



Department of Energy
Washington, DC 20585

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OCT 18 1994

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OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT (OCRWM)
QUALITY ASSURANCE (QA) AUDIT YMP-94-10 OF LAWRENCE LIVERMORE
NATIONAL LABORATORY (LLNL) SUPPORT OF THE YUCCA MOUNTAIN SITE
CHARACTERIZATION PROJECT (SCPB: N/A)

Enclosed is the report of OCRWM QA Audit YMP-94-10. The audit was conducted by the Yucca Mountain Quality Assurance Division of the Office of Quality Assurance (OQA) in Livermore, California, September 19-23, 1994.

During the course of the audit, the audit team generated one OCRWM Corrective Action Request (CAR). Response to the CAR (which was transmitted via separate letter) is due by the date indicated in Block 13 of the CAR. A response to this audit report and any documented recommendations is not required.

The audit is considered completed and closed as of the date of this letter; however, the open CAR will continue to be tracked until it has been closed to the satisfaction of the QA representative and the Director, OQA.

If you have any questions, please contact either Mario R. Diaz at (702) 794-7974 or Thomas E. Rodgers at (702) 794-7727.

Donald G. Horton, Director
Office of Quality Assurance

OQA:MRD-317

Enclosure:
Audit Report YMP-94-10

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

AUDIT REPORT

OF

LAWRENCE LIVERMORE NATIONAL LABORATORY
LIVERMORE, CALIFORNIA

AUDIT YMP-94-10
SEPTEMBER 19-23, 1994

Prepared by: Thomas E. Rodgers Date: 10/14/94
Thomas E. Rodgers
Audit Team Leader
Yucca Mountain Quality Assurance Division

Approved by: R.C. Science For Date: 10/18/94
Donald G. Horton
Director
Office of Quality Assurance

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ENCLOSURE

1.0 EXECUTIVE SUMMARY

As a result of Quality Assurance (QA) Audit YMP-94-10, the audit team determined that Lawrence Livermore National Laboratory (LLNL) is satisfactorily implementing an effective QA program in accordance with the U. S. Department of Energy (DOE) Office of Civilian Radioactive Waste Management (OCRWM) Quality Assurance Requirements and Description (QARD), DOE/RW-0333P, Revision 1, and LLNL implementing procedures for QA Program Elements 1.0, 2.0, 4.0, 5.0, 6.0, 7.0, 12.0, 13.0, 16.0, 17.0, 18.0 and Supplements I, II, and III. There was no implementation of QA Program Element 15.0 due to lack of activity in that area.

The audit team identified nine deficiencies during the audit that resulted in the issuance of one Corrective Action Request (CAR). CAR YM-94-102 concerned the incomplete documentation of Management Assessment 93-01 as described in Section 5.5.1 of this report. The remaining deficiencies were corrected prior to the postaudit meeting as described in Section 5.5.2 of this report. There were 13 recommendations resulting from the audit, as described in Section 6.0 of this report.

2.0 SCOPE

The audit was conducted to evaluate the adequacy of, the compliance to, and the effectiveness of the LLNL QA Program as described in the QARD and the LLNL implementing procedures.

The QA program elements/requirements evaluated during the audit, in accordance with the approved audit plan, are as follows:

QA PROGRAM ELEMENTS

- 1.0 Organization
- 2.0 Quality Assurance Program
- 4.0 Procurement Document Control
- 5.0 Implementing Documents
- 6.0 Document Control
- 7.0 Control of Purchased Items and Services
- 12.0 Control of Measuring and Test Equipment
- 13.0 Handling, Storage, and Shipping
- 15.0 Control of Nonconforming Items
- 16.0 Corrective Action
- 17.0 Quality Assurance Records
- 18.0 Audits
- Supplement I Software
- Supplement II Sample Control
- Supplement III Scientific Investigation

The following QA program elements/requirements were not reviewed during the audit because LLNL has no activity for which these elements apply:

- 3.0 Design Control
- 8.0 Identification and Control of Items
- 9.0 Control of Special Processes
- 10.0 Inspection
- 11.0 Test Control
- 14.0 Inspection, Test and Operating Status
- Supplement IV Field Surveying
- Appendix A High Level Radioactive Waste Form Production
- Appendix B Transportation
- Appendix C Mined Geologic Disposal System

TECHNICAL AREAS

The technical scope of the audit included the following areas, in accordance with the approved audit plan:

Work Breakdown Structure (WBS) No.

- 1.2.2.3.1.1, Oven Dry Bath Oxidation
- 1.2.2.3.1.1, Spent Fuel/UO₂ Flow Thru Saturated Dissolution Testing
- 1.2.2.3.1.2, High Level Waste (HLW) Glass Unsaturated Testing

3.0 AUDIT TEAM AND OBSERVERS

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

<u>Name/Title</u>	<u>QA Program Element/Requirement</u>
Thomas E. Rodgers, Audit Team Leader (ATL), Yucca Mountain Quality Assurance Division (YMQAD)	2.0 (partial), 18.0
Cynthia A. Humphries, ATL-in-Training, YMQAD	
Amelia I. Arceo, Auditor, YMQAD	15.0, 16.0, 17.0
Sandra D. Bates, Auditor, YMQAD	2.0 (partial)
Vance A. Cannaday, Auditor, Headquarters Quality Assurance Division (HQAD)	Supplement I
Mario R. Diaz, Auditor, YMQAD	1.0, 4.0, 7.0
John A. Gray, Auditor, YMQAD	5.0, 6.0
F. Hugh Lentz, Auditor, HQAD	12.0, 13.0, Supplements II and III
Thomas J. Higgins, Lead Technical Specialist, YMQAD	

J. Kevin McCoy, Technical Specialist, Management and Operating (M&O) Contractor
John G. Spraul, Observer,
U.S. Nuclear Regulatory Commission (NRC)
Bruce E. Mabrito, Observer, NRC

WBS No. 1.2.2.3.1.1 (Parts 1
and 2) and 1.2.2.3.1.2

4.0 AUDIT MEETINGS AND PERSONNEL CONTACTED

The preaudit meeting was held at the LLNL offices in Livermore, California on September 19, 1994. Briefing and coordination meetings were held with the LLNL management and staff on a daily basis. Audit team meetings were also held daily to discuss issues and potential deficiencies. The audit was concluded with a postaudit meeting held at the LLNL offices on September 23, 1994. A list of personnel contacted during the audit is found in Attachment 1 of this report. The list includes those who attended the preaudit and postaudit meetings.

5.0 SUMMARY OF AUDIT RESULTS

5.1 Program Effectiveness

The audit team concluded that, in general, the LLNL QA Program is adequate and is being satisfactorily implemented for the scope of this audit. Individually, QA Program Elements 1.0, 2.0, 4.0, 5.0, 6.0, 7.0, 12.0, 13.0, 16.0, 17.0, 18.0, and Supplements I, II, and III are satisfactorily implemented. No implementation of QA Program Element 15.0 could be identified due to lack of activity.

5.2 Stop Work or Immediate Corrective Actions Taken

There were no Stop Work Orders, immediate corrective actions or related additional items resulting from this audit.

5.3 QA Program Audit Activities

A summary table of audit results is provided in Attachment 2. The details of the audit evaluation, along with objective evidence reviewed, are contained within the audit checklists. The checklists are kept and maintained as QA Records.

5.4 Technical Audit Activities

The three activities below were covered by the technical evaluation under WBS 1.2.2.3.1.1 and 1.2.2.3.1.2:

WBS 1.2.2.3.1.1: Oven Dry Bath Oxidation

LLNL provides technical management of spent fuel oxidation experiments conducted at the Pacific Northwest Laboratories (PNL) in Richland, Washington. Increased oxidation yields uranium-oxygen compounds that are more mobile in the environment. The goal of this study is to identify the time-temperature domains that lead to enhanced mobility.

The test materials are a well-characterized sample of fuel from the Turkey Point Nuclear Power Plant and a selection of fuels designated ATM-104, -105, and -106 by Battelle's Materials Characterization Center. The test strategy is straight forward. Samples are maintained at an elevated temperature in a dry, oxygen-rich environment. Periodically, sample mass is measured and any increase is attributed to oxidation of the fuel. From this increase with time, and the standard assumption of stoichiometry, the changing chemical composition can be inferred as the test progresses. When a sample's test schedule has been completed, direct examination by an electron microscope and by x-ray diffraction will then be possible.

Boiling and pressurized water reactors are the source of the spent fuels that are candidates for geologic disposal. These fuels exhibit a broad range of variation in burnup and gaseous fission product release that is somewhat broader than that of the test samples. However, test results thus far indicate that there is no strong dependence of oxidation on burnup, gaseous fission product release, or reactor type of origin and so the sample set may well be representative.

LLNL is employing test temperatures that are above those at which the spent fuel would normally be exposed to air during geologic disposal. This is one method to accelerate the physical processes and observe more pronounced effects in a shorter period of time. The range of test temperature does overlap that which is expected in the proposed Yucca Mountain repository and this is appropriate.

LLNL believes that an empirical, phenomenological model of fuel oxidation will be sufficient. This does seem to be a reasonable position in view of the phenomena under study; however, it was noted that LLNL did not feel sufficiently confident to attempt a prediction of oxidation as a function of time for a specified temperature history. Clearly the work is not yet finished.

This work is judged to be satisfactory and should enable the YMP to meet its goals. This evaluation was based upon interviews with the Technical Area Leader (TAL) over the course of a day. The governing scientific investigation plan (SIP), activity plan, and other supporting documentation were used in preparation for these interviews.

WBS 1.2.2.3.1.1: Spent Fuel/ UO_2 Flow Thru Saturated Dissolution

Flow-through dissolution testing of unirradiated UO_2 is being performed at LLNL. Similar experiments on spent fuel and spent fuel that has been oxidized to U_4O_9 are being conducted at PNL. The experiments at PNL have been interrupted by a building closure, but work will resume after the building is reopened and preparatory activities are completed. Technical meetings between PNL and LLNL staff typically occur two or three times per year.

In experiments at LLNL, simulated groundwaters are used; these are similar to J-13 groundwater but have certain chemical characteristics, such as pH, carbonate concentration, and oxygen activity, controlled by addition of solutes or equilibration with cover gases of known composition. The simulated groundwater is pumped through vials that contain samples of UO_2 . Samples of the leachant are collected periodically and analyzed by kinetic phosphorimetry for uranium concentration. Uranium analyses typically have an uncertainty of about ten percent. The phosphorimeter is calibrated with standards supplied by National Institute of Standards and Testing.

The laboratory and apparatus were examined. The apparatus and experiment appear to be designed to minimize the number of instruments that must be calibrated. All instruments in the laboratory were found to be in calibration. During the previous audit, the investigators suggested that a procedure should be implemented for uranium analysis. The procedure has been implemented. Since the previous audit, the apparatus has been changed in that leachant is now supplied by high-pressure, low-volume pumps rather than by gravity feed. The pumps provide more reproducible flow and do not require calibration because flow rates are measured by weighing the leachant collected over a given time. Cover gases are mixed by the supplier, with the composition being determined by weighing the cylinder while it is being filled with high-purity gaseous components. Manufacturers' certificates of composition are kept as part of the scientific records. Compositions are not checked by LLNL, but negotiations are underway to obtain all cover gases from one supplier with an approved QA program. There appears to be a commendable pattern of continuous quality improvement.

The water chemistries used in the experiment bracket those expected at Yucca Mountain. The most aggressive water chemistries will provide an upper bound on dissolution rate. The results on dissolution rate will be combined with an understanding of water flow rate and waste package failure rate to set an upper bound on releases from the engineered barrier system.

This work is judged to be satisfactory and should enable the YMP to meet its goals. This evaluation was based upon interviews with the TAL, Technical Leader (TL), and laboratory personnel over the course of two days. The

governing SIP, activity plan, and other supporting documentation were used in preparation for these interviews. Objective evidence, in addition to the verbal response of interviewed individuals, included the review of laboratory logbooks, scientific notebooks including the procedures included therein, and inspection of apparatus including instruments

WBS 1.2.2.3.1.2: HLW Glass Unsaturated Testing

LLNL provides technical management of experiments at Argonne National Laboratory (ANL) on dissolution of HLW glass. Testing has been ongoing since before 1991. Although quality-affecting experiments are continuing, only experiment maintenance is actually being performed. The glass compositions being tested are ATM-10, which has the projected composition for West Valley waste glass, and SRL-165, which has the projected composition for Savannah River waste glass. The glasses contain actinides, but to reduce the level of radioactivity, fission products are replaced with stable forms of the same elements. No effort is being made on determining the effect of composition on durability because specifications on composition variation are expected to be tight. Durability typically varies by a factor of two or three from sample to sample.

There has been no work on model development, but an activity plan has been written for that work. Specific procedures for development of models have not been written. Suitable controls will be developed before quality-affecting work begins.

Metallic materials in the vicinity of waste glass have been found to affect the rate of glass degradation, so it is appropriate to test glasses in the presence of potential container materials. LLNL intends to study the effects of these materials and getter materials that might be placed outside the waste package. Plausible materials will be studied.

The test conditions employ the water contact modes that are thought to be most likely to occur at Yucca Mountain: water vapor and occasional drips. The water composition is likewise that of the water that is expected to be available at Yucca Mountain: J-13 water for the liquid phase and essentially pure steam for the vapor. The waste form degradation rates and waste package failure rates will be used to demonstrate controlled release. The samples are not intended to represent miniature waste packages, and they differ in that an actual waste package is expected to have fractured glass and partial metal barriers. The samples being tested are intended to provide information on degradation of bare glass.

This work is judged to be satisfactory and should enable the YMP to meet its goals. This evaluation was based upon interviews with the TAL over the course of a day. The governing SIP, activity plan, and other supporting documentation were used in preparation for these interviews.

The audit team considers that LLNL technical staff had implemented and was applying adequate controls for the technical areas evaluated during the audit.

5.5 Summary of Deficiencies

The audit team identified nine deficiencies during the audit for which one CAR has been issued. Eight additional deficiencies were corrected prior to the postaudit meeting.

A synopsis of the deficiency documented as a CAR and those corrected during the audit are detailed below.

5.5.1 Corrective Action Requests (CARs)

As a result of the audit, the following CAR was issued:

CAR YM-94-102

Contrary to the requirements of Paragraph 2.3.4 of Quality Procedure QP-2.3, "Management Assessment," Revision 1, documentation for Management Assessment 93-01 was incomplete.

5.5.2 Deficiencies Corrected During the Audit

Deficiencies that are considered isolated in nature and only requiring remedial action can be corrected during the audit. The following deficient conditions were identified and corrected during the course of the audit:

1. Contrary to the requirements of Paragraphs 3.4.5.2.1 and 3.4.5.2.3 of QP 3.4, Revision 3, "Scientific Notebooks," one notebook failed to include an "initial entry" and two notebooks failed to include a "final entry." The required entries were made prior to the postaudit meeting.
2. Contrary to the requirements of Paragraphs 5.0.3, 5.0.5 and 5.0.9 of QP-5.0, Revision 3, "Technical Implementing Procedures":
 - a. title pages of Technical Implementing Procedures (TIPs) were not consistent with the content requirements;

- b. performance prerequisites were incomplete;
- c. preparation provisions addressed cancelled procedures;
- d. modifications were allowed by unauthorized personnel; and
- e. Performance/Outcome overview were not performed by the required level of management.

The above deficiencies were corrected by the issuance of QP-5.0, Revision 4 prior to the postaudit meeting.

- 3. Contrary to the requirements of Section 4.0.5.1 of QP 4.0, Revision 4, "Procurement Document Control," Purchase Requisitions (PRs) were approved and issued without containing the QA requirements applicable to the procured items. Objective evidence documenting that LLNL-YMP QA had reviewed and approved the subject PRs was provided prior to the postaudit meeting.
- 4. Contrary to the requirements of Section 4.2.1 of the QARD, QP 4.0, Revision 4, "Procurement Document Control," failed to contain the prescribed mandatory language. Change Notice (CN) 4.0-4.3 was issued to add the required wording to QP 4.0 prior to the postaudit meeting.
- 5. Contrary to the requirements of Paragraph 8.0.4.2.6 of QP 8.0, Revision 2, "Identification and Control of Items, Samples, and Data," the sample identification on the glass container of one sample was smeared where part of the identification was difficult to read. This condition was corrected by replacing the smeared label on the container prior to the postaudit meeting.
- 6. Contrary to the requirements of Section 17.0.5.2 of QP 17.0, Revision 5, "Quality Assurance Records," the cover page to Activity Plan E-20-18(f) contained conflicting dates. CN AP-E-20-18(f)-1-1 was issued to correct the condition prior to the postaudit meeting.
- 7. Contrary to the requirements of Section 17.0.5.3 of QP 17.0, Signature Verification Memoranda for three Record Sources were signed but not dated. These documents were revised to reflect the appropriate dates prior to the postaudit meeting.

8. Contrary to the requirements of Paragraph 18.2.4.4 of QP 18.2, Revision 3, "Qualification of Quality Assurance Personnel," the annual reviews performed as a basis for extending two Lead Auditor certifications were not documented. This documentation was provided and placed in the appropriate Lead Auditor certification files prior to the postaudit meeting.

5.5.3 Follow-up of Previously Identified CARs

CAR YM-93-085

The subject CAR, issued on August 3, 1993 and closed on November 11, 1993, identified the adverse condition that LLNL had not conducted an audit nor completed an annual evaluation of PNL (spent fuel waste forming processing) or ANL (defense waste processing facility glass) since September, 1991. It is required that subcontractor audits be performed on a triennial basis when supplemented by documented annual evaluations. An evaluation of the LLNL-YMP FY94 QA Audit Schedule, Revision 2, indicated that LLNL had performed audits A94-11 and A94-12 of PNL and ANL, respectively. Audit report A94-11 was reviewed against program requirements and found acceptable. Audit report A94-12 was not yet issued at the time of this audit. The corrective action taken by LLNL in response to CAR YM-93-085 is considered to be effective.

CAR-YM-91-056

The subject CAR, issued on June 13, 1991, identified the adverse condition that LLNL implementing procedures failed to adequately incorporate all of the applicable OCRWM QA Program requirements. Partial verification of corrective action was performed on February 5, 1992. All remaining corrective actions were verified during the course of this audit. The LLNL Requirements Traceability Network Matrix, documenting adequate flowdown of the OCRWM QARD requirements into the LLNL implementing procedures, was accepted by YMQAD on September 12, 1994. The verification of corrective action on the subject CAR was performed during the audit, the CAR was procedurally closed on October 12, 1994.

6.0 RECOMMENDATIONS

The following recommendations resulted from the audit and are presented for LLNL management consideration.

1. The results of the QA Requirements Specification reviews should be documented in order to demonstrate performance of this task.
2. The method of determining if a technical publication or report is a quality-affecting activity should be evaluated. Ninety-five percent of the work performed in 1994 has been classified as non-quality. However, some of this work contains information or data that will be used as a basis for future decisions that could impact quality-affecting activities.
3. The traceability of in-process records for procurement documentation should be closely monitored to ensure that files remain complete and that, in the event of misplacement, documents may be properly refiled.
4. The method for assembling procurement document QA record packages should be reviewed to ensure that only quality-related activities within the process are used to determine when each package is considered complete.
5. The term "items" should be defined relative to its specific application in QP 8.0.
6. The TL for "Thermodynamic Data Determination" should initiate the appropriate QA implementing procedures as soon as possible, since this task is in its initial stages.
7. The TIPs should be screened to ensure that all title pages contain the following information: revision history, author's name, and training entries.
8. Managers responsible for QPs 2.1, 5.0, and 6.0 should review interfacing steps to ensure consistency in terminology, process, and indicated responsibilities for procedure development, review, change, and approval.
9. Criteria should be provided to enhance management's check of the TIP implementers work during performance of the TIP. This would help ensure that the data collected and/or analysis performed is consistent with the objectives of the TIP and will lead to a supportable conclusion.
10. Management should establish tighter controls over any changes to procedural processes.
11. The ability to add "additional" review criteria during the performance of document reviews should be provided.

12. The annual LLNL-YMP Management Assessment Report should be issued by the Office of the Deputy Director or Fission Energy and Systems Safety Programs (FESSP), who has responsibility for the task, rather than by QA who is independent from the task.
13. The LLNL-YMP Lead Auditor Certification files should be purged of any redundant and/or unnecessary documentation prior to the next audit.

7.0 LIST OF ATTACHMENTS

- Attachment 1: Personnel Contacted During the Audit**
- Attachment 2: Summary Table of Audit Results**

ATTACHMENT 1

PERSONNEL CONTACTED DURING THE AUDIT

<u>Name</u>	<u>Organization/Title</u>	<u>Preaudit Meeting</u>	<u>Contacted During Audit</u>	<u>Postaudit Meeting</u>
Alegre, B.	LLNL-YMP/Records Coordinator		X	
Benedict, K.	LLNL/Associate Administrator	X	X	X
Blink, J.	LLNL-YMP/Deputy Project Leader	X		
Brumburgh, C.	LLNL-YMP/QA Administrative Specialist	X	X	X
Bryan, B.	LLNL-YMP/Project Administrator	X	X	X
Chou, C.	LLNL/Deputy Associate Director FESSP			X
Chukwueke, T.	LLNL/QA Project Manager	X		X
Clarke, W.	LLNL-YMP/Technical Project Officer	X		X
Comstock, P.	LLNL-YMP/Resource Manager	X	X	X
Duewer, T.	LLNL-YMP/Chemical Management Manager		X	
Glassley, B.	LLNL-YMP/TL Geochemistry		X	
Gordon, S.	LLNL-YMP/Metal Barriers Laboratory Assistant		X	
Halsey, W.	LLNL-YMP/TAL Performance Analysis	X		X
Hamati, R.	LLNL-YMP/QA Engineer	X	X	X
Lin, W.	LLNL-YMP/TL Exploratory Studies Facility Test		X	X
Mabrito, B.	NRC/Observer	X		X
Mones, E.	LLNL-YMP/Sr. Science Associate		X	
Monks, R.	LLNL-YMP/QA Manager	X	X	X
O'Connell, W.	LLNL-YMP/TL Performance Assessment	X		
Palmer, C.	LLNL-YMP/TL Thermodynamic Data Determination	X	X	X
Podobnik, J.	LLNL-YMP/Project Control Manager	X		X
Sippel, J.	LLNL-YMP/TC		X	
Spraul, J.	NRC/Observer	X		X
Steward, S.	LLNL-YMP/TL Spent Fuel Dissolution	X	X	X
Stewart, M.	LLNL-YMP/Publications Manager		X	X
Stout, R.	LLNL-YMP/TAL Waste Form Characterization	X	X	X
Weed, H.	LLNL-YMP/Chemist	X	X	X
Wilder, D.	LLNL-YMP/TAL Near Field Environment Characterization	X	X	X
Wilgus, C.	LLNL-YMP/Programmer	X		X
Wolrey, T.	LLNL-YMP/Principal Investigator			X

ATTACHMENT 2

SUMMARY TABLE OF AUDIT RESULTS

AUDIT YM-94-10 DETAIL SUMMARY								
ELEMENT	DOCUMENTS REVIEWED	DETAILS (CHKLIST)	CAR	CDA	RECOMMEND	ADEQUACY	COMPLIANCE	OVERALL
1	QP 1.0, R4	YMP-94-10-01 pgs. 2-4a	N	N	N	NV	SAT	SAT
2	QP 2.1, R5	pgs. 5-8	N	N	N	NV	SAT	SAT
	QP 2.2, R1	pg. 8	N	N	N	NV	SAT	
	QP 2.3, R1	pgs. 9-14	YM-94-102	N	12	NV	SAT	
	QP 2.4, R1	pgs. 15-16	N	N	N	NV	SAT	
	QP 2.5, R1	pgs. 17-19	N	N	N	NV	lack of activity	
	QP 2.6, R2	pgs. 20-21	N	N	N	NV	lack of activity	
	QP 2.7, R2	pg. 21	N	N	N	NV	lack of activity	
	QP 2.8, R3	pgs. 22-23	N	N	N	NV	SAT	
	QP 2.9, R5	pgs. 24-26	N	N	N	NV	SAT	
	QP 2.10, R5	pgs. 27-28	N	N	N	NV	SAT	
4	QP 4.0, R4	pgs. 29-31	N	3,4	1,2,3,4	NV	SAT	SAT
	QP 4.1, R3	pg. 32	N	N	N	NV	SAT	
5	QP 5.0, R3	pgs. 33-42	N	2	7,8,9,10,11	NV	SAT	SAT
6	QP 6.0, R4	pgs. 43-47	N	N	N	NV	SAT	SAT
7	QP 7.0, R1	pgs. 48-52	N	N	N	NV	SAT	SAT

AUDIT YM-94-10 DETAIL SUMMARY

ELEMENT	DOCUMENTS REVIEWED	DETAILS (CHKLIST)	CAR	CDA	RECOMMEND	ADEQUACY	COMPLIANCE	OVERALL
12	QP 12.0, R6	pgs. 55-59A	N	N	N	NV	SAT	SAT
13	QP 13.0, R1	pgs. 60-61	N	N	N	NV	SAT	SAT
15	QP 15.0, R3	pg. 62	N	N	N	NV	<i>lack of activity</i>	NI
16	QP 16.0, R5	pgs. 63-67b	N	N	N	NV	SAT	SAT
	QP 16.1, R4	pgs. 68-69	N	N	N	NV	SAT	
	QP 16.2, R2	pgs. 70-71	N	N	N	NV	SAT	
17	QP 17.0, R5	pgs. 72-76d	N	6,7	N	NV	SAT	SAT
18	QP 18.0, R5	pgs. 77-79	N	N	N	NV	SAT	SAT
	QP 18.1, R5	pgs. 80-81	N	N	N	NV	SAT	
	QP 18.2, R3	pgs. 82-85	N	8	13	NV	SAT	
SI	QP 3.2, R2	pgs. 86-104e	N	N	N	NV	SAT	SAT
SII/8	QP 8.0, R2	pgs. 105-115	N	5	5,6	NV	SAT	SAT
	TIP-YM-03, R0	pgs. 116-117c	N	N	N	NV	SAT	SAT
SIII	QP 3.0, R4	pgs. 118-124b	N	N	N	NV	SAT	SAT
	QP 3.3, R2	pgs. 125-128b	N	N	N	NV	SAT	
	QP 3.4, R3	pgs. 129-135b	N	1	N	NV	SAT	
	QP 3.5, R1	pgs. 136-138	N	N	N	NV	<i>lack of activity</i>	

AUDIT YM-94-10 DETAIL SUMMARY

ELEMENT	DOCUMENTS REVIEWED	DETAILS (CHKLIST)	CAR	CDA	RECOMMEND	ADEQUACY	COMPLIANCE	OVERALL
WBS 1.2.2.3.1.2 HLW Glass Unsaturated Testing		YMP-94-10-02 pgs. 1-7	N	N	N	NV	SAT	SAT
WBS 1.2.2.3.1.1 Oven Dry Bath Oxidation		pgs. 8-15	N	N	N	NV	SAT	SAT
WBS 1.2.2.3.1.1 Spent Fuel/UO ₂ Flow Thru Saturated Dissolution		pgs. 15-19b	N	N	N	NV	SAT	SAT
TOTAL		184	1	8	13			SAT

CARs Corrective Action Requests
 CDA Corrected During the Audit
 RECOMMEND ... Recommendations
 NI No Implementation
 NV Not Verified

ADEQUACY Requirements in Procedure meet QARD
 COMPLIANCE ... Procedures Implemented
 OVERALL Summary of Element
 N None