U.S. DEPARTMENT OF ENERGY

OCRWM OGR

Nevada Nuclear Waste Storage Investigations PROJECT

YUCCA MOUNTAIN

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS PROJECT

MONTHLY REPORT

SEPTEMBER 1985

UNITED STATES DEPARTMENT OF ENERGY

NEVADA OPERATIONS OFFICE

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, Nevada Operations Office. NNWSI Project work is sponsored by the Office of Geologic Repositories of the DOE Office of Civilian Radioactive Waste Management.

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ABSTRACT

WBS X.2.1 SYSTEMS

Narrative not available.

WBS X.2.2 WASTE PACKAGE

The off-line data reduction and analyses of microprobe data collected from wafers run in the long-term tests were completed. Post-test election microprobe analyses and detailed SEM observation of secondary minerals were completed on the wafers removed from the short-term tests with vitric tuff. The radiochemistry on the Series 2, Cycle 2 termination samples has been completed. The results of a long-term Unsaturated Test matrix using defense glass doped with uranium, cesium and strontium have been compiled. A paper entitled "A Ground Reaction Curve Based upon Block Theory" has been prepared for the 34th Geomechanics Colloquy. M135, "FY 1985 Status Report on Feasibility Assessment of Copper-Base Waste Package Container Materials in a Tuff Repository" was completed. Thermal analysis of twelve waste package container configurations were completed. The paper on transition state theory has been completed. The MCRT data files have been unified.

WBS X.2.3 SITE

A paper was delivered on fractal geometry of fracture networks at Yucca Mountain to the International Symposium on Fundamentals of Rock Joints in Sweden. The report entitled "Investigation of an Heromagnetic Anomaly on West Side of Yucca Mountain, Nye County, Nevada" was distributed. Geophysical logs were obtained in 15 of the 18 water table drill holes at NTS. Samples were collected for PIXE and IC analyses from Trench 14 and Busted Butte. A 20-foot test hole on the Fran Ridge sand ramp was drilled and sampled. A model has been developed for thermogravimetric analysis data for zeolites. A fracture network transport model was constructed using a sample of Tpt tuff taken from an outcrop at Fran Ridge. The report entitled "Particulate Content of Flowing Groundwater" was issued. The report entitled "Sensitivity of Radionuclide Transport Times to Uncertainties in Chemical Sorption and Molecular Diffusions" has been completed. Reports entitled, "Alternate Numerical Methods" and "The Effects of Geochemical Processes on the Transport of Contaminents in Multicomponent Systems: A Modeling Perspective" were completed. The quantitative re-analysis of USW G1 by x-ray diffraction was completed.

WBS X.2.4 REPOSITORY

Narrative not available.

WBS X.2.5 REGULATORY/INSTITUTIONAL

Internal reviews of SCP Chapters 6, 4, and 1 were completed. The DOE/HQ review of Chapter 2 was held in Washington. The Administrative Record for the SCP is being coordinated at DOE/HQ. The next draft Comment Response Document and draft Final EA are due to DOE/HQ on October 4, 1985. The final EA is scheduled for December 20, 1985. Copies of the EA Management Plan will be distributed to the TPOs at the October PM-TPO meeting.

WBS X.2.6 EXPLORATORY SHAFT

Update and reorganization continued of the ESF subsurface facilities construction drawings and specifications by F&S. All 3 waste disposal projects were represented at the ESF Budget and Design Document Workshop in Denver to standardize budget requesting processes. Copies of the ESTP, Rev. 1, were sent to DOE/HQ for review. The Draft Final Hardware Design Document has been completed.

WBS X.2.7 TEST FACILITIES

A report summarizing the results of the ADINA/ADINAT calculations of the thermomechanical response of the SFT-C was completed. The reports entitled "Estimates of In Situ Performability with NX Borehole Jack, SFT-C, NTS" and "Negative Hysteresis Effect Observed During Calibration of the U.S. Bureau of Mines Borehole Deformation Gauge" have been released by WMPO for publication. A schedule is being prepared to allow shipment of the 17 fuel element located at E-MAD during May and June, 1986, and for close-down of the E-MAD facility. All E-MAD fuel assemblies are stored in the Hot Bay Lag Storage Pit and are in a safe configuration. Operations for measuring the decay heat rate of five fuel assemblies were completed.

WBS X.2.8 LAND ACQUISITION

None.

WBS X.2.9 PROGRAM MANAGEMENT

Three change requests were approved affecting three milestones. The preliminary draft of the PMDS system description document was distributed to all Project participants. The Annual Status Report was completed through August, 1985. The draft Project Management Plan will be prepared to the FY 86 baseline.

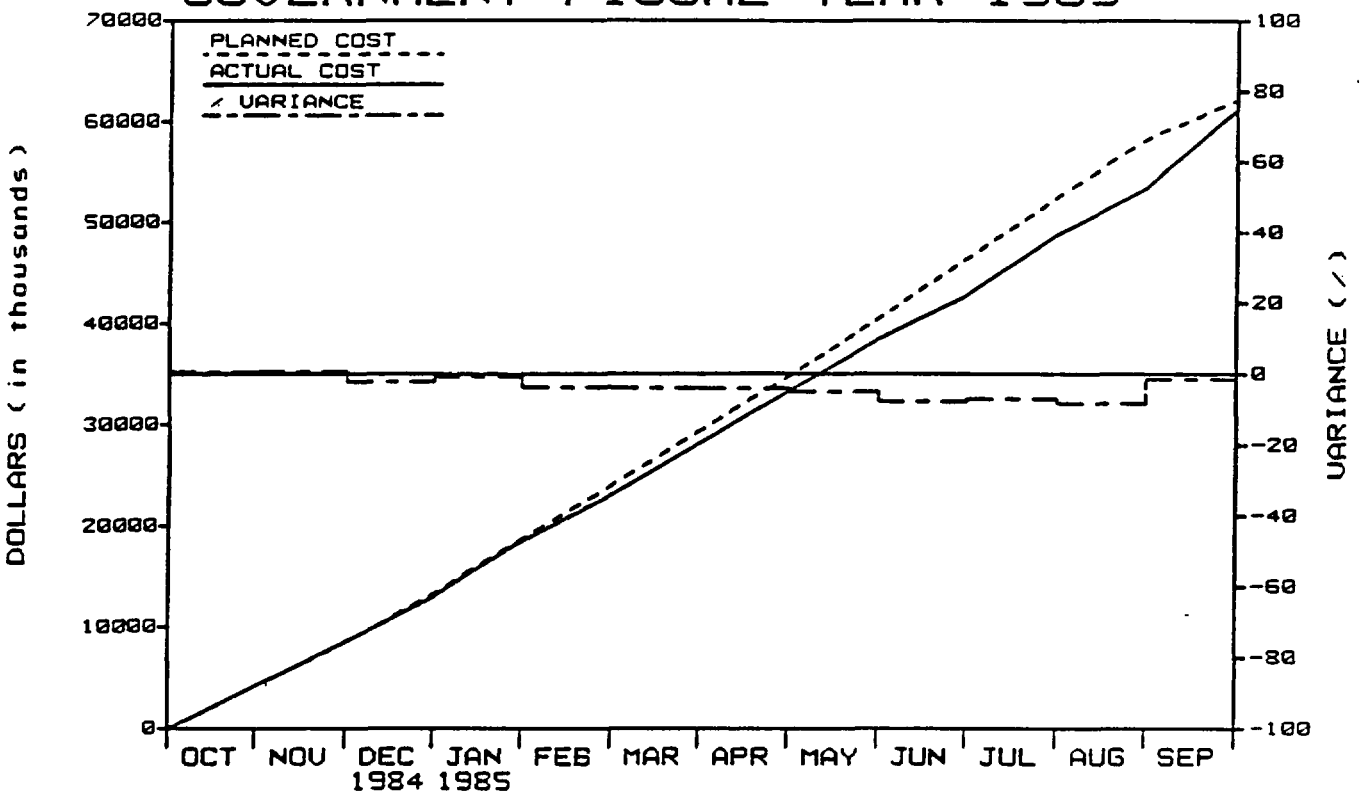
Funding Overview

The month-end programmatic estimated costs were $61,188,000 against a plan of $62,135,000 resulting in a cost underrun of $947,000. The current plan does reflect the reduced funding per the revised time-phased Cost Plans for FY 85. These changes were incorporated into the September 1985 NNWSI Project Monthly Report.

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

		Plan	($000) (Cost)	Variance	% Variance
X.2.1	Systems	$ 3,789	$ 3,781	$ 7	-0-
X.2.2	Waste Package	5,572	5,584	(12)	-0-
X.2.3	Site	17,644	17,561	83	-0-
X.2.4	Repository	10,211	10,190	21	-0-
X.2.5	Regulatory/ Institutional	6,507	6,057	450	7
X.2.6	Exploratory Shaft	6,185	5,973	212	3
X.2.7	Test Facilities	1,470	1,482	(12)	(1)
X.2.9	Project Management	10,757	10,560	197	(2)
X.2	NNWSI Project	$62,135	$61,188	$947	2%

WBS X.2 NNWSI PROJECT
GOVERNMENT FISCAL YEAR 1985



PLAN (x1000)	4217	8482	13238	18656	23973	29355	34734	40504	46389	52505	58226	62135
COST (x1000)	4241	8543	12955	18478	23077	28203	33266	38440	42759	48787	53390	61188
VARIANCE (x1000)	-24	-61	283	178	896	1152	1468	2064	3630	3718	4836	947
% VARIANCE	1	1	-2	-1	-4	-4	-4	-5	-8	-7	-8	-2

NNWSI PLANNING AND SCHEDULING
BUDGET BASELINE

SEPTEMBER 1985

CONTRACTORS	($000) BEGINNING FUNDING	CHANGE	($000) ENDING FUNDING
SNL	$18,334	(800)	$17,534
LLNL	8,565	(50)	8,515
LANL	10,130	(583)	9,547
USGS	9,922	90	10,012
SAIC	7,775	(545)	7,230
REECo	4,608	(285)	4,323
H&N	898	-	898
F&S	1,212	70	1,282
WSI	200	-	200
PAN AM	50	-	50
STATE GRANT	1,744	(150)	1,594
MISCELLANEOUS	530	-	530
NTS ALLOCATION	422	(2)	420
RESERVE	-0-	-	-0-
SUBTOTAL	64,390	(2,255)	$62,135
CAPITAL EQUIPMENT	5,274	-	3,170
TOTAL	$69,664	-0-	$65,305*

* C/SCR 095 APPROVED 10/3/85

U.S. DEPARTMENT OF ENERGY

OCRWM
OGR

Nevada
Nuclear
Waste
Storage
Investigations
PROJECT

YUCCA MOUNTAIN

PROJECT STATUS

X.2.1 SYSTEMS

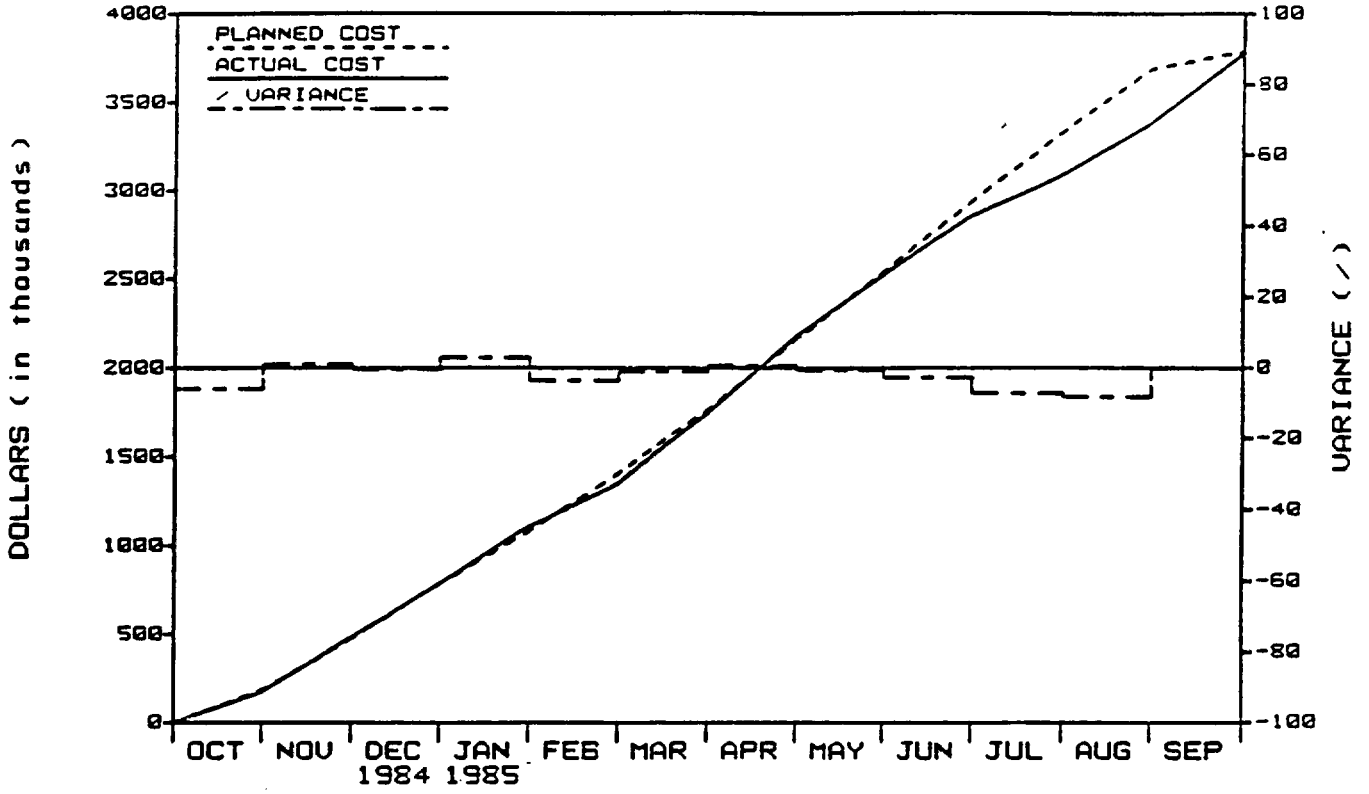
OBJECTIVE

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

Narrative not available.

WBS X.2.1 SYSTEMS
GOVERNMENT FISCAL YEAR 1985



PLAN (x1000)	185	477	786	1078	1401	1761	2164	2540	2941	3335	3690	3789
COST (x1000)	174	482	781	1108	1349	1741	2179	2522	2862	3092	3382	3781
VARIANCE (x1000)	11	-5	5	-30	52	20	-15	18	79	243	308	8
/ VARIANCE	-6	1	-1	3	-4	-1	1	-1	-3	-7	-8	0

MILE-STONE	RESP. AGENCY	WBS	MILESTONE DESCRIPTION	O	N	D	J	F	M	A	M	J	J	A	S
M113	SNL	X.2.1	Performance Assessment Plan												△
M277	SNL	X.2.1	Annual PASS Program Interaction												

△ PLANNED MILESTONE COMPLETION DATE
▲ COMPLETED AS SCHEDULED

◇ REVISED MILESTONE COMPLETION DATE
◆ COMPLETED AS REVISED

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X.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

Waste Package Environment

The off-line data reduction and analyses of microprobe data collected from wafers run in the long-term tests DB12 and DB13 were completed. Efforts to handpick the Ca-rich zeolite found growing on the wafer (DB13) reacted at 150°C with J-13 water for 304 days were unsuccessful. Only a few crystal aggregates were observed and their small size made it extremely difficult to remove them from the wafer.

Post-test electron microprobe analyses and detailed SEM observation of secondary minerals were completed on the wafers removed from the short-term tests with vitric tuff completed earlier. These hydrothermal interaction tests run in the Dickson-type gold-bag rocking autoclave are being done to investigate the hydrothermal stability of vitric tuff from the Tpt and underlying units. This cooperative effort with Los Alamos will compliment previous field studies to evaluate the susceptibility of vitrophyre to thermal alteration by emplacement of HLW in Yucca Mountain. The chemical analyses of fluid samples taken during the most recently finished experiment are now complete.

Wafers were prepared from the altered vitric tuff samples. These wafers will be run next in the continuation of the cooperative project with Los Alamos.

The influence of geologic discontinuities on the stability of waste-package emplacement holes is to be evaluated using methods that examine rock blocks that could be encountered in the perimeter of a typical emplacement hole. However, these methods require certain types of data. SNL provided LLNL with the requested data this month, but the analyses cannot yet proceed since no response has been received to the request for discontinuity data from the USGS.

A paper entitled "A Ground Reaction Curve Based upon Block Theory" has been prepared for the 34th Geomechanics Colloquy, which is organized annually by the Austrian Society for Geomechanics. This paper is an excerpt from Milestone W207, which was completed earlier this year.

Effort has been spent on the two-phase permeability system. LLNL has successfully controlled two-phase flow through an aperture used to simulate a rock fracture (a metering valve). In addition, the system has been modified by the addition of a check valve in the gas-feed line for easier system control. Recently work has resumed with the fractured tuff sample; single phase permeability is now being measured on the sample.

Automation of the impedance camera has been successfully "bread boarded." It appears that total time required per image will be about two minutes from beginning of data collection to displayed color image. This should yield essentially real-time CIT monitoring of an experiment. The software for image processing is being transferred to our laboratory computer.

Waste Form Testing

The radiochemistry on the Series 2, Cycle 2 termination samples has been completed. The I-129 irradiation for activation analysis is being conducted at Washington State University since the N-Reactor is down for maintenance. Fabrication of prototypic Series 3 test vessels is in progress.

Hot cell ceramographic examination of cathodic vacuum etched transverse sections from terminated Series 2 specimens indicated finer pre-irradiation microstructure for the H. B. Robinson fuel relative to the Turkey Point fuel.

The spent-fuel bundles for the autoclave experiments are in the last stages of assembly. A final decision on an appropriate O-ring material has not been made.

In preparation for low temperature oxidation testing, three hot cell ports were manufactured. A stainless steel plate was also manufactured for each end of the port(s). They have been fitted with gaskets and lids. The in-cell arrangement was mocked-up and gas lines fabricated to meet the feed-through port.

Drafts of "Spent Fuel Oxidation FY 1985 Progress Letter - Oxidation of spent Turkey Point Fuel at 140 °C" and "Test Plan for Series-2 Thermogravimetric Analyses of Spent Fuel Oxidation" were completed and are under internal WHC review. Preparation of the "Test Plan for Long-Term, Low-Temperature Oxidation of Spent Fuel-Series 1" is in progress.

The results of a long-term Unsaturated Test matrix using defense glass doped with uranium, cesium, and strontium have been compiled in a Topical Report, "One Year Results of the NNWSI Unsaturated Test Procedure: SRL 165 Glass Application," that has been submitted to LLNL for review.

Another series of tests was done using Unsaturated Test vessels fitted with Si gaskets. Additional tests are being done with the NNWSI Project vessels and a variety of gasket types. Hopefully, these tests will resolve whether the vessels are tight during the test and whether the additional Si is coming from the Si gasket, the stainless steel, or both.

Two experiments have been completed using pressed and sintered UO_2 pellets. These experiments indicated that there was ample uranium released from the UO_2 pellets to be analyzed. The weight gain observed for each sample is a result of the formation of calcium silicates on the pellet surface. This conclusion is based on solution analyses which show a decrease in Ca and Si levels in the water, and will be confirmed with SEM analysis of the test components.

A series of experiments has also been started using three different configurations. In each experiment the UO_2 is contained in Zircaloy tubing. All the samples will be sampled every 6.5 weeks. The solution results through the first three sampling periods are completed. These results indicate that the reproducibility between experiments of the same type is reasonably good. It is also evident that the same normalized amount of uranium is not being released in experiments of different types.

A series of experiments has been completed using a gamma field of 1×10^4 rad/hr and a temperature of 90°C. The solutions and test components are undergoing analysis, and only very preliminary observations are available at this time.

Metals Barriers Testing

Samples will be submitted for chemical analysis to compare the composition of the synthesized, concentrated water with the compositions obtained from earlier boiled-down determinations. These tests have involved relatively small volumes of solution; exposure of weight loss, creviced, and stressed (corrosion) specimens for long periods of time will require significantly larger quantitites of solution. Modeling of the synthesized composition will also be carried out in collaboration with the effort on the geochemical EQ3/6 code.

Modeling of the redox potential on stainless steels under conditions where radiolysis reactions occur in water films is proceeding under sub-contract work at SRI-International. Ultimately, the radiation influences on the corrosion potential will be compared with critical potentials for the initiation of localized and stress corrosion cracking on the candidate materials. The position of the corrosion potentials well below the critical potentials will be an important criterion for demonstrating the absence of these devastating forms of corrosion; this criterion will be an important basis for container material selection.

An algorithm has been developed for calculating the concentration profiles of species involved and the redox potential of the metal surface/water interface. Further parameter values will be added to this compilation.

SRI-International has submitted a proposal for augmenting the present subcontract work statement to include some complimentary work on copper and copper base alloys.

M135, "FY 1985 Status Report on Feasibility Assessment of Copper-Base Waste Package Container Materials in a Tuff Repository", was completed. An advanced printing was delivered to DOE/HQ.

Other Materials

Acceptance tests continue for the Nicolet 60 SX spectrometer. The company is replacing several components to meet LLNL specifications. Development of techniques for analysis of powders by transmission and reflectance techniques is proceeding. However, actual acquisition of the mineral IR data base cannot proceed until the spectrometer meets the specifications. All software for data acquisition, analysis, and storage has been tested and de-bugged and library development can begin as soon as LLNL formally accepts the instrument.

Design, Fabricate, and Prototype Testing

LLNL input to the high-priority, OGR-directd Common Canister Study (CCS) was completed during September. The impact of twelve spent fuel canister configurations on NNWSI Project waste package and repository reference designs were evaluated. A status report on this study was forwarded to DOE/HQ on September 13, and the results will be reported in detail at a program-wide meeting (in Washington, D.C.) on September 30-October 4.

Thermal analysis of twelve waste package container configurations were completed and results were included in CCS reports. The analyses were performed in order that package and repository configurations might be planned to maintain fuel cladding temperatures below the limiting value of 350 °C while holding outside container wall temperature above 95 °C for long periods after the time of emplacement.

Work is in progress using a combination of an analytical and a simple experimental approach to resolve questions raised at a NRC workshop (7/23-24/85) on structural failure criteria for three-dimensional, large deformation, nonlinear analyses of disposal containers.

Performance Assessment

Work continued in three major areas to support the Waste package Performance Assessment Subtask. These efforts include: 1) design of the NNWSI Project Waste Package System Model and development/revision of a draft program description, 2) analysis of the hydrothermal boundary conditions at the waste package-borehole interface, and 3) preparation of the Waste Package Information Need data outlines for Section 8.3 of the NNWSI Project SCP. Staff have been involved in a review of the draft OGR Systems Engineering Management Plan (SEMP), development of a charter for an NNWSI Project Systems Engineering Integration Group (SEIG), and preparation of an annotated outline for the NNWSI Project SEMP.

The development process for the NNWSI Project Waste Package System Model has been proceeding; the first step has been consultation with the potential users to develop a charter to describe the range of processes and events to be covered, the planned used, and the desired degree of accuracy, and speed in use. The second step is the development of the program requirements document, which describes the process models, their inputs and outputs. The third step is design of the program to resolve questions of program and data structure, flow of control, computer selection, and degree of portability. The draft Program Description combines, in one document, the products of steps one and two; it includes the descriptions and specification of the relevant processes. Major sections of this document have been completed and are undergoing interal review. Design of the program structure is also in progress, but will not be finalized until the functional specification is finalized.

Work continued on the near-field flow modeling (COVE3) activity. Current simulations using a relative permeability scheme supplied by SNL are using more computer time than is practical. Alternate methods for representing both fracture and matrix permeability in a weighted average are being investigated.

A new version of WAFE that is being installed at LLNL has an improved tracer transport routine. It is intended to allow dissolution and precipitation of constituents and include a method for varying permeability as a function of precipitated material.

A summary of interactions between the PASS Program and LLNL waste package staff was prepared and forwarded to WMPO and SNL for inclusion in the NNWSI/PASS Interaction Report.

Geochemical Modeling Code EQ3/6

The paper on transition state theory has been completed, is undergoing internal review, and will be submitted for journal publication in the near future.

The MCRT data files have been unified. This task has included creation of a master reaction file (MREAC) which now contains over 4000 lines and is consistent with the master data file (MDAR). The DATAO review has been completed; it has 974 species blocks that are consistent with the master data file. Major revisions have been included in the plutonium subset. Future data base upgrades and documentation have been outlined. These will be implemented once the system is running on the Ridge.

PLANNED WORK

W281, a report on Results of Long Term Testing of Topopah Spring Tuff and J-13 Water, will be completed by 1/31/86.

W282, a report on Rocking Autoclave Studies using Core Wafers of Topopah Spring Tuff and J-13 Water, is planned for delivery to WMPO in October.

W209, a report on Geochemical Variability within the Topopah Spring member, is undergoing technical review. Delivery to WMPO in November is expected.

W210, a report on the Reaction of Topopah Spring Tuff and J-13 Water in a Gamma Radiation Field, has been rescheduled to 12/31/85.

M225, a report on Test Results for Glass Waste Form using an Unsaturated Test Method, is planned for delivery to WMPO in October.

W224, a report on Actinide Distribution in Tuff Reaction Vessels used in Glass Waste Form Testing, is rescheduled to 6/30/86.

W226, a report on Parametric Testing of U-doped, Actinide-doped and "Aged" PNL 76-68 Glass, will be completed as two documents. The report on U-doped glasses will be completed by 4/30/86. The report on the other two glasses will be completed in summary form by 6/30/86.

W220, a report on Testing of Actinide Doped PNL 76-68 Glass in J-13 Water using Tuff Reaction Vessels, is rescheduled to 1/31/86.

A revised version of the report on functions of packing material in the unsaturated zone will be prepared.

Work will continue on revision of the Advanced Conceptual Design Criteria Report (M231) in October. This report is a preprequisite to the Advanced Conceptual Design Phase of the NNWSI Waste Package Program (M233) planned to begin in January 1986.

A revision to the LLNL EQ3/6 Project Plan is being prepared. This will show the relationship of the NNWSI Project work to the efforts for ONWI and BWIP and the critical path for providing information to the various parts of the NNWSI Project program.

PROBLEM AREAS

Lack of response to requests for input data is causing delays in M213, which was due on September 30, and will be rescheduled to six months after receipt of the needed data from the USGS.

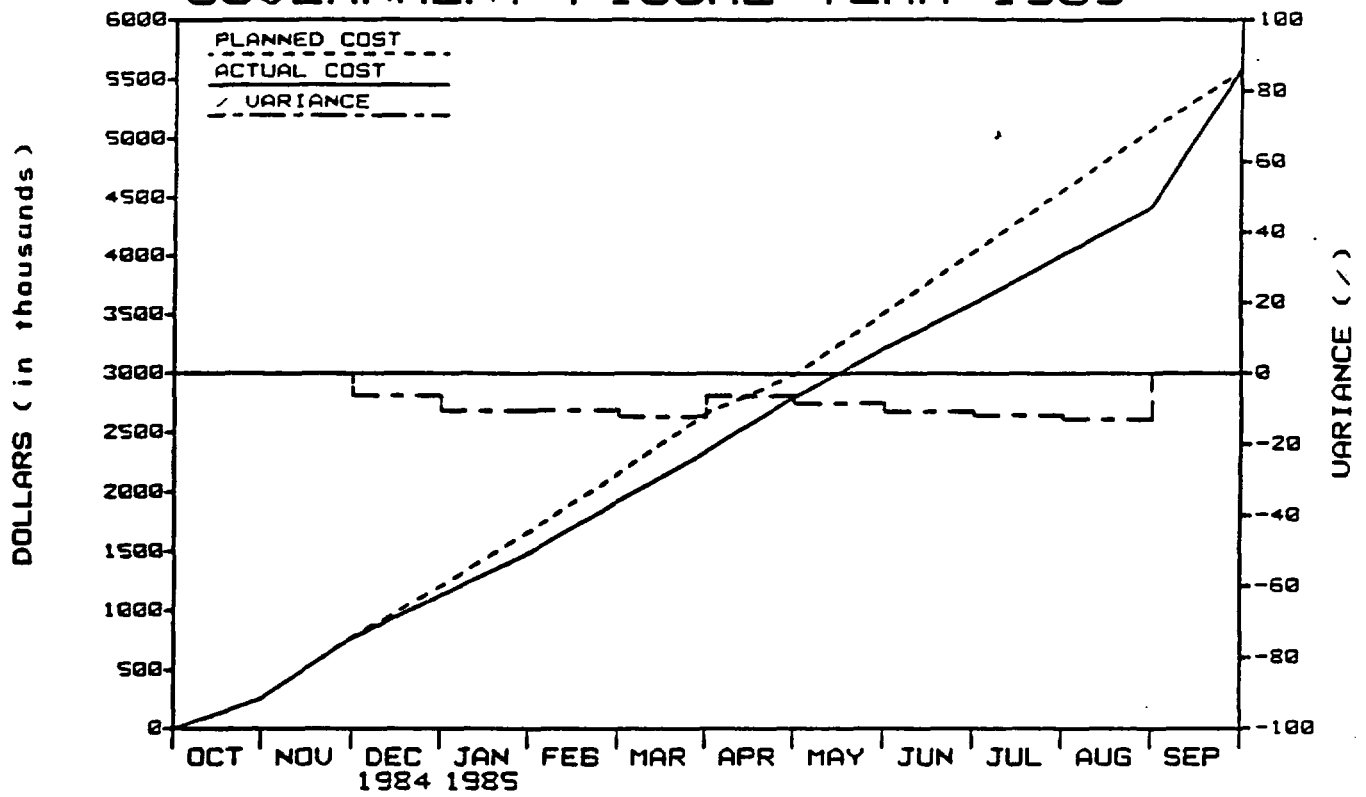
The three glass fabrication reports have been received. The cover letters indicated that the reports are in the process of clearance at PNL and should not be referenced until finalized. Milestones affected by these reports have been rescheduled. They have been sequenced to provide minimum impact on the other milestones and on the ongoing testing program.

The increased budget and scope of work activities for FY 86 will require additional manpower. LLNL is particularly short on metallurgists to act as principal investigators for some of the stress corrosion and alloying effects activities. LLNL is reviewing the internal situation for an early resolution on re-assigning staff members, hiring new staff members, and/or increasing subcontracting efforts.

Difficulty is being encountered in obtaining qualified staff additions to the Performance Assessment subtask. Progress is being retarded by competing SCP-related activities and insufficient staff.

Until the entire EQ3NR package is running on the Ridge, no applications work can be done with the new data base. It is not expected that EQ6 will be running until after January 1, 1986.

WBS X.2.2 WASTE PACKAGE
GOVERNMENT FISCAL YEAR 1985



PLAN (X1000)	252	771	1200	1657	2152	2657	2988	3511	4033	4554	5077	5572
COST (X1000)	252	769	1124	1480	1926	2333	2799	3216	3594	4012	4415	5584
VARIANCE (X1000)	0	2	76	177	226	324	189	295	439	542	662	-12
/ VARIANCE	0	0	-6	-11	-11	-12	-6	-8	-11	-12	-13	0

MILE-STONE	RESP. AGENCY	WBS	MILESTONE DESCRIPTION	O	N	D	J	F	M	A	M	J	J	A	S
M250	LLNL	X.2.2	Establish Interim Product Specifications							◆					
M222	LLNL	X.2.2	Input to DOE/HQ Rpt. to Congress on Copper for WP											△	
M251	LLNL	X.2.2	Pre-closure Analysis of selected Conceptual Designs			◇									
M231	LLNL	X.2.2	Complete WP Conceptual Design Criteria									▲			
M233	LLNL	X.2.2	Initiate WP Advanced Conceptual Design									△			

△ PLANNED MILESTONE COMPLETION DATE
▲ COMPLETED AS SCHEDULED

◇ REVISED MILESTONE COMPLETION DATE
◆ COMPLETED AS REVISED

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X.2.3 SITE

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

Site Geology

Extensive field work was completed on the lateral and vertical distribution of facies of the Topopah Spring Member of the Paintbrush Tuff.

A paper was delivered on the fractal geometry of fracture networks at Yucca Mountain to the International Symposium on Fundamentals of Rock Joints in Bjorkliden, Sweden during September 15-20.

Detailed measurements were made on field-mapped fracture arrays to verify fracture zones identified on low-level aerial photographs of Yucca Mountain.

Topographic Analysis

Six detailed topographic maps covering the Yucca Mountain area were submitted to DOE for review. These maps will be used to support geologic as well as gravity studies.

Gravity and Magnetics

Preliminary gravity, aeromagnetic, and profiles of the NTS and vicinity map were completed and have been distributed.

Open-File Report 85-459, "Investigation of an Aeromagnetic Anomaly on West Side of Yucca Mountain, Nye County, Nevada", was distributed.

The following manuscripts will be distributed: "POLYGON - An interactive program for constructing and editing the geometries of polygons using a color graphics terminal" and "An automatic program for the interpretation of two-dimensional gravity and magnetic anomalies."

Seismic Investigations

Presentation on geologic research plans at Yucca Mountain by a team of Bechtel Corp. scientists was made in Menlo Park on September 6. Bechtel's prime concern is to pick an area for waste processing facilities that won't be split apart by surface faulting for the life of the buildings - about 30 years. The USGS has been asked to comment on the plan.

Rock Properties

Geophysical logs were obtained in 15 of the 18 water table drill holes at NTS. A data report describing these logs is in final preparation. The report contains an evaluation of the use of alcohol as a defoaming agent before geophysical logging in holes drilled with an air-detergent foam circulating medium, concluding from tests that alcohol causes no significant changes in the geophysical logging tool response.

Isotope Geology

Open-File Report 85-540 entitled "Uranium-trend dating of Quaternary deposits in Nevada Test Site Area, Nevada and California", is nearly complete and will be published as a USGS Professional Paper on the uranium-trend method of dating Quaternary deposits.

Groundwater Flow Analysis

A presentation was given at Los Alamos National Labs on September 23 regarding current and potential modeling activities, specifically with respect to the ground-water flow system of Yucca Mountain. The consensus was that modeling should precede data collection wherever possible to determine the most critical and sensitive variables in the ground-water flow system.

A draft of a proposal to drill a deep borehole in the Amargosa Desert has been written and is in the process of revision.

Future Groundwater Systems

Samples were collected for PIXE and ICP analysis from trench 14 and Busted Butte to add to the Calcite/Silicate signature data base. Samples of modern carbonate deposits were collected from roots in trench 16 for chemical analysis. Samples were also collected for pollen/opalphtolith analysis from the carbonate veins exposed in trench 14.

A 20-foot test hole on the Fran Ridge sand ramp was drilled and sampled and casing was installed for soil moisture measurements.

Volcanism

The manuscript entitled "Late Cenozoic Baslatic Volcanic Episodes of the Nevada Test Site Region: Geology, K-AR Ages and Tectonic Setting" is about 75 percent complete.

The petrology data base for the volcanic hazard studies will be transferred to an IBM-PC/AT for increased portability of data between coworkers. Three data base systems are being evaluated for use; evaluation of two of the systems has been completed.

Groundwater Chemistry

Milestone C103, entitled "Particulate Content of Flowing Groundwater," was issued. This report suggests that particulate transport of radionuclides in Yucca Mountain groundwater will not be significant.

Natural Isotope Chemistry

"The Use of ^{36}Cl for Infiltration Measurements of Yucca Mountain, Nevada," was presented at the National American Chemical Society meeting in Chicago during September 8-13. "^{36}Cl Measurements of the Unsaturated Zone Flux at Yucca Mountain" was presented at the DOE/ANS-sponsored International Topical Meeting on High-Level Nuclear Waste Disposal held in Pasco, Washington, during September 24-26. The full text of this paper will be published in the proceedings of the meetings.

Hydrothermal Geochemistry

A model has been developed for thermogravimetric analysis (TGA) data for zeolites. Coding has been completed to fit actual TGA data. The modeling will help to assess the extent to which the TGA experiments represent equalibrium dehydration and provide a means of assessing the effects of the water pressure on the temperature of dehydration.

Solubility Determination

A review of thermodynamic data of americium hydrolysis products, carbonate complexes, hydroxide solids, and hydroxycarbonate solids has been sent to LLNL and LBL for comment. Work is continuing on determination of formation constants of Pu(IV) with carbonate. A paper entitled "The Formation of Pu(IV) Colloid by the Alpha Peduction of Pu(V) or Pu(VI) in Aqueous Solutions," (Milestone C411) has completed internal review.

Sorption Precipitation

Sorption ratios were determined for Sr, Cs, Ba, and ^{4}Eu on three heated clinoptilolite samples at room temperature, 105°C and 200°C exposures (for 385 days). No significant changes in sorption for these elements were observed.

Experiments with Pu and Am that use four different waters were concluded.

Dynamic Transport Process

A fracture network transport model was constructed using a sample of Tpt tuff taken from an outcrop at Fran Ridge. Two-channel fracture flow models have been developed to study flow data.

Retardation Sensitivity Analysis

Papers were contributed to the International Symposium on Coupled Processes Affecting the Performance of a Nuclear Waste Repository during September 18-25, at LBL, Berkeley, California.

Milestone report R377, "Sensitivity of Radionuclide Transport Times to Uncertainties in Chemical Sorption and Molecular Diffusion," has been completed. Radionuclide transport times and concentrations are examined as a function of nine input parameters. Four of these parameters were identified as those that most affected transport times and concentration levels. These conclusions were consistent over all examined combinations of stratigraphic layers and radionuclides.

A second milestone report evaluating kriging (and competing techniques) as a method for extrapolating stratigraphic boundary information is in preparation. Preliminary conclusions are that the data are too sparse to allow significant improvement over the extrapolation provided by a simple plane fit to the observations. Significant correlations between observations do not exist on the scale defined by the distances between currently available data.

C717 entitled, "Alternate Numerical Methods" was completed.

"The Effects of Geochemical Processes on the Transport of Contaminants in Multicomponent Systems: A Modeling Perspective," was completed.

Mineralogy

The quantitative re-analysis of USW G-1 by x-ray diffraction (XRD) was completed. Data analysis will be completed during October. These data will be supplied to the Tuff Data Base maintained by SNL and will replace the older semi-quantitative G-1 analyses.

Fracture mineralogy studies in USW G-4 were completed in the bottom of the drill hole. Preliminary results indicate that the complex zeolite development that occurs in fractures of the unsaturated devitrified Topopah Spring Member does not occur in the devitrified tuff fractures below the water table.

Field work at Yucca Mountain was focused on the collection of representative samples from trenches, from sand ramps near faults, and from sand ramps away from faults to compare the intervals of silica mineralization that occur in these environments. More detailed sampling will be coupled to the USGS/F&S remapping of Trench 14.

Probe standards of zeolite samples were prepared for comparison with analyses of the same materials by wet-chemical, x-ray flourescence (XRF), and atomic absorption (AA) methods.

Statistical comparisons of bulk-rock Topopah XRF analyses and microprobe data on the groundmass were completed.

Following the review of Chapter 4 of the SCP, and discussions with the reviewers, the chapter has been revised.

PLANNED WORK

In October, XPD data from USW G-1 will be analyzed. Work will begin on the XRD analysis of cuttings and core samples from UE-25p#1. Final revisions will be completed on two reports: "Mineralogic Summary of Yucca Mountain, Nevada" and Petrochemical Variation of Topopah Spring Tuff Matrix with Depth (Stratigraphic Level), Drill Hole USW G-4, Yucca Mountain, Nevada".

A report will be completed by Los Alamos on the valuation of kriging and other methods for extrapolation of small data sets.

The Information Needs Data Outline will be reviewed by Los Alamos with particular attention paid to the levels and dates of deliverables.

PROBLEM AREAS

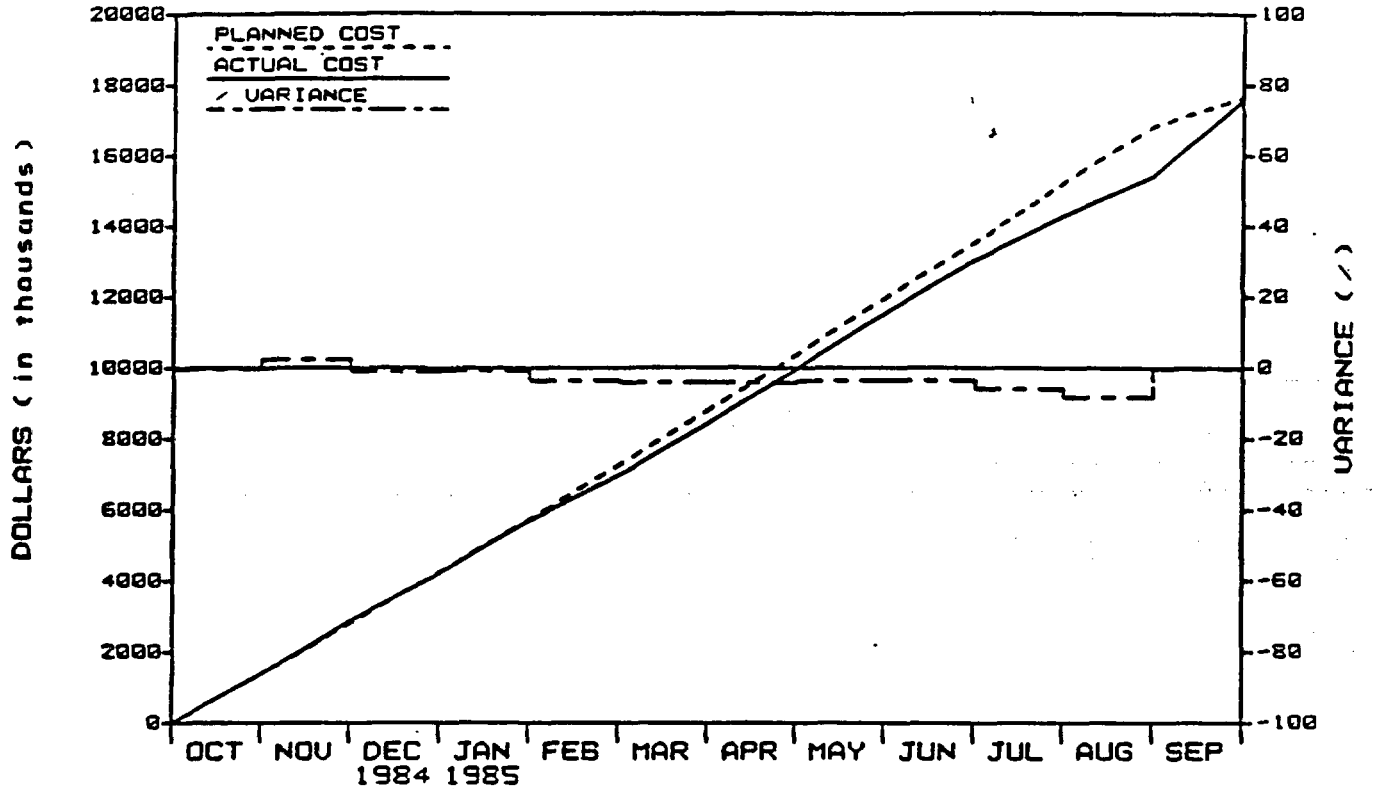
A report describing the important radionuclides in nuclear waste (Milestone R386) has been delayed in order to review the implications of the new version of the EPA standard (40 CFR 191) that was published in the Federal Register on September 19, 1985.

Analysis of flourescent tracers has been put three months behind schedule because of the later arrival of the Flourometer.

Milestone M313 is overdue, partially as a result of SCP and NRC meetings.

R368 will be delayed.

WBS X.2.3 SITE INVESTIGATIONS
GOVERNMENT FISCAL YEAR 1985



PLAN (X1000)	1392	2797	4244	5733	7262	8795	10361	11968	13548	15218	16826	17644
COST (X1000)	1386	2861	4200	5685	6996	8423	9939	11526	13050	14299	15420	17561
VARIANCE (X1000)	6	-64	44	48	266	372	422	442	498	919	1406	83
/ VARIANCE	0	2	-1	-1	-4	-4	-4	-4	-4	-6	-8	0

MILE-STONE	RESP. AGENCY	WBS	MILESTONE DESCRIPTION	O	N	D	J	F	M	A	M	J	J	A	S
M354	LANL	X.2.3	Letter Rpt. on Groundwater Chemistry along Flow Path					◆							
M357	SNL	X.2.3	Weapons Test Seismic Rpt.				△					◆			
M356	LANL	X.2.3	Complete Rpt. on Volcanic Hazards Analysis				◆								
M355	LANL	X.2.3	Progress Rpt. on 3-D Mineralogic Model of YM	◆											
M364	SAIC	X.2.3	Implementation of Meteorological Monitoring Plan									△			◇

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X.2.4 REPOSITORY

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.

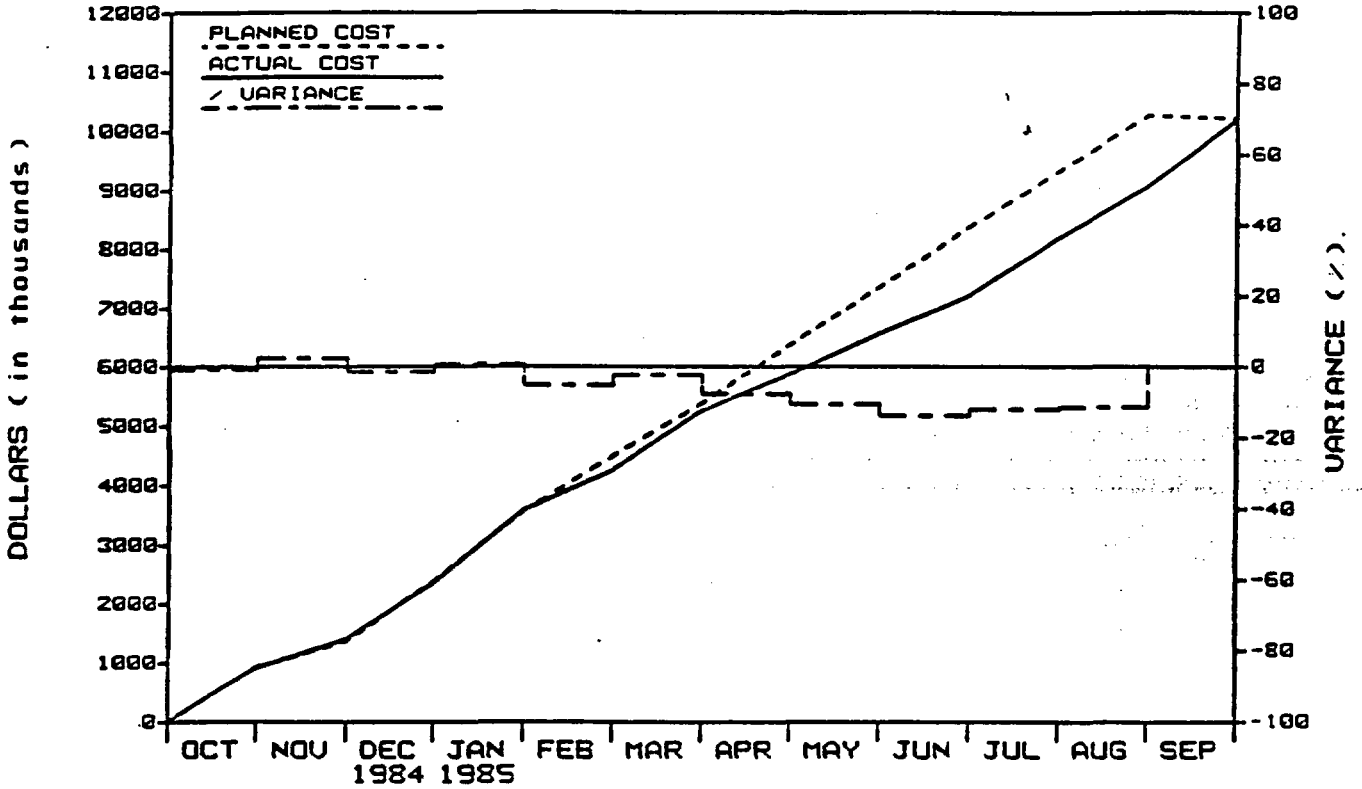
ACTIVITIES

Sealing Materials

As a result of a meeting in August at Penn State to develop a plan for additional testing a set of experiments was designed to evaluate the physical, mechanical, and chemical properties of the 82-22 sanded grout formulation after exposure to normal curing conditions at 38°C for up to 28 days and after hydrothermal treatment. Testing will include compressive strength, linear dimensional stability, porosity, pore size distribution, permeability, density, phase composition, and microstructure. A set of additional samples will be tested on a much more restricted basis after the samples are dry-heat treated at atmospheric conditions to 300°C. Two samples will be tested that were prepared and have been curing for 2.5 years. These tests are intended to assess the effects that mineral alteration occurring at elevated temperature will have on physical-mechanical properties.

Narrative from SNL not available.

WBS X.2.4 REPOSITORY INVESTIGATIONS
GOVERNMENT FISCAL YEAR 1985



PLAN (x1000)	917	1359	2380	3565	4492	5380	6374	7362	8384	9329	10253	10211
COST (x1000)	909	1392	2344	3592	4256	5256	5876	6575	7224	8196	9070	10190
VARIANCE (x1000)	8	-33	36	-27	236	124	498	787	1160	1133	1183	21
/ VARIANCE	-1	2	-2	1	-5	-2	-8	-11	-14	-12	-12	0

MILE-STONE	RESP. AGENCY	WBS	MILESTONE DESCRIPTION	O	N	D	J	F	M	A	M	J	J	A	S
M447	SNL	X.2.4	Seal Development Plan for Repository		◆										
M430	SNL	X.2.4	Start Repository Conceptual Design												△
M432	SNL	X.2.4	NNWSI Project Site Specific Repository Design Concept Rpt.												△
R014	SNL	X.2.4	NNWSI Project Design Study: MRS - Repository Interface Task Force												△

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X.2.5 REGULATORY/INSTITUTIONAL

OBJECTIVE

The objective of the Regulatory/Institutional 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

Site Characterization Plan

The internal reviews of SCP chapters 6 (Repository), 4 (Geochemistry), and 1 (Geology) were completed. The review of Chapter 1 was not on a page-by-page basis, but provided guidance to the USGS so that they can complete a rewrite of the chapter. The USGS was asked to estimate the level of activity for this rewrite and submit the estimate of the time and man-hours required to complete the chapter. Chapters 1, through 7 and sections 8.4, 8.6, and 8.7 have been through internal review. Chapters 1, 3, and 5 will need a second internal review after they have been rewritten and submitted.

The DOE/HQ review of Chapter 2 (Geoengineering) was held during September 11-12 in Washington. Comments resulting from the review have been entered into the SCP comment tracking record. This was the first chapter to undergo DOE/HQ review; it serves as the test case for the final review and comment resolution process.

Preparations were made for the program-wide SCP Coordinating Group meeting on October 3-4, 1985, to discuss the level of detail needed to describe the planned tests, analyses, and studies presented in Section 8.3. A SCP Working Group meeting was held on September 25 to identify the format and content of the test descriptions that would best fit the Information Need format that presently exists in Section 8.3. It is intended that the working group position would be presented and defended at the SCP CG meeting.

The Administrative Record for the SCP is being coordinated at DOE/HQ. A copy of the SCP project file list was sent to DOE/HQ with the understanding that the Project will work with that office to define the items on the list that also need to be included in the Administrative Record.

Rewriting began on SCP sections 3.6.3 (Potentiometric levels), 3.7.1 (Identification of recharge and discharge areas), and 3.7.2 (Principal groundwater flow paths).

USGS internal review meetings were held and the revised Information Need-Investigation outlines were submitted to WMPO for review on September 19.

Environmental Assessment

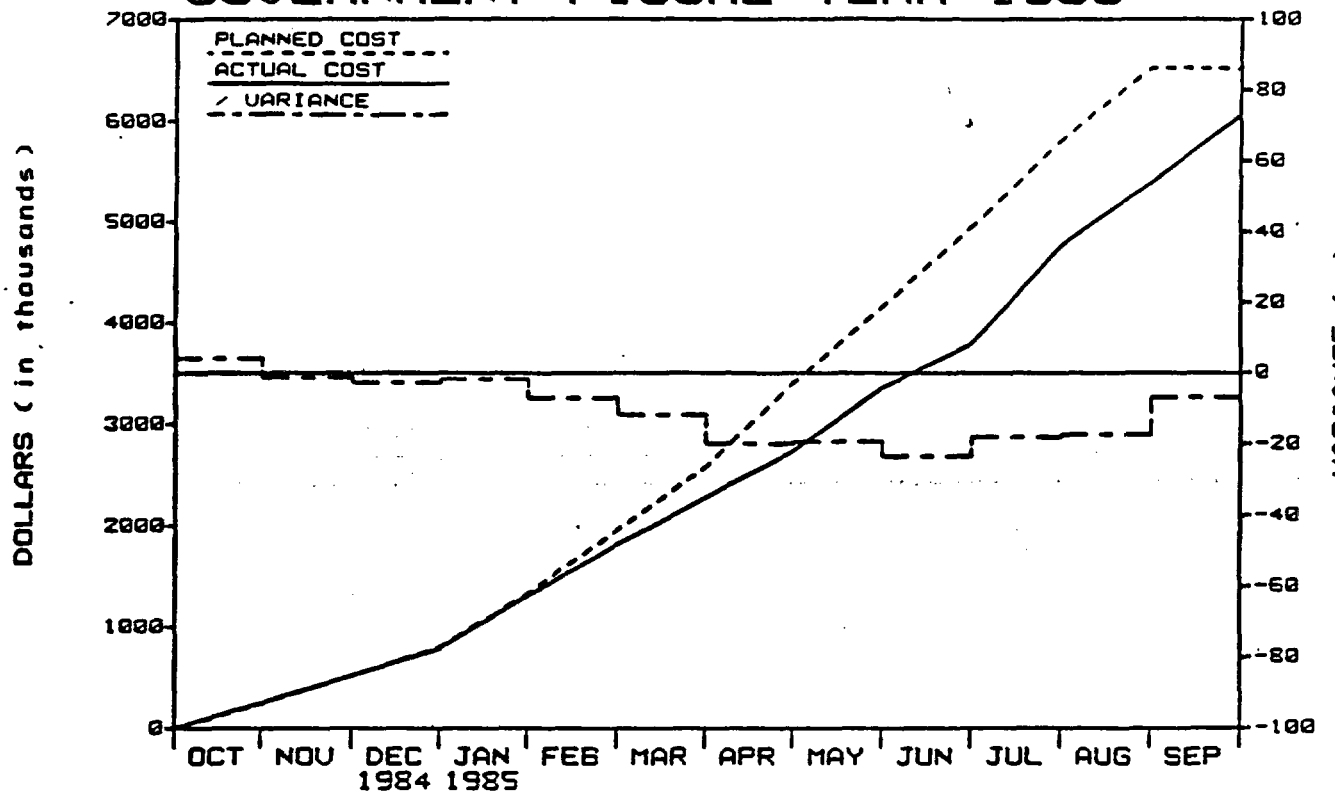
Comment responses are being summarized into issue responses and the issue responses are being compiled into the draft EA Comment Response Document (CRD). The next draft CRD and draft Final EA are due to DOE/HQ on October 4, 1985. The TOC will review the drafts on October 7-10, 1985, and a DOE/HQ review is scheduled for October 21-25, 1985. The final EA is still scheduled to be completed on December 20, 1985.

Minor revisions that were received from WMPO for the EA Management Plan (EAMP) and were incorporated into the final version. The approval page was sent to WMPO for signature. Copies will be distributed informally to the TPOs at the October PM-TPO meeting and formally distributed upon receipt of the WMPO approval page.

Meteorological Monitoring Plan

Activity includes preparation for monitoring implementation after completion of the Readiness Review. The review is currently scheduled to be conducted during October 1985. NNWSI Audit 85-1 of SAIC/T&MSS concentrated on the status of implementation of the MMP. All stations were installed prior to the audit (September 24-26) and the system had been activated, although it had not been declared operational.

WBS X.2.5 REGULATORY & INSTITUTIONAL
GOVERNMENT FISCAL YEAR 1985



PLAN (X1000)	245	522	805	1328	1953	2576	3406	4164	4952	5810	6522	6507
COST (X1000)	255	515	783	1306	1816	2275	2734	3361	3791	4767	5387	6057
VARIANCE (X1000)	-10	7	22	22	137	301	672	803	1161	1043	1135	450
/ VARIANCE	4	-1	-3	-2	-7	-12	-20	-19	-23	-18	-17	-7

MILE-STONE	RESP. AGENCY	WBS	MILESTONE DESCRIPTION	O	N	D	J	F	M	A	M	J	J	A	S
M523	SAIC	X.2.5	NNWSI Project References for EA Complete						◆						
M502	SAIC	X.2.5	Draft Environmental Assessment		▲										
M504	SAIC	X.2.5	Final Environmental Assessment								△				
M503	SAIC	X.2.5	EA Comment/Response Document								△				

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X.2.6 EXPLORATORY SHAFT

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

Exploratory Shaft Facility Management and Integration

Update and reorganization of the ESF subsurface facilities construction drawings and specifications by F&S continued. An informal review was conducted on the drawings and specifications; the informal review was conducted by WMPO, Los Alamos, and REECo. A comment resolution meeting was held on September 24. After the informal review comments have been incorporated into the design by F&S, a formal design review will be conducted.

A decision was reached to move the muck pile off the repository block to eliminate all possiblity of contamination of the repository block by muck water runnoff. For the same reason, the sewage disposal pit and the mine water evaporation pond will be moved off the repository block. These changes will result in revisions to some of the surface facilities drawings.

A series of information-gathering meetings was begun between the NTS support Contractors and the ESF principal investigators to gather criteria for construction support of testing.

At the ESF Budget and Design Document Workshop on September 18-20 in Denver, all three waste disposal projects (NNWSI, BWIP, and Salt) were represented to standardize budget requesting processes.

A new format for the upcoming ESF budget submittal will be generated by Weston, Inc. A NNWSI Project-baselined cost breakdown will remain in effect until different instructions are issued by DOE/HQ.

Exploratory Shaft Test Plan

Copies of the ESTP, Rev. 1, were sent to DOE/HQ for review.

A study was completed of the choice between coring long lateral holes or mining to obtain geological data from the ESF.

The conceptual test plan for the Waste Package Environment Tests has been printed for the NNWSI Project and internal distribution as UCID 20450, and is included in the NNWSI Project Exploratory Shaft Test Plan (ESTP), Revision 1. Three individual, complementary Waste Package Environment Tests are described in the conceptual test plan; all three tests use a horizontal emplacement configuration. In view of the fact that the NNWSI Project reference design is vertical waste package emplacement, LLNL is examining the possibility of reconfiguring the Waste Package Environment Tests into four individual tests. Such a revised testing scheme would include two tests in a horizontal emplacement mode and two in a vertical emplacement mode. The incremental cost of such a change is believed to be small, since only procurement and construction expenses would be affected; instrument evaluation, planning, and test interpretation expenses would be relatively unaffected.

Work was completed to identify and evaluate alternative means of characterizing portions of the repository block located laterally around the ES. The results were submitted to WMPO.

ES staff prepared lists of activities for LLNL submittal to the NNWSI Project Q-List. SNL report SAND84-7100, entitled "Final Report of Core Drill Conceptual Design Study for Retrieval of Radioactive Waste Disposal in a Geologic repository," was reviewed by ES personnel for technical content.

Exploratory Shaft Testing

The main phase of high frequency electromagnetic (HFEM) geotomography work in the sand pit test bed was completed in August, and plans for testing in FY 86 are being finalized. A report entitled "Evaluation of Alterant Geophysical Tomography in Welded Tuff," describing the G-tunnel experiments, sand pit experiments, and computer simulation studies, is undergoing internal LLNL review.

Instruments such as extensometers and borehole deformation gauges are candidates for use in the Waste Package Environment Test. Other geophysical and fiber optics instrumentation techniques that have been successfully applied in extreme environments are being examined for possible adaptation to measure rock mass deformation and stress changes in the Waste Package Environment Tests.

Analysis of the rock mass response to heating and cooling during the Waste Package Environment Tests will require that the rock mass deformability be determined at actual test locations. An NX borehole jack that was used at the Spent Fuel Test--Climax is being evaluated as a means of making these measuremetns. The draft report that examines a criterion for screening test results has been totally revised and is being reviewed.

Exploratory Shaft Integrated Data System

Quality levels were assigned to IDS components and a determination was made that no IDS components are required to be on the Q-list.

The draft NNWSI Project SOP for Software Quality Assurance was reviewed. The review revealed that this SOP does not pertain to the IDS software nor to several other categories of software that will be used in the NNWSI Project. Another NNWSI Project SOP will probably be required to cover this remaining software.

The Draft Final Hardware Design Document (M661) has been completed and is in internal Los Alamos review.

PLANNED WORK:

A formal design review of the ESF subsurface facilities design will be conducted in October.

Meetings between the PIs and the NTS support contractors are planned for October 9-11 to conclude the initial round of integration of test planning and ESF design/operations.

Los Alamos will continue work with the facility designers to incorporate instrumentation requirements into the ESF design.

A plan for satisfying reasonable needs for additional IDS services requested by principal investigators will be submitted.

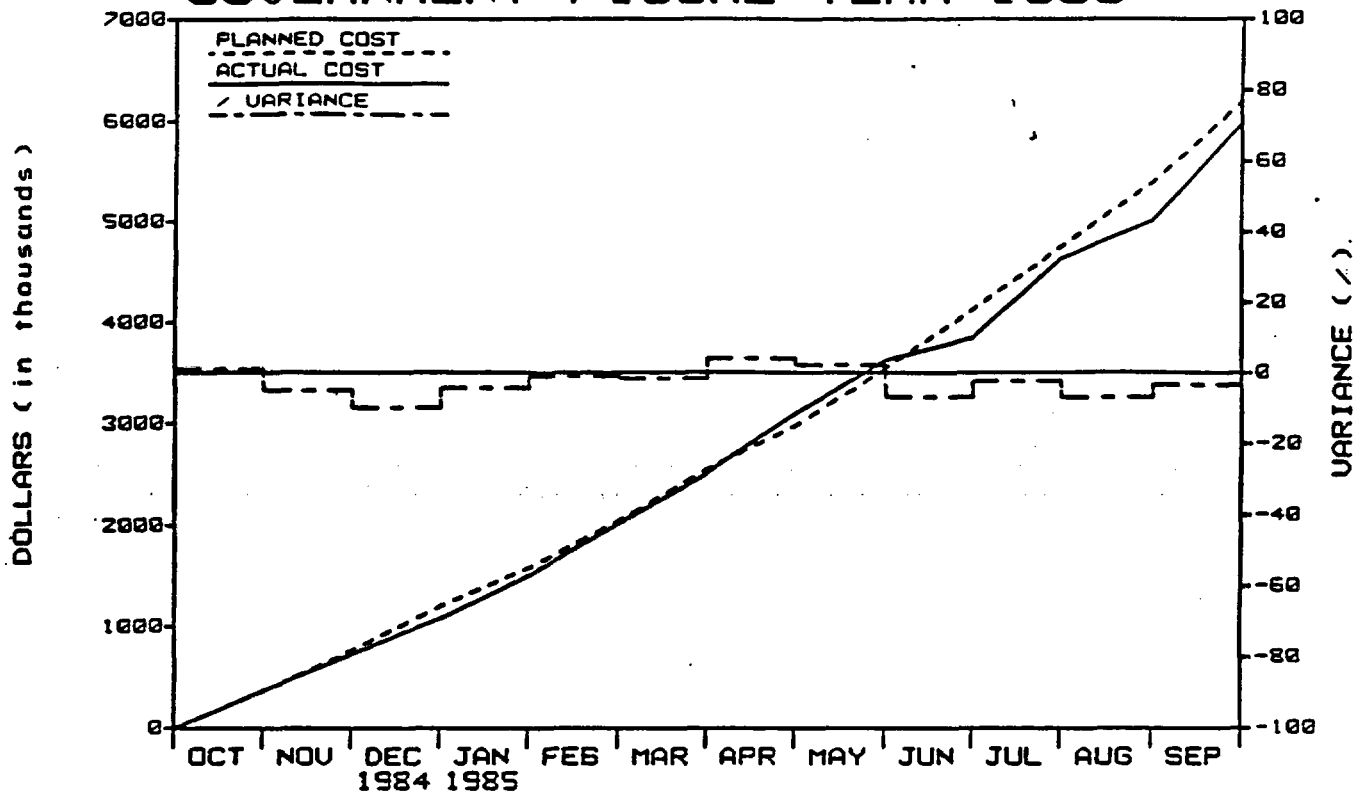
Work on the test plan for the Waste Package Environment Tests will proceed with emphases on test configuration and on engineering aspects of testing. Since the NRC/DOE workshop on the ESTP has been delayed, testing activities will continue to focus on instrument evaluation. Plans will also be developed for prototype testing of instruments in the welded tuff at G-tunnel. Additional tests of HFEM techniques will be performed in the sand pit test bed prior to testing at NTS. Plans for tests of USBM gauges will be implemented, and scoping calculations of near field hydrologic and geochemical phenomena will be initiated as soon as possible. Review of the report on the NX jack screening criterion will be completed, and the list of milestones and deliverables for FY 86 will be revised to reflect current work plans.

PROBLEM AREAS

Some concern remains as to what will be required of the ESTP Committee in support of the SCP Chapter 8.

A shortage of qualified technical personnel is delaying instrument evaluations for test plan development.

WBS X.2.6 EXPLORATORY SHAFT
GOVERNMENT FISCAL YEAR 1985



PLAN (X1000)	366	762	1194	1573	2042	2546	2978	3542	4130	4747	5384	6185
COST (X1000)	370	724	1076	1504	2020	2502	3095	3619	3846	4635	5085	5973
VARIANCE (X1000)	-4	38	118	69	22	44	-117	-77	284	112	379	212
/ VARIANCE	1	-5	-10	-4	-1	-2	4	2	-7	-2	-7	-3

MILE-STONE	RESP. AGENCY	WBS	MILESTONE DESCRIPTION	O	N	D	J	F	M	A	M	J	J	A	S
M666	LANL	X.2.6	Issue Exploratory Shaft Test Plan												△
M023	LANL	X.2.6	Issue Draft Revised Definite Design for 1st & 2nd Shafts, Subsurface Facilities, & Underground Service System for ESF							▲					

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

X.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

Spent Fuel Test-Climax

A report summarizing the results of the recently completed ADINA/ADINAT calculations of the thermomechanical response of the SFT-C was completed and submitted to WMPO for review.

A report entitled "SFT-C: Technical Measurements Data Management System Description and Data Presentation" has been reviewed and is being revised. This report serves the dual purposes of documenting the data reduction procedures used on the SFT-C and releasing the entire data set to the technical community and describes the complete data management system.

The report entitled "Estimates of In Situ Deformability with NX Borehole Jack, SFT-C, NTS" has been released by WMPO for publication.

The report entitled "Post-Test Thermomechanical Calculations and Preliminary Comparisons with Data from the SFT-C" has been submitted to WMPO for review.

The report entitled "Negative Hysteresis Effect Observed During Calibration of the U.S. Bureau of Mines Borehole Deformation Gauge" has been released by WMPO for publication.

E-MAD

A schedule is being prepared to allow for shipment of the 17 fuel elements located at E-MAD during May and June, 1986, and for subsequent close-down of the E-MAD facility. Close-down activities will be limited to the tasks that can be accomplished within final funding availability.

Westinghouse personnel have been requested by Pacific Northwest Laboratories (PNL) to present FY 85 E-MAD activities at the October 29-30 CSFM Project Information Meeting in Seattle. A draft of the presentation was prepared, transmitted to DOE/NV for approval, and forwarded to PNL.

All E-MAD fuel assemblies are stored in the Hot Bay Lag Storage Pit. All canisterized fuel assemblies lcoated in the Lag Storage Pit are in a safe configuration. The maximum recorded canister temperatures are well below the canister design limits. All monitored fuel assemblies reflect a normal profile over the past month.

The two archive fuel rods which were removed from B02 prior to the Metal Cask Simulation Test and stored in helium filled containers were reinserted into the fuel assembly. Two other rods were to be removed for characterization; however photographic support was not available and that portion of the oepration was deleted. The fuel assembly was returned to its lag storage location.

All FY 85 fuel integrity monitoring activiites were completed during August, 1985. Analysis results are being summarized as received.

All operations for measuring the decay heat rate of five fuel assemblies were completed during August, 1985. Calculation of the decay heat rates of the assemblies was completed.

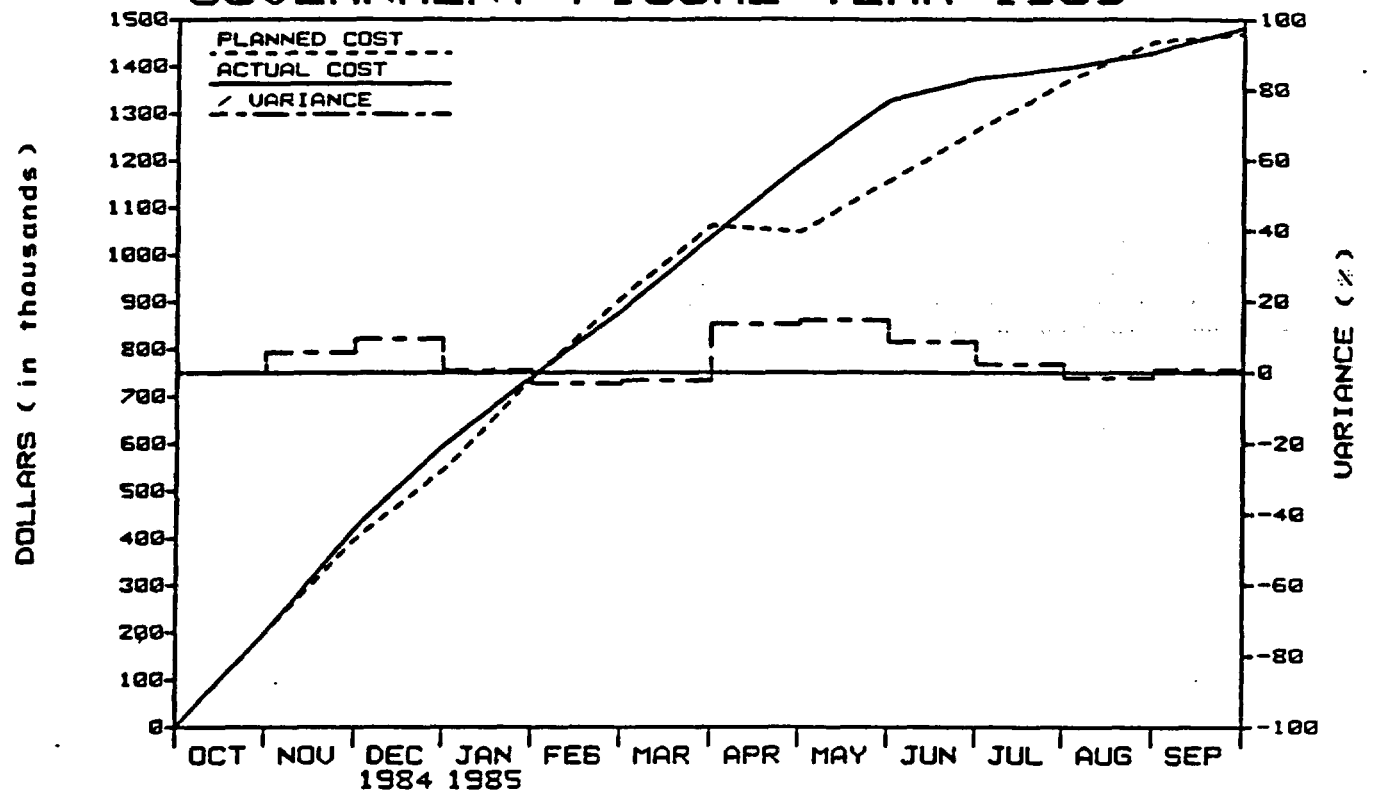
PLANNED WORK

A letter report will be prepared summarizing analysis results and providing an assessment of the integrity of all E-MAD fuel assemblies within 30 days of receipt of the final analysis reports.

PROBLEM AREAS

Two scheduled project reports were not completed in this final quarter of the SFT-C: the post-test thermal analyses report and the project final report. Delays are a direct result of the principal author being assigned to higher priority NNWSI Project activities. The delay of the final report (M708) has been brought to the attention of the CCB.

WBS X.2.7 TEST FACILITIES
GOVERNMENT FISCAL YEAR 1985



PLAN (X1000)	197	397	543	737	907	1061	1048	1157	1265	1365	1452	1470
COST (X1000)	197	420	595	742	879	1038	1191	1328	1374	1396	1430	1482
VARIANCE (X1000)	0	-23	-52	-5	28	23	-143	-171	-109	-31	22	-12
/ VARIANCE	0	6	10	1	-3	-2	14	15	9	2	-2	1

X.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.

PLANNED WORK

To be included in future NNWSI Monthly Reports.

PROBLEM AREAS

None.

X.2.9 PROGRAM 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

Project Monitoring System

The Cost and Schedule Control Branch completed the NNWSI Project Cost Variance Report for August; provided cost and budget data for the August MSA Report; provided cost data and chart graphics for the NNWSI Project Monthly Report for August; and provided a cost variance summary and chart graphics on the NNWSI Project for the DOE Status Review Book. The branch also provided a summary of SAIC/T&MSS costs by WBS for the DOE/NV Finance Department and a spread sheet showing FY 86 WPAS funding plans by NNWSI Project participant and WBS element.

The progress and status data, as provided by the NNWSI Project participants for August 1985 has been incorporated into the schedules. Efforts to incorporate FY 87 WPAS Milestones into the networks has continued. A review of the OCRWM/PMS manual was completed and comments were forwarded to WMPO. The review was completed of the OGR First Repository Network and comments were forwarded to WMPO/HQ.

Three change requests were approved affecting three milestones. A revised list of baselined milestones will be distributed following the September CCB meeting scheduled for October 3, 1985.

The preliminary draft of the PMDS system description document was completed and distributed to all NNWSI Project participants. Development of system details continued including a draft of the Contract WBS for all 15 NNWSI Project participants, and the format for the Cost Account/Work Package Earned Value Input Report. The NNWSI Project FY 86 performance baseline planning instructions for all NNWSI Project participants was completed.

Details of the proposed earned values system are being expanded into a report by SAIC/Golden. The cost accounts were evaluated to select representative tasks for the 20 percent FY 86 reporting requirements. Five tasks were selected for consideration.

Preparation of the USGS FY 86 Project Plan continues but, because of the volume of material, will be delayed about six weeks. Work to be completed centers around the need to integrate the mass of information through several strategically placed narratives.

Project Documentation System

The draft Project Management Plan (PMP) will be prepared to the FY 86 baseline. The new delivery date will be January 30, 1986, to WMPO to incorporate FY 86 baseline data.

The NNWSI Project Plan was amended to reflect additional DOE/HQ changes and returned to WMPO on September 27 for DOE/NV and OGR approval.

ESI worked with the SAIC records center staff at the Golden office on September 3-6, and September 24-26, 1985, in the development of the records management system. Although debugging of the records processing system and the software system will continue with ESI's assistance, the records center is ready to process documents, and has begun processing quality assurance manuals and procedures.

Since an NNWSI Project Records Center Records Administrator is not yet in place, ESI is acting as Records Administrator and will be receiving indexing data from the records center and providing guidance in data base problems. ESI will also continue debugging and further customization of the Revelation software.

The records management guidelines, developed as a working guide to expand on the records management section of the Quality Assurance Program Plan, are complete.

NNWSI Project Quality Assurance

The NNWSI QA Plan and four SOPs (02-01, 02-02, 03-01, and 15-01) were sent to WMPO and QAD for review and approval on August 12, 1985. QAD comments were received and are being evaluated.

The status of the unissued Project-wide implementing procedures (SOPs) are as follows:

NNWSI-SOP-17-01, QA Records Management

The pilot installation of the Quality Assurance Records Management System at the USGS/Denver was completed. Effective Solutions, Inc. (ES) submitted the draft NNWSI SOP-17-01, their final deliverable of the FY 85 contract. The decision was made to proceed with the remainder of the installation of the Quality Assurance Records Management System. The tentative installation dates are: (1) SNL, October 15, 1985; (2) the Project Records Center and SAIC, November 1, 1985; (3) LLNL, November 15, 1985; and (4) Los Alamos, January 2, 1986. The FY 86 contract with ESI is being renegotiated.

NNWSI-SOP-03-02, Quality Assurance Software

Comments from the TPOs were received and forwarded to the chairman of the QA Software Committee for evaluation.

NNWSI-SOP-03-03, Non-NNWSI Project QA Plan Data or Interpretation Acceptance

A draft of the procedure was submitted to WMPO and QAD for review and approval on August 8, 1985. QAD comments were returned and are being evaluated.

Project Surveillance

The FY 86 NNWSI Project Surveillance Schedule is being developed and is scheduled for submittal to WMPO by October 31, 1985.

Project Audits

Status of FY 85 audits is as follows:

85-1 WMPO Internal - Audits & Surveillances

The audit was conducted on April 10-11, 1985. Three audit findings of nonconformance and two observations were reported. The proposed corrective actions for the findings were accepted as satisfactory. The corrective actions will be verified upon completion of their implementation.

85-2 WMPO Internal - Organization and Training

The audit was conducted on May 1-2, 1985. Three audit findings of nonconformance and two observations were reported. The proposed corrective actions for the findings were accepted as satisfactory. The corrective actions will be verified upon completion of their implementation.

85-3 WMPO Internal - NCR and CAR

The audit was conducted on May 8-9, 1985. One audit finding of nonconformance and three observations were reported. The proposed corrective actions for the findings were accepted as satisfactory. The corrective actions will be verified upon completion of their implementation.

85-4 WMPO Internal - Document Control and Records

The audit was conducted on May 22, 1985. There were three observations reported that did not require a corrective action response. The audit is closed.

85-5 WMPO Internal - Document Review

The audit was conducted on May 23 and 30, 1985. There was one observation reported that does not require a corrective action response. The audit is closed.

85-6 The LLNL audit was conducted on July 9-11, 1985. There were three audit findings of nonconformance reported. The audit report was transmitted to LLNL on September 11.

85-7 The WTSD-Westinghouse Audit 85-7 is scheduled to be conducted on October 8-10, 1985. The letter of notification has been issued and the audit plan and checklists have been prepared.

85-8 SNL Audit 85-8 is scheduled for October 16-18, 1985. The letter of notification has been issued and the audit plan and checklists are in preparation.

85-9 H&N Audit 85-9 was conducted on August 7-9, 1985. There were four audit findings of nonconformance and two observations reported. The audit report was transmitted to H&N on September 20.

85-10 The F&S Audit was conducted on September 10-12. There were seven findings of nonconformance and two observations reported. The audit report has been completed and was sent to WMPO on October 1, 1985 for issuance.

85-11 Los Alamos Audit 85-11 was conducted on August 6-8, 1985. There were ten findings of nonconformance and two observations reported. The audit report is in final review and will be transmitted to Los Alamos by October 18, 1985.

85-12 USGS/Denver Audit 85-12 was conducted on August 28-30, 1985. There were six findings of nonconformance and four observations reported. The audit report has been completed and was sent to WMPO on September 24 for issuance.

85-13 REECo Audit 85-13 was conducted on August 13-15, 1985. There were five findings of nonconformance and two observations reported. The audit report is in preparation and will be sent to REECo by October 11, 1985.

85-14 The USGS/Menlo Park Audit 85-14 was conducted on September 4-6. There was one finding of nonconformance and two observations reported. The audit report is in preparation and will be sent to the USGS/Denver by October 11, 1985.

85-15 The SAIC/T&MSS Audit 85-15 was conducted on September 24-26. There were nine findings of nonconformance and one observation reported. The audit report is being prepared and will be sent to SAIC/T&MSS by October 25, 1985.

Review of Project Participants' QAPPs and Implementing Procedures

The status of reviews is as follows:

LLNL — The LLNL QAPP and procedures received by WMPO to date have been reviewed and approved.

USGS — The USGS QA Manual has been provided to WMPO for review and approval. It has been found to be acceptable for use.

Los Alamos — The Los Alamos QAPP and nine implementing procedures have been approved by WMPO. Two additional procedures have been reviewed and found to be acceptable. The remaining procedures are in various stages of development by Los Alamos.

Westinghouse — The QAPP and QA procedures that have been received by WMPO have been reviewed and approved.

REECo — The REECo QAPP has been reviewed and approved by WMPO. SAIC is awaiting submittal of their implementing procedures for review.

SNL — The SNL QAPP and revised procedures have been reviewed for compliance with NNWSI-SOP-02-01 and comments have been collated from these reviews.

F&S — WMPO received a letter from F&S identifying a schedule for submittal of the QAPP and implementing procedures. Their submitted schedule shows a date of October 31, 1985, for the QAPP and dates into March 1986 for submittal of the implementing procedures. The dates would appear to be unacceptable if the NNWSI Project exploratory shaft activities remain on schedule. The schedule will be evaluated for a WMPO response. In addition, five implementing procedures have been reviewed for approval by WMPO.

SAIC T&MSS — The QAPP and QA procedures that have been received by WMPO have been reviewed and approved.

H&N — WMPO has responded to the H&N letter of June 14, 1985, on the resolution of WMPO comments to the H&N QAPP and implementing procedures and submittal dates. WMPO indicated in the response that a submittal date of November 27, 1985, for the QAPP was unacceptable and requested a date of October 1, 1985.

PLANNED WORK

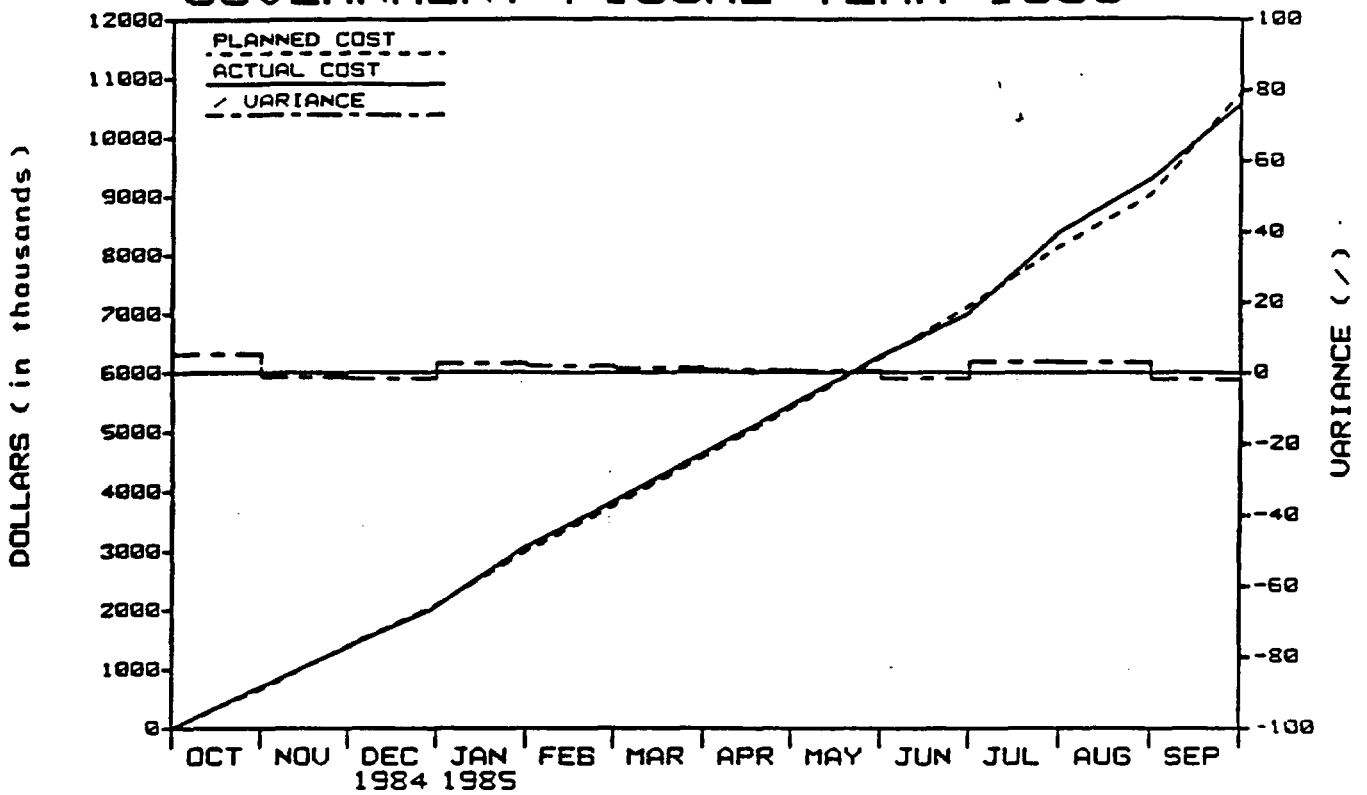
The Meteorological Monitoring Plan was policy reviewed and will be published in early October 1985. The equipment at the 60-meter tower site was installed in early September. The monitoring system will be operational in October 1985, following completion of the procedures manual and the Readiness Review.

The meterological monitoring program continues to be tracked by the earned value system for the fourth quarter of FY 85.

PROBLEM AREAS

None.

WBS X.2.9 PROJECT MANAGEMENT
GOVERNMENT FISCAL YEAR 1985

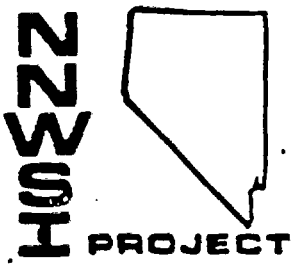


PLAN (X1000)	663	1397	2086	2985	3764	4579	5415	6260	7136	8147	9022	10757
COST (X1000)	698	1380	2052	3061	3835	4635	5453	6293	7018	8390	9281	10560
VARIANCE (X1000)	-35	17	34	-76	-71	-56	-38	-33	118	-243	-259	197
/ VARIANCE	5	-1	-2	3	2	1	1	1	-2	3	3	-2

MILE-STONE	RESP. AGENCY	WBS	MILESTONE DESCRIPTION	O	N	D	J	F	M	A	M	J	J	A	S
M901	SAIC	X.2.9	Submit FY 1985 NNWSI Project Plan to DOE/HQ				◆		△						
M915	SAIC	X.2.9	Submit NVO-196-18 (Rev. 2) to DOE/HQ		▲										
M907	SAIC	X.2.9	Draft Project Management Plan						△						

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

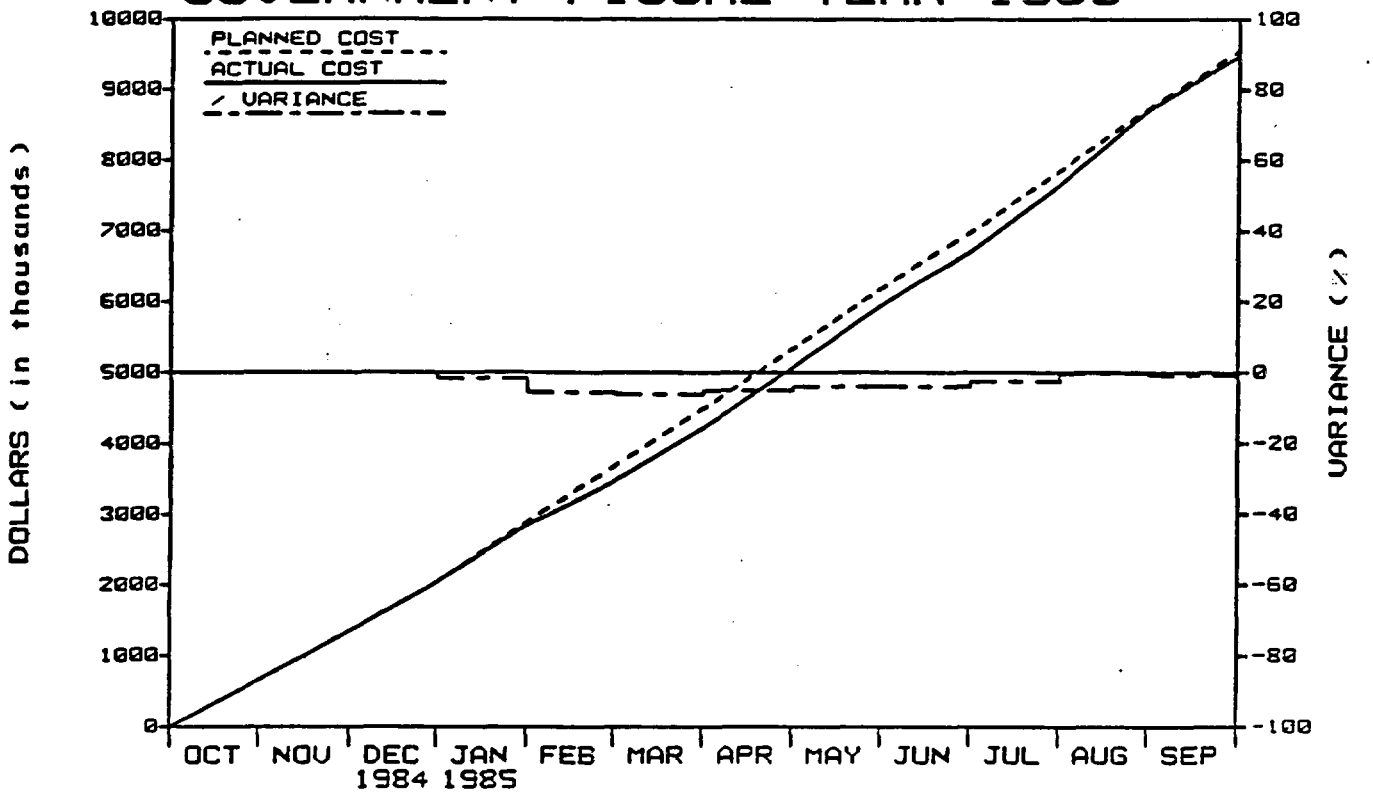
[WBS.WRF 10/11/3



PARTICIPANT

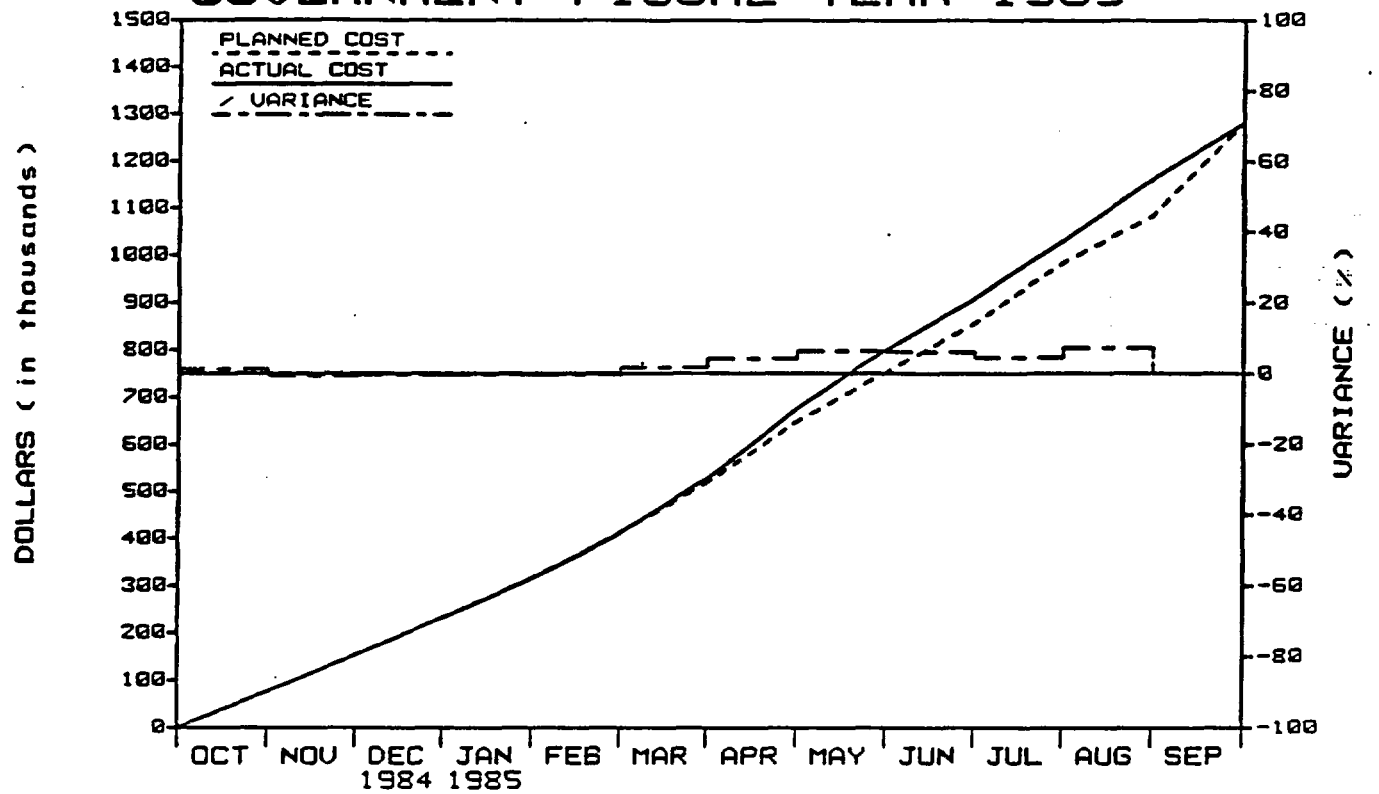
BUDGET vs COST

LOS ALAMOS NATIONAL LABORATORY
GOVERNMENT FISCAL YEAR 1985



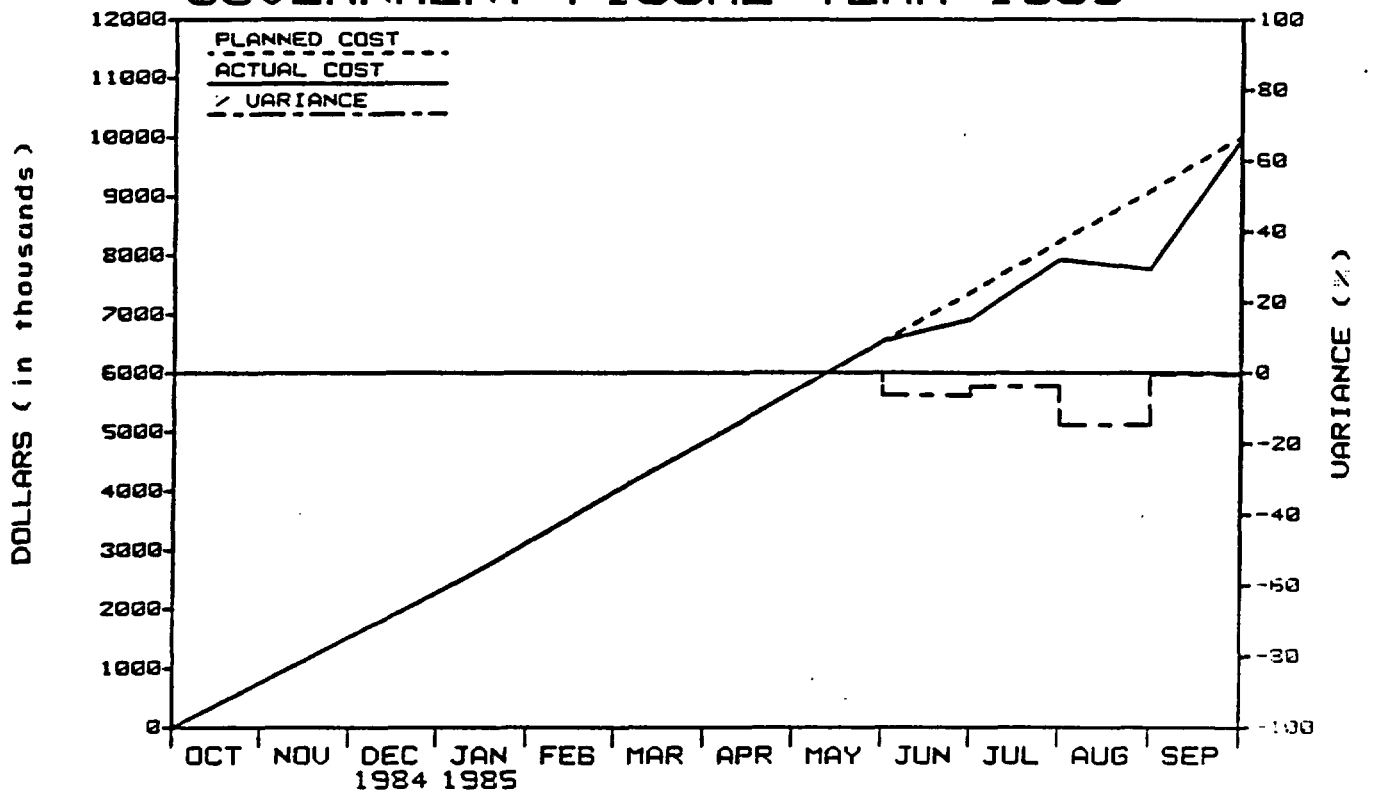
PLAN (x1000)	656	1354	2039	2892	3678	4491	5328	6187	6983	7859	8741	9547
COST (x1000)	656	1354	2039	2842	3471	4213	5060	5941	6700	7652	8714	9466
VARIANCE (x1000)	0	0	0	50	207	278	268	246	283	207	27	81
/ VARIANCE	0	0	0	-2	-6	-6	-5	-4	-4	-3	0	-1

FENIX & SCISSON, INC
GOVERNMENT FISCAL YEAR 1985



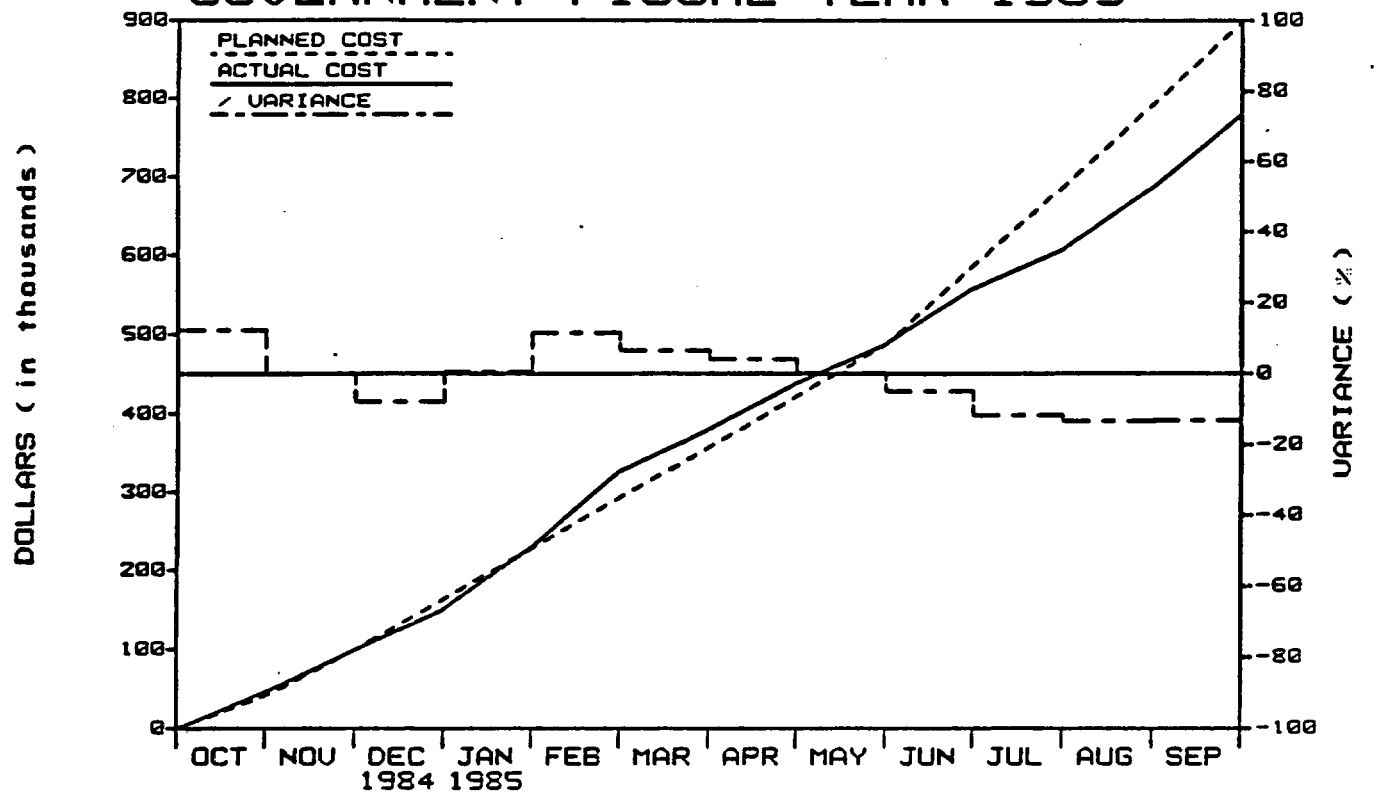
PLAN (X1000)	76	154	232	317	412	519	649	753	857	984	1083	1282
COST (X1000)	77	153	231	316	410	527	676	800	909	1029	1160	1281
VARIANCE (X1000)	-1	1	1	1	2	-8	-27	-47	-52	-45	-77	1
/ VARIANCE	1	-1	0	0	0	2	4	6	6	5	7	0

U. S. GEOLOGICAL SURVEY
GOVERNMENT FISCAL YEAR 1985



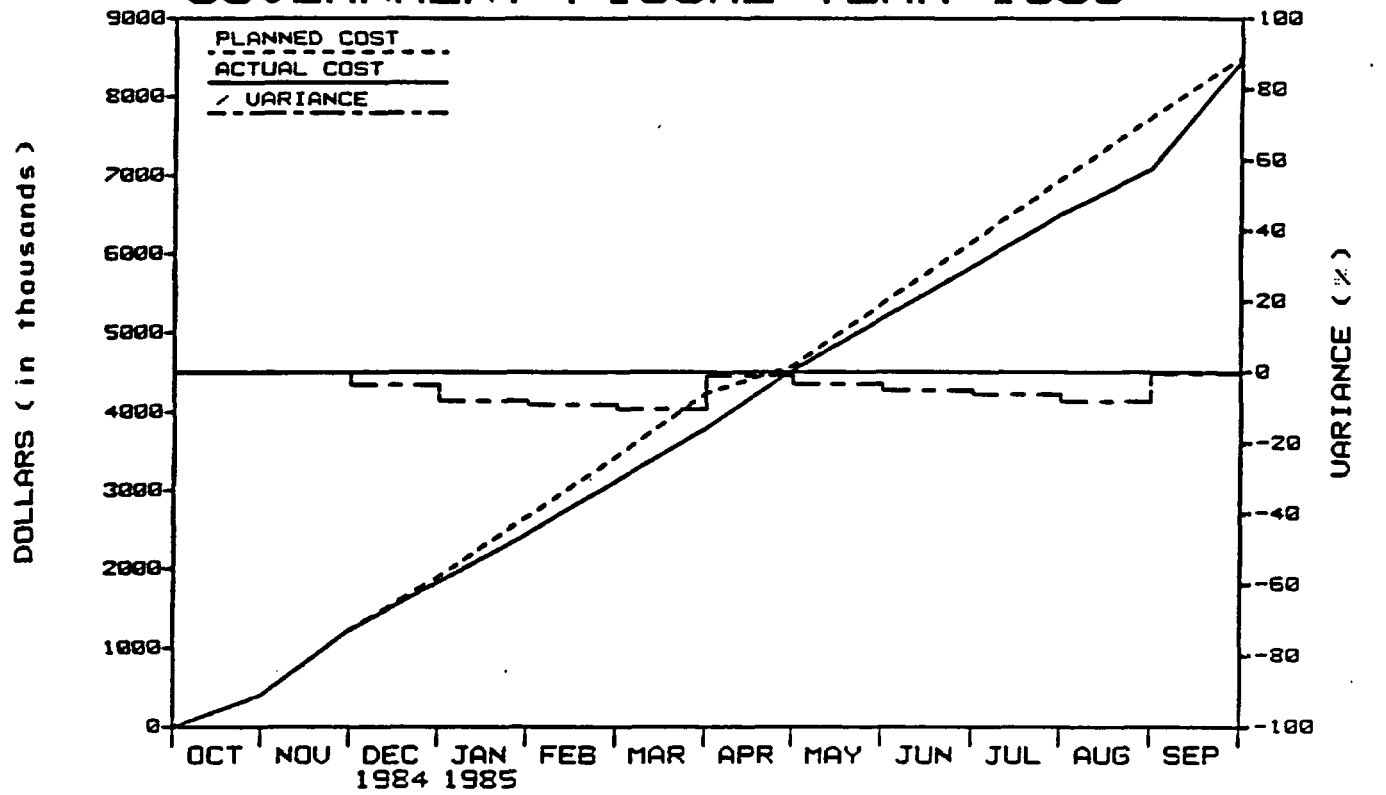
PLAN (x1000)	760	1520	2277	3125	3986	4830	5680	6525	7378	8226	9075	10012
COST (x1000)	760	1520	2277	3125	3986	4830	5680	6525	6911	7910	7751	9952
VARIANCE (x1000)	0	0	0	0	0	0	0	0	467	316	1324	60
% VARIANCE	0	0	0	0	0	0	0	0	-6	-4	-15	-1

HOLMES & NARVER
GOVERNMENT FISCAL YEAR 1985



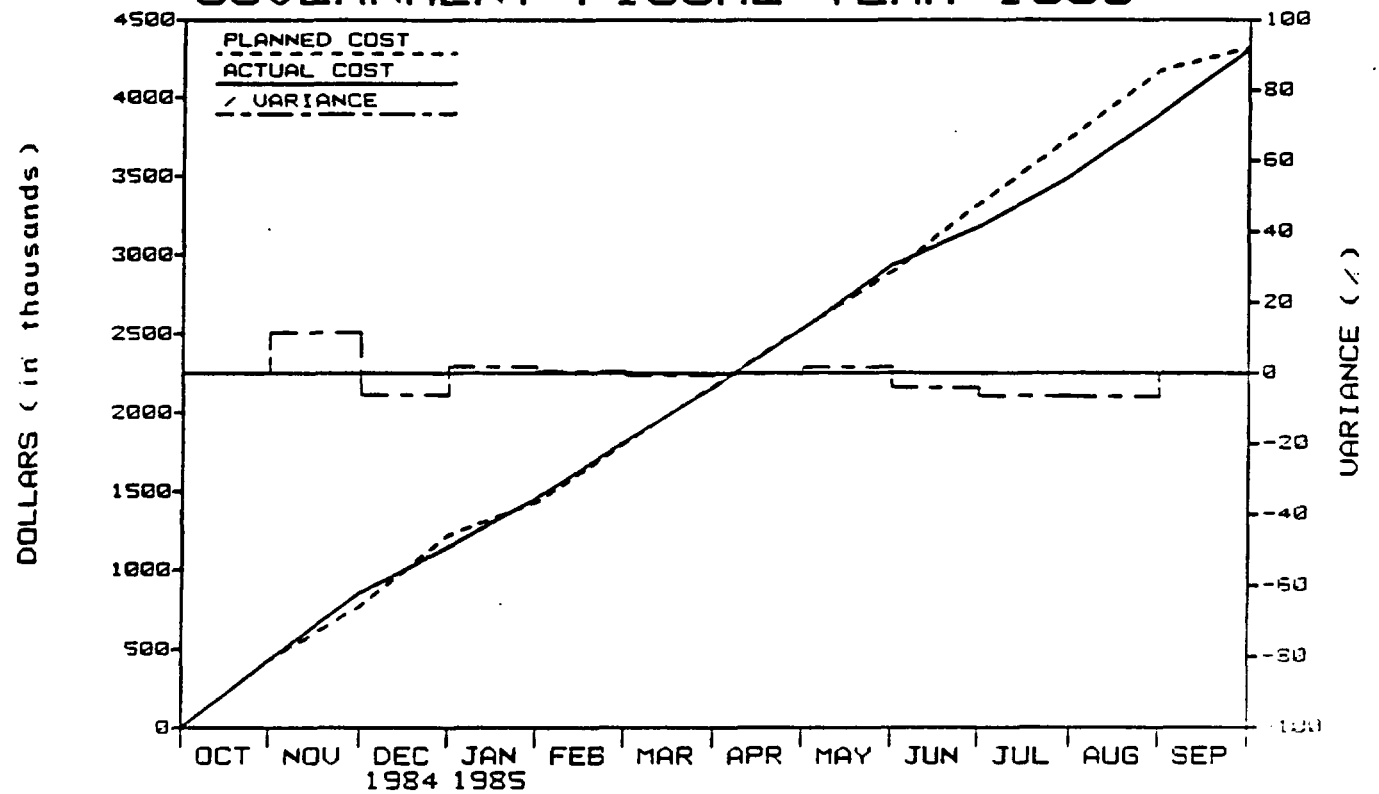
PLAN (x1000)	41	99	164	228	293	357	422	487	587	687	793	898
COST (x1000)	46	99	151	229	327	380	439	488	558	607	687	780
VARIANCE (x1000)	-5	0	13	-1	-34	-23	-17	-1	29	80	106	118
/ VARIANCE	12	0	-8	0	12	6	4	0	-5	-12	-13	-13

LAWRENCE LIVERMORE NATIONAL LABORATORY
GOVERNMENT FISCAL YEAR 1985



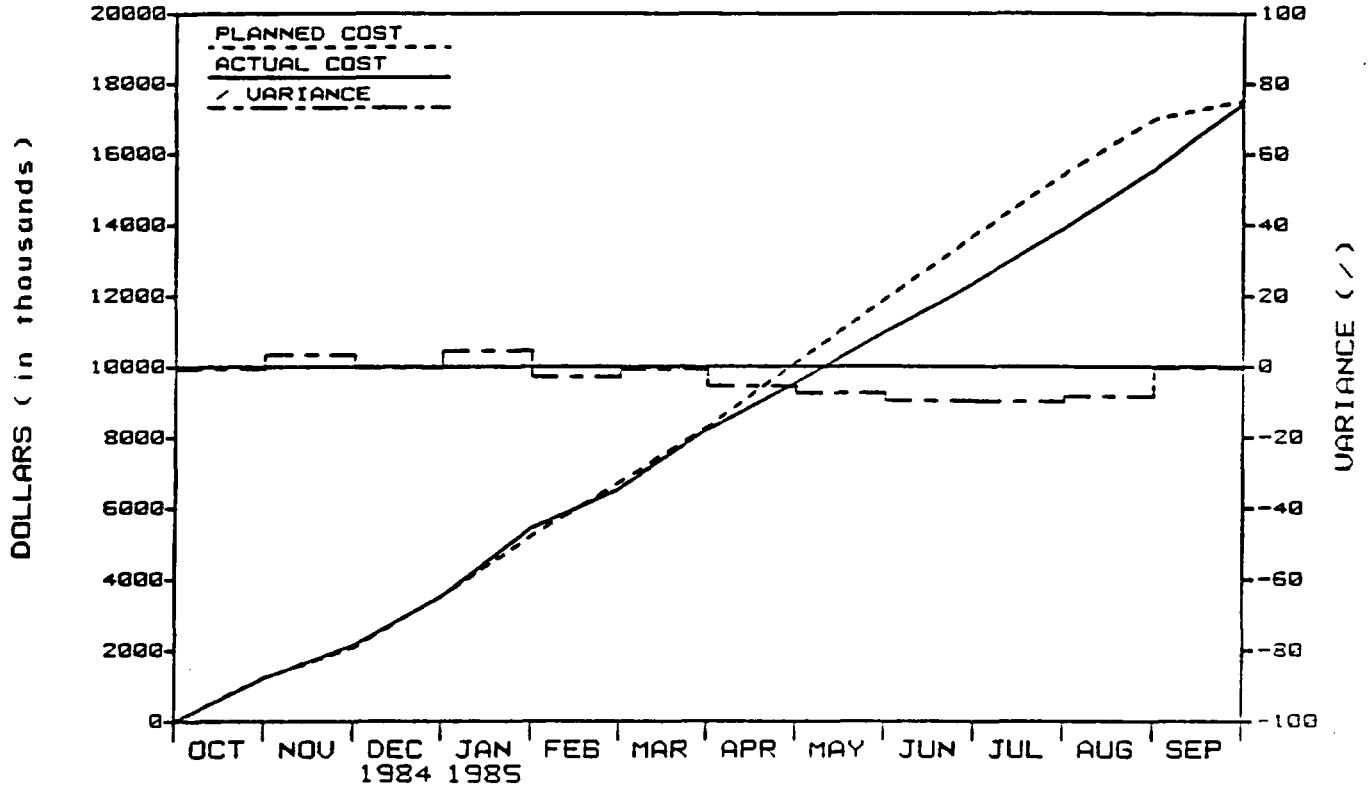
PLAN (x1000)	404	1229	1899	2655	3429	4230	4580	5372	6166	6955	7731	8515
COST (x1000)	404	1226	1829	2437	3113	3785	4526	5190	5843	6514	7088	8469
VARIANCE (x1000)	0	3	70	218	316	445	54	182	323	441	643	46
/ VARIANCE	0	0	-4	-8	-9	-11	-1	-3	-5	-6	-8	-1

REECO
GOVERNMENT FISCAL YEAR 1985



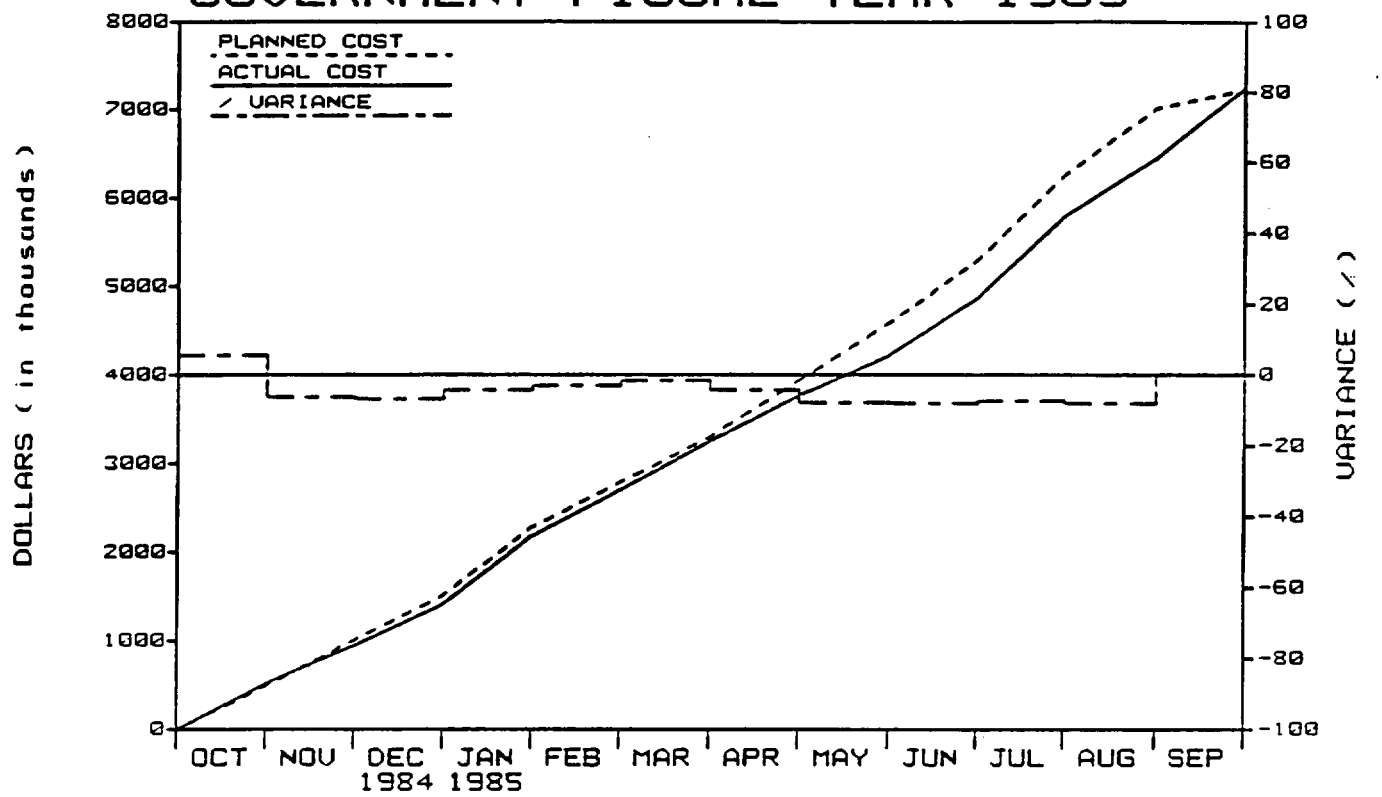
PLAN (x1000)	426	772	1222	1430	1802	2174	2538	2895	3325	3749	4172	4323
COST (x1000)	426	861	1148	1454	1812	2159	2533	2939	3184	3502	3893	4315
VARIANCE (x1000)	0	-89	74	-24	-10	15	5	-44	141	247	279	8
/ VARIANCE	0	12	-6	2	1	-1	0	2	-4	-7	-7	0

SANDIA NATIONAL LABORATORIES
GOVERNMENT FISCAL YEAR 1985



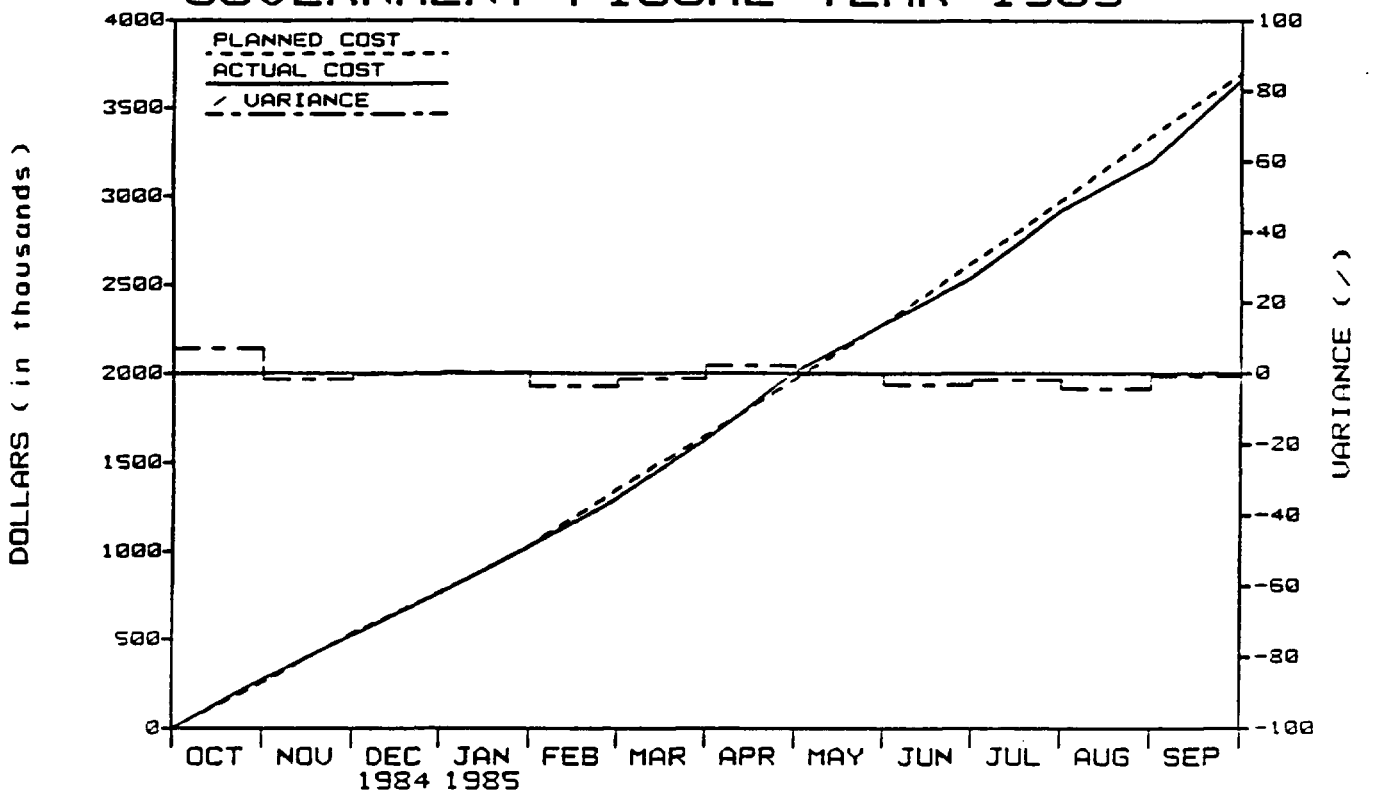
PLAN (x1000)	1240	2091	3527	5197	6736	8289	10115	11898	13722	15429	16976	17534
COST (x1000)	1230	2160	3511	5435	6546	8209	9544	10987	12380	13887	15541	17443
VARIANCE (x1000)	10	-69	16	-238	190	80	571	911	1342	1542	1435	91
% VARIANCE	-1	3	0	5	-3	-1	-6	-8	-10	-10	-8	-1

SCIENCE APPLICATIONS INT'L CORP.
GOVERNMENT FISCAL YEAR 1985



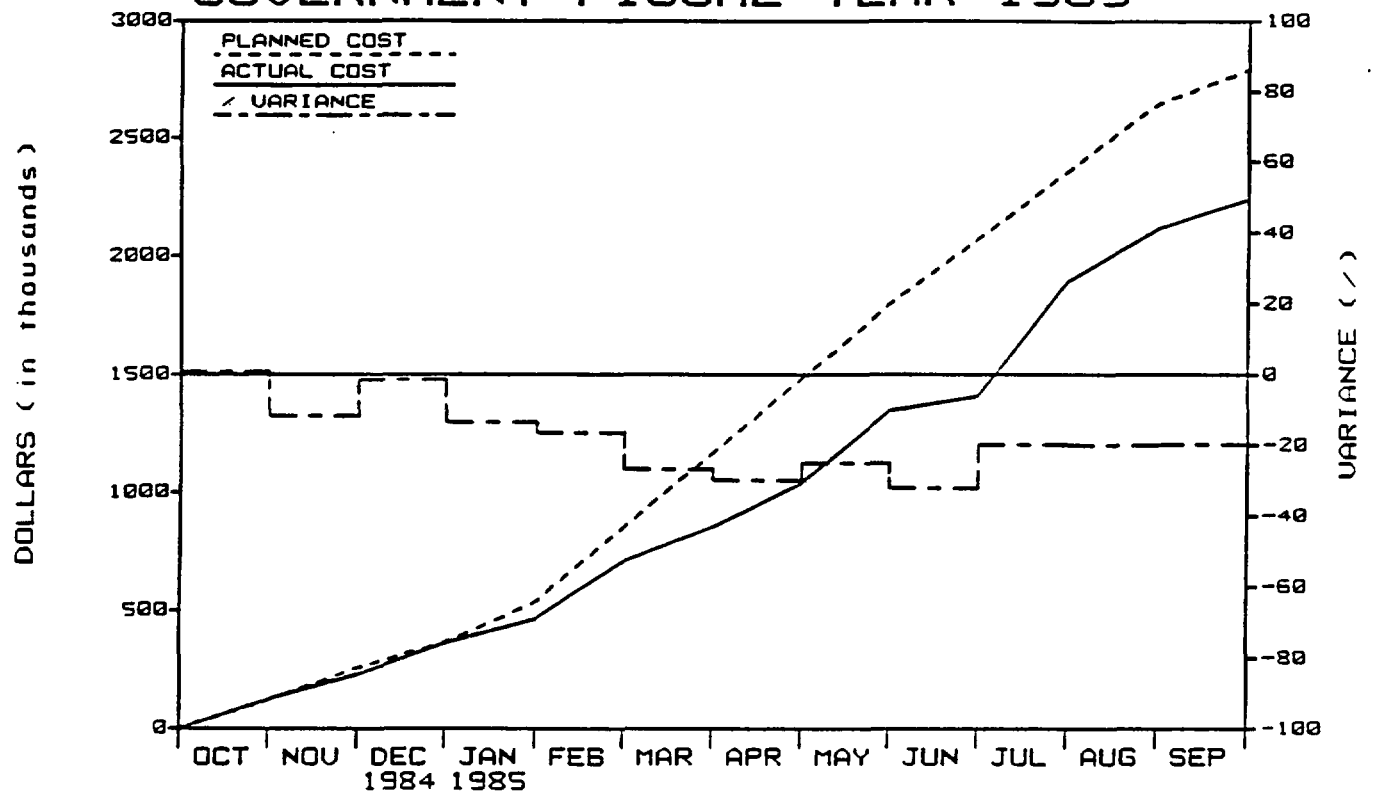
PLAN (X1000)	492	1005	1512	2276	2786	3298	3939	4588	5293	6253	7008	7230
COST (X1000)	519	942	1408	2177	2703	3246	3768	4222	4864	5790	6440	7241
VARIANCE (X1000)	-27	63	104	99	83	52	171	366	429	463	568	-11
/ VARIANCE	5	-6	-7	-4	-3	-2	-4	-8	-8	-7	-8	0

E-MAD
GOVERNMENT FISCAL YEAR 1985



PLAN (x1000)	255	533	764	1024	1346	1649	1966	2285	2627	2975	3342	3697
COST (x1000)	273	524	761	1028	1296	1624	2009	2279	2543	2921	3198	3662
VARIANCE (x1000)	-18	9	3	-4	50	25	-43	6	84	54	144	35
/ VARIANCE	7	-2	0	0	-4	-2	2	0	-3	-2	-4	-1

MISCELLANEOUS CONTRACTORS
GOVERNMENT FISCAL YEAR 1985



PLAN (X1000)	122	258	366	536	851	1167	1483	1799	2078	2363	2647	2794
COST (X1000)	123	228	361	463	709	854	1040	1348	1410	1896	2116	2241
VARIANCE (X1000)	-1	30	5	73	142	313	443	451	668	467	531	553
% VARIANCE	1	-12	-1	-14	-17	-27	-30	-25	-32	-20	-20	-20

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS
LEVEL 1 MILESTONES IN A TIME WINDOW OF 01 Oct 1984 TO 30 Sep 1985
Run Date: 30 October 1985

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL
Annual PASS Program Interaction - (Letter Report)	X.2.1.1.S	Blanchard	1	SNL	M277	B	30 Sep 85 01 Oct 85
Performance Assessment Plan	X.2.1.1.S	Blanchard	1	SNL	N113	B	30 Sep 85
Establish Interim Product Specifications	X.2.2.3.1.L	Valentine	1	LLNL	M250	B	30 Aug 84 12 Apr 85
Input to DOE/HQ Report to Congress on Copper for Waste Packages	X.2.2.3.2.L	Valentine	1	LLNL	M222	B	01 Aug 85 24 Oct 85
Complete Waste Package Conceptual Design Criteria	X.2.2.4.L	Valentine	1	LLNL	M231	B	15 Jun 85 17 Jun 85
Initiate Waste Package Advanced Conceptual Design	X.2.2.4.L	Valentine	1	LLNL	M233	B	30 Jun 85
Pre-Closure Analysis of Selected Conceptual Designs	X.2.2.4.L	Valentine	1	LLNL	M251	B	28 Sep 84 20 Dec 84
Progress Report on 3-Dimensional Mineralogic Model of Yucca Mountain	X.2.3.2.A	Blanchard	1	LANL	M355	B	31 Aug 84 10 Oct 84
Weapons Test Seismic Report	X.2.3.2.2.4.S	Blanchard	1	SNL	M357	B	15 Jan 85 14 Jun 85
Letter Report on Groundwater Chemistry Along Flow Paths	X.2.3.4.1.1.A	Blanchard	1	LANL	M354	B	30 Aug 84 14 Feb 85
Complete Report on Volcanic Hazards Analysis	X.2.3.6.1.A	Blanchard	1	LANL	M356	B	28 Sep 84 22 Jan 85

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS
LEVEL 1 MILESTONES IN A TIME WINDOW OF 01 Oct 1984 TO 30 Sep 1985
Run Date: 30 October 1985

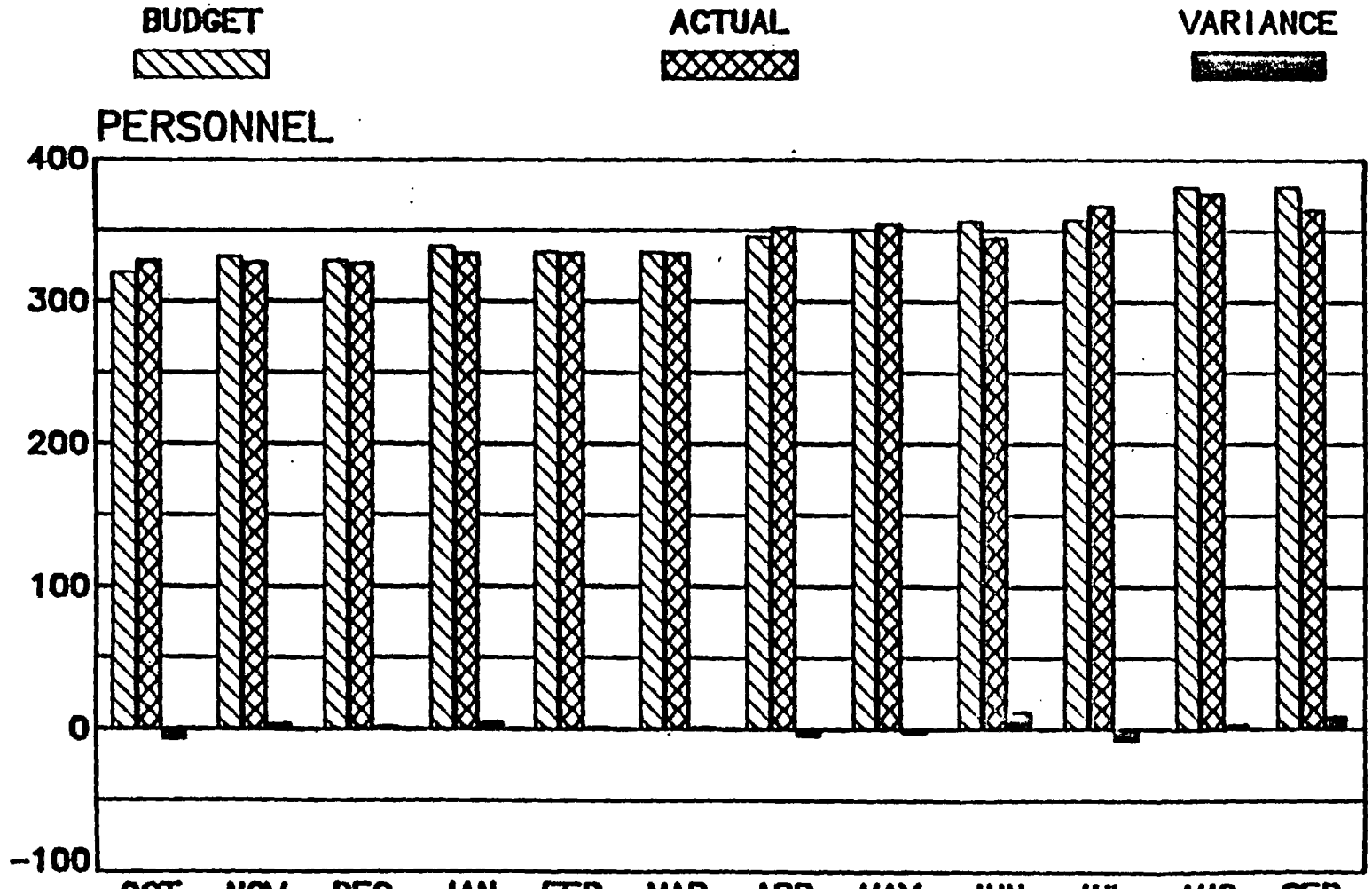
MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL
Implementation of Meteorological Monitoring Plan	X.2.3.6.1.T	Blanchard	1	SAIC	M364	B	01 Jun 85
Start Repository Advanced Conceptual Design	X.2.4.1.S	Skousen	1	SNL	N430	B	30 Sep 85
NNWSI Project Design Study: MRS - Repository Interface Task Force	X.2.4.1.S	Skousen	1	SNL	R014	B	16 Aug 85
Seal Development Plan for Repository to OCRWM for Review	X.2.4.2.3.1.S	Skousen	1	SNL	M447	B	12 Nov 84 17 Dec 84
Draft Environmental Assessment (Camera ready)	X.2.5.3.1.T	Blanchard	1	SAIC	M502	B	30 Nov 84 29 Nov 84
EA Comment/Response Document	X.2.5.3.1.T	Blanchard	1	SAIC	M503	B	30 May 85
Final Environmental Assessment	X.2.5.3.1.T	Blanchard	1	SAIC	M504	B	20 Jun 85
NNWSI Project References for EA Complete	X.2.5.3.1.T	Blanchard	1	SAIC	M523	B	01 Aug 84 06 Mar 85
Issue Draft Revised Definitive Design for the First and Second Shafts, Subsurface Facilities, and Underground Service System for the ESF	X.2.6.1.1.A	Irby	1	LANL	M023	B	29 Apr 85 29 Apr 85
Issue Exploratory Shaft Test Plan (ESTP) (NVO-244)	X.2.6.9.1.A	D'Lugosz	1	LANL	M666	B	27 Sep 85

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS
LEVEL 1 MILESTONES IN A TIME WINDOW OF 01 Oct 1984 TO 30 Sep 1985
Run Date: 30 October 1985

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL
Complete Decision Analysis on Use of Climax Facility	X.2.7.1.L	Kunich	1	LLNL	M706	B	15 Oct 84 06 Jul 84
Draft Project Management Plan	X.2.9.1.T	Dixon	1	SAIC	M907	B	29 Mar 85
Submit FY 85 NNWSI Project Plan to DOE/HQ for Approval	X.2.9.1.1.T	Vieth	1	SAIC	M901	B	15 Mar 85 09 Jan 85
Submit NVO-196-18 (Rev. 2) NNWSI Project Quality Assurance Program Plan and Implementing Procedures to DOE/HQ for Approval	X.2.9.3.T	Blaylock	1	SAIC	M915	B	30 Nov 84 30 Nov 84

NO. MILESTONES IN THIS REPORT: 25

- NNWSI PROJECT STAFFING -
FISCAL YEAR 1985



Planned NNWSI Project Field Activities

Participant	Activity	Location	Day	Time
USGS	Geologic Mapping	Yucca Mountain	11/1-10	8-5
USGS	Fault Mapping	Yucca Mountain	11/12-20	8-5
USGS	Drilling Neutron holes (UZ Hydrology)	Yucca Mountain	11/6-30	8-5
USGS	Fault Investigations	Yucca Mountain	11/12-15	8-5
USGS	Paleohydrology field trip	Yucca Mountain and Amargosa Desert	11/5-6	8-5
USGS	Paleoclimate core drilling	Walker Lake	11/6-30	8-5
USGS	Flood studies	Yucca Mountain	11/3-4	8-5
USGS	Precipitation and runoff data collection	NTS & Vicinity	Storm events	8-5
USGS	Gravity measurements along seismic line	Well VH-1 to Bear Mountain	11/11-22	8-5
USGS	Ground magnetic study to select site for wells VH-3 and VH-4	Crater Flat	11/18-21	8-5
Los Alamos (Schon Levy, Barbara Carlos)	Origin of shallow secondary carbonate and silicate deposits. Coordinate sampling with USGS mapping.	Trench 14	11/7-8	8-5
SNL	Start mining welded tuff for mining evalu-tion experiment	G-tunnel	Estimate Nov. 11	TBD
SAIC	Meterological monitoring	Yucca Mountain	o Equipment runs continuously o Site tech maintains equipment weekly, approximately Monday, Wednesday, and Friday	
LLNL	No scheduled activities			