OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

YUCCA MOUNTAIN QUALITY ASSURANCE DIVISION

QUALITY ASSURANCE SURVEILLANCE REPORT

OF SOFTWARE QUALITY ASSURANCE

SURVEILLANCE NO. YMP-SR-92-018

CONDUCTED JUNE 16 THROUGH 17, 1992

AT LAWRENCE LIVERMORE NATIONAL LABORATORY

LIVERMORE, CALIFORNIA

ACTIVITY SURVEILLED:

IMPLEMENTATION OF THE SOFTWARE QUALITY
ASSURANCE PROCESS FOR COMPLIANCE WITH THE
LAWRENCE LIVERMORE NATIONAL LABORATORY
SOFTWARE QUALITY ASSURANCE PLAN

Prepared by: _____ Date: 06-23-92

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Surveillance Team Leader
Yucca Mountain Quality Assurance Division

Approved by: _____ Date: 6/30/92

Donald G. Horton
Director
Office of Quality Assurance

1.0 EXECUTIVE SUMMARY

The surveillance of the implementation of the software quality assurance (QA) process was conducted to verify compliance to the Lawrence Livermore National Laboratory (LLNL) Yucca Mountain Project Software Quality Assurance Plan (SQAP). Implementation was very limited and as a result, effectiveness of implementation could not be adequately determined. However, there were two conditions adverse to quality identified by the surveillance evaluator. The conditions adverse to quality were related to: 1) the approval of the Software Category Selection (SCS) form and the Individual Software Plan (ISP), and 2) development and maintenance of master logs. Two Corrective Action Requests (CARs) were issued to document the conditions. Specific details of these conditions adverse to quality are provided in Section 5.0 and copies of the CARs are provided in Enclosure 1 of this report.

Recommendations as a result of this surveillance are provided in Section 6.0 of this report.

2.0 SCOPE

This report contains the results of the Office of Civilian Radioactive Waste Management (OCRWM) QA Surveillance No. YMP-SR-92-018 of the implementation of the software QA process. The surveillance was conducted at LLNL, Livermore, California, on June 16 through 17, 1992. The surveillance was conducted by a team from the Yucca Mountain Quality Assurance Division (YMQAD) of the Office of Quality Assurance in accordance with OCRWM Quality Assurance Administrative Procedure QAAP 18.3, Revision 3, "Surveillance Program."

The surveillance was intended to examine implementation of the LLNL Yucca Mountain Project SQAP, Revision 0.

3.0 SURVEILLANCE TEAM

Richard L. Maudlin, QA Specialist, Surveillance Team Leader, Mac Technical Services/YMQAD

4.0   PERSONNEL CONTACTED DURING THE SURVEILLANCE

James A. Blink, Software QA Manager, LLNL
Dale G. Wilder, Technical Area Lead, LLNL
Thomas J. Wolery, Principle Investigator, LLNL
Dean W. Wolfe, QA Manager, LLNL

5.0   SURVEILLANCE RESULTS

The surveillance consisted of documentation reviews and personnel interviews in order
to determine procedural compliance. Due to limited software activities, only one
quality-affecting software activity was selected for review. The activity selected
related to software for Geochemical Modeling and Data Base Development (EQ 3/6,
WBS 1.2.1.4.5). As noted in the May LLNL Monthly Progress Report (1992)
provided to the Yucca Mountain Site Characterization Project Office, and in
discussions with the responsible Principle Investigator (PI), it was indicated that an
update to EQ 3/6 from the current version 7.0 to version 8.0, is in progress.

LLNL's SQAP requires two key prerequisites to be performed prior to the
performance of any changes to existing software. First, an SCS form must be
completed for the existing software and second, an ISP must be developed if the
software is categorized as "Large" and as "Scientific Engineering Software" (SES).
The purpose of the SCS is to categorize and determine the type of software and
provide the justification for category and type selected. The purpose of the ISP is to
provide a plan of software life cycle activities associated with the particular software
application. In a review of the SCS, EQ 3/6 had been categorized as SES, "Large"
and was typed as "Existing." As a result of this classification, an ISP was prepared.
However, it was noted that both of these documents (the SCS and ISP) are in the draft
form and have not been approved prior to the start of work on EQ 3/6. These
conditions are documented in CAR YM-92-048.

The LLNL SQAP requires that a master log be kept for two types of baselines: 1)
Configuration Item Baseline, and 2) Software Product Baseline. Also, a master log is
required to be maintained which will establish traceable records regarding new
versions, new releases, and Level I and II applications. In an interview with the PI,
the LLNL QA Manager and the Software QA Manager, it was found that these logs
do not exist and that the requirements of the SQAP in this area have not been
implemented on a project-wide basis. These conditions have been documented in
CAR YM-92-049.

In discussions with the PI responsible for EQ 3/6, he indicted that this software has been distributed to personnel at LLNL for use. However, the software has not yet been verified and validated. The PI pointed out to the surveillance evaluator that there was a disclaimer which prints out whenever the software is used. This disclaimer clearly states: "LLNL YUCCA MOUNTAIN PROJECT DISCLAIMER...The Lawrence Livermore National Laboratory, a participant in the Yucca Mountain Project, has not determined that this software constitutes "approved code" for the conduct of "quality affecting work" for the Yucca Mountain Project." This action was considered to provide an acceptable flag regarding the use of the software in quality-affecting activities.

Two points should be brought out as a result of the above. First, the conditions adverse to quality identified in this surveillance do not indicate any adverse affect on the software under revision (i.e., EQ 3/6), and second, the review of software QA controls at LLNL was very limited. This area will be assessed in greater detail in the next audit scheduled of LLNL in August 1992.

CARs issued:

YM-92-048	Contrary to the requirements of the LLNL SQAP, the SCS form and the ISP were not approved prior to work being performed on EQ 3/6.
YM-92-049	Contrary to the LLNL SQAP, the requirements for the development and maintenance of the Configuration Management baseline master log and the master log for traceable records have not been implemented to date for the software maintained by LLNL.

See attached information copies of referenced CARs (Enclosure 1).

6.0   RECOMMENDATIONS

The following recommendation is provided as a result of this surveillance. This recommendation is not considered a condition adverse to quality, but is an area in which it is felt that management should evaluate to assure compliance with the software QA program.

Presently, the designated Software QA Manager has been assigned to duties in Las Vegas, Nevada, which appears to impede his responsibilities as Software QA Manager. It is strongly recommended that LLNL management appoint a new Software QA Manager or an alternate that is located at LLNL on a fulltime basis. It is the opinion of the surveillance evaluator, that some of the problems identified as a result of this surveillance, could have been avoided if the Software QA Manager was active at LLNL.

ENCLOSURE 1

ORIGINAL
THIS IS A RED STAMP

OFFICE OF CIVILIAN **RADIOACTIVE WASTE MANAGEMENT** **U.S. DEPARTMENT OF ENERGY** **WASHINGTON, D.C.**		**8** CAR NO.: IM-92-048 DATE: 6/18/92 SHEET: 1 OF 1 QA

CORRECTIVE ACTION REQUEST

1 Controlling Document	2 Related Report No.
LLNL SOFTWARE QA PLAN, R0	YMP-SR-92-018

3 Responsible Organization	4 Discussed With
LLNL	D. WOLFE, T. WOLERY

5 Requirement:

LLNL Sotware Quality Assurance Plan, Subsection 6.3.2 states in part:
"A Software Category Selection form, Appendix C, is required for existing
software. For Large Scientific Engineering Sotware (SES) an Individual
Software Plan is required."

Subsection 6.2.2 states in part: "The individual Software Plan is a
precursor to starting work...."

6 Adverse Condition:

Contrary to the above, work is being performed on EQ 3/6, as noted in the
May LLNL Monthly Report and in discussion with the responsible Principle
Investigator, in the absence of an approved Individual Software Plan (ISP)
and completed Software Category Selection (SCS) form.

NOTE: Both the ISP and the SCS are in the draft form.

9 Does a significant condition adverse to quality exist? Yes___ No_X_ If Yes, Circle One: A B C	10 Does a stop work condition exist? Yes___ No_X_; If Yes - Attach copy of SWO If Yes, Circle One: A B C D	11 Response Due Date: 20 Days from issuance

12 Required Actions: ☒ Remedial ☐ Extent of Deficiency ☐ Preclude Recurrence ☐ Root Cause Determination

13 Recommended Actions:
Prior to continuing activities on EQ 3/6: (1) Formalize and complete the
Software Category Selection form and (2) Review and approve the Individual
Software Plan.

7 Initiator R. L. Maudlin _____ Date 06/18/92	14 Issuance Approved by: QADD Date
15 Response Accepted QAR Date	16 Response Accepted QADD Date
17 Amended Response Accepted QAR Date	18 Amended Response Accepted QADD Date
19 Corrective Actions Verified QAR Date	20 Closure Approved by: QADD Date

REV. 08/91

ENCLOSURE 1
(Continuation)

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT U.S. DEPARTMENT OF ENERGY WASHINGTON, D.C.	CAR NO.: YH-92-049 DATE: 6/18/92 SHEET: 1 OF 1 QA

CORRECTIVE ACTION REQUEST

1 Controlling Document LLNL SOFTWARE QA PLAN, R0	2 Related Report No. YMP-SR-92-018
3 Responsible Organization LLNL	4 Discussed With D. WOLFE, J. BLINK

5 Requirement:

LLNL Software Quality Assurance Plan, Section 4.0 (A) states in part: "Configuration Management establishes two types of baselines....one type of baseline is the Configuration Item Baseline and the other is the Software Product Release Baseline....A Master Log is kept on both baselines."

Subsection 4.3.1 states in part: "MASTER LOG - The Master Log will establish traceable records regarding new versions, new releases and Level I and II applications. The log will contain the following...."

6 Adverse Condition:

Contrary to the above, no evidence could be provided to indicate the implementation of the above requirements. As of this date, neither of the Master Logs have been established for software maintained by LLNL.

9 Does a significant condition adverse to quality exist? Yes___ No X If Yes, Circle One: A B C	10 Does a stop work condition exist? Yes___ No X ; If Yes - Attach copy of SWO If Yes, Circle One: A B C D	11 Response Due Date: 20 Days from issuance

12 Required Actions: ☒ Remedial ☐ Extent of Deficiency ☐ Preclude Recurrence ☐ Root Cause Determination

13 Recommended Actions:
Take actions to prepare and maintain the required Master Logs.

7 Initiator R. L. Maudlin Date 06/18/92	14 Issuance Approved by: QADD Date
15 Response Accepted QAR Date	16 Response Accepted QADD Date
17 Amended Response Accepted QAR Date	18 Amended Response Accepted QADD Date
19 Corrective Actions Verified QAR Date	20 Closure Approved by: QADD Date

REV. 08/91