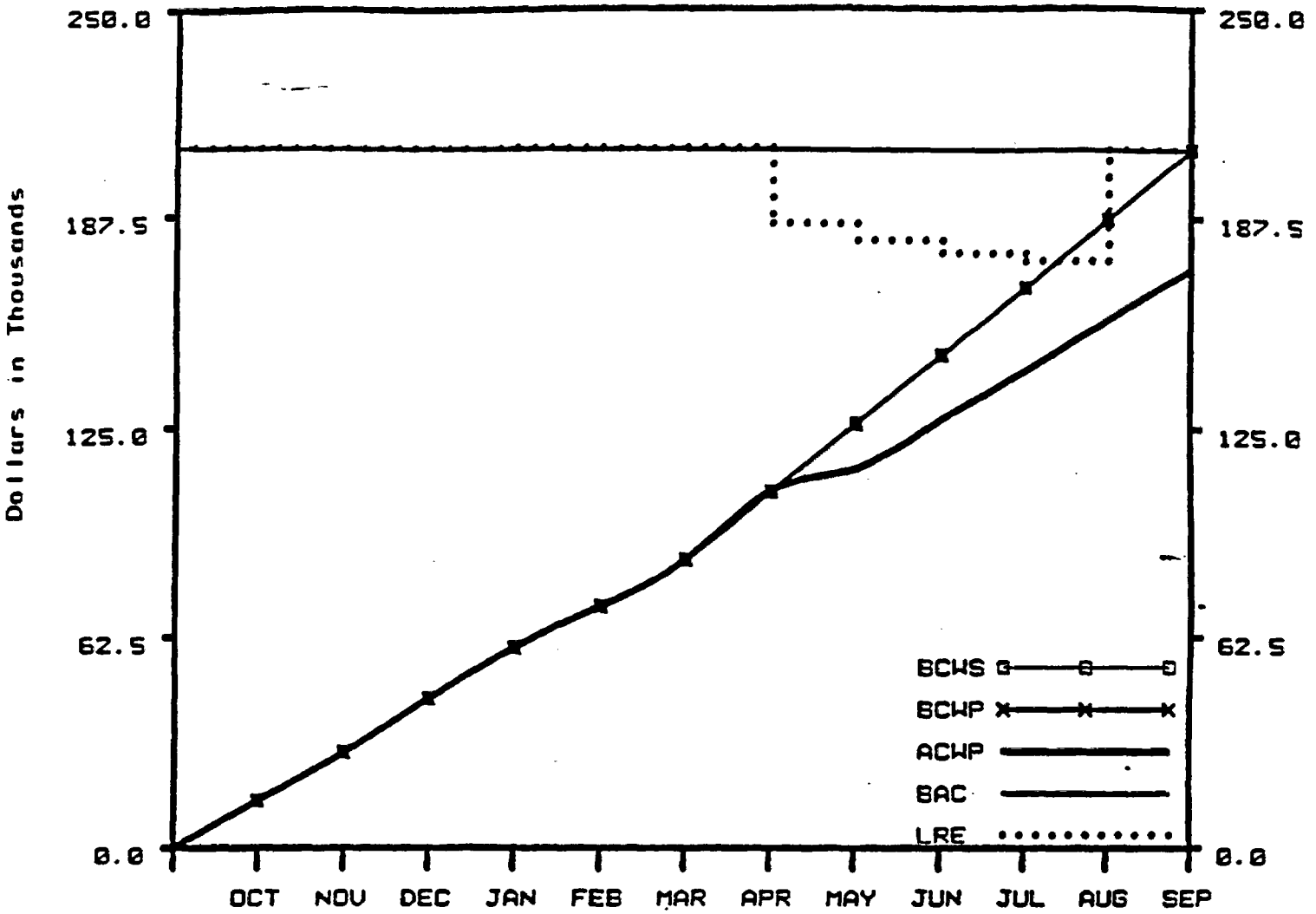
H&N - TOTAL	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	311.0	2298.4
B. BUDGETED COST OF WORK PERFORMED (BCWP)	311.0	2298.4
C. ACTUAL COST OF WORK PERFORMED (ACWP)	173.3	1133.6
D. BUDGET AT COMPLETION (BAC)		2298.4
E. LATEST REVISED ESTIMATE (LRE)		1863.1

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	0.0	0.00
G. COST VARIANCE (B-C)	1164.8	50.68
H. AT COMPLETION VARIANCE (D-E)	435.3	18.94

Remarks:

Decrease of work being performed due to the stop-work order resulted in a cost underrun of $1.2M.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.I



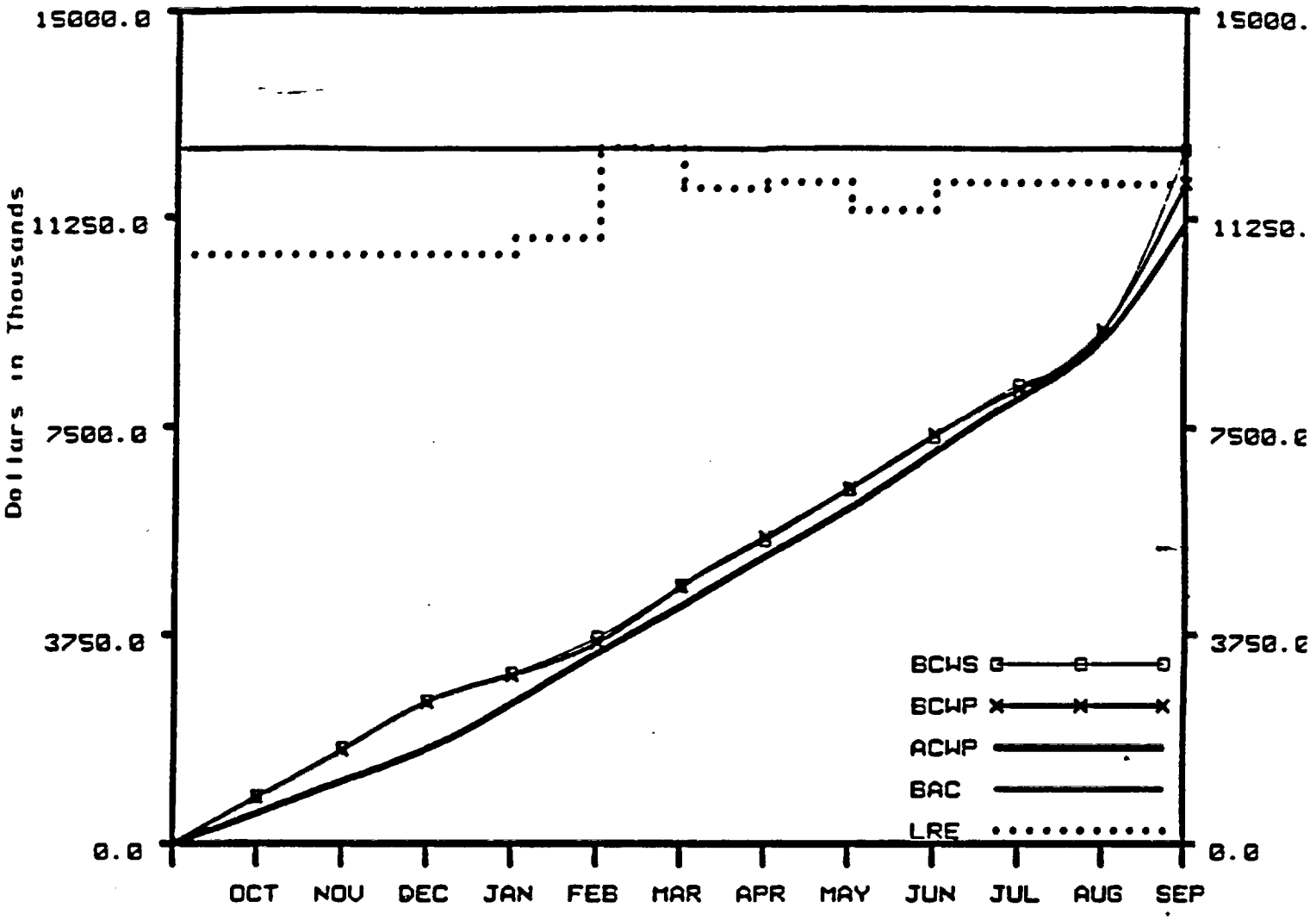
WSI - TOTAL	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	20.7	208.0
B. BUDGETED COST OF WORK PERFORMED (BCWP)	20.7	208.0
C. ACTUAL COST OF WORK PERFORMED (ACWP)	15.1	172.4
D. BUDGET AT COMPLETION (BAC)		208.0
E. LATEST REVISED ESTIMATE (LRE)		208.0

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	0.0	0.00
G. COST VARIANCE (B-C)	35.6	17.10
H. AT COMPLETION VARIANCE (D-E)	0.0	0.00

Remarks:

This level-of-effort for security was less than originally estimated for FY 1986.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.L



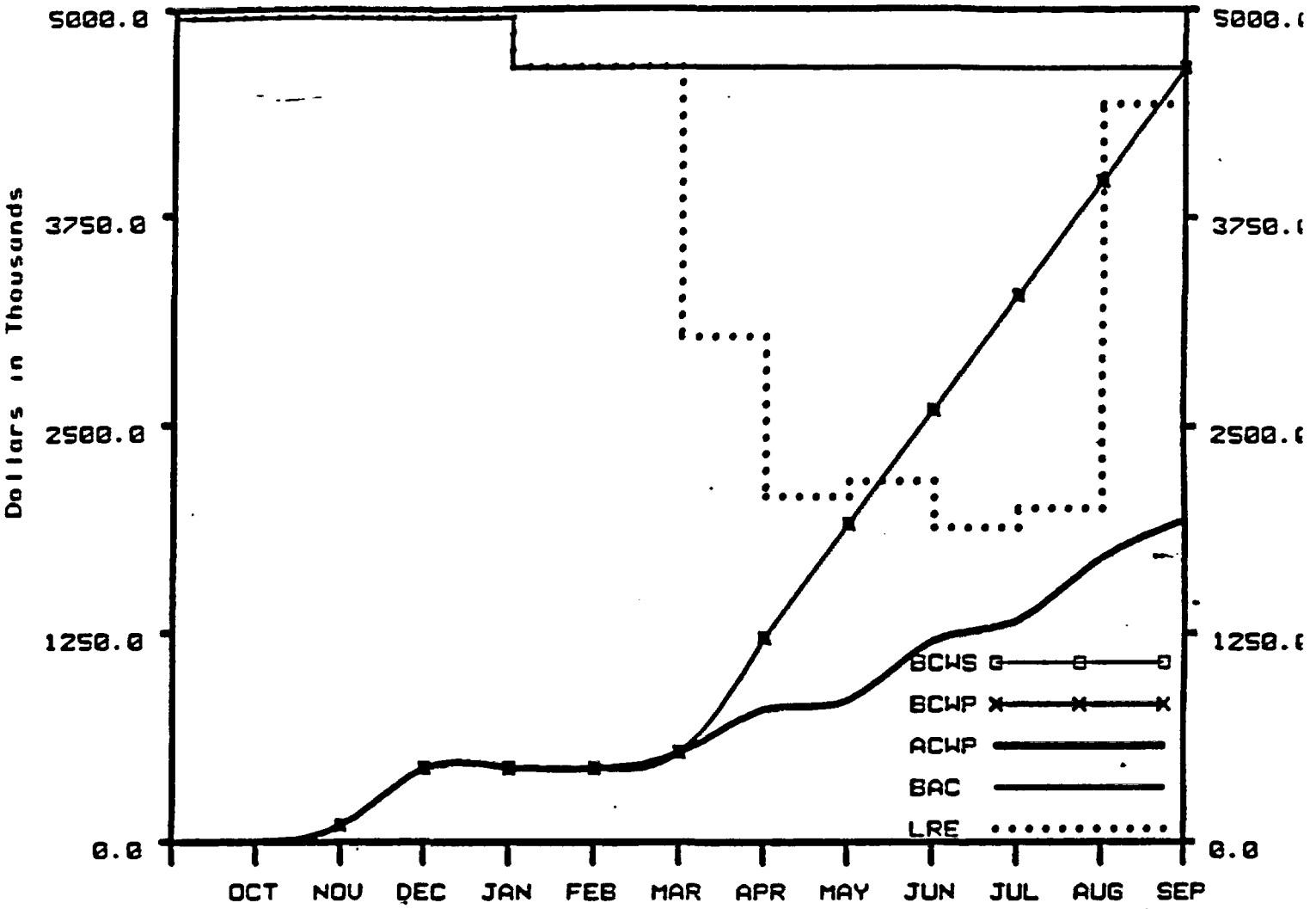
LLNL - TOTAL	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	3294.0	12495.0
B. BUDGETED COST OF WORK PERFORMED (BCWP)	2637.0	11881.0
C. ACTUAL COST OF WORK PERFORMED (ACWP)	2084.0	11160.9
D. BUDGET AT COMPLETION (BAC)		12495.0
E. LATEST REVISED ESTIMATE (LRE)		11854.6

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	-614.0	-4.91
G. COST VARIANCE (B-C)	720.1	6.06
H. AT COMPLETION VARIANCE (D-E)	640.4	5.13

Remarks:

Cost and schedule variances are under the 10% threshold. No analysis required.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.N



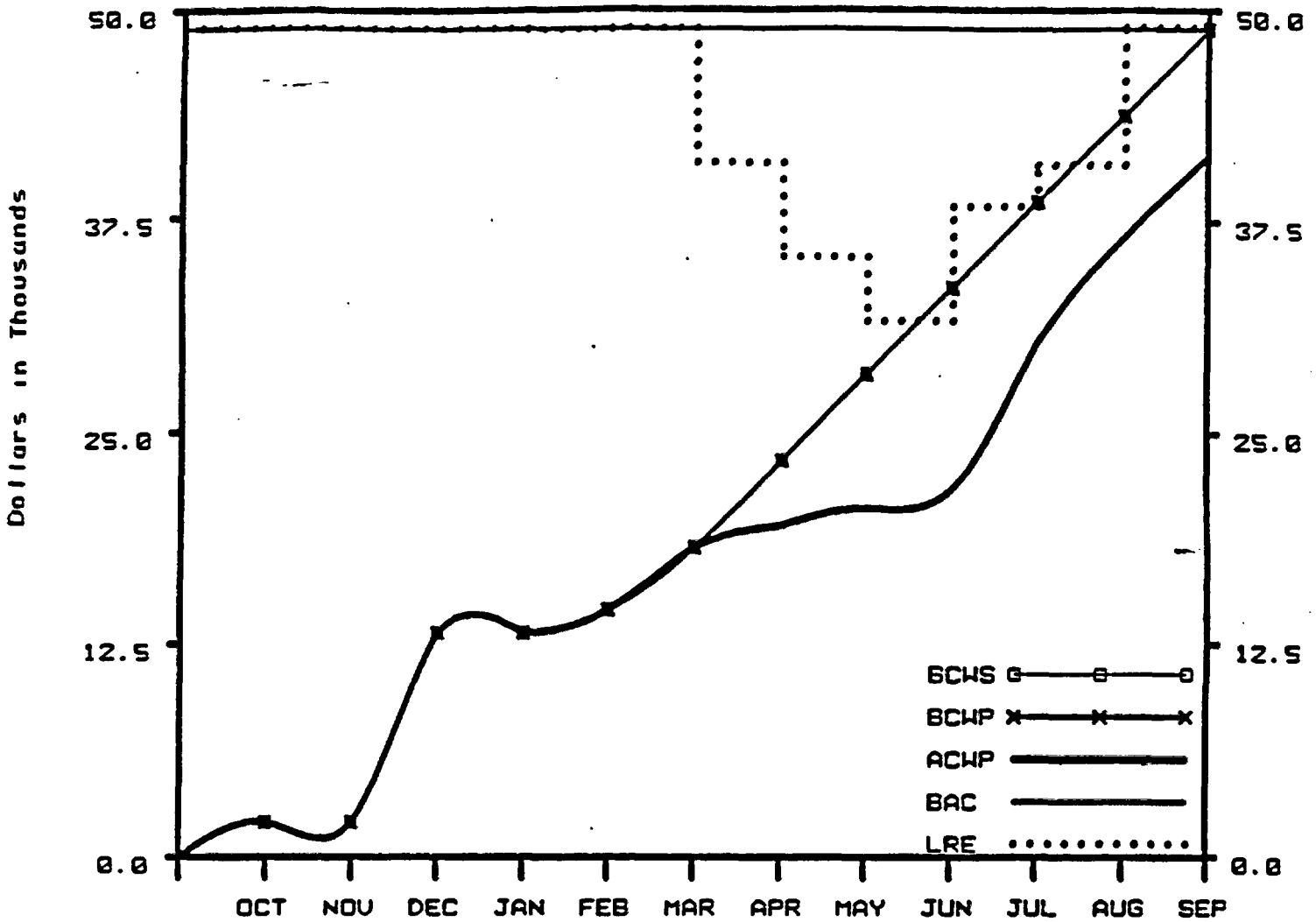
STATE - TOTAL	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	685.8	4650.0
B. BUDGETED COST OF WORK PERFORMED (BCWP)	685.8	4650.0
C. ACTUAL COST OF WORK PERFORMED (ACWP)	225.6	1930.2
D. BUDGET AT COMPLETION (BAC)		4650.0
E. LATEST REVISED ESTIMATE (LRE)		4426.0

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	0.0	0.00
G. COST VARIANCE (B-C)	2719.7	58.49
H. AT COMPLETION VARIANCE (D-E)	224.0	4.82

Remarks:

This cost underrun of $2.7M for FY 1986 will be carried over into FY 1987.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.P



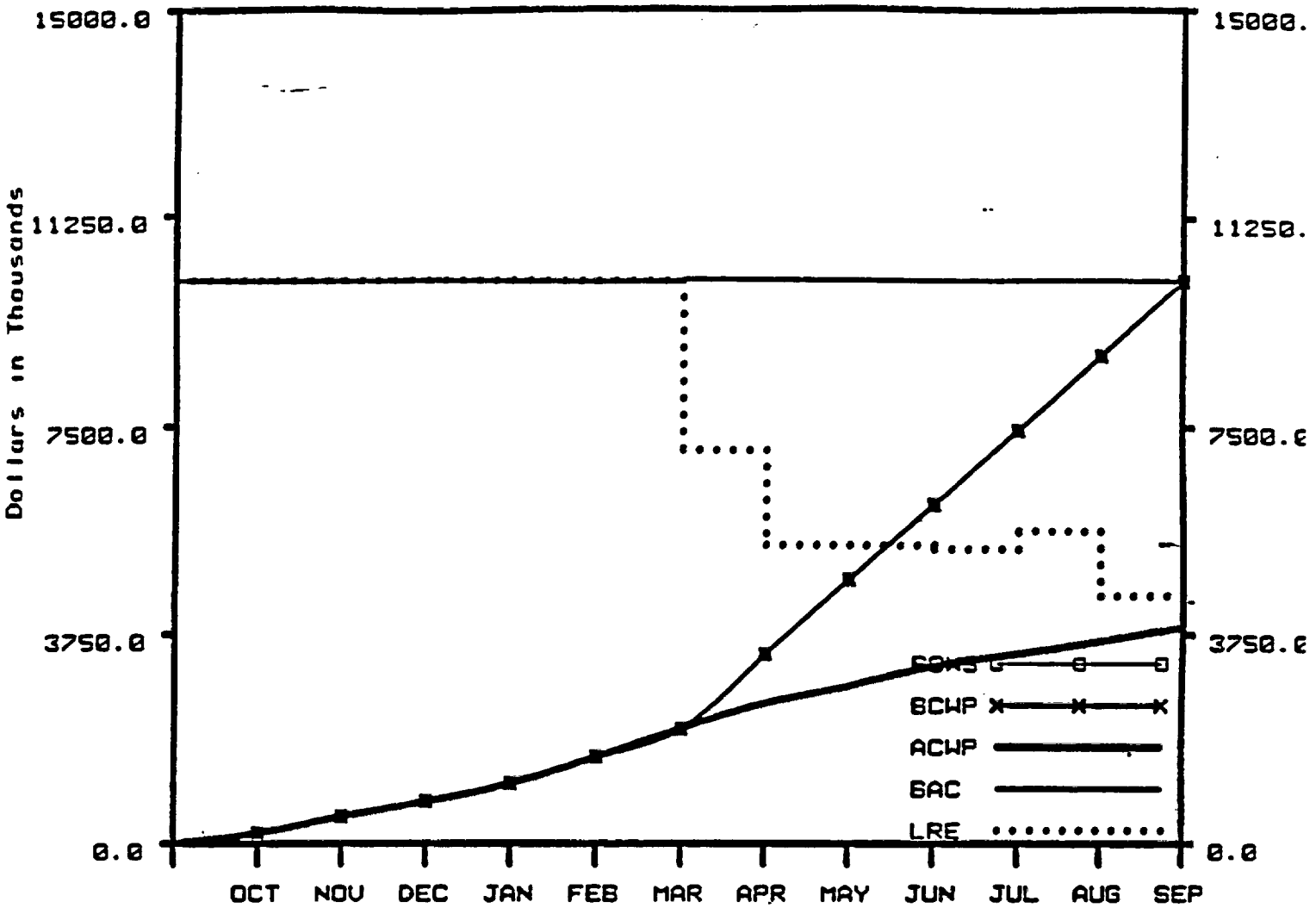
PAN AM - TOTAL	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	5.1	48.9
B. BUDGETED COST OF WORK PERFORMED (BCWP)	5.1	48.9
C. ACTUAL COST OF WORK PERFORMED (ACWP)	4.9	41.4
D. BUDGET AT COMPLETION (BAC)		48.9
E. LATEST REVISED ESTIMATE (LRE)		49.0

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	0.0	0.00
G. COST VARIANCE (B-C)	7.5	15.42
H. AT COMPLETION VARIANCE (D-E)	-0.1	-0.20

Remarks:

Camera support for Site Investigations was curtailed due to the stop-work order resulting in a cost underrun of $7.5K.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.R



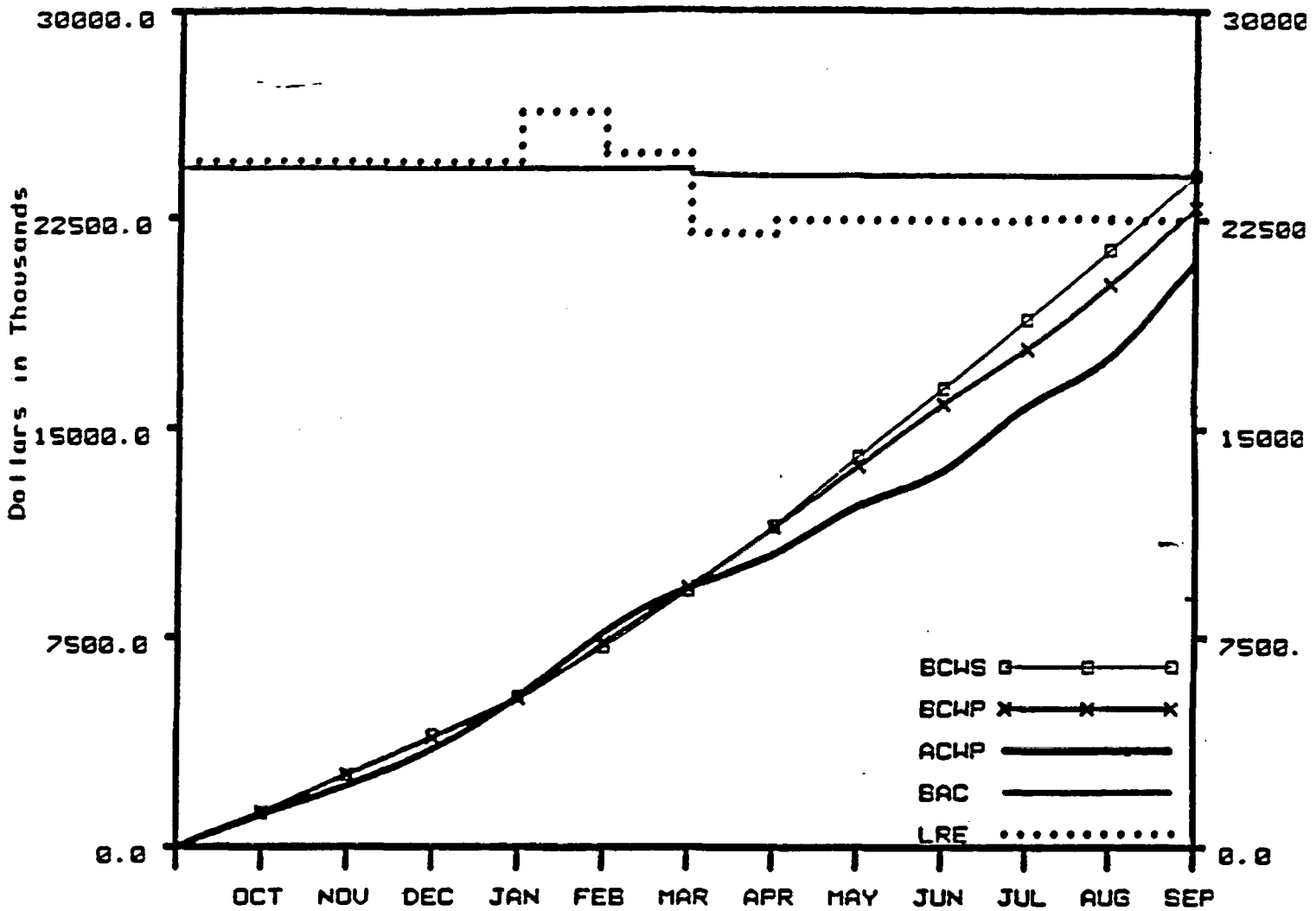
REECO - TOTAL	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	1344.3	10113.4
B. BUDGETED COST OF WORK PERFORMED (BCWP)	1344.4	10113.4
C. ACTUAL COST OF WORK PERFORMED (ACWP)	243.2	3880.6
D. BUDGET AT COMPLETION (BAC)		10113.4
E. LATEST REVISED ESTIMATE (LRE)		4436.0

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	0.0	0.00
G. COST VARIANCE (B-C)	6232.8	61.63
H. AT COMPLETION VARIANCE (D-E)	5677.4	56.14

Remarks:

Support for Drilling and Site Investigations activities was curtailed due to the stop-work order, resulting in a cost underrun of $6.2M.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.S



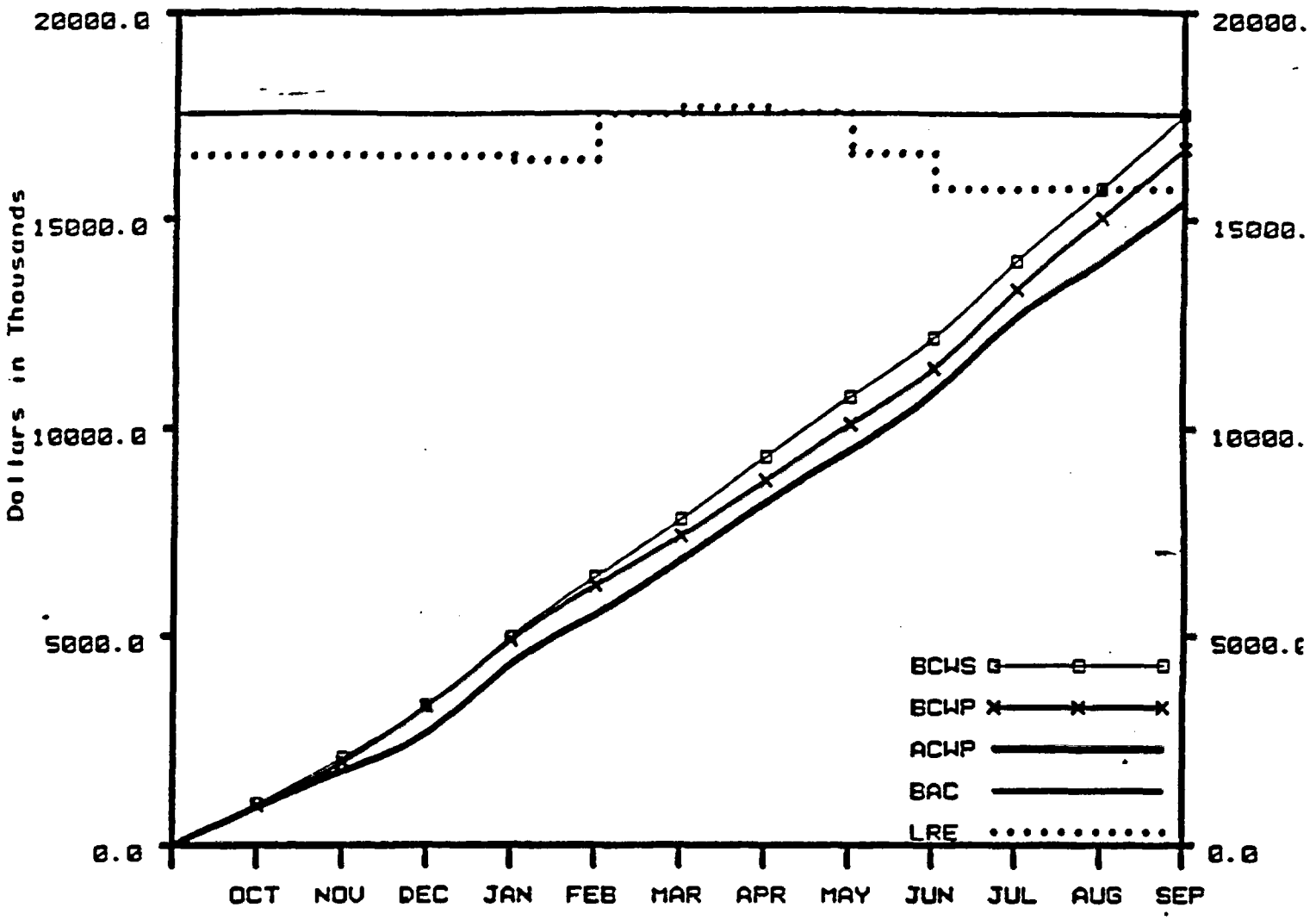
SNL - TOTAL	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	2681.0	24084.0
B. BUDGETED COST OF WORK PERFORMED (BCWP)	2748.2	22917.1
C. ACTUAL COST OF WORK PERFORMED (ACWP)	3429.0	20997.0
D. BUDGET AT COMPLETION (BAC)		24084.0
E. LATEST REVISED ESTIMATE (LRE)		22458.0

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	-1166.9	-4.85
G. COST VARIANCE (B-C)	1920.1	8.38
H. AT COMPLETION VARIANCE (D-E)	1626.0	6.75

Remarks:

Cost and schedule variances are under the 10% threshold. No analysis required.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.T



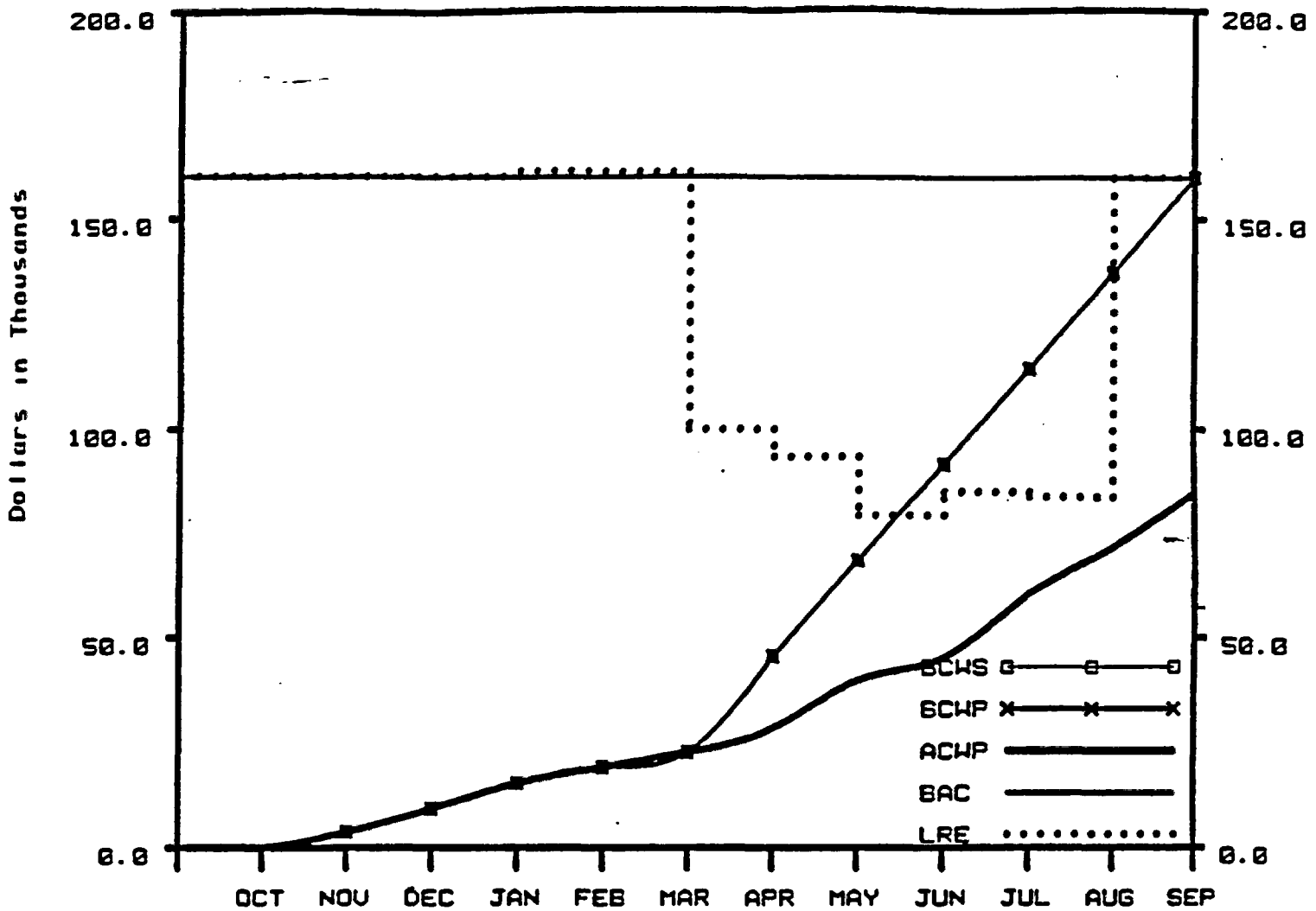
SAIC - TOTAL	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	1785.9	17523.9
B. BUDGETED COST OF WORK PERFORMED (BCWP)	1650.8	16693.5
C. ACTUAL COST OF WORK PERFORMED (ACWP)	1451.7	15436.6
D. BUDGET AT COMPLETION (BAC)		17523.9
E. LATEST REVISED ESTIMATE (LRE)		15726.0

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	-830.4	-4.74
G. COST VARIANCE (B-C)	1256.9	7.53
H. AT COMPLETION VARIANCE (D-E)	1797.9	10.26

Remarks:

Cost and schedule variances are under the 10% threshold. No analysis required.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.U



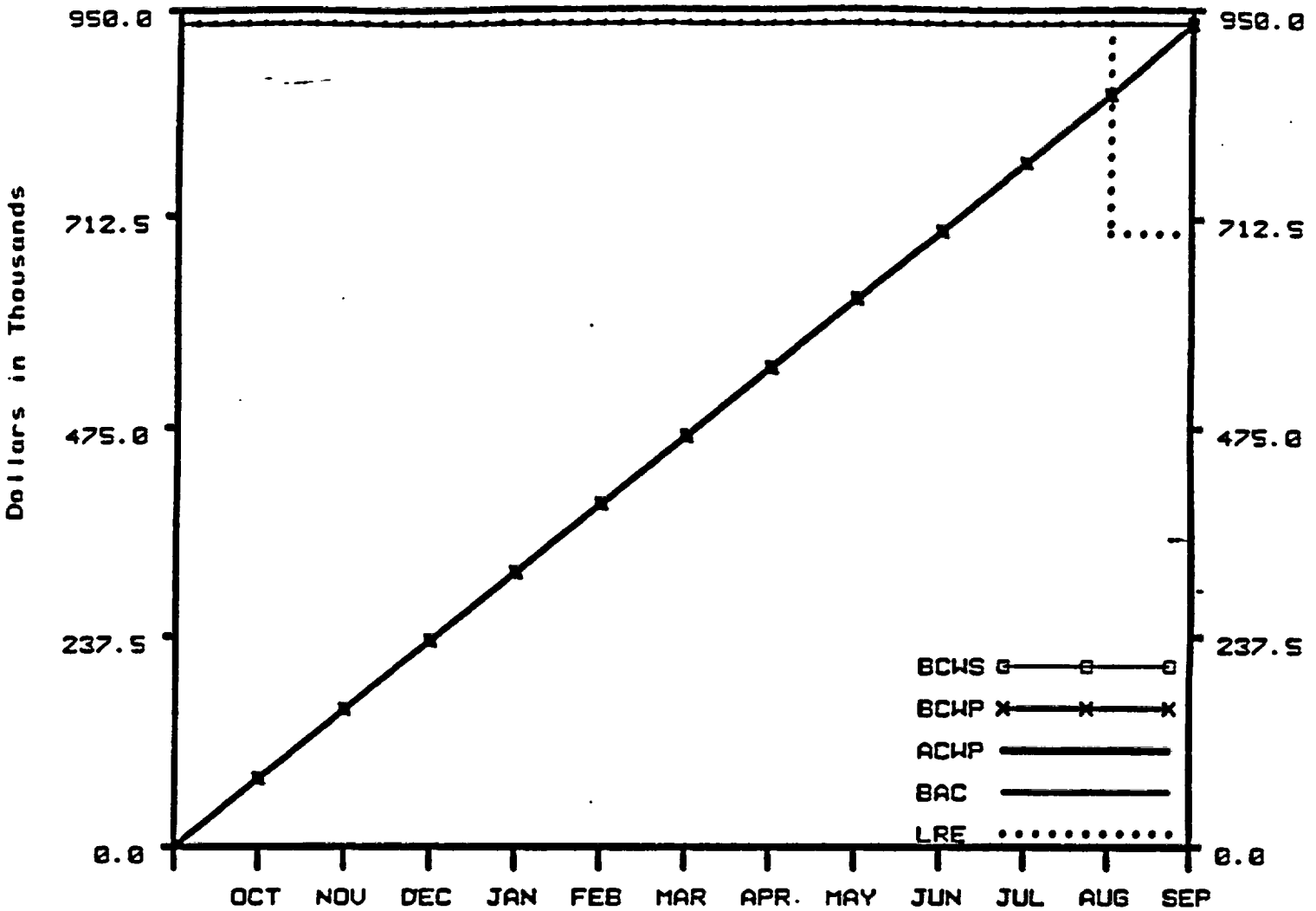
DRI - TOTAL	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	22.9	160.0
B. BUDGETED COST OF WORK PERFORMED (BCWP)	22.9	160.0
C. ACTUAL COST OF WORK PERFORMED (ACWP)	12.9	84.6
D. BUDGET AT COMPLETION (BAC)		160.0
E. LATEST REVISED ESTIMATE (LRE)		160.0

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	0.0	0.00
G. COST VARIANCE (B-C)	75.4	47.16
H. AT COMPLETION VARIANCE (D-E)	0.0	0.00

Remarks:

This task was level-of-effort through FY 1986 to support Site Characterization with archaeology and site reconnaissance. This effort was curtailed during the fiscal year, resulting in a cost underrun of $75.4K.

NNWSI PROJECT
COST PERFORMANCE GRAPH FOR SEP 1986
WBS: 1.2.X



NTS - TOTAL	Current Period	Year To Date
A. BUDGETED COST OF WORK SCHEDULED (BCWS)	81.7	934.3
B. BUDGETED COST OF WORK PERFORMED (BCWP)	81.7	934.3
C. ACTUAL COST OF WORK PERFORMED (ACWP)	51.7	934.3
D. BUDGET AT COMPLETION (BAC)		934.3
E. LATEST REVISED ESTIMATE (LRE)		695.0

VARIANCES (Year To Date)	Dollars	Percent
F. SCHEDULE VARIANCE (B-A)	0.0	0.00
G. COST VARIANCE (B-C)	0.0	0.00
H. AT COMPLETION VARIANCE (D-E)	239.3	25.61

Remarks:

Cost and schedule variances are under the 10% threshold. No analysis required.

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS
LEVEL 1 MILESTONES IN A TIME WINDOW OF 1 Oct 1985 TO 30 Sep 1987
Run Date: 8 October 1986

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL/ EXPECTED
Annual PASS Program Interaction - (Letter Report)	1.2.1.1.S	Robson	1	SNL	M870	B	30 Sep 86 15 Oct 86 E
Yucca Mountain Mined Geologic Disposal System (MGDS) Requirements	1.2.1.2.1.S	Robson	1	SNL	M120	B	30 Nov 85 2 Jan 87 E
Draft Yucca Mountain Site-Specific Mined Geologic Disposal System (MGDS) Description	1.2.1.2.1.S	Robson	1	SNL	M261	B	30 Sep 86 30 Nov 86 E
System Engineering Management Plan (SEMP)	1.2.1.2.4.S	Robson	1	SNL	M108	B	2 May 86 30 Nov 86 E
Input to DOE/HQ Report to Congress on Copper for Waste Packages	1.2.2.3.2.L	Valentine	1	LLNL	M222	B	1 Aug 85 24 Oct 85 A
Progress Report on the Results of Testing Advanced Conceptual Design Metal Barrier Materials Under Relevant Environmental Conditions for a Tuff Repository	1.2.2.3.2.L	Valentine	1	LLNL	M236	B	30 Apr 86 30 Jan 87 E
Final Report on Feasibility of Using Copper as a Waste Package Material	1.2.2.3.2.L	Valentine	1	LLNL	M247	B	30 Sep 86 24 Sep 86 A
Revised Draft Waste Package Subsystem Conceptual Design Requirements to DOE/HQ for Review	1.2.2.4.L	Valentine	1	LLNL	M013	B	30 May 86 15 Nov 86 E
Initiate Waste Package Advanced Conceptual Design	1.2.2.4.L	Valentine	1	LLNL	M233	B	31 Jan 86 2 Jan 87 E
Report on the System Model for Waste Package Performance Analysis	1.2.2.5.L	Valentine	1	LLNL	M276	B	30 Jun 86 30 Oct 86 E

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS
LEVEL 1 MILESTONES IN A TIME WINDOW OF 1 Oct 1985 TO 30 Sep 1987
Run Date: 8 October 1986

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL/ EXPECTED
Report on Geochemistry Simulation of Yucca Mountain Using Best Available Data on Mineralogy, Water Chemistry, Flow Rates and Crack Statistics	1.2.3.4.1.7.A	Livingston	1	LANL	M325	B	27 Jun 86 30 Nov 86 E
Implementation of Meteorological Monitoring Plan	1.2.3.6.1.T	Blanchard	1	SAIC	M364	B	1 Jun 85 16 May 86 A
Final Radiological Monitoring Plan Complete	1.2.3.6.1.T	Jankus	1	SAIC	M897	B	28 Feb 86 28 Feb 87 E
Draft Socioeconomic Monitoring and Mitigation Plan	1.2.3.7.T	Dixon	1	SAIC	P029	B	30 Jun 86 8 Sep 86 A
Review of the Concepts Developed by HEDL for Remote/Automated Waste Handling Systems Initiated	1.2.4.1.1.S	Skousen	1	SNL	M802	B	30 Jul 86 6 Aug 86 A
Assistance to HEDL in Defining Remote/Automated Waste Handling Systems	1.2.4.1.1.S	Skousen	1	SNL	M806	B	31 Oct 85 30 Oct 86 E
Start Repository Advanced Conceptual Design	1.2.4.1.1.S	Skousen	1	SNL	N430	B	30 Jun 86 5 Jan 87 E
Initial Subsystem Design Requirement (SDR)	1.2.4.1.2.S	Skousen	1	SNL	N433	B	31 Jan 86 31 Oct 86 E
Repository Conceptual Design in Support of Site Characterization	1.2.4.1.3.S	Skousen	1	SNL	N432	B	3 Dec 86 1 May 87 E
Report on G-Tunnel Underground Facility (GTUF) Summary	1.2.4.2.1.2.S	Skousen	1	SNL	M455	B	30 Sep 86 5 Jan 87 E

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS
LEVEL 1 MILESTONES IN A TIME WINDOW OF 1 Oct 1985 TO 30 Sep 1987
Run Date: 8 October 1986

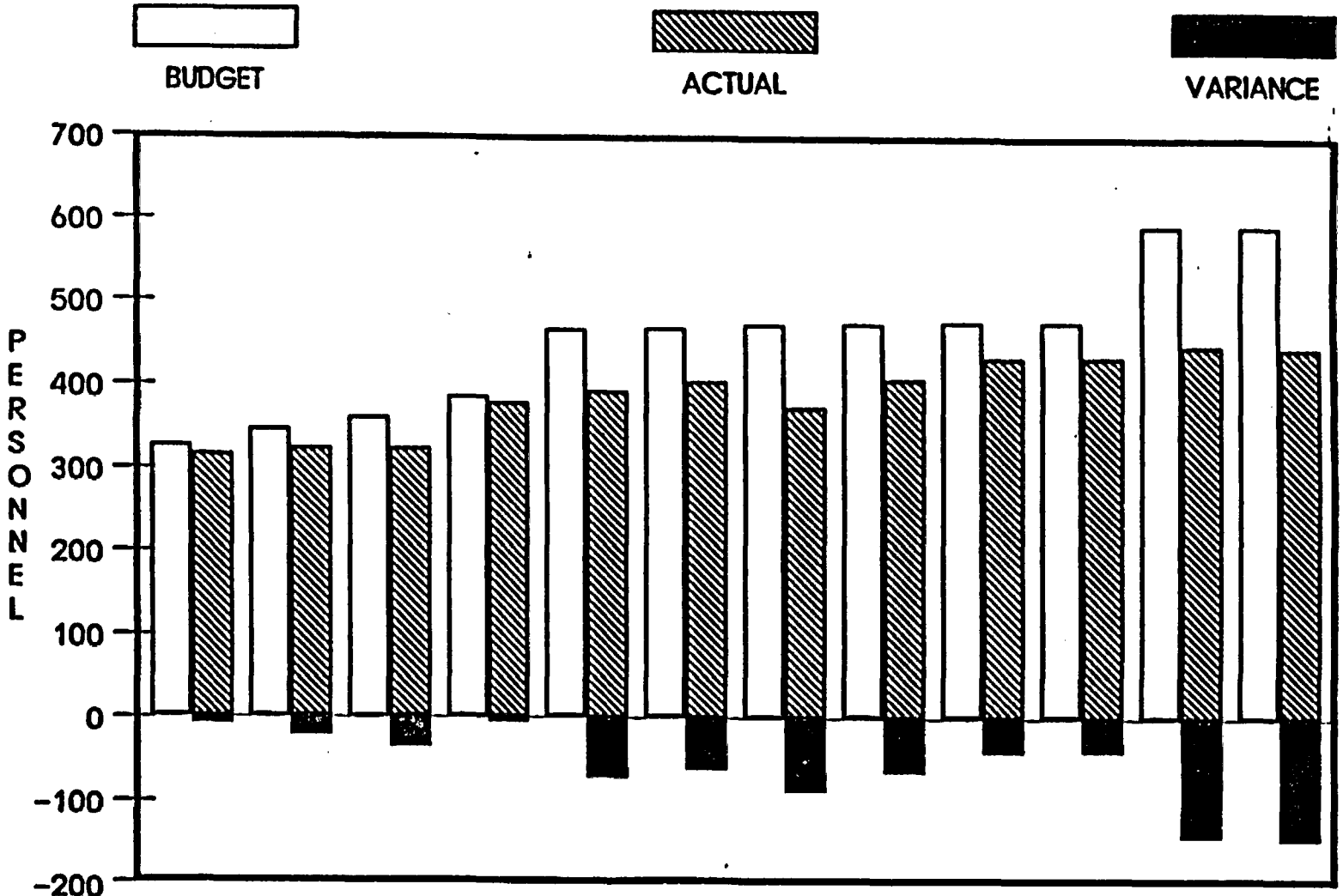
MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL/ EXPECTED
Feasibility Analysis of Horizontal Emplacement and Retrieval - Letter Report	1.2.4.2.2.1.S	Skousen	1	SNL	M295	B	31 Oct 85 5 Sep 86 A
Horizontal Waste Emplacement Equipment Development Plan	1.2.4.2.2.1.S	Skousen	1		N406	B	30 Apr 86 31 Jan 87 E
Prepare Design Requirements and Materials Recommendation Report	1.2.4.2.3.1.S	Skousen	1	SNL	P404	B	30 Jul 86 5 Mar 87 E
Preliminary Study of the Effects of Uncertain Geologic Data on Design of the Underground Facility	1.2.4.6.2.S	Skousen	1	SNL	N457	B	30 Aug 86 27 Feb 87 E
Issue IMS Requirement Study to WMPO/NV for Review and Comment	1.2.5.2.1.T	Szymanski	1	SAIC	M855	B	30 Sep 86 30 Dec 86 E
Draft Site Characterization Plan (SCP)	1.2.5.2.2.T	Clanton	1	SAIC	M521	B	15 Aug 86 14 Nov 86 E
Site Characterization Plan (SCP)	1.2.5.2.2.T	Clanton	1	SAIC	M522	B	24 Nov 86 31 Dec 86 E
Camera Ready Environmental Assessment/Comment Response Appendix (EA/CRA) to DOE/HQ	1.2.5.3.1.T	Blanchard	1	SAIC	M504	B	24 Jan 86 24 Jan 86 A
Revised Camera-Ready Environmental Assessment/Comment Response Appendix (EA/CRA)	1.2.5.3.1.T	Blanchard	1	SAIC	P054	B	9 Apr 86 9 Apr 86 A
ESF Shaft and Mining Subcontract Awarded	1.2.6.1.1.A	Irby	1	LANL	M022	B	21 Mar 86 1 Aug 88 E

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS
LEVEL 1 MILESTONES IN A TIME WINDOW OF 1 Oct 1985 TO 30 Sep 1987
Run Date: 8 October 1986

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL/ EXPECTED
Complete Exploratory Shaft Readiness Review	1.2.6.1.1.A	Irby	1	LANL	M243	B	24 Feb 86 1 Apr 88 E
Start First Shaft (ES-1) Construction	1.2.6.1.1.A	Irby	1	LANL	M652	B	28 Aug 86 25 May 88 E
Start ESF Site Preparation	1.2.6.2	Irby	1	LANL	M645	B	1 Dec 86 1 Dec 86 E
Begin ESF Testing	1.2.6.9.2	Irby	1	LANL	M612	B	31 May 87 25 May 88 E
Final Report on the SFT-C	1.2.7.2.1.L	Zavada	1	LLNL	M708	B	28 Feb 86 30 Nov 86 E
Completion of Mining for G-Tunnel Welded Tuff Mining Evaluations	1.2.7.2.3.S	Skousen	1	SNL	M279	B	30 May 86 2 Jun 86 A
Submit FY 1988 Budget to DOE/HQ	1.2.9.1.2.X	Dixon	1	WMPO	M719	B	21 Apr 86 15 May 86 A
Implementation of Phase I of Earned Value System (80 percent level of effort)	1.2.9.2.T	Dixon	1	SAIC	M720	B	30 Nov 85 13 Nov 85 A
FY 86 Project Budget Baseline Approved	1.2.9.2.T	Dixon	1	SAIC	M722	B	31 Oct 85 24 Apr 86 A
List of Project Office Controlled Milestones Complete	1.2.9.2.T	Dixon	1	SAIC	M893	B	31 Dec 85 30 Nov 86 E

NO. MILESTONES IN THIS REPORT: 40

NNWSI PROJECT STAFFING*
FISCAL YEAR 1986



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
B	327	347	361	386	466	468	473	474	476	476	593	593
A	317	324	324	379	393	405	374	408	434	435	449	446
V	-10	-23	-37	-7	-73	-63	-99	-66	-42	-41	-144	-147

*These budgeted and actual amounts reflect input from six project participants: F&S, Los Alamos, LLNL, REECo, SAIC, and SNL.

PLANNED NNWSI PROJECT FIELD ACTIVITIES

FOR NOVEMBER

Participant	Activity	Location	Planned Day	Planned Time
LLNL	No report received			
Los Alamos	No scheduled activities			
SAIC	Meteorological monitoring	Yucca Mountain	Field site technician will maintain stations weekly, 3 days per week.	
USGS	Seismic network monitoring	NTS and Vicinity	Continuous throughout month.	
	Collect precipitation and runnoff data	NTS	Following storm events.	
	Water-level monitoring	Yucca Mountain and Vicinity	Nov. 3-5 Nov. 17-19	8-4
	Monitoring of testwell USW UZ1	Test Well USW UZ-1	Nov. 6, 17, and 26	8-11 4-5
	Monitoring of neutron test holes	Yucca Mountain and Vicinity	Continous throughout month.	8-4

Enclosures:
As stated

cc w/encls.:
Project File 1.2.9.1.1.2.1