U. S. NUCLEAR REGULATORY COMMISSION

OBSERVATION AUDIT REPORT NO. 89-4

FOR THE YUCCA MOUNTAIN PROJECT OFFICE

AUDIT NO. 89-6 OF LAWRENCE LIVERMORE NATIONAL LABORATORY

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SUMMARY

The Nuclear Regulatory Commission (NRC) staff concluded that, overall, the U. S. Department of Energy (DOE)/Yucca Mountain Project Office (YMPO) Quality Assurance (QA) Audit No. 89-6 of Lawrence Livermore National Laboratory (LLNL) was meaningful and effective. The audit team was well qualified in the QA and technical disciplines, and their assignments and checklist items were adequately described in the audit plan. The audit's coverage of implementation of the LLNL QA program was limited to review and evaluation of LLNL QA and technical procedures and personnel to understand and determine the acceptability of the LLNL QA and technical programs, including the capabilities of the LLNL QA and technical staff.

The NRC staff agrees in general with the DOE/YMPO audit team findings that LLNL has an acceptable QA program for the areas that were audited, and qualified QA and technical personnel with the exception of the software QA program. LLNL appears to meet the requirements contained in 10 CFR Part 50, Appendix B and the Nevada Nuclear Waste Storage Investigations (NNWSI) Project Quality Assurance Plan, NNWSI 88-9, Revision 2 (88-9 QA Plan) with the exception of the LLNL software QA program, which is currently under development and review. The NRC staff will observe future DOE/YMPO audits and surveillances to determine if LLNL is continuing to implement its QA program in an acceptable manner.

1.0 INTRODUCTION

From June 5 through 9, 1989, members of the NRC staff participated as observers in DOE/YMPO QA Audit No. 89-6 of LLNL conducted in Livermore, California. This audit covered only limited implementation of the QA program elements concerning technical products (i.e., technical procedures) since LLNL had not performed much technical work under the QA program for licensing related activities.

Lawrence Livermore National Laboratory is responsible for the development of the waste package for emplacement in tuff, which includes the definition of the package environment, material development and testing, package design, performance analysis, and testing; and provides assistance to other NNWSI Project participants in areas of specialized expertise.

This report addresses the adequacy of the DOE/YMPO audit and, to a lesser extent, the LLNL QA program.

2.0 OBJECTIVES

The objective of the DOE/YMPO audit was to determine the effectiveness of the LLNL QA program in meeting the applicable requirements of the 88-9 QA Plan for the YMPO. The NRC staff's objective was to gain confidence that DOE and its contractors are properly implementing the requirements of their QA programs by evaluating the effectiveness of the DOE/YMPO audit and determining whether the LLNL QA program is in accordance with the requirements of the 88-9 QA Plan and 10 CFR Part 50, Appendix B.

3.0 AUDIT PARTICIPANTS

3.1 NRC

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Bruce Mabrito	Observer (Center for Nuclear Waste Regulatory Analyses)

3.2 DOE

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Arthur W. Spooner	Surveillant	DOE HQ (Weston)
Michael Valentine	Observer	YMPO

3.3 State of Nevada

Susan W. Zimmerman	Observer	

4.0 REVIEW OF THE AUDIT AND AUDITED ORGANIZATION

The NRC staff evaluated the effectiveness of the audit team and the audit of LLNL and, to a lesser extent, acceptability of the LLNL QA program. The NRC staff evaluations are based on direct observations of the auditors, discussions with members of the audit team, and review of the audit plan, checklists, background material, and the LLNL technical and QA programs. The DOE audit was conducted in accordance with procedures WMPO QMP 18-01, "Audit System for the Waste Mangement Project Office", Revision 3, and WMPO QMP 16-03, "Standard Deficiency Reporting System," Revision 0.

NRC staff observations are classified in accordance with the following guidelines:

(a) Level 1

Failure of the audit team to independently identify either:

- Flaws in completed and accepted work important to safety or waste isolation which renders the work unuseable for its intended purpose. Denotes failure of the QA program to verify quality, or
- A breakdown in the QA program resulting in multiple examples of the same or similar significant deficiencies over an extended period of time in more than one work activity (technical area), or
- Multiple deficiencies of the same or similar significant deficiencies in a single work activity (technical area).

Failure of the audit team to adequately assess a significant area of the QA program or its implementation, such as technical products, applicable 10 CFR Part 50, Appendix B criteria, or quality level classifications, without prior justification, such that the overall effectiveness of the QA program being audited is made indeterminate.

(b) Level 2

Failure of the audit team to independently identify an isolated significant deficiency.

(c) Level 3

Failure of the audit team to independently identify deficiencies that have minor significance, or failure of the audit team to follow applicable audit procedures.

Level 1, 2 and 3 NRC staff observations require a written response from DOE to be resolved.

The NRC staff findings may also include weaknesses (actions or items which are not deficiencies but could be improved), good practices (actions or items which enhance the QA program) and requests for information required to determine if an action or item is deficient. Written responses to weaknesses identified by the NRC staff will be requested when appropriate. In general, weaknesses and items related to requests for information will be examined by the NRC staff in future audits or surveillances.

4.1 Scope of Audit

(a) Programmatic Elements - The QA portion of the audit utilized checklists based on the requirements in the 88-9 QA Plan and the LLNL Quality Assurance Program Plan (QAPP), 033-YMP-R, Revision 0, December 15, 1988. The checklists covered the QA program controls for all eighteen elements listed below:

1.0 Organization
2.0 Quality Assurance Program
3.0 Scientific Investigation Control and Design Control
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
9.0 Control of Processes
10.0 Inspection
11.0 Test Control
12.0 Control of Measuring and Test Equipment
13.0 Handling, Shipping, and Storage
14.0 Inspection, Test, and Operating Status
15.0 Control of Nonconforming Items
16.0 Corrective Action
17.0 Quality Assurance Records
18.0 Audits

The scope of the audit is acceptable in that it covered all the 10 CFR Part 50, Appendix B criteria for which LLNL has responsibility. These programmatic elements were found acceptable by the NRC staff in their review of the LLNL QAPP (ref. Linehan/Stein letter dated June 19, 1989).

(b) Technical Areas - The October 1988 DOE/YMPO QA audit of the LLNL QA program (see NRC Observation Audit Report dated November 25, 1988) resulted in 21 Standard Deficiency Reports (SDRs) and the conclusion by the audit team that the LLNL QA program would not support QA Level 1 activities. After the October 1988 audit, LLNL suspended most technical work, including all QA Level 1 and Level 2 work, and concentrated on correcting their QA program deficiencies. A limited amount of QA Level 3 technical work has been accomplished in some technical areas since the October 1988 audit.

The YMPO Audit Plan provided to the NRC prior to the start of the audit stated that "No technical work has been identified which is currently in progress." The audit team technical specialists were instructed to review the following personnel and procedural-type elements common to all the technical (subject) areas:

- Technical qualifications of LLNL design/scientific investigation personnel (technical staff); and
- LLNL technical staff understanding of the design/scientific investigation process; and
- LLNL procedural adequacy from a technical standpoint; and
- LLNL technical staff understanding of technical procedures; and
- LLNL technical staff understanding of QA program requirements.

The audit plan included the requirement to determine whether LLNL had taken effective corrective actions to resolve discrepancies identified during previous DOE audits and surveillances.

4.2 Timing of the Audit

The NRC staff believes the timing of the QA audit was appropriate. LLNL had made a number of improvements in their QA program in the last six months, and even though implementation was limited, it was beneficial to assess the adequacy of the improvements to date.

4.3 Examination of Technical Products

The audit team technical specialists reviewed, to varying degrees, the technical areas listed below. The reviews consisted mainly of interviews with LLNL technical personnel, due to the limited quantity of technical work products available for review.

- Engineered Barrier Design Tests;
- Waste Package;
- Waste Package Environment Experiment;
- Borehole Stability;
- Waste Package Performance Assessment;
- Hydrology;
- EQ 3/6 Code Development;
- Measurement and Test Equipment Calibration; and
- Geochemistry.

The NRC staff observed portions of the reviews performed by the audit team technical specialists in the following areas:

(a) Qualifications of Technical Personnel

The audit team technical specialists checked training folders and objective evidence with the LLNL Training Coordinator in the Training Records office. Not less than 17 LLNL personnel folders were carefully reviewed in detail by the technical specialists. Questions were asked of the records maintenance personnel by the technical specialists; the LLNL Training Coordinator was especially knowledgeable in responding to the auditors' questions.

The technical specialists performed a very thorough and comprehensive review, followed their checklist, and were persistent in obtaining and reviewing considerable objective evidence to verify implementation of the LLNL QAPP requirements.

In addition to this specific review of technical qualifications, the audit team technical specialists also reviewed and evaluated the qualifications of LLNL technical staff during audit interviews with technical staff in various technical areas.

(b) Waste Package Performance Assessment

The technical specialists questioned LLNL personnel on the progress of the software program, ascertained the status of the User's Manual, and discussed work in progress. The subject of "Uncertainty Analysis" was covered, along with training of personnel, and the YMPO audit checklist was utilized throughout the audit interview process.

The audit team technical specialists asked appropriate questions, were professional in their approach, and were knowledgeable in the subject matter.

(c) EQ 3/6 Code Development (Geochemistry Modeling)

The technical specialists met with LLNL technical staff to question them regarding development of the EQ 3/6 Code. The LLNL personnel were asked to answer the auditors' questions, which came directly from the audit checklist. The technical specialists took the responses and recorded the answers on the checklist. Due to the product and stage of development, this interview process was utilized and was found to be satisfactory by the NRC observers.

The technical specialists exercised their portion of the audit in a professional and comprehensive manner, adequately covering the checklist items and following up with questions where required.

(d) Hydrology/Engineered Barrier Design Tests

The technical specialists interviewed LLNL technical staff to determine the current status of the work, including Hydrology and Engineered Barrier tests. It was determined that the activity plan

for the work has not yet been developed and this is consistent with the LLNL schedule. The activity plan is a detailed planning document which is approved by the appropriate, cognizant personnel. The vertical Prototype Test activity plan was in "early draft form." A detailed discussion on how LLNL project scientific notebooks were utilized and controlled took place.

The LLNL technical personnel working in this area are presently performing QA Level 3 activities; however, where appropriate they are working in accordance with QA Level 1 requirements, to gain experience and evaluate the applicable procedures. This includes the use of scientific notebooks for all work, although it is not a requirement for QA Level 3 work. The NRC staff considers this LLNL initiative to be a good practice which should be evaluated for adoption by other DOE contractors.

The technical specialists asked questions in addition to those on the audit checklist and they were able to obtain appropriate technical information from the interviewees. The technical specialists performed a thorough and comprehensive audit and were persistent in obtaining the objective evidence which was available to verify progress.

(e) Waste Package

The DOE technical specialists interviewed LLNL technical personnel to discuss activities related to the waste package, including container material selection, container fabrication and testing, container cover closure and radioisotope release rates. The technical specialists used their prepared checklist as the bases for interviews; no technical procedures or work products had been produced under the current QA program controls.

The technical specialists performed a thorough and comprehensive audit. Efforts were made to determine if discrepancies found to exist in one technical area (discipline) were present in other technical areas.

The LLNL technical personnel appeared knowledgeable in their technical areas of responsibility, and aware of the QA program requirements affecting their activities.

In general, the technical portion of the audit was well performed. The technical specialists were qualified and adequately trained as auditors. The technical checklists were adequately prepared, and the questions pertained to important technical design issues. Specific questions were asked focusing on the design items important for site characterization or waste isolation. The technical checklists had not been adjusted for the lack of QA Level 1 technical work done to date, so many items were not applicable (N/A).

The only QA Level 1 work accomplished in LLNL's area of responsibility since the October 1988 DOE/YMPO QA audit was done by LLNL subcontractors, whose QA programs were accepted for Level 1 work based upon their

experience with 10 CFR Part 50 Appendix B. LLNL has instituted a "readiness review" program which precludes any QA Level 1 or Level 2 activities by LLNL until appropriate procedures for the activities are approved and in place.

4.4 Examination of Programmatic Elements

The NRC staff observed the DOE audit team's evaluation of selected programmatic elements of the LLNL QAPP.

(a) Organization and Quality Assurance Program

The DOE auditors utilized the published audit checklists and were thorough in reviewing objective evidence presented. The auditors utilized in-depth questioning and interviewed the LLNL-YMP Manager of Quality Assurance at length on all Standard Quality Requirement Audit Guidelines. The auditors went beyond the audit checklists in certain areas to ensure LLNL activities (organization & assurance sections) met the intent of the LLNL QAPP. The area of training was extensively investigated.

A majority of the LLNL QA personnel are contract employees (Kaiser Engineers) who have substantial experience in QA. While this experience has strengthened the LLNL QA organization, it may take some time for the knowledge to be transferred to LLNL permanent employees.

LLNL has assigned personnel experienced in QA, who were part of the project QA organization, to various technical groups. These people will assist the LLNL technical personnel in understanding and implementing the LLNL QA program. The NRC staff considers this to be a good practice which should enhance the effective implementation of the LLNL QA program.

The auditors performed a thorough and comprehensive audit, following the checklists, and the auditors were presistent in obtaining objective evidence to verify implementation of the QAPP requirements.

(b) Scientific Investigation Control and Design Control

The DOE auditors used a checklist containing 27 questions developed from the requirements in the 88-9 QA Plan and the LLNL implementing procedures. The implementation of the program was limited, however, and the auditors were unable to investigate every area on the checklist. Nevertheless, the auditors did examine available documentation which included the following:

- Scientific Investigation Plans which were prepared in 1986 and 1987;
- Draft Scientific Investigation Plan ("YMP Spent Fuel Waste Form Testing" dated May 31, 1989);
- Draft Study Plan ("Mechanical Attributes of the Waste Package Environment" dated June 2, 1989);

- Draft LLNL Yucca Mountain Project Software Quality Assurance Plan dated May 30, 1989;
- Activity Plan "Establishment of Selection Criteria: Activity E-20-15 of the Scientific Investigation Plan 'Metal Barrier Selection and Testing'; WBS# 1.2.2.3.2" dated May 31, 1989;
- Activity Plan for Babcock and Wilcox Container Fabrication Process Development dated May 20, 1989; and
- Activity Plan for Babcock and Wilcox Container Closure Process Development dated May 20, 1989.

The auditors verified that the applicable requirements in the checklist were fulfilled in these documents. Because most of the documents were either drafts or several years old, the auditors termed the implementation of the program "indeterminate" at this time. In addition, many of the checklist questions could not be answered because no applicable work had been performed, such as surveillances, change control to plans, etc. Nevertheless, the limited implementation which was audited does provide some confidence that the program can be implemented successfully.

The audit was performed adequately. One weakness observed by the NRC staff, however, was the limited coordination between the programmatic auditors and the technical specialist team members. Technical specialists on the audit team had examined in parallel several of the above documents, but there was limited interaction between the technical specialists and the auditors. Further discussions between the auditors examining the process and the technical specialists examining products, for example in the audit team meetings, would have improved the conduct of the audit. After this concern was brought to the auditors' attention, additional coordination did occur.

(c) Instructions, Procedures, Plans and Drawings

The NRC staff observed a portion of this DOE evaluation. This programmatic element of the QAPP requires that activities affecting quality be performed in accordance with instructions, procedures, plans or drawings appropriate to the circumstances. The auditor used a checklist which contained general requirements from the LLNL QAPP and specific LLNL requirements extracted from the QA implementing procedures. The checklist questions were adequate to audit this criterion. The auditor examined the following documents to determine if LLNL was meeting the requirements:

- "Plan for Waste Package Design, Fabrication, and Prototype Testing" dated February 1988;
- "Yucca Mountain Project Activity Plan for Babcock and Wilcox Container Fabrication Process Development" dated May 20, 1989 (draft); and
- Technical procedure ARC-TP-760, "Fabrication and Testing of NNWSI Nuclear Waste Container Mock-Ups" dated July 28, 1988.

Based on the review of the above documents, the auditors determined that this portion of the program was satisfactory. The auditors examined only programmatic (i.e., non-science or engineering) areas and did not reach this conclusion in consultation with the technical specialists on the team, who were simultaneously examining similar technical products for their technical adequacy. The NRC staff considers this to be a weakness similar to that identified under 4.4 (b) above which should be improved in future DOE audits. The NRC staff considers that both "process" (i.e., programmatic areas) and "product" (i.e., technical areas) need to be examined to make a determination of the adequacy of a QA program.

(d) Control of Measuring and Test Equipment

LLNL uses two calibration facilities, one for mechanical equipment and the other for electrical. The NRC staff focused on the mechanical activities. For this portion of the review, the DOE auditor examined the LLNL Quality Assurance Requirements Specification 001D Rev. 1, provided to the Mechanical Calibration Lab by the Yucca Mountain Project Organization in LLNL. The Mechnical Calibration Lab developed a QA Plan to meet this specification (the Electronic Services Group developed a similar document entitled "Electronic Services Group Calibration and Certification Manual" for its work). The auditor compared the requirements specification with the plans developed to meet them and evaluated their adequacy.

To evaluate the implementation of the mechanical equipment calibration QA Plan, the auditors prepared two checklist questions based on requirements extracted from the 88-9 QA Plan and the LLNL implementing procedures. A number of areas to be examined were then added based upon the auditors' experience. The Yucca Mountain Project master list of equipment was examined and several discrepancies were identified which were shown to the LLNL personnel. The only equipment that was calibrated at this time, due to the limited work on the project, were several Type K thermocouples. The auditor reviewed the procedure used to calibrate these thermocouples and examined them in the lab to ensure that they were properly identified.

The auditors also interviewed LLNL personnel at length on the MT&E program, questioning them about vendors used for outside services, calibration techniques for different equipment, the parameters measured by LLNL for the Yucca Mountain Project, and other areas. The auditors had considerable experience working in the calibration and test equipment area, which was used in the evaluation of the LLNL MT&E program.

Based on the above, the DOE auditor performed an adequate evaluation of the MT&E program at LLNL. The program's administrative plans and procedures are being put into place, and implementation is just beginning and will need to be evaluated in the future.

(e) Audits

The DOE auditors used their audit checklist as the basis for reviewing LLNL internal audit and surveillance reports and for discussions with LLNL QA organization personnel. Among the documents reviewed by the auditors were:

- Records of LLNL QA auditor qualifications;
- Schedule for internal and external (subsuppliers) audits;
- Monthly Status Report covering open SDRs;
- Surveillance Reports S89-01, S89-05, S89-09, S89-11 and S89-14; and
- Audit Reports 89-03, 89-05 and 89-06.

The DOE auditors discussed details of the documents reviewed with LLNL QA personnel, checked the status of corrective actions and plans for future surveillances and audits. The NRC staff considers the audit in this area to be thorough and professional in nature, emphasizing the use of objective evidence to support statements made by LLNL QA personnel.

The LLNL program of audits and surveillances, as represented by the sample observed during this audit, appears to be well planned and implemented and generally effective.

(f) Miscellaneous Programmatic Items

- The NRC staff also questioned the audit team about the quality level classification of prototype testing in G-tunnel at the Nevada Test Site, which is now classified as Level III, i.e., it is not considered to be important to waste isolation or a part of site characterization. It is not clear that a Level III classification is appropriate. If this testing is to be relied on to prove the validity of the test methods in licensing (as opposed to just the feasibility of the techniques), then a Level I classification may be appropriate. In its response to this audit observation report, DOE should provide a justification for the Level III classification of these tests, or indicate that they are being upgraded.

- A weakness noted by the NRC staff was that the DOE procedure for conducting audits does not explicitly state that previously NRC or State of Nevada audit observation reports from previous audits will be reviewed to help determine the scope of future audits. The staff recommends that these reports be added to the list of documents to be reviewed for upcoming audits to ensure that all previously identified concerns are covered in the audit.

- Another area of concern was identified by the NRC staff which was outside the scope of the audit and therefore does not reflect on the adequacy of the audit. LLNL considers that all or most of its laboratory investigations of the waste package

are not "site characterization" activities and therefore do not need to be conducted using study plans. Instead, scientific investigation plans will be used, which are required to contain less information than study plans and are not required to be submitted for formal staff review. In addition, LLNL has developed a new document in the hierarchy of documents called an "activity plan", which falls between the study plans or scientific investigation plans and detailed technical implementing procedures in the hierarchy of documents. The purpose of the activity plan is to give the investigators greater flexibility in their research.

The NRC staff's concern with the above approach is that the NRC review information requirements, which were agreed to in the "SCP Level of Detail" meeting in May 1986, may not be satisfied if activity plans and scientific investigation plans are not submitted for NRC staff review. This concern should be addressed in a separate response from DOE. It is not an observation on the practices of the audit team.

- In general LLNL administrative procedures do not appear to require that resolution of internal review comments on technical procedures be documented, unless they are accepted and incorporated in the procedures. The persons making the comments may not be aware of the resolution or lack of resolution of their comments, and the comments could be lost. The procedures for this process could be strengthened by adding requirements for final resolution and documentation of all internal review comments.

- The interchange of information between LLNL technical groups does not appear to be generally directed or controlled by procedures, and may be verbal, informal and undocumented. A more formal system would give additional confidence that important safety information is exchanged and provide a historical record of this exchange for future reference.

- LLNL has completed a draft Peer Review Report on selection criteria for container materials. Based on NRC staff inquiries, it appears that while YMPO is actively involved in the LLNL peer review process, YMPO does not intend to provide information to the NRC concerning their peer review process. This decision may be imprudent if the process is eventually needed to develop data required for licensing.

4.5 Conduct of Audit

The overall conduct of the QA and technical portions of the LLNL audit was effective and productive. The audit team was well prepared and demonstrated a sound knowledge of the QA and technical aspects of the LLNL program. The audit checklists included the important QA controls addressed in the 88-9 QA Plan that are applicable to LLNL (see Section 4.1.1). The audit team used the comprehensive checklists effectively during the interviews with LLNL personnel. In general, the team was persistent in their interviews, challenging certain LLNL responses when necessary.

4.6 Qualification of Auditors

The qualifications of the QA auditors on the team were previously accepted by the NRC staff (ref. NRC Observation Audit Report for USGS dated August 22, 1988) or were acceptable based on QMP-02-02, the DOE procedure for qualifying auditors.

4.7 Audit Team Preparation

The QA and technical auditors were well prepared in the areas they were assigned to audit and knowledgeable in the LLNL QAPP and implementing procedures. Audit Plan 89-6 overall was complete and included: (1) the audit scope, (2) a list of audit team personnel and observers; (3) a list of all the audit activities; (4) the audit notification letter; (5) the LLNL QAPP, and past audit report; and (6) the QA and technical checklists.

4.8 Audit Team Independence

The audit team members did not have prior responsibility for performing the activities they investigated. Members of the team appeared to have sufficient independence to carry out their assigned functions in a correct manner without adverse pressure or influence from LLNL personnel.

4.9 Review of Previous Audit Findings

The NRC staff reviewed the status of the SDRs and NRC and State of Nevada observations resulting from the October 24 through 28, 1989 audit of LLNL.

(a) DOE/YMPO - Identified SDRs

The previous audit identified 21 SDRs and resulted in LLNL imposing a stop-work on technical activities required to be performed under a 10 CFR Part 50 Appendix B QA program. All but five of these SDRs have been closed as a result of LLNL corrective actions as verified by DOE surveillances. The five remaining SDRs, 038, 090, 242, 246 and 247 are essentially resolved, and closure is waiting on verification of the effectiveness of the corrective actions.

(b) NRC Staff Findings

The NRC staff reviewed the NRC Audit Observation Report resulting from the previous audit. The NRC staff did not identify in this report any findings separate from the deficiencies and observations identified by the DOE audit team. The five findings highlighted in the transmittal letter for the Audit Observation Report were designated as SDRs by DOE/YMPO and have been/are being resolved.

(c) State of Nevada Observations

The NRC staff reviewed the State of Nevada observations resulting from the previous audit (memorandum from S. Zimmerman to Distribution, 12/1/88), and discussed these observations with the

State of Nevada observer. The concerns expressed by these observations appear to have been resolved to the extent possible prior to further implementation of the LLNL QA program and future DOE/YMPO audits of LLNL technical work products.

4.10 Summary of NRC Staff Findings

(a) Observations - No NRC staff observations relating to audit team deficiencies or audited organization deficiencies were identified.

(b) Weaknesses

- The DOE audit team members need additional training in coordinating the results of technical specialist and auditor findings in related areas. Improved coordination would enhance the ability of the audit team to evaluate the overall effectiveness of the audited organization QA program. (Sections 4.4(b) and (c))

- The DOE audit procedure(s) should be modified to explicitly require that previous NRC and State of Nevada observations be reviewed to determine the scope of the audit. (Section 4.4(f))

- LLNL administrative procedures do not require that internal review comments on technical procedures be documented unless they are accepted and incorporated in the procedures. The persons making the comments may not be aware of the resolution or lack of resolution of their comments, and the comments could be lost. The internal review procedures for this process appears to be questionable. (Section 4.4(f))

- The interchange of information between LLNL technical groups is not generally directed or controlled by procedures, and may be verbal, informal and undocumented. A more formal system might ensure that important, safety significant information is exchanged and a historical record of this exchange is maintained for future reference. (Section 4.4(f))

- LLNL has completed a draft Peer Review Report on selection criteria for container materials. Based on NRC staff inquiries, it appears that YMPO has not made provisions to provide information to the NRC concerning the details of the peer review process. This oversight may be imprudent if the process is eventually needed to develop data required for licensing. (Section 4.4(f))

(c) Good Practices

- The use of scientific notebooks for all appropriate work (including QA Level 3) should be evaluated for adoption by other DOE contractors. The NRC understands that LLNL has issued a letter to implement this practice for all YMPO activities. (Section 4.3(d))

- LLNL has assigned personnel experienced in QA to various technical groups to assist in the implementation of the QA program. (Section 4.4 (a))

(d) Requests for Information

- DOE should provide a justification for the QA Level 3 classification of prototype testing in G-tunnel, or indicate that the classification is being upgraded. (Section 4.4 (f)).

- DOE should clarify the use of scientific investigation plans and activity plans for work performed under a 10 CFR Part 50 Appendix B QA program. (Section 4.4.(f))

4.11 Summary - DOE/YMPO Audit Team Findings

The preliminary finding of the audit team is that the LLNL QA and technical organizations and programs appear to be adequate to support QA Level 1 and Level 2 activities, with the exception of those activities which are affected by the LLNL software QA program (Note: prior to the audit it was understood by LLNL and YMPO that the LLNL software QA program is presently under review by YMPO).

During the course of the audit, the audit team identified two preliminary SDRs pertaining to the LLNL QA program and two preliminary SDRs pertaining to the YMPO QA program.

(a) LLNL: AM CAR-001 was not sent to SAIC/T&MSS upon initiation as required by NNWSI QAP 88-9. This deficiency was corrected during the audit.

(b) LLNL: Instruments were sent to a calibration facility that had not been audited or otherwise evaluated for QA Level 1 work; however, the instruments have only been used for QA Level 3 work.

(c) YMPO: LLNL documents which should have been sent to YMPO were held based on verbal, not written, instructions from YMPO.

(d) YMPO: Long term sample retention has not been defined by YMPO.

These are preliminary findings which will be further evaluated by the audit team and the YMPO prior to becoming final. The SDR's and observations are not considered serious enough by the NRC staff to render the LLNL QA program unacceptable.

5.0 CONCLUSIONS

The DOE/YMPO QA audit team members were well qualified in the QA and technical disciplines and performed in an meaningful and effective manner. The audit checklists were of sufficient depth both in the QA and technical areas. The review and evaluation of LLNL QA program was sufficient to enable audit team members and NRC staff to gain an understanding of the acceptability of the QA and technical programs and the qualifications and acceptability of the QA and technical staff. The NRC staff is in general agreement with the preliminary audit team evaluation that the QA and technical procedures and personnel, with the exception of the QA software program, are acceptable. The NRC staff will observe future DOE/YMPO QA audits or surveillances to determine if LLNL is continuing to implement its QA program in an acceptable manner.