

**QA: QA**

**U. S. DEPARTMENT OF ENERGY  
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT  
OFFICE OF QUALITY ASSURANCE**

**AUDIT REPORT LLNL-ARC-02-07**

**OF**

**LAWRENCE LIVERMORE NATIONAL LABORATORY**

**AT**

**LIVERMORE, CALIFORNIA**

**APRIL 15 -19, 2002**

**Prepared by:** \_\_\_\_\_ **Date:** \_\_\_\_\_

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**Approved by:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Ram Murthy  
Acting Director  
Office of Quality Assurance**

## 1.0 EXECUTIVE SUMMARY

As a result of Quality Assurance (QA) Audit LLNL-ARC-02-07, the audit team determined that the Lawrence Livermore National Laboratory (LLNL) located in Livermore, CA, is satisfactorily and effectively implementing the applicable portions of the U.S. Department of Energy (DOE), Office of Civilian Radioactive Waste Management (OCRWM) QA Program in accordance with DOE/RW-0333P, Revision 11, *Quality Assurance Requirements and Description* (QARD), OCRWM program procedures, and LLNL implementing procedures.

There were five conditions adverse to quality identified during the audit resulting in two Deficiency Reports (DRs) relating to records submittals and document reviews; one Deficiency Identification and Referral (DIR) relating to the annual compliance review of scientific notebooks (SN); and two Quality Observations (QO), which are described in Section 5.5 of this report.

In addition, the effectiveness of corrective actions related to three previously closed DRs were evaluated with satisfactory results. The details are described in paragraph 5.5.5. One recommendation resulting from the audit is documented in Section 6.0 of this report for management's consideration.

## 2.0 SCOPE

Auditors representing the DOE's OCRWM Office of Quality Assurance (OQA) conducted a compliance audit to evaluate LLNL's implementation of the OCRWM QA Program as described in the QARD and applicable implementing procedures at the LLNL facilities. In addition, observers representing the U.S. Nuclear Regulatory Commission (NRC) and Clark County, NV observed the audit.

The audit team, through interviews of cognizant personnel, reviews of documentation, and evaluation of procedures, assessed implementation, adequacy, and effectiveness of LLNL's implementation of the QA program.

In addition, the audit team also reviewed three-closed OCRWM deficiency documents related to LLNL activities to determine the effectiveness of completed corrective actions.

In accordance with the approved audit plan, the following QA Program Sections were evaluated.

1.0	Organization
2.0	Quality Assurance Program
5.0	Implementing Documents
6.0	Document Control
7.0	Control of Purchased Items and Services
12.0	Control of Measuring and Test Equipment
15.0	Nonconformances

16.0	Corrective Action
17.0	Quality Assurance Records
Supplement I	Software
Supplement II	Sample Control
Supplement III	Scientific Investigation
Supplement V	Control of the Electronic Management of Data
Appendix C	Monitored Geologic Repository

The following QA Program Sections were not evaluated, as LLNL is currently not implementing them:

3.0	Design Control
4.0	Procurement Document Control
8.0	Identification and Control of Items
9.0	Control of Special Processes
10.0	Inspection
11.0	Test Control
13.0	Handling, Storage, and Shipping
14.0	Inspection, Test, and Operating Status
18.0	Audits
Supplement IV	Field Surveying
Appendix A	High-Level Waste Form Production
Appendix B	Storage and Transportation

### 3.0 AUDIT TEAM AND OBSERVERS

The following is a list of audit team members and assigned areas of responsibility:

<u>Name/Title/Organization</u>	<u>QA Program Sections</u>
John R. Doyle, Navarro Quality Services (NQS) Las Vegas, NV, Audit Team Leader	1.0, 2.0
James E. Flaherty, NQS, Las Vegas, NV, Auditor	6.0, 12.0, 15.0, SI, SIII,
Christian M. Palay, NQS, Las Vegas, NV, Auditor	17.0, SI, SII
Lester W. Wagner, NQS, Las Vegas, NV, Auditor	2.0, 5.0, 6.0, 7.0, 15.0, 16.0 Appendix C

#### Observers

Kamalakar Naidu, NRC, Rockville, MD  
 Thomas Trbovich, Southwest Research Institute, San Antonio, TX  
 Engelbrecht von Tiesenhausen, Clark County, NV

### 4.0 AUDIT TEAM MEETINGS AND PERSONNEL CONTACTED

The pre-audit meeting was held at LLNL's offices in Livermore, CA on April 15, 2002. Daily debriefings were held to apprise cognizant management and staff of the progress of the audit and any conditions adverse to quality. The audit was concluded with a post-audit meeting held on April 19, 2002, at LLNL's Livermore, CA facility.

Personnel contacted during the audit, including those who attended the pre- and post-audit meetings, are listed in Attachment 1, "Personnel Contacted During the Audit."

## **5.0 SUMMARY OF AUDIT RESULTS**

### **5.1 Program Effectiveness**

Based on the objective evidence and the sample of information reviewed, the audit team concluded that overall, LLNL's implementation of the QA program is adequate and effective. The results for each QA program section evaluated are contained in Attachment 2, "Summary Table of Audit Results."

### **5.2 Stop Work or Immediate Corrective Actions Taken**

There were no stop work orders or immediate corrective actions as a result of the audit.

### **5.3 QA Program Implementation**

Attachment 2, "Summary Table of Audit Results," provides results for each QA program section audited. The details of the audit, including the objective evidence reviewed, are documented in the audit checklist. The checklist is maintained as a QA record.

### **5.4 Technical Audit Activities**

There were no technical activities evaluated during this audit.

### **5.5 Summary of Deficiencies**

There were five conditions adverse to quality identified during the audit resulting in two DRs, two QOs and one DIR.

#### **5.5.1 Corrective Action Reports**

None.

#### **5.5.2 Deficiency Reports**

##### **LLNL(O)-02-D-107**

AP-17.1Q, Revision 2, ICN 2, *Records Source Responsibilities for Inclusionary Records*, Section 5.2 g), requires individual records to be submitted to the Records Processing Center (PRC) within 60 days of their completion and records packages within 60 days of the completion of the

activity. Seven records/records packages for Measuring and Test Equipment (M&TE) Acceptance Reports, and a Self-Assessment were found to have been submitted to the RPC past the required 60-day time frame.

#### **LLNL(O)-02-D-108**

LLNL Quality Procedure 033-QP-3.3 Revision 5, CN3.3-5-3, *Review of Technical Publications*, Section 3.3.5.8 requires an Engineering Assurance Manager (EAM) review and sign off on the Technical Reviewer's Comment Form prior to issuance of a technical publication. A review of said comment form for document URCL-JC-146506 "Microbiologically Facilitated Effects on the Surface Composition of Alloy 22, a Candidate Nuclear Waste Packaging Material" reveals that this publication did not have the required EAM review.

### **5.5.3 Deficiency Identification and Referrals**

#### **DIR 02-08**

AP-SIII.1Q, Revision 1, ICN 1, *Scientific Notebooks*, Section 5.5.2 a), requires that an annual compliance review be performed on active SNs. Contrary to that requirement, SNs LLNL-SCI-460 V1 and LLNL-SCI-SCI-459 have not had their annual review during the required time frame. This adverse condition has been previously identified and referred to open DR BSC-01-D-087.

### **5.5.4 Quality Observations**

#### **LLNL(O)-02-O-010**

Contrary to the requirements of AP-17.1Q, Section 5.2 d), pen and ink corrections to change the effective dates to Quality Control Sample Plans (QCSPs) QCSP/AS-8/801 and QCSP-MIC-001 "Quality Sample Plan for Aqueous Samples" were initialed, but not dated.

#### **LLNL(O)-02-O-011**

Technical implementing Procedure (TIP) TIP-CM -01, Revision 0, *Accounting of Test Specimens for the Long-Term Corrosion Testing*, Section 4.2, requires that post test analysis for corrosion samples be documented in the applicable SN. No objective evidence of post-test analysis for metal specimen DCA 166 was found in SN LLNL-SCI-241 V1 "Long Term Corrosion Studies."

### **5.5.5 Follow-up of Previously Identified Conditions Adverse to Quality**

Three following DRs were evaluated for effectiveness of corrective actions:

#### **LLNL-01-D-048**

This DR documented the adverse condition that long-term specimen identification photographs located in a loose-leaf notebook were not linked to the controlling SN LLNL-SCI-241-V1 as a supplement. Loose-leafed notebooks were identified as supplements and no recurrence of this condition was identified during the audit.

#### **LLNL-01-D-049**

This DR documented the adverse condition concerning sample transfer traceability. No recurrence of such was identified during the audit.

#### **LLNL-01-D-098**

This DR identifies numerous conditions concerning M&TE identification, tagging and documentation. While recurrence of this condition was found during internal LLNL QA Surveillance BSCQA-02-S-17 and documented on DR LLNL (B)-02-D-105, no other recurrences of these conditions were identified during the audit.

## **6.0 RECOMMENDATIONS**

The following recommendation is presented for management for consideration:

During a record copy review of a SN, AP-SIII.1Q computer generated form # ASIII1-1 "Compliance Review Worksheet, it was found that some information on the document was almost obscured by the Automatic forms System (AFS) "See Addendum" text. The AFS system automatically places this statement in the form field when there more text than the field will display. This AFS referral has the potential to obscure some text typed in that field in the record copy of the document. It is recommended that the responsible organization for AP-SIII.1Q enlarge these fields to allow for any "See Addendum" instructions. This item has been entered into to Conditions/Issue Identification and Reporting/Resolution System as #2583.

## **7.0 LIST OF ATTACHMENTS**

Attachment 1 "Personnel Contacted During the Audit"  
Attachment 2 "Summary Table of Audit Results"  
Attachment 3 "Acronyms/Abbreviations"

**ATTACHMENT 1**  
**Personnel Contacted During the Audit**

Name	Organization	Pre-audit Meeting	Contacted During Audit	Post-audit Meeting
Alegre, Barbara	LLNL Records Coordinator		X	X
Barish, Vctor	LLNL Engineering Assurance Manager	X	X	X
Beckman, Donald	BSC Manager, Regulatory Coordinator			X
Bucci, Don	LLNL Data Coordinator	X	X	X
Darnell, Sounia	BSC Technologist	X		
Derby, Shirl	BSC Commitments Management			X
Dorering, Thomas	BSC ESP Project Manager			X
Estill, John	LNNL Deputy Technical Area Lead, Waste Package Material Testing	X	X	X
Carrington, Charles	LLNL Observer			X
Deloach Laura	LLNL Data Qualification Lead		X	
Gebhart, Judith	BSC QA Engineering Science Projects Lead	X		X
Gdowski, Greg	LLNL Principal Investigator Environmental Testing	X		X
Hendrikson, Teri	LLNL Technical Data Coordinator		X	
Kohler, Martha	LLNL Laboratory Lead		X	X
Governor, Marilyn	LLNL Procurement		X	
McCright, Daniel	LLNL/Chief Scientist		X	
Lewis, Chris	BSC Manager, Sample Management Facility		X	
Lin, Wunan	LLNL Technical Area Lead			X
Melczer, M. E.	LLNL Software QA Manager	X	X	X
Mahler, Steve	LLNL EA Engineer		X	X
Palmer, Cynthia	LLNL Deputy Laboratory Lead	X	X	X
Reshel, Tanya	LLNL M&TE Custodian		X	
Skaggs, Kirk	LLNL Technician		X	
Swenning, Steve	BSC Chief Science Office Staff			X
Summers, Tammy	LLNL TAL Waste Package Modeling		X	X
Stanworth, Pamela	LLNL Training Coordinator		X	
Torres, Sharon	LLNL P.I. Metallurgical Testing		X	
Warren, Charlie	BSC QA On-Site Representative	X	X	X
Watson, William	BSC Performance Assessment Deputy Manager	X		X
Williams, Nancy	BSC Manager of Projects			X
Weaver, Jeffery	BSC Performance Assessment			X
Zinkovitz, Fred	BSC/Commitment Management Staff	X	X	

## ATTACHMENT 2 SUMMARY TABLE OF AUDIT RESULTS

QARD Sections	Implementing Documents	Checklist Pages	Deficiencies/ DIRs	QO	REC	Program Adequacy	Procedure Compliance	Overall
1.0	033-YMP-QP 1.0 Rev. 7 033-YMP-QP- 2.0 Rev.3	1-2 3	N/A	N/A	N/A	SAT	SAT	SAT
2.0	AP-2.1Q, Rev.2, ICN 0 AP-2.2Q, Rev1, ICN 0 AP-2.14Q Rev 2 ICN 0 AP-2.19Q, Rev 0, ICN 0 AP-2.20Q Rev. 1 ICN 0* AP-2.21Q Rev. 1 BSCN 1 033-YMP-QP 3.5 Rev. 1 C/N 3.5-1-2	4-5 6-8 9-13 14-16 17-18 19 20-21	N/A	N/A	N/A	SAT	SAT	SAT
5.0	033-YMP-QP-2.1Q Rev. 10 033-YMP-QP 3.3 Rev. 5, CN 3.3-5-3 033-YMP-QP 5.0 Rev.5 CN 2	22-23 24-27 28-31	N/A DR LLNL(O)-02-D-108 N/A		NA	SAT	SAT	SAT
6.0	AP-6.1Q, Rev 6, ICN 4	32	N/A	N/A	N/A	SAT	NI	SAT
7.0	AP-7.7Q, Rev 0, ICN 1	33-36	N/A		N/A	SAT	SAT	SAT
12.0	AP-12.1Q, Rev 0, ICN 2	37-43	N/A	N/A	N/A	SAT	SAT	SAT
15.0	AP-15.2Q, Rev 0, ICN 1 AP-15..3Q Rev. 0	44-46 47	N/A N/A	N/A N/A	N/A N/A	SAT SAT	NI SAT	SAT SAT
16.0	AP-16.1Q, Rev 4, ICN 1	48-50	N/A	N/A	N/A	SAT	SAT	SAT
17.0	AP-17.1Q, Rev 2, ICN 2	51-56	DR LLNL(O)-02-107	QO LLNL(O)--02-O10	REC	SAT	SAT	SAT
Supp. I	AP-SI.1Q, Rev 3, ICN 3	57-64	N/A	N/A	N/A	SAT	SAT	SAT
Supp. II	AP-SII.2Q Rev. 0 YAP-SII.4Q 033-YMP-QP-8.0 CN 8.0 2-4 TIP-CM-01 Rev. 0 CN 1 TIP-CM-02 Rev. 0 TIP-CL-103 Rev. 0 033-YMP-QP 13.0 Rev. 13CN 13.0 1-4 TIP-YM-3 Rev. 1	65 66-67 68-69 70-71 72 73-74 75 76-77	N/A	OQ LLNL(O)-02-O-011	N/A	SAT	SAT	SAT
Supp. III	AP-SIII.1Q, Rev 1, ICN 1 AP-SIII.3Q, Rev. 1 ICN 1 AP-SIII.7Q Rev. 0	78-87 88-92 93-95	DIR 02-8 N/A N/A	N/A	N/A	SAT	SAT	SAT
Supp. V	AP-SV.1Q, Rev 0, ICN 2 033-YMP-QP 3.8 Rev. 1	96-98 99-100	N/A	N/A	N/A	SAT	SAT	SAT
App. C	TIP-AC-10 Rev. 0	101-102	N/A	N/A	N/A	SAT	SAT	SAT

**Legend:** QO = Quality Observation      DIR = Deficiency Identification and Referral      N/A = Not Applicable  
 NI = No Implementation      UNSAT = Unsatisfactory      SAT = Satisfactory

\* AP-2.20Q was found to not be applicable to LLNL during the audit.

### ATTACHMENT 3

#### ACRONYMS/ABBREVIATIONS

BSC	Bechtel SAIC Company, LLC
DIR	Deficiency Identification and Referral
DOE	U.S Department of Energy
DR	Deficiency Report
LLNL	Lawrence Livermore National Laboratory
M&TE	Measuring and Test Equipment
NRC	U.S. Nuclear Regulatory Commission
NQS	Navarro Quality Services
OCRWM	Office of Civilian Radioactive Waste Management
OQA	Office of Quality Assurance
QA	Quality Assurance
QARD	Quality Assurance Requirements and Description
QO	Quality Observation