

PROJECT OFFICE QUALITY ASSURANCE AUDIT REPORT FOR

THE YUCCA MOUNTAIN PROJECT OFFICE AUDIT OF

LAWRENCE LIVERMORE NATIONAL LABORATORY

AUDIT NO. 89-6

CONDUCTED: JUNE 5 - 9, 1989

Prepared By: *John C. Friend for*
John C. Friend,
Team Leader

Date: 6/30/89

Approved By: *Grag F Fehr*
Grag F Fehr
Deputy Assistant Project,
Manager, Quality Assurance

Date: 6-30-89

Approved By: *Edwin L. Wilmot*
Edwin L. Wilmot
Acting Quality Assurance
Division Director

Date: 6-30-89

8907170062 890702
PDR WASTE
WM-11 PDC

ENCLOSURE

EXECUTIVE SUMMARY

PROJECT OFFICE AUDIT REPORT NO. 89-6

LAWRENCE LIVERMORE NATIONAL LABORATORY (LLNL)

LIVERMORE, CALIFORNIA

JUNE 5 - 9 1989

In the opinion of the Project Office Audit Team, the LLNL Quality Assurance (QA) Program 033-YMP-R, Revision 0, is adequate for the overall control of quality related activities. LLNL should be allowed to proceed with quality related activities as applicable Study Plans (SP), Scientific Investigation Plans (SIP), Activity Plans, and Technical Implementing Procedures (TIP) are prepared and LLNL Readiness Reviews confirm procedures, personnel, and prerequisites are adequate for the control of the activities.

It should be noted that the LLNL QA Program does not fully meet the provisions of the Yucca Mountain Project Quality Assurance Plan NWSI/88-9, Revision 2. Neither the LLNL Software QA Plan nor QA Level Assignment and grading efforts have been approved by the Project Office.

The effectiveness of the LLNL QA Program cannot be determined at this time because the implementing plans and technical procedures have not been completed and the limited quantity of technical products issued to date is insufficient to allow an effectiveness conclusion.

No Standard Deficiency Reports (SDR) were issued as a result of this audit. Four (4) Observations were identified, and are discussed further in this report; two (2) require LLNL response and two (2) require Project Office response. Five (5) SDRs, open from previous audits, were reviewed for implementation of corrective action. Two of the SDRs will be closed. The remaining three (3) will remain open pending completion of LLNL calibration program review and acceptance, and Project Office approval of the LLNL Software QA Plan.

The audit team reviewed the actions discussed in LLNL letter, December 19, 1988 (Ballou) and Department of Energy Nevada Operations YMPO letter, March 3, 1989 (Gertz) regarding " LLNL actions in response to Standard Deficiency Reports for Audit 88-05" which restricted performance of QA Level I and II activities. Not all of the actions had been completed at the time of the audit (e.g. QA Level assignment, implementing plan and procedure development, and readiness reviews), but work was progressing to resolve those items.

It is apparent that a great deal of effort and time has been expended by LLNL to correct the previously identified QA program deficiencies and to bring the current QA program in compliance with YMP requirements. LLNL personnel should be commended for the cooperation and effort necessary to bring the QA program to this level.

1.0 Introduction

This report contains the results of a QA Audit of LLNL Yucca Mountain Project activities. The audit was conducted at the LLNL facilities in Livermore, CA., June 5 - 9, 1989. The audit was conducted in accordance with the requirements of QMP-18-01, Revision 3, "Audit System for the Waste Management Project Office." The QA Program requirements to be verified were taken from QA Plan NNWSI/88-9, Revision 2.

2.0 Audit Scope

The purpose of this audit was to evaluate the LLNL Quality Assurance Program through verification of implementation of the LLNL QAPP, Revision 0, (effective 2/10/89) and its implementing procedures. Additionally, a technical review was performed to determine readiness to start QA Level I and II activities.

3.0 Audit Team Personnel

John Friend	Audit Team Leader/Lead Auditor	SAIC, Las Vegas, NV
James Clark	Auditor	SAIC, Las Vegas, NV
Sidney Crawford	Auditor	SAIC, Las Vegas, NV
Frank Kratzinger	Auditor	SAIC, Las Vegas, NV
Wendell Mansel	Auditor	YMP, Las Vegas, NV
Florencio Ramirez	Auditor	DOE/SAN, San Francisco, CA
Paul Cloke	Lead Technical Specialist	SAIC, Las Vegas, NV
Dwayne Chesnut	Technical Specialist	SAIC, Las Vegas, NV
Martha Mitchell	Technical Specialist	SAIC, Las Vegas, NV
U-Sun Park	Technical Specialist	SAIC, Las Vegas, NV
Thomas Ricketts	Technical Specialist	SAIC, Las Vegas, NV
James Kennedy	Observer	NRC, Washington, DC
Kenneth Hooks	Observer	NRC, Washington, DC
Kien Chang	Observer	NRC, Washington, DC
Bruce Mabrito	Observer	NRC, SWRI, San Antonio
Susan Zimmerman	Observer	State of Nevada
Arthur Spooner	Observer	DOE/HQ Weston, Wash. DC
Michael Valentine	Observer	YMP, Las Vegas, NV

4.0 Summary of Audit Results

4.1 Statement of Program Effectiveness

In the opinion of the Project Office Audit Team, the effectiveness of the Quality Assurance Program at LLNL cannot be determined at this time. Until such time as the program is completed and objective evidence to demonstrate technical adequacy and program implementation can be reviewed, the effectiveness will remain indeterminate.

However, based on the results of the audit, the LLNL QA Program appears to be adequate to support the initiation of QA Level I and II activities. This is based upon the fact that staffing appears adequate, training is satisfactory, most required upper tier procedures are in place, and there are no major outstanding deficiencies.

4.2 Summary of Technical Evaluation

The focus of the technical specialist team was on the technical adequacy of the LLNL Quality Assurance Program Plan and on other plans and procedures written to meet the requirements of the YMP QAPP NWSI/ 88-9, Revision 2. This included familiarity of the LLNL technical staff with the requirements, their training to these requirements, and a review of their technical expertise by the technical specialists. Very little technical work has been accomplished by LLNL personnel under these plans except for the involvement in writing various technical and quality assurance plans. A newly prepared Study Plan and a revised Scientific Investigation Plan were examined, but not formally reviewed during the audit. In addition, the LLNL draft Software QA Plan was also reviewed.

The effectiveness of these various plans could not be fully evaluated because of the lack of significant work performed under them. However, the technical specialists did concur that these plans promise to be fully effective in controlling required work at all QA levels. This represents a dramatic improvement from the audit 88-05, conducted during October, 1988.

4.3 Summary

No Standard Deviation Reports (SDR) were identified as a result of this audit. Four (4) Observations (Enclosure 2) were issued. Two of the Observations require LLNL response; the remaining two require Project Office response. In addition, six (6) Recommendations were noted for consideration by LLNL. The Observations and Recommendations are discussed in Section 6.0 of this report.

At the time of the audit, five (5) SDR's remained open for previous Project Office audits and surveillances of LLNL. Corrective action to SDR 242 and SDR 246 was considered to be properly implemented and those SDR's will be closed. The Calibration Programs of the LLNL metrology facilities had not been fully accepted by LLNL YMP QA, and only limited implementation of calibration activities under current program requirements had occurred to date. As a result, SDR 038 and SDR 090 shall remain open, pending acceptance of the LLNL Mechanical Engineering and Electrical Instrument Calibration QA Plans and sufficient implementation to allow verification of the effectiveness of corrective action. The LLNL Software QA Plan was submitted to YMFO on June 1, 1989, just prior to the audit. Since the Software QA Plan has not yet been accepted by the Project Office, SDR 247 will remain open.

The following program elements described in the LLNL QAPP were reviewed and found to be not applicable to LLNL activities at this time because LLNL had no scope of work activities involving "Engineered Items":

- 3.2 Design Control
- 8.A Identification of Items
- 9.0 Control of Processes
- 10.0 Inspection
- 11.0 Test Control
- 14.0 Inspection, Test, and Operating Status

The following program elements were considered to be in compliance with NWSI/88-9, Revision 2, and LLNL QAPP, Revision 0, although only limited evidence of implementation was available at the time of the audit.

- 1.0 Organization
- 2.0 QA Program
- 3.0 Scientific Investigation (except 3.2, Design Control and 3.3 Software QA)
- 4.0 Procurement Document Control
- 5.0 Instructions, Procedures, Plans, and Drawings
- 6.0 Document Control
- 7.0 Control of Purchased Items and Services
- 8.0 Identification and Control of Items, Samples, and Data (except 8.A, Items)
- 13.0 Handling, Shipping and Storage
- 15.0 Control of Nonconforming Items
- 16.0 Corrective Action
- 17.0 Quality Assurance Records
- 18.0 Audits

The following program elements were considered to be not fully in compliance with NNWSI/88-9, Revision 2 and the LLNL QAPP, Revision 0, because implementing plans had not been approved by LLNL YMP QA or Project Office at the time of the audit.

3.3 Software Quality Assurance Requirements
12.0 Control of Measuring and Test Equipment

Technical review was conducted during the audit to verify the following areas:

- Technical expertise of LLNL Technical Staff
- Project indoctrination and training of LLNL Technical Staff
- LLNL Technical Staff familiarity with scientific investigation process
- Technical adequacy of SP/SIP's (limited, non formal review)
- Software QA Plan (non formal review)

5.0 Audit Meetings

5.1 Preaudit Conferences

A preaudit conference was held with the LLNL Technical Project Officer (TPO) and his staff at 10:45 a.m. on June 5, 1989. The purpose, scope, and proposed agenda for the audit were presented and the audit team was introduced. A list of attendees for this meeting is provided in Enclosure 1.

5.2 Audit Status Meetings

Audit Status Meetings were held with the LLNL TPO and his key staff at 8:30 a.m. on June 6, 7 and 8, 1989. A status of how the audit was progressing and identification of discrepancies were discussed daily.

5.3 Postaudit Conference

The postaudit conference was held at 9:00 a.m. on June 9, 1989. A synopsis of the preliminary Observations identified during the course of the audit was presented to the TPO and his staff. A list of attendees of this meeting is provided in Enclosure 1.

6.0 Synopsis of SDRs, Observations, and Complete Recommendations

6.1 Standard Deficiency Reports (SDRs)

No SDRs were identified as a result of this audit.

ENCLOSURES 1

ATTENDEES

6.2 Observations

1. A calibration service supplier had not been audited by LLNL YMP QA for calibration capability; two calibration services suppliers (4 locations) had been audited, but had not been added to the LLNL YMP Qualified Suppliers List. Observation 89-6-01 (LLNL)
2. A copy of a LLNL Corrective Action Request (CAR) was not forwarded to SAIC/T&MSS when issued. Observation 89-6-02 (LLNL)
3. "Long term" was not defined for sample storage to identify those samples requiring special storage criteria. Observation 89-6-03 (YMPO)
4. QA records submitted by LLNL to YMP Central Records Facility (CRF) were not accepted and were returned by YMP CRF. Observation 89-6-04 (YMPO)

6.3 Recommendations

1. Some personnel resumes had not been updated since hire at LLNL. As a result, personnel records did not include work experience at LLNL as a part of the individuals total experience. Personnel resumes should be updated to describe LLNL responsibilities and duties.
2. Although assignment of QA Level III to methodology, development and equipment prototyping is appropriate, documentation of those activities should be sufficient to identify controls on the equipment or process, development, consistency and respectability of data, and correlation of input versus output parameters. It is recommended that all scientific work, including QA Level III, be documented in scientific notebooks. It is also recommended that the QA Level III activities be subject to some QA verification (e.g.: review, surveillance) commensurate with the complexity of the process or uniqueness of equipment to assure that the process or equipment development is consistent with good scientific and engineering practice and has a basis of validity when used for QA Level I and II activities. Direction was issued by memo by LLNL during the audit to effect.

3. LLNL Quality Procedure 033-YMP-QP 6.0 provides measures for accomplishing "minor changes" to procedures. Minor changes were issued May 3, 1989 using "replacement pages", but the pages were not redated or marked "corrected copy" or similar notice. As a result, it is difficult to assure that the most current procedure versions are currently posted. Replacement pages should be marked "corrected copy" or "replacement page" and reflect the reissue date. After discussion with LLNL personnel, administrative procedure replacement pages issued June 7, 1989 were appropriately marked.

4. LLNL Quality Procedure 033-YMP-QP 2.1 did not provide for reviews to consider potential impact on waste isolation. A procedure Change Notice was prepared during the audit.

5. LLNL Quality Procedure 033-YMP-QP 5.0, paragraph 5.0.5.9, identifies a list of QP's which interface with Technical Implementing Procedure development. The list does not include:

- 033-YMP-QP 3.0, "Scientific Investigation Control" (par.3.0.5,3.0.11)
- 033-YMP-QP 3.1, "Design Control" (par. 3.1.5)
- 033-YMP-QP 3.2, "Software Quality Assurance" (par. 3.2.5)

The above procedures should also be listed in 033-YMP-QP 5.0.

6. LLNL Quality Procedure 033-YMP-QP 8.0, paragraphs 9.0.4.1.4, (items) and 8.0.4.2.6 (samples) provide for documentation of damaged or deteriorated identifiers, including description of the condition, preventive actions, corrective actions, individual performing corrective actions, dates, etc. However, the QP does not identify the form of discrepancy documentation or reference specific procedures for the identification, documentation, and correction of marking discrepancies. It is recommended that a Nonconformance Report (NCR) be used per 033-YMP-QP 15.0 and that 033-YMP-QP 8.0 reflect the NCR and QP to be used.

7.0 Required Action

A written response from LLNL is required for the Observations 89-6-01 and 89-6-02 contained in Enclosure 2 of this report. Project Office response is required for Observations 89-6-03 and 89-6-04. Responses are due 20 working days after the transmittal letter of this report.

Written responses are not required for the recommendations contained in this report. The recommendations were generated by the audit team for the LLNL staff to consider during implementation of its QA Program.

ENCLOSURES 1

ATTENDEES

<u>NAME</u>	<u>TITLE</u>	<u>ORG.</u>	<u>PRE</u>	<u>DUR</u>	<u>EX</u>
Aines, R.	TAL	LLNL			
Alegre, B.	- - -	LLNL		X	X
Ballou, L.	YMP Staff	LLNL		X	
Beall, K.	Observer	SAIC			X
Bell, W.	- - -	LLNL			X
Bradley, S.	- - -	LLNL		X	
Bruton, C.	- - -	LLNL		X	
Bryan, B.	Proj. Admin.	LLNL	X	X	
Bullen, D.	- - -	LLNL		X	X
Buscheck, T.	- - -	LLNL		X	
Caldwell, H.	Mgr. Audits	SAIC		X	
Chang, K.	Observer	NRC	X		X
Chesnut, D.	Tech. Spec.	SAIC	X		X
Chubb, K.	SQA Tech.	LLNL	X		X
Clark, J.	Auditor	SAIC	X		
Clark, J.	QA Sec.	LLNL	X		X
Clarke, W.	TAL	LLNL	X	X	
Cloke, P.	Lead Tech.Spec.	SAIC	X		X
Cloninger, M.	Observer	DOE/YMP			X
Crawford, S.	Auditor	SAIC	X		X
Cummins, N.	SQA	LLNL			X
Dann, R.	QA Mgr.	KE/LLNL	X	X	X
Davis, L.	- - -	Tektronix		X	X
DeLeon, E.	QA Spec.	KE/LLNL	X		
Dobson, C.	Prin.Admin.	LLNL	X		X
Engle, R.	ME QA	LLNL			X
Farmer, J.	- - -	LLNL		X	
Flemming, D.	- - -	LLNL		X	
Friend, J.	ATL/LA	SAIC	X		
Glassley, W.	T.L.	LLNL		X	
Goldner, A.	- - -	LLNL		X	X
Grant, P.	- - -	LLNL		X	
Halsey, W.	- - -	LLNL		X	
Hardenbrook, C.	- - -	LLNL		X	
Hoheisel, T.	- - -	LLNL		X	
Hooks, K.	Observer	NRC	X		
Jackson, K.	- - -	LLNL		X	X
Jardine, L.	Project Leader	LLNL	X	X	
Johnson, J.	Geochemist	LLNL			X
Kennedy, J.	Obsever	NRC	X		X
Klein, G.	- - -	LLNL			X
Knauss, K.	- - -	LLNL		X	
Kratzinger, F.	Auditor	SAIC	X	X	
Kugler, A.	PM Staff	KE/LLNL	X	X	X
Leider, H.	T.L.	LLNL	X	X	
Lin, W.	- - -	LLNL		X	
Lucina, R.	- - -	LLNL		X	
Mabrito, B.	Observer	NRC/SWRI	X		X
Madson, A.	QA Spec.	KE/LLNL	X	X	X
Manis, W.	- - -	LLNL		X	

<u>NAME</u>	<u>TITLE</u>	<u>ORG.</u>	<u>PRE</u>	<u>DUR</u>	<u>EX</u>
Mansel, W.	Auditor	DOE/YMP	X		X
McCright, R.	- - -	LLNL		X	
Merrigan, J.	- - -	LLNL		X	
Mitchell, M.	Tech. Spec.	SAIC	X		X
Morissett, R.	Observer	SAIC			X
Nitao, J.	- - -	LLNL		X	
O'Connell, W.	TAL	LLNL	X	X	X
Oberle, R.	QA Support	KE/LLNL	X	X	X
Palmer, J.	QA	LLNL			X
Park, U.	Tech. Spec.	SAIC		X	
Pfeifer, D.	- - -	LLNL		X	
Ramirez, A.	T.L.	LLNL		X	X
Ramirez, F.	Auditor	DOE/SAN	X		X
Revelli, M.	T.L.	LLNL			X
Ricketts, T.	Tech. Spec.	SAIC		X	
Ruggleri, M.	- - -	LLNL		X	
Russell, A.	QA Spec.	KE/LLNL	X	X	X
Russell, E.	Engineer	LLNL	X	X	
Schafer, P.	OMR Mgr.	LLNL			X
Schock, R.	Energy Proj.Ldr.	LLNL			X
Schwartz, L.	Dept.Head	LLNL			X
Schwartz, R.	YMP QA Mgr.	LLNL	X	X	X
Shaw, H.	TAL	LLNL	X	X	X
Short, D.	Dep.Proj.Ldr.	LLNL	X		X
Silva, R.	- - -	LLNL		X	
Spooner, A.	Surveillant	DOE/BO Weston	X		X
Stockdale, W.	- - -	LLNL		X	
Stout, R.	T.L.	LLNL	X	X	
Thatcher, R.	- - -	LLNL		X	
Valentine, M.	Observer	DOE/YMP	X		X
Van Konynenberg, R.	- - -	LLNL		X	
Wilder, D.	TAL	LLNL	X	X	X
Wilmot, E.	QA Div.Dir.	DOE/YMP			X
Wolery, T.	- - -	LLNL		X	
Zimmerman, S.	QA Manager	St of NV	X		X

ENCLOSURE 2
OBSERVATIONS

YUCCA MOUNTAIN PROJECT OFFICE
1 YMPO OBSERVATION NO. 89-6-02

N-QA-012
4/89

Completed by Originating Organization	2 Noted During: YMP QA Audit 89-6	3 Identified By: F. J. Kratzinger	4 Date: 6/7/89
	5 Organization: LLNL	6 Person(s) Contacted: R. Schwartz, R. Oberle	7 Response Due Date is 20 Days from Date of Transmittal
	8 Discussion: It was noted during the audit that a copy of CAR-001, dtd. 4/18/89, was not forwarded to SAIC/T&MSS upon issuance as required by NNWSI/88-9, Revision 2, and by LLNL procedure 033-YMP-QP-16.0. A copy of the CAR was transmitted to YMPO and T&MSS upon closure. LLNL issued NCR-022, dtd. 6/7/89, to identify the discrepancy, and a letter of explanation was sent to YMPO and SAIC on 6/7/89. NCR-022 was closed 6/7/89.		
Completed by Respondee	9 QA/Lead Auditor <i>[Signature]</i>	Date 6/29/89	10 Branch Manager <i>[Signature]</i>
	11 Response:		
Completed by QA Org.	12 Signature:		Date:
	13 Response Receipt Acceptable <input type="checkbox"/>	Initiator	Date
	14 Remarks:	QA/Lead Auditor	Date

YUCCA MOUNTAIN PROJECT OFFICE
1 YMPO OBSERVATION NO. 89-6-01

N-QA-012
4/89

Completed by Originating Organization	2 Noted During: YMP QA AUDIT 89-6	3 Identified By: S. L. Crawford	4 Date: 6/8/89
	5 Organization: LLNL	6 Person(s) Contacted: W. Clarke, R. Lucina, R. Dann	7 Response Due Date is 20 Days from Date of Transmittal
	8 Discussion: LLNL YMP QA performs audits of calibration service suppliers at the request of the Electronic Calibration facility and Mechanical Engineering Calibration facility. Audits have been performed at Tektronix (3 locations) and SIMCO (Santa Clara, CA). 1. Four (4) Brooks Instrument flowmeters were sent to CEESI (Colorado Engineering, Nunn, Co.) for calibration; CEESI has not been audited or evaluated for capability to provide calibration services in accordance with LLNL YMP QA		
Completed by Respondee	9 QAE/Lead Auditor <i>[Signature]</i>	Date 6/29/89	10 Branch Manager <i>[Signature]</i> 6-29-89
	11 Response:		
	12 Signature: _____ Date: _____		
Completed by QA Org.	13 Response Receipt Acceptable <input type="checkbox"/>		
	Initiator _____ Date _____	QA/Lead Auditor _____	Date _____
14 Remarks:			

8 Discussion: (continued)

requirements. Although the flowmeters are located physically at G tunnel, NTS, the flowmeters have not been used for any activities since calibration by CEESI. CEESI is on the LLNL YMP QA External Audit Schedule, but the planned month has not been designated.

2. Neither Tektronix nor SIMCO have been included on the LLNL YMP Qualified Suppliers list.

YUCCA MOUNTAIN PROJECT OFFICE
1 YMPO OBSERVATION NO. 89-6-03

N-QA-012
4/89

Completed by Originating Organization

2 Noted During: YMP QA Audit 89-6	3 Identified By: S. L. Crawford	4 Date: 6/6/89
5 Organization: YMPO	6 Person(s) Contacted: R. Schwartz, W. Glassley	7 Response Due Date is 20 Days from Date of Transmittal

8 Discussion:

Neither LLNL/QAPP-033-YMP-R8 or procedure 033-YMP-QP 8.0 define "long term" for sample storage to identify those samples requiring special storage criteria to prevent deterioration, or change of sample chemical or physical characteristics. Furthermore, the YMP QAPP/NNWSI 88-9, Section VIII does not define "long term" and passes the responsibility for definition to individual project participants.

In actual practice, although no QA Level I samples have been collected or received by LLNL, all rock and mineral samples are intended to be stored as

9 QAE/Lead Auditor <i>[Signature]</i>	Date 6/29/89	10 Branch Manager <i>[Signature]</i>	Date 6-29-89
--	-----------------	---	-----------------

Completed by Respondee

11 Response:

J

12 Signature: _____ Date: _____

Completed by QA Org.

13 Response Receipt Acceptable <input type="checkbox"/>					
Initiator	Date	QA/Lead Auditor	Date	Date	

14 Remarks:

8 Discussion: (continued)

"long term" (without specific definition of that term) with protection only from external contamination as the basic storage control.

Since sample collection, storage, and retention is to be accomplished by several participants, "long term" storage should be defined by the Project Office to assure consistency of definition and comparability of stored samples.

YUCCA MOUNTAIN PROJECT OFFICE
1 YMPO OBSERVATION NO. 89-6-04

N-QA-012
4/89

Completed by Originating Organization	2 Noted During: YMP QA Audit 89-6	3 Identified By: F. J. Kratzinger	4 Date: 6/6/89
	5 Organization: YMPO	6 Person(s) Contacted: A. Madson, R. Dann	7 Response Due Date is 20 Days from Date of Transmittal
	8 Discussion: LLNL submitted various record files to YMP Central Record Facility (CRF). Those records were returned to LLNL because the CRF was not accepting records (except litigation records) from any participant. The position was documented on an informal, unsigned memo which stated the participants "will be notified by the Project Office when to begin submitting these records." The Project Office should resolve any problems it has in accepting records and formally advise the participants when records may be submitted.		
Completed by Respondee	9 QAE/Lead Auditor 		Date 6/29/89
	10 Branch Manager 		Date 6-29-89
	11 Response:		
Completed by QA Org.	12 Signature:		Date:
	13 Response Receipt Acceptable <input type="checkbox"/>		
	Initiator	Date	QA/Lead Auditor
14 Remarks:			
			Page <u>1</u> of <u>1</u>