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

AUDIT REPORT

OF

SANDIA NATIONAL LABORATORIES

ALBUQUERQUE, NEW MEXICO

AUDIT YMP-94-09

AUGUST 29 THROUGH SEPTEMBER 2, 1994

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Date: *10/17/94*

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Office of Quality Assurance

Date: *10/19/94*

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1.0 EXECUTIVE SUMMARY

As a result of Quality Assurance (QA) Audit YMP-94-09, the audit team determined that Sandia National Laboratories (SNL) 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, for the Civilian Radioactive Waste Management Program and SNL implementing procedures for QA Program Elements 1.0, 4.0, 6.0, 7.0, 12.0, 16.0, 17.0, 18.0, and Supplement II. QA Program Elements 2.0, 5.0, and Supplement III were determined to be marginally effective. QA Program Element 3.0 is included in the evaluation of Supplement III and thus is included in the marginally effective category. Supplement I was determined to have no implementation due to a lack of activity in that area.

The audit team identified 17 deficiencies during the audit that resulted in the issuance of 13 Corrective Action Requests (CAR). These CARs are described in Section 5.2.1 of this report. CAR YM-94-087 addresses inadequate information on SNL CARs. CAR YM-94-088 concerned Work Agreements (WAs) which did not contain required information. CAR YM-94-089 concerned calculations not conducted in accordance with procedure. CAR YM-94-090 dealt with Quarterly QA Program Reports, one of which was late in issuance and another which was not properly distributed. CAR YM-94-091 addresses conditions adverse to quality misidentified as observations. CAR YM-94-092 concerned the failure to demonstrate the evaluation of maintenance of proficiency of personnel. CAR YM-94-093 concerned procurement records which were not being forwarded to the Central Records Facility (CRF). CAR YM-94-094 addresses missing records in dual storage. CAR YM-94-095 concerned the status of quality not being contained in SNL publications. CAR YM-94-096 addresses the inadequate level of detail in SNL Quality Assurance Implementing Procedures (QAIPs). CAR YM-94-097 dealt with the acceptance of incomplete calibration certificates. CAR YM-94-098 addresses calibration certificates that were found to not contain all the required information. CAR YM-94-099 concerned inadequate documentation of activities in Scientific Notebooks (SNs).

There were four deficient conditions identified by the audit team and subsequently corrected during the course of the audit. These conditions are described in Section 5.5.2 of this report. Additionally, there were 24 recommendations resulting from the audit which are detailed in Section 6.0 of this report.

The following strengths and/or improvements in the SNL QA Program were noted during the audit:

- The examination of the documentation pertaining to external audits performed by SNL indicated a very thorough and comprehensive external audit process.

- Sample handling at SNL was found to be very well controlled and the documentation and traceability were exceptional.
- SNL has the foundation of a sound records program, augmented by a knowledgeable and professional staff.

2.0 SCOPE

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

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

QA PROGRAM ELEMENTS

- 1.0 Organization
- 2.0 Quality Assurance Program
- 3.0 Design Control
- 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
- 16.0 Corrective Action
- 17.0 Quality Assurance Records
- 18.0 Audits
- Supplement I, Software
- Supplement II, Sample Control
- Supplement III, Scientific Investigations

The following QA program elements/requirements were not reviewed during the audit because SNL has no activities to which these elements apply:

- 8.0 Identification and Control of Items
- 9.0 Control of Special Processes
- 10.0 Inspection
- 11.0 Test Control
- 13.0 Handling, Shipping, and Storage
- 14.0 Inspection, Test, and Operating Status
- 15.0 Nonconformances
- Supplement IV, Field Surveying

QA Program Element 10.0, according to the SNL QAIP numbering system, incorporates surveillances as QAIP 10-1, Revision 03. This QA program element was

examined during the audit but not to the depth necessary to arrive at a valid conclusion concerning the adequacy of implementation in relation to surveillances conducted by SNL Yucca Mountain Project (YMP) and matrix staff.

TECHNICAL AREAS

The following technical areas were reviewed during the audit:

<u>Work Breakdown Structure (WBS) No.</u>	<u>Title</u>
1.2.5.4.1	Total System Performance Assessment
1.2.5.4.6	Development and Validation of Flow and Transport Models
1.2.5.4.7	Supporting Calculations for Postclosure Performance Analyses
1.2.3.2.6.2	Soil and Rock Properties of Potential Locations of Surface Facilities
1.2.3.2.6.2.1	Surface Facilities Exploration Program
1.2.3.2.6.2.2	Surface Facilities Laboratory Tests and Material Property Measurements
1.2.3.2.6.2.3	Surface Facilities Field Tests and Characterization Measurements
1.2.3.2.7.1.3	Laboratory Determination of Mechanical Properties of Intact Rock
1.2.3.2.7.1.4	Laboratory Determination of Mechanical Properties of Fractures
1.2.4.2.1.1.4	Insitu Design Verification

3.0 AUDIT TEAM AND OBSERVERS

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

<u>Name/Title</u>	<u>QA Program Elements/Requirements</u>
Kenneth T. McFall, Audit Team Leader (ATL), Yucca Mountain Quality Assurance Division (YMQAD)	
James Blaylock, Auditor, YMQAD	3 and Supplement III
Robert E. Harpster, Auditor, YMQAD	3 and Supplement III
Kristi A. Hodges, Auditor, YMQAD	18
John R. Matras, Auditor, YMQAD	4, 7, and Supplement I
Richard L. Maudlin, Auditor, YMQAD	16 and 17
Mary G. McDaniel, Auditor, YMQAD	16 and 17
Steven P. Nolan, Auditor, YMQAD	12 and Supplement II

Charles E. Betts, Auditor, Headquarters Quality Assurance Division (HQAD)	5 and 6
James J. George, Auditor, HQAD	1 and 2
Keith M. Kersch, Technical Specialist, Science Applications International Corporation (SAIC)	Supplement III WBSs 1.2.5.4.1, 1.2.5.4.6, 1.2.5.4.7
William R. Sublette, Technical Specialist, SAIC	Supplement III and WBSs 1.2.3.2.6.2.1, 1.2.3.2.6.2.2 1.2.3.2.6.2.3, 1.2.4.2.1.1.4, 1.2.3.2.7.1.3, 1.2.3.2.7.1.4
Jack Spraul, Observer, U.S. Nuclear Regulatory Commission (NRC)	
John Buckley, Observer, NRC	
Banad Jagannath, Observer, NRC	
Robert Baca, Observer, NRC/Southwest Research Institute (SWRI)	
Robert Brient, Observer, SWRI	
Donald Dunavant, Observer, SWRI	
Simon Hsiung, Observer, SWRI	
John Hauschild, Observer, U.S. Environmental Protection Agency (EPA)	
Thomas Vandel, Observer, EPA	

4.0 AUDIT MEETINGS AND PERSONNEL CONTACTED

The preaudit meeting was held at the SNL YMP offices in Albuquerque, New Mexico, on August 29, 1994. A daily debriefing and coordination meeting was held with SNL management and staff to discuss logistics and to inform SNL of all potential deficiencies. Daily audit team meetings were held to discuss issues and potential deficiencies. The audit concluded with a postaudit meeting held at the SNL YMP offices in Albuquerque, New Mexico, on September 2, 1994. Personnel contacted during the audit are listed in Attachment 1 of this report. The list also includes an indication of those who attended the preaudit and postaudit meetings.

5.0 SUMMARY OF AUDIT RESULTS

5.1 Program Effectiveness

The audit team concluded that, overall, the SNL QA Program is adequate and is being satisfactorily implemented for the scope of this audit. Individually, QA Program Elements 1.0, 4.0, 6.0, 7.0, 12.0, 16.0, 17.0, 18.0, and Supplement

satisfactory. QA Program Element Supplement I was determined to have insufficient implementation due to a lack of activity since the issuance of new procedures.

5.2 Stop Work or Immediate Corrective Actions or Additional Actions

There were no Stop Work Orders (SWOs) or immediate corrective actions resulting from this audit. As a result of this audit, one surveillance was proposed to YMQAD to ensure satisfactory implementation of the requirements pertaining to surveillances conducted by SNL.

5.3 QA Program Audit Activities

Details of the QA program audit activities are provided in Attachment 2. A list of objective evidence reviewed during the audit is provided in Attachment 3.

5.4 Technical Activities

Details of the technical activities audited are included in Attachment 2 and a list of objective evidence reviewed during the technical portion of the audit is provided in Attachment 3 of this report.

5.5 Summary of Deficiencies

The audit team identified 17 deficiencies during the audit for which thirteen CARs have been issued. Four of the identified deficiencies were corrected prior to the postaudit meeting.

Synopses of deficiencies documented as CARs and those corrected during the audit are detailed below. Information copies of the CARs are included in Attachment 4 of this report.

5.5.1 Corrective Action Requests

As a result of the audit, the following CARs were issued:

CAR YM-94-087

SNL CARs were found to not contain sufficient documentation of significance, impact on previous work, and corrective action verification.

CAR YM-94-088

WAs did not reference Technical Procedures (TPs), or if SNs were used, the WAs did not address the required information from QAIP 01-05, Revision 07.

CAR YM-94-089

There was no evidence that calculations in an SN were conducted in accordance with the requirements of QAIP 02-04, Revision 01.

CAR YM-94-090

There was no documented evidence that the YMQAD was included on distribution for a SNL quarterly QA Program Report and that a QA Program Report for the second quarter of 1993 was not issued until November 1993.

CAR YM-94-091

Conditions adverse to quality identified by SNL personnel were designated as observations, when in fact they were findings and should have been documented as such.

CAR YM-94-092

No objective evidence was located to demonstrate that individuals performing work subject to QARD requirements, were evaluated to determine the need for additional training to maintain proficiency.

CAR YM-94-093

Procurement records were not transferred to the CRF as required due to their SNL company sensitive nature. There were no provisions in the SNL QA Program that allows for different treatment of such sensitive records.

CAR YM-94-094

The dual storage requirements implementation was found to be deficient, in that some records could be located in one storage area but not in the other.

CAR YM-94-095

Several published papers did not contain the reference to the QA level or an accurate statement of whether the work was acceptable for the licensing process.

CAR YM-94-096

Some SNL QAIPs do not contain sufficient detail to meet all of the requirements of the QARD.

CAR YM-94-097

Calibration certificates were accepted by an SNL delegated representative when they did not conform to the procurement document requirements.

CAR YM-94-098

Calibration certificates for selected instrumentation were found not to contain the information required in QAIP 12-01, Revisions 3 and 4.

CAR YM-94-099

Documentation in SNs was not sufficient to allow a competent person to repeat the analyses or experiment without recourse to the author.

5.5.2 Deficiencies Corrected During the Audit

Deficiencies which are considered isolated in nature and only require remedial action can be corrected during the audit. The following deficiencies were identified and corrected during the audit.

1. QAIP 05-01, Revision 04, Appendix B, Part B, required that Tables of Contents be developed for procedures with more than five pages of text or numerous appendices. Contrary to this requirement, several procedures did not have Tables of Contents. This deficiency was corrected during the audit by changing the requirement (shall) to should to leave the inclusion of the Table of Contents up to the discretion of the procedure author.
2. QAIP 05-01, Revision 04, Section 6.3, Step 4, required the procedure author to perform prescribed activities that were not appropriate for the procedure author. This condition was

corrected during the audit by deleting the procedure author from the list of personnel affected by Step 4.

3. It was noted that WA 106 did not meet the requirements in Supplement I of the QARD. WA 106 was revised to reflect the current software implementing procedure, QAIP 19-01, Revision 01, and all deliverables were brought under configuration management.
4. QAIP 02-07, Revision 00, required Interim Change Notice (ICN) No. 01, dated September 6, 1994, in order to clarify intent of previous employers Lead Auditor Qualification documents. The ICN was approved prior to the end of the audit but was made effective on September 6, 1994, which was the first working day after this audit.

5.5.3 Follow-up of Previously Identified CARs

1. CAR YM-93-097 was closed on March 24, 1994. This CAR concerned SNL procedure QAIP 04-01, Revision 03, where contracts had been awarded by SNL without all QA requirements being incorporated into the pertinent procurement documents. The corrective action resulted in a review of 45 contracts that required technical services to be performed to SNL QA implementing procedures. Three SNL CARs were written as a result of this review. During this audit, the corrective action for this CAR was determined to be effective.
2. CAR YM-93-023 was closed on March 30, 1993. This CAR documented that suppliers to an SNL contractor had not been audited by or incorporated into the SNL audit schedule. Corrective action to the CAR resulted in a procedure revision to require SNL to perform annual evaluations of contractor's subcontractors who work under the SNL QA Program. The effectiveness of the corrective action was verified by reviewing the 1994 audit schedule and selected annual evaluation reports.

6.0 RECOMMENDATIONS

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

PROGRAMMATIC:

1. QARD, Section 5.2.2H requires identification of lifetime or nonpermanent QA records generated by an implementing document. QAIP 01-05, Section 4.1, Step 1, Item 12, requires identification of required records, but it does not differentiate between lifetime/nonpermanent. Also, QARD, Section 2.2.9F requires documenting and resolving mandatory comments resulting from reviews. QAIP 01-05, Section 5.0, does not require review records to be designated as QA records; they are maintained as non-processed records. Other than signatures on WAs, there is no QA documented evidence of the review/resolution process. It is recommended that QAIP 01-05 be revised to include provisions for lifetime/non-permanent records and designate review records as, at least, non-permanent records.
2. Section 4.1, Step 1, Note and Note 2, Item 3, of QAIP 01-05 are confusing and do not appear to add any value to the process. It is recommended that QAIP 01-05 be revised and these items be removed from the procedure.
3. QAIP 02-05, Revision 02, Section 5.3, Step 4, requires the use of a computer generated form, "Confirmation of Training Activities," to document and complete required training activities; however, this form is not an actual form, part of the procedure, or required to be part of the QA records package. It is recommended that either the form be made part of the procedure and record packages, or delete the use of the form and document completion of assigned training activities on the forms identified in the QAIP Appendices. Additionally, if the form is incorporated into the QAIP, it is recommended that the form be revised to delete the "check-off" box indicating completion and understanding of the contents of the procedure. Individuals do not consistently check-off this block because the block is redundant to the actual signature attesting to the statement that training is complete and understood.
4. QAIP 02-06, Appendix A, Certification of Personnel Qualifications, Position Description block, Page 7, has space for an entry "Position Title" and "Category" which are chosen from the appropriate position and category blocks on the back of the Appendix, Page 8. For the position title "Support Staff," there is no requirement for a "Category." Note (1) on Page 8, states that there is no category for the support staff positions but does not give any guidance on completion of the "Category" entry. It is recommended that the note be revised to clarify that this entry may be marked "NA," or develop an entry for "Category." This note should also consider that support staff includes summer staff who perform work subject to the QARD.
5. QAIP 02-06, Revision 01, Section 4.1, Note 2, requires for contractor employees that a management level person sign the Certification of Personnel Qualifications form attesting to the verification of education and experience;

however, Note 1 does not require the same for SNL employees. The verification is actually performed and retained by the SNL Human Resources Department; however, the signature by the SNL manager is not attesting to actual verification. It is recommended that Step 4 of the procedure be revised to require the SNL Human Resources Department individual performing the verification to sign off on the form, or the SNL Human Resources Department to supply written verification to the Department Manager who attests and signs that verification is complete.

6. **Contracts using Federal Agency Order agreements are handled differently from other contracts in that a Request for Quotation (RFQ) is not required. QAIP 04-01, Revision 05, needs to clearly reflect this.**
7. **In discussions with the Principal Investigators (PIs) responsible for Regional Climate Model 2 and Finite Element Heat and Mass software codes, it was determined that the method of validation would be to run vendor supplied test cases. The PIs agreed that these cases assure the proper installation of the software. It is recommended that additional test cases from text books or scientific and engineering literature, in addition to vendor supplied test cases, be run to assure the correct operation of the mathematics in the code.**
8. **In the review of SNL CAR YM-94-012, it was noted that the initiator was an individual within the SNL QA organization. Further review notes that the response was provided by the QA Manager and evaluated and closed by the initiator who reports directly to the QA Manager. It is strongly recommended that in future circumstances where the QA Manager is responsible for providing corrective action, an independent individual not reporting directly to the QA Manager be involved in the evaluation of the response.**
9. **It is recommended that periodic records training (similar to that offered in March 1994) be given to record generators to address their responsibilities, with emphasis on protection of material destined to become records and other good records management practices. This would supplement general requirements identified in QAIP 17-01, Revision 01. The training should not be optional.**
10. **It is recommended that the SNL/YMP Local Records Center (LRC) submittal form be incorporated into QAIP 17-01 and QAIP 17-03.**
11. **It is recommended that SNL consider submitting training records packages on an annual basis. Current practice is to submit packages when individuals terminate the project.**
12. **It is recommended that the method of performing SNL internal audits be reevaluated. Although minimum QARD requirements are met, the**

effectiveness of the single full scope audit performed by a team that is not internal to the YMP organization is questionable. Consideration should be given to smaller audit scopes with emphasis placed on effectiveness of specific criteria/WBS elements as well as follow-up on previous audit findings and CARs.

13. Since SNL does not generally procure items but procures predominately consultant services that do not necessarily lend themselves to supplier audits, it is recommended that the criteria for determining whether or not a contractor is to be audited be clearly identified in QAIP 18-01. The SNL YMP QA schedule cover sheet contains review criteria for this determination as does the SNL YMP Procurement Screening document. It is strongly recommended that a consolidation of determination criteria be incorporated in QAIP 18-01 and a documented rationale be provided for each contractor that is determined not to meet that criteria.

TECHNICAL:

1. Several SNs were examined and found to be questionable for use in the licensing environment. The form and content of these notebooks should be similar to that required for evidence in a court of law or a patent application. It is recommended that QAIP 20-02 (Scientific Notebooks), Revision 00, be revised to provide more explicit guidance on the preparation of these notebooks. It is suggested that SNL YMP staff consult with patent attorneys to obtain their suggestions on what should be contained in the revised version of the procedure.

As a minimum, SNs should contain the following features:

- a. They should be in a bound notebook with sequentially numbered pages,
- b. indelible ink should be used,
- c. notebooks should be periodically read, understood, and attested to by a peer,
- d. a clear statement of the work to be performed should be included at the beginning,
- e. sufficient detail should be provided so that a competent independent reviewer could repeat the results without recourse to the author, and
- f. pages should be signed and dated in a temporal sequence.

2. During the audit it was determined that there has been no oriented core taken in any of the North Ramp Geologic (NRG) or South Ramp Geologic (SRG) boreholes. Video logs were taken but these were not capable of orienting fractures. It is recommended that fracture orientation be obtained in at least two site specific boreholes by either using oriented coring techniques or oriented video logging techniques.
3. During the audit it was determined that WA 0071 does not identify as needed deliverables Rock Quality Designation (RQD), Rock Mass Quality Index (Q), and Rock Mass Rating (RMR). This is the main output produced by this WA; however, it is not listed as a deliverable. It is recommended that these geotechnical data parameters be added as deliverables in the WA.
4. It was determined during the audit that there were no discussions in any of the documents or Technical Document Information Forms (TDIFs) regarding the fact that there was a bias produced in the exploration process due to the predominant vertical alignment of the boreholes. This exploration bias will have a noticeable impact on RQD and fracture frequency, which will in turn impact the rock mass classification parameters Q and RMR. RQDs and fracture frequencies determined from vertical boreholes will not be representative of the RQDs and fracture frequencies which will be encountered when driving a ramp at a 2.15 percent slope. These RQDs and fracture frequencies must be adjusted to account for the exploration bias. If they are not adjusted by SNL then there should at least be a reference to the exploration bias in SNL's TDIFs to the designers.
5. It is recommended that the term "weighted average" in TDIF 303139 on Page i, be replaced with the term "average." It is not truly a weighted average.
6. It was noted on TDIF 303139, Page ii, that Schmidt Hammer data was used to determine strength. This is considered not to be a reliable method for estimating strength. It is recommended that either the Franklin Point Load Index test be used or results from laboratory unconfined compression tests be used to determine intact rock strength.
7. It was noted in TDIF 303136 that hardness was estimated by a method of visual assessment. This method of determining hardness is very subjective and not a recommended method. It is recommended that the results from the Franklin Point Load Index test be used to estimate hardness and strength.
8. It is recommended that a WA be written on the Test Planning Package and Work Plan be revised such that the process for SNL to provide the Management and Operating (M&O) Contractor design validation input data, is clearly defined.

9. After reviewing the methods used by Carl Brectal and Scott Carlisle to determine the Norges Geotekniske Institute (NGI) Tunneling Quality Index "Q," there appears to be some inconsistencies between the method used by Brectal versus the method used by Carlisle to classify some of the joint characteristics. It is recommended that Brectal and Carlisle review their methodologies to ensure a consistency between them.
10. After reviewing the SN for the North Ramp Starter Tunnel Rock Mass Quality Estimation (Top Heading and Bench), WA 0065, Section 3, it was noted that the method of presenting Q "NGI Tunneling Quality Index" was misleading. The SN identified a Q(max) and a Q(min); however, the Q(max) was really a Q(avg). It is recommended that the SN be corrected such that if an average Q is determined, then it be represented as Q(avg) instead of Q(max).
11. It is recommended that the Study Plan (SP) entitled, "In-Situ Design Verification," be changed to "In-Situ Design Validation," which is a title that will more correctly represent the activities being performed within this SP. As defined in the QARD, design verification is a process which occurs before construction, whereas design validation is a process that occurs after construction begins. The design validation process consists of two parts. The first part is that process that determines if the in-situ conditions encountered are consistent with the geotechnical and design parameters used as design input. The second part of the design validation process is the measuring and monitoring of the engineered systems performance to determine if it satisfies the design criteria and performs its intended function.

7.0 LIST OF ATTACHMENTS

- Attachment 1: Personnel Contacted During the Audit
- Attachment 2: Audit Details
- Attachment 3: Objective Evidence Reviewed During the Audit
- Attachment 4: Information Copies of CARs

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>
Askew, S.	SNL/Software QA Coordinator	X	X	X
Agotte, K.	SNL/PDA Administration		X	X
Bachicha, M.	SNL/Office AA		X	
Carrell, B.	SNL/Observer	X		
Chocas, C.	SNL/PI		X	
Cochrell, R.	SNL/DC and Training Analysis	X		
Costin, L.	SNL/Mgr. 6313	X		X
Davies, P.	SNL/Mgr. 6115	X		X
Dockery, H.	SNL/Mgr 6312	X	X	X
Edge, E.	SNL/Procurement Specialist		X	
Friend, J.	MACTEC/QA Specialist	X	X	X
Gallegos, A.	SNL/Training DC Staff		X	
Garcia, N.	GeoCenters, Inc./Records Lead Technician	X	X	X
Geisler, R.	GeoCenters, Inc./Tech. Assistant II			X
Gerstner-Miller, G.	GeoCenters, Inc./Tech. Document Coordinator	X	X	X
Glass, R.	SNL/PI		X	
Harrison, K.	GeoCenters, Inc./Records Tech.		X	
Hawkinson, D.	MACTEC/QA Engineer	X	X	X
Heedt, M.	SNL/Office AA		X	
Ho, C.	SNL/PI		X	
Hotchkiss, A.	SNL/PC TL		X	X
James, E.	GeoCenters, Inc./Records Tech.	X	X	X
Jaramillo, C.	SNL/QA Coordinator	X	X	X
Kessel, D.	SNL/TL	X		
Longenbaugh, R.	SNL/Sr. Tech. Staff		X	
Perkins, G.	SNL/TL	X	X	X
Price, R.	SNL/TL	X	X	X
Richards, R.	SNL/QA Mgr.	X	X	X
Schelling, J.	SNL/PI		X	
Shain, M.	SNL/PDA Administration		X	X
Sharpton, S.	SNL/Mgr. 6352	X		
Shephard, L.	SNL/TPO	X	X	X
Siegel, M.	SNL/PI	X	X	
Sobolik, S.	SNL/TL	X	X	X
Thompson, R.	SNL/Mgr. 6351	X		X
Tidwell, V.	SNL/TL		X	
Tucker, M.	GeoCenters, Inc./RM Spvr.	X	X	X

ATTACHMENT 1

Personnel Contacted During the Audit
(Continuation)

<u>Name</u>	<u>Organization/Title</u>	<u>Preaudit Meeting</u>	<u>Contacted During Audit</u>	<u>Postaudit Meeting</u>
Voigt, J.	MACTEC/QA Engineer	X	X	X
Wamer, P.	GeoCenters, Inc./Records Mgr.	X	X	X
Wrobel, D.	SNL/QA Engineer	X	X	

LEGEND:

- AA - Administrative Assistant
- DC - Document Control
- MACTEC - MAC Technical Services
- PC - Project Control
- PDA - Participant Data Archiving
- RM - Records Management
- Spvr. - Supervisor
- Tech. - Technician
- TL - Task Leader
- TPO - Technical Project Officer

ATTACHMENT 2

Audit Details

The following is a summary of SNL QA Program activities covered during the audit. The list of objective evidence reviewed and specific procedures audited is provided in Attachment 3.

1.0 ORGANIZATION

The evaluation of QA Program Element 1.0 was based on selected requirements from the QARD and a review of the SNL implementing procedures referenced by the Requirements Traceability Network (RTN) Matrix. Compliance with the SNL procedures was based upon personnel interviews, review of the procedural requirements, and evaluation of applicable documentation produced as a result of procedural implementation. The evaluation included a review of selected requirements from the QARD to determine flowdown of requirements and compliance with selected requirements of SNL procedures QAIPs 01-02, 01-03, 01-04, and 01-05. The specific requirements selected for evaluation of adequacy and compliance are listed below.

Requirements:

QARD, Section 1.0, Revision 1, Organization

Each affected organization shall identify the management position within the organization responsible for performing QA functions. This position shall be occupied by an individual with appropriate knowledge and experience in management and QA. The position shall:

- Be at the same or higher organization level as the highest line manager directly responsible for performing work subject to QARD requirements.
- Be sufficiently independent from cost and schedule considerations.
- Have the organizational freedom to effectively communicate with other senior management positions.
- Be responsible for interpreting and approving QA program requirements as they apply to the affected organization's scope of work.
- Have no other assigned responsibilities unrelated to the QA program that would prevent full attention to QA matters.
- Be responsible for identifying quality problems, initiating, recommending, or providing solutions to quality problems, and verifying solutions to quality problems.

- Be responsible for verifying the proper establishment and execution of the QA program.
- Have the authority to stop work when significant conditions adverse to quality warrant such action.
- Difference of opinion involving QA program requirements shall be brought to the attention of the appropriate management and, if not resolved, shall be evaluated progressively to successively higher levels of management.

Organization (QAIP 01-02)

- The QA Department Manager performs reviews of QARD revisions to assess the need for changes to procedures as appropriate.
- The QA Department Manager verifies adequacy and implementation effectiveness of subtier organizations' QA program.

Stop Work Orders (QAIP 01-03)

- The TLs, Department Managers, and the TPO stop work in the functional areas and organizations for which they are responsible.
- SWOs are initiated either through 1) a CAR in accordance with QAIP 16-01, or 2) via correspondence to responsible management.

1) If by a CAR:

- words "Work Stoppage" prominently displayed in deficiency description section
- corrective actions documented in disposition section
- work stoppage rescinded upon verification by QA personnel that corrective actions have been implemented

2) If by correspondence:

- correspondence contains
 - a. Instruction to stop activity
 - b. Explanation of problem
 - c. Request for management/QA approval of developed corrective actions (if necessary)

d. Request for immediate acknowledgement of SWO notification

- corrective actions documented by letter or memorandum
 - verification of corrective actions implementation documented in surveillance report in accordance with QAIP 10-01
- QA records include SWO correspondence or CARs and related documentation as applicable.

Resolution of QA Disputes (QAIP 01-04)

- The TPO and/or the QA Department Manager resolve disputes, and, if necessary, elevate disputes to progressively higher organizational levels.

Establishing Work Agreements (QAIP 01-05)

- WAs are established
 - For all WBS elements to establish interfaces/direction between TPO/TL
 - For activities subject to QA program
 - To document organizational interfaces
 - For work to be specified via written procedures/instructions
 - For scientific investigations conducted without a TP
- Upper-tier WAs
 - Define basic organizational interfaces
 - Establish lines of communications
 - Delegate responsibility/authority
 - Define scope of work to TL

And when lower-tier WAs are not issued to provide detailed work, they also contain specific details on the following

- QA records
 - Acceptance criteria
 - Deliverables
 - Personnel
 - Procedures to use
- Lower-tier WAs prescribe work in more detail (than upper-tier) and
 - Define/allocate specific work scope

- Identify requirements/controls/deliverables
- (Adequate) communication of information to support staff and contractors
- Are used only with upper-tier WAs
- If the subject WA is to govern scientific investigation work, then the scientific investigation is performed using SNs, TPs or a combination of both:
 - If TP(s) to be used, WA need not address all of the work elements, if they are fully/adequately addressed in TP and TP referenced in the WA
 - If SN to be used without a TP, then all of the work elements to be addressed, as applicable, in the WA
 - If study plans developed and initiated that address all of the work elements, they may be referenced by including applicable portions in Appendix to the WA
- Verify that all WAs are submitted for independent technical and QA review.

Results:

A review of checklist items, objective evidence, and interviews with individuals concerning responsibilities and activities relative to the requirements of Section 1 of the QARD, as implemented through the SNL QAIPs, appeared to indicate that the QAIPs incorporated the appropriate requirements and the requirements are being adequately implemented. The SNL organization is well defined, interfaces identified and controlled, and individuals aware of their responsibilities. Specific items evaluated included incorporation of appropriate QARD requirements by review of the RTN against the QAIPs; QA Department review of subtier QA programs; issuance of SWOs, including corrective actions, verification, and close out; resolution of disputes; and development of upper and lower-tier WA to control activities subject to the QA program for work specified via procedures/instructions or for scientific investigations, including independent technical and QA reviews. Although the audit team found that the procedures for this criteria were being implemented, and specifically for WAs found the QAIP very effective in controlling work, the team did have several concerns.

First, QAIP 01-05 requires that if a WA is to govern scientific investigation work, then the WA needs to either address the: 1) Section 4.1, Step 1, Note 2, No. 2, a. through k. items, or 2) reference the appropriate TPs in which these items are fully and adequately referenced. The team found numerous examples where the WAs did not

include or address items a. through k. of the above procedure, either by direct incorporation or TP reference. (See CAR YM-94-088 on Page 86 of this report.)

A second area of concern for the audit team was with the records resulting from the independent technical and QA review of WAs. The QARD Section 5.2.2H requires identification of lifetime or nonpermanent QA records generated by the implementing document. The audit team recommends revising QAIP 01-05 (and other appropriate QAIPs) to include provisions for lifetime/nonpermanent records, and, at least, designate review records as nonpermanent QA records. (See Programmatic Recommendation No. 1 in Section 6.0 of this report.)

The last concerns of the audit team were with 1) QAIP 01-05, Section 4.1, Step 1, Note 1, on the use of contracts instead of a WA; and 2) Note 2, Item 3, on the inclusion of portions of study plans in WA appendices. The audit team recommends that the QAIP be revised to clarify the intent of these notes, or delete the statements/requirements. (See Programmatic Recommendation No. 2 in Section 6.0 of this report.)

Summary for the QA Program Element:

The audit team determined that overall implementation of QA Program Element 1.0 was satisfactory.

2.0 QUALITY ASSURANCE PROGRAM

The evaluation of QA Program Element 2.0 was based on selected requirements from the QARD and a review of the SNL implementing procedures referenced by the RTN Matrix. Compliance with the SNL procedures was based upon personnel interviews, review of the procedural requirements, and evaluation of applicable documentation produced as a result of procedural implementation. The evaluation included a review of selected requirements from the QARD to determine flowdown of requirements and compliance with selected requirements of SNL procedures QAIPs 02-02, 02-04, 02-05, 02-06, 02-08, 02-09, and 02-10. The specific requirements selected for evaluation of adequacy and compliance are listed below.

Requirements:

QARD, Section 2.0, Revision 0, Quality Assurance Program

Each affected organization shall establish a program for the evaluation, selection, indoctrination, training, and qualification of personnel performing work subject to QARD requirements. The program shall:

- Evaluate each job position to determine whether the responsibilities of the position include performing work subject to QARD requirements.

- **Establish descriptions for those positions that include work subject to QARD requirements.**
- **Ensure personnel are indoctrinated and trained, as needed, to achieve initial proficiency; maintain proficiency; and adapt to changes in technology, methods, or job responsibilities.**
- **Establish minimum education and experience requirements for each position commensurate with the scope, complexity, and nature of the work.**
- **Ensure personnel have the experience, education, training, and proficiency commensurate with the minimum requirements established.**
- **Ensure minimum education and experience are verified or, when minimum education and experience cannot be specifically verified, provide a statement and justification for the personnel assignment.**
- **Ensure supervisors evaluate and assess the need for additional indoctrination and training as assignments, positions, and implementing documents change.**
- **Ensure the required indoctrination and training for a specified task is completed prior to performing the task.**
- **Ensure records on individuals generated by training and qualification programs are collected and maintained.**
- **Ensure personnel are indoctrinated in the following topics as they relate to a particular function:**
 - **General criteria, including the QARD, applicable codes, regulations, and standards**
 - **Applicable implementing documents**
 - **Job responsibilities and authority**
- **The need for readiness reviews shall be identified by management for scheduled or planned work to ensure program objectives are met. Where needed, readiness reviews shall be conducted for the planned scope of work to ensure that objective evidence exists demonstrating that:**
 - **Work prerequisites have been satisfied**
 - **Personnel have been suitably trained and qualified**

- Detailed implementing documents and management controls are available and approved
- The QA program shall apply to site characterization data and samples. Site characterization for the purpose of QA program applicability includes activities related to sample collection and the collection and analyses of data to support performance confirmation or performance assessments.
- The QA program shall apply to activities related to the items on the Q-List (such as design, procurement, construction, fabrication, production, handling, packaging, shipping, storing, cleaning, assembly, inspection, testing, operation, maintenance, repair, modification, decontamination, dismantling, decommissioning, and permanent closure). An activity shall take on the same level of importance as the item to which it pertains.
- The QA program shall apply to those activities that provide data used to assess the potential dispersion of radioactive materials from the licensed facility.
- The QA program shall apply to activities related to the high-level waste form from production through acceptance.
- For items on the Q-List, related activities, and activities associated with site characterization data and samples, QA controls (grading) shall be applied to the degree commensurate with the:
 - Function or end use of the item
 - Consequence of failure (risk)
 - Importance of the data
 - Complexity of design or fabrication of the item or design or implementation of the activity
 - Reliability of the process
 - Reproducibility of the results
 - Uniqueness of the item or degree of standardization
 - History of the item or service quality
 - Necessity for special controls or processes

- Degree to which functional compliance can be demonstrated through inspection or test

Study Plan Requirements (QAIP 02-02)

- The following requirements are met for SPs:
 - Drafted or revised by qualified PI
 - Reviewed by at least one Technical and QA Reviewer
 - QA concurrence obtained if Technical Reviewer is PI's immediate supervisor

Conducting and Documenting Analyses (QAIP 02-04)

- Analyses are conducted and the results documented in accordance with requirements specified in the controlling WA.
- The QA records include documented objective evidence of the selection and determination of suitability of any input data used in the analyses.

Training (QAIP 02-05)

- The Training Center is notified of new/transfer personnel requiring orientation/training.
- Required orientation/training determined based on scope, complexity and nature of the individual's activities, and education, experience and proficiency of the individual.
- Required training provided to ensure individual achieves initial proficiency in applicable assignments.
- Indoctrination/training for specified task completed prior to implementing the task.
- Training Manager determines required training to complete trainer's qualification training.
- Lesson plans include, as a minimum:
 - Training objective
 - Outline of training contents

- Presentation methods
- Trainee evaluation
- The SNL YMP Manager
 - a) Determines additional orientation/training required to maintain proficiency for changes
 - in WBS assignment
 - Procedures
 - Responsibilities
 - Positions
 - Technology; and
 - b) Determines methods to provide training to maintain

Qualification and Certification of Personnel (QAIP 02-06)

- Personnel are certified or evaluated, as appropriate, prior to performing or verifying YMP work subject to the QA Program.
- Personnel selected for work subject to the QA Program have, as a minimum, for the specified Position Description:
 - Education
 - Experience
 - Training
 - Special Skills
- When minimum education and experience cannot be verified, a statement and justification for the personnel assignment is provided.

Conduct and Reporting of Management Assessments (QAIP 02-08)

- Management Assessments are performed annually (not to exceed 15 months between assessments), by individuals above or outside of QA, results are documented, and corrective actions initiated and tracked in a QA action tracking system.
- Management Assessment evaluates:
 - adequacy of organization to implement QA program
 - adequacy and effectiveness of QA program

- adequacy of Indoctrination and Training Program and personnel qualifications
- adequacy of planning and procedural controls
- effectiveness of Nonconformance Report and corrective action systems
- adequacy of QA management information tracking, evaluation and reporting system

Readiness Reviews (QAIP 02-09)

- The Readiness Review Plan identifies review subject, evaluation criteria, and performance measures.
- The Readiness Review Report summarizes results, defines additional recommended actions, and makes a recommendation on whether or not to proceed.
- QA Record Package includes the Notification, Review Plan and Report, and other documentation providing evidence of completion.

Determination of Applicable QA Controls (QAIP 02-10)

- "Mark-up" copies of the Quality Assurance Grading Report (QAGR) are retained as non-processed records by the QA department.
- The Department Manager and SNL YMP TPO review the QAGR to ensure controls are consistently applied between technical elements and controls, are consistent throughout the project.
 - WAs are used to identify QA program elements and procedures applicable to lower-tier activities and these elements are selected from the applicable approved QAGR.

Results:

A review of checklist items, objective evidence, and interviews with individuals concerning the responsibilities and activities relative to the requirements of Section 2.0 of the QARD, as implemented through the SNL QAIPs, appeared to indicate that the QAIPs incorporated the appropriate requirements and the requirements are being adequately implemented. The SNL QA Program is well defined, appropriate controls in place, and personnel are well aware of their responsibilities. Specific items evaluated included incorporation of appropriate QARD requirements by review of the RTN against the QAIPs; review of SPs; analyses conducted as specified in WA;

personnel are certified or evaluated and selected for work to a specified Position Description prior to performing work; personnel receive the appropriate orientation and training to achieve and maintain proficiency for specified tasks prior to performing work; individuals above or outside the QA program annually assess the implementation, adequacy, and effectiveness of the QA program; readiness reviews are performed and documented as appropriate; and, through use of the QAGR, that controls are consistently applied between technical elements and throughout SNL project work, including use of WAs to identify QA program elements and procedures applicable to lower-tier activities as selected from the applicable QAGRs. Although the audit team found that the procedures for this criteria were being implemented, the team did have several concerns.

First, QAIP 02-05, Sections 5.3, Step 1, and 5.4, Step 1, require that individuals are evaluated to determine what additional orientation and training is required to ensure that proficiency is maintained for changes in WBS assignment, procedures, responsibilities, positions, or technology. The audit team could not find any objective evidence that individuals, performing work subject to QARD requirements, are evaluated to determine if changes in WBS, procedures, responsibilities, positions, or technology require additional training for the individuals to maintain proficiency. CAR YM-94-092 was written to document this deficiency.

A second area of concern for the audit team was in the use of a computer-generated form, "Confirmation of Training Activities," to document and complete required assigned training activities. This form is not an actual form, or part of the QAIP, or required to be part of the QA record packages. The audit team recommends either incorporating this form into the QAIP and making it a part of the record packages, or deleting the use of the form and documenting completion of assigned training activities on the forms identified in the current QAIP Appendices. (See Programmatic Recommendation No. 3 in Section 6.0 of this report.)

The last two concerns of the audit team were with QAIP 02-06. First, Appendix A, Certification of Personnel Qualifications, Position Description block, Page 7, has spaces for entry of "Position Title" and "Category" which are chosen from the appropriate position and category blocks on the back of the Appendix, Page 8. For the Position Title "Support Staff," there is no requirement for a "Category." The audit team recommends that the note be revised to clarify that this entry may be "NA" (not applicable), or develop an entry for "Category." (See Programmatic Recommendation No. 4 in Section 6.0 of this report.) Second, Section 4.1, Step 4, Note 2, requires for contractor employees that a management-level individual sign the Certification of Personnel Qualifications form attesting to the verification of education and experience; however, Note 1 does not require the same for SNL employees. The audit team recommends revising Step 4 to require the SNL Human Resources Department

individual performing verification to sign-off on the form, or the SNL Human Resources Department to supply written verification to the department manager who attaches and signs-off that verification is complete. (See Programmatic Recommendations No. 5 in Section 6.0 of this report.)

Summary for the QA Program Element:

The audit team determined that overall implementation of QA Program Element 2.0 was marginally satisfactory.

3.0 DESIGN CONTROL AND SUPPLEMENT III. SCIENTIFIC INVESTIGATION

SNL QA Program Element 3.0, Design Control, is covered in Supplement III, Scientific Investigations.

4.0 PROCUREMENT DOCUMENT CONTROL

The evaluation of this QA program element was based on selected requirements from the QARD and a review of the SNL implementing procedures referenced by the RTN Matrix and interviews with SNL QA organization management, procurement personnel as well as examination of objective evidence to determine the degree of compliance with selected requirements from QAIP 04-01. The specific requirements selected for evaluation of compliance and effectiveness are listed below.

Requirements:

QARD, Section 4.0, Revision 0, Procurement Document Control

- Procurement documents issued by each affected organization shall include the following provisions, as applicable to the item or service being procured:
 - A statement of the scope of work to be performed by the supplier
 - Technical requirements
 - QA Program Requirements
 - Right of access to supplier facilities and records for inspection or audit by the purchaser, OCRWM, or other designee authorized by the purchaser
 - Provisions for establishing hold points beyond which work cannot proceed without purchaser authorization

- Documentation required to be submitted to the purchaser for information, review, or acceptance
- Purchaser requirements for the supplier to report nonconformances and the purchaser approval of the disposition of nonconformances

Procurement (QAIP 04-01)

- The Procurement Planning Checklist (PPC) shall be completed in accordance with Appendix A on Purchase Requisitions (PRs) for commercial products or services and shall be reviewed by management for technical adequacy (this includes QA and technical requirements).
- The QA Procurement Coordinator shall review the PPC for correctness and the PR Statement-of-Work for inclusion of applicable QA standard clauses and assures that QA requirements are consistent with QAGRs for the WBS activity to assure the product or services meet specified requirements.
- The PPC shall be developed in accordance with Appendix A.

The RFQ shall contain the following elements:

- Statement of Work
 - Period of Performance
 - QA Program Including Subtier
 - Technical Requirements
 - Supplier/Contractor Performance Evaluation
 - Rights of Access
 - Documentation Requirements
 - Deviation (Services)
 - Records Requirements
 - Proposal Evaluation Plan
 - Acceptance Criteria
- The QA Procurement Coordinator shall review the PPC for correctness and the PR Statement of Work for inclusion of applicable QA standard clauses and assures that QA Requirements are consistent with QAGRs for the WBS activity to assure the product or services meet specified requirements.
 - Authenticated procurement packages shall be forwarded to the LRC.
 - Upon receipt of the contractor proposal, an evaluation shall be conducted in accordance with the proposal evaluation plan developed for the subject contract by designated, technically qualified organizations, including the QA organization.

- For post-award contract changes, a PR form for a Change Requisition (CR) shall be completed and the change shall be determined to be technical or administrative.
- A PPC shall be prepared in accordance with Appendix A for all technical changes and a management review for technical adequacy.
- Authenticated changes to procurement packages shall be forwarded to the LRC.
- Documented evidence shall exist of conformance to the original and amended requirements prior to the use of the product or service when such evidence is a contract requirement.

Results:

Nine completed QA Procurement records packages were reviewed. One deficiency was detected during the audit. One deficiency was corrected during the audit which addressed the correct incorporation of Software QA requirements in the WA. See Item 3 of Section 5.5.2 of this report.

Summary for the QA Program Element:

Based on the interviews conducted and review of the objective evidence, the implementation by SNL of QA Program Element 4.0 is considered as satisfactory.

5.0 IMPLEMENTING DOCUMENTS

The evaluation of this QA program element was based on selected requirements of the SNL implementing procedures reflecting the QARD requirements as referenced by the RTN Matrix. Compliance with the QARD and SNL procedures was based upon personnel interviews and review of the procedural requirements for procedures QAIP 05-01 and QAIP 06-02. The specific requirements selected for evaluation of compliance and effectiveness are listed below.

Requirements:

QARD, Section 5.0, Revision 0, Implementing Documents

Implementing documents shall include the following information as appropriate to the work to be performed:

- Responsibilities of the organizations affected by the document.
- Technical and regulatory requirements.

- A sequential description of the work to be performed including controls for altering the sequence of required inspections, tests, and other operations. The organization responsible for preparing the document shall determine the appropriate level of detail.
- Quantitative or qualitative acceptance criteria sufficient for determining that activities were satisfactorily accomplished.
- Prerequisites, limits, precautions, process parameters, and environmental conditions.
- Quality verification points and hold points.
- Methods for demonstrating that the work was performed as required (such as provisions for recording inspection and test results, check-off lists, or sign-off blocks).
- Identification of the lifetime or nonpermanent QA records generated by the implementing document.
- Identification of associated items and activities.

Quality Assurance Implementing Procedures (QAIP 05-01)

- Upon identifying the need for a new procedure, the requester completes the applicable part of the Procedure Action Request (PAR) form.
- The PAR is completed as appropriate by the QA Department Manager, QA Manager and TPO.
- The procedure author shall identify applicable requirements and controls using the following sources:
 - SNL YMP commitments (e.g., corrective action for audit findings)
 - QARD
 - Other sources with requirements or controls affecting the department's scope of work
- The procedure author shall identify applicable guidelines using the following sources:
 - Yucca Mountain Site Characterization Office (YMSCO) Procedures

- **YMSCO Systems Engineering Management Plans**
 - **YMSCO Records Management Plan**
 - **YMSCO Training Plan**
 - **SNL Instructions (SLI)**
 - **Other Plans**
 - **Other sources that have guidelines affecting the department's scope of work**
- **The procedure author shall draft the new procedure in accordance with the procedure format and content, Appendix B.**
 - **The procedure author shall prepare input to the matrix system that serves as verification that all applicable requirements and controls are addressed.**
 - **The procedure author shall prepare:**
 - **Document Review and Comment (DRC) forms in accordance with Procedure 6-3**
 - **A Request to Provide Training form in accordance with Procedure 2-5**
 - **A Request for Distribution/Recall of a Controlled Document form in accordance with Procedure 6-1**
 - **For an ICN, the procedure author and requester shall use the form and instructions in Appendix C**
 - **For a revision, the procedure author and requester shall:**
 - **Number revisions sequentially beginning with 01**
 - **Incorporate all ICNs issued since the previous revision**
 - **Identify all changes except those resulting from ICNs by vertical bars in the outside margin, adjacent to the change**
 - **Provide a rationale for each change from the last issue by completing the form in Appendix D and locating the form on the reverse side of the procedure cover page**

- QA and management reviews of the procedure package shall be performed by the QA reviewer, TPO, and procedure author.
- The procedure author, QA reviewer, and TPO shall sign the procedure, revision, or ICN for concurrence and approval as appropriate.
- The TPO or QA Department Manager enters the effective date on the procedure or revision cover page (including the Rationale for Revision form) or the ICN form.
- The procedure coordinator enters the effective date on the Request to Provide Training form and forwards the procedure package as follows:
 - The approved procedure, revision or ICN and the Request for Distribution/Recall of a Controlled Document form for the Document Control staff for distribution and processing in accordance with Procedure 6-1
 - The Request to Provide Training form to the Training Manager for processing in accordance with Procedure 2-5
 - The matrix system input to the QA Department for updating the matrix system
- The QA staff updates the matrix system when provided with matrix system input.

Reviewing, Approving, and Issuing Technical Information Documents. (QAIP 06-02)

- Before a Sandia Document (SAND) document is distributed or disseminated outside SNL, it shall be reviewed and approved by the SNL YMP, YMSCO, and by Sandia Publication Representatives.
- The author, References Reviewer, and Technical Reports Manager submits a list of all references cited in SAND documents to Reference Reviewer for verification against the YMSCO Records Information System data base.
- The technical, QA or peer reviewer shall perform and document the review in accordance with Procedures QAIP 06-03 or QAIP 03-12 as appropriate.
- The author signs the Manuscript Review Sheet (MRS) or Letter Report Review Sheet (LRRS) when all review comments are resolved and accepted.
- The Data Records Management System (DRMS) Reviewer and author assigns the TDIF number to DRMS data set(s).

- When all comments are resolved with author and accepted, the department manager signs the MRS and LRRS.
- For an SNL letter (SLTR), the SNL YMP TPO shall signify acceptance by signing the LRRS.
- The Technical Reports Manager prepares a publication request package (commonly called a transmittal package) according to Administrative Procedure (AP)-1.3 for transmittal of SAND documents to YMSCO. The SNL YMP TPO shall signify acceptance of the SAND document by signing the MRS.
- The author and Technical Reports Manager distributes SAND reports according to SNL's requirements (AP-1.3 and SLI 1008).
- The Technical Reports Manager and author issues and distributes SLTRs as designated by the author.
- The author and Technical Reports Manager collects record segments and prepares and submits appropriate record package(s) to the LRC.

Results:

During the time of the audit, there were 37 QAIPs approved for use at SNL, of these, 23 were examined for compliance with selected requirements from QAIP 05-01. The review of these QAIPs revealed that generally, QAIPs were being prepared under the control of QAIP 05-01. It was noted that two minor problems were closed during the audit, specifically:

- 1) Page 15, Appendix B, Part B, stated, "Develop a table of contents for all procedures with more than (5) pages, excluding appendices." Contrary to this, several procedures did not have a table of contents, but were more than five pages.
- 2) The Responsible Individual columns for Section 6.3, Step 4 were incorrect.

As a result of the above concerns, ICN 01 to QAIP 05-01, Revision 04, dated 9-7-94, was issued during the audit which corrected these deficiencies. (See Items 1 and 2 of Section 5.5.2 of this report)

Throughout the course of the audit, the audit team noted through procedure review that SNL's QAIPs did not meet all of the requirements of the QARD. For details, refer to CAR YM-94-096 on Page 94 of this report.

Although not a procedural and/or QARD violation, there was a concern relative to the review of technical information documents (i.e. SAND documents and SAND Reports). The method and level of detail by which reviewers are documenting and resolving comments on the DRC form is inconsistent between reviewers. Because of these inconsistencies, it was sometimes difficult to determine; (1) the extent of the comments received and (2) if all comments received had been satisfactorily resolved. This was brought to the attention of the SNL Procedure Coordinator as a potential weakness. No further action was required.

Summary for the QA Program Element:

Except were noted, implementation of QA Program Element 5.0 was considered to be marginally satisfactory.

6.0 DOCUMENT CONTROL

The evaluation of this QA program element was based on selected requirements of the SNL implementing procedures reflecting the QARD requirements as referenced by the RTN Matrix. Compliance with the QARD and SNL procedures was based upon personnel interviews and review of the procedural requirements for procedures QAIP 06-01 and QAIP 06-03. The specific requirements selected for evaluation of compliance and effectiveness are listed below.

Requirements:

QARD, Section 6.0, Revision 0, Document Control

- Documents that specify technical requirements, quality requirements or prescribe work shall be reviewed for adequacy, correctness, and completeness, according to the requirements of Section 2.0, prior to approval and issuance.
- The organizational position responsible for approving the document for release shall be identified.
- The distribution and use of documents, including changes and editorial corrections to documents, shall be controlled.
 - Documents used to perform work shall be distributed to, and used at, the work location
 - Effective dates shall be established for approved implementing documents
 - The disposition of obsolete or superseded documents shall be controlled

- Lists shall be established to identify the current status of each document that is required to be controlled in accordance with this section
- Changes to documents shall be reviewed for adequacy, correctness, and completeness, according to the requirements of QARD, Section 2.0, prior to approval and issuance.
 - Changes shall be reviewed by the organizations or disciplines affected by the change
 - The QA organization shall review changes if the QA organization was involved in the review of the previous version
 - Changes shall be approved for release by the designated organizational position that is responsible for the document
 - Implementing documents shall define the method used to incorporate changes. If the defined method is other than reissue of the entire controlled document, the implementing document shall define the maximum number of changes permitted prior to requiring reissue of the entire controlled document
 - Implementing documents shall require that a history of changes to QA program documents, including the reasons for the changes, be documented and maintained. This document history shall be reviewed each time additional changes to the document are proposed
- Implementing documents shall describe the process to control expedited changes according to the following requirements.
- The level of management with the authority to make expedited changes shall be identified.
- The time limits for processing expedited changes through the normal change process shall be specified.
- Editorial corrections may be made to documents without being subject to review requirements.
- The organizational position responsible for the document shall approve editorial corrections.

Document Control System (QAIP 06-01)

- The author ensures that documents are prepared, reviewed and approved in accordance with the procedure under which the document is generated.
- The author ensures that documents released for use have an effective date identified.
- The author completes a "Request for Distribution/Recall of a Controlled Document" form (Appendix B) and submits to the Document Control staff with a clear, clean master copy of the approved document to be controlled.
- The Document Control staff updates the controlled document database with the document, the document revision, or the ICN to the "Master List of Controlled Documents."
- The Document Control staff marks the superseded copy of the controlled document "Superseded" or "Deleted," as appropriate and stamps the master copy of the controlled document with the "Controlled Document" stamp, if necessary.
- The Document Control staff stamps any forms in the controlled document with the "Sample" stamp.
- The Document Control staff places a unique control number using red ink, on each copy.
- The Document Control staff issues the controlled document with the "Controlled Document Transmittal/Acknowledgment Form."
- The Document Control staff, as necessary, generates "Controlled Document Recall/Acknowledgment Forms" (Appendix D) for all individuals on distribution when a document is deleted from the Controlled Document System.
- The Document Control staff monitors the status of both the "Controlled Document Recall/Acknowledgment Form" and the "Controlled Document Transmittal/Acknowledgment Form," and sends reminders if forms are not returned in two weeks.
- The Document Control staff maintains and periodically distributes the "Master List of Controlled Documents" to recipients of SNL YMP controlled documents and the YMP Quality Manager.
- The Document Control staff fills requests submitted on the "Request to be Added To/Deleted From Controlled Document Distribution Form" (Appendix A).

- Recipients and users of SNL YMP controlled documents acknowledge receipt of documents, and revisions and ICNs to documents, as instructed in the "Controlled Document Transmittal and Acknowledgment Form."
- The recipients and users of SNL YMP controlled documents acknowledge recall of documents by completing the "Controlled Document Recall and Acknowledgment Form" as instructed.
- Document Recipients/Users use the correct and applicable revisions and ICNs of documents in performing SNL YMP activities. NOTE: When document revisions or ICNs are not specified or otherwise identified, the version identified as current on the latest approved in the "Controlled Document Database" shall be used.

Conducting and Documenting Reviews (QAIP 06-03)

- The review requester shall determine personnel who are to perform reviews.
- The review requester shall assure that the qualifications of the personnel selected to perform the review are in accordance with Procedure 2-6.
- The review requester shall prepare a DRC form (Appendix A) for each individual selected to perform the review.
- Reviewers shall conduct reviews in accordance with specified criteria and document comments on the DRC form.
- If there are no comments, the reviewers shall complete the DRC form, noting that there were no comments.
- The reviewer shall document acceptance or rejection of comment resolution on the DRC form.
- The DRC form and any relevant marked-up document pages shall be prepared and submitted to the SNL YMP LRC in accordance with Procedure 17-1, "Protecting, Preparing, and Submitting YMP QA Records" and the "Master List of File Codes."

Results:

The evaluation of this QA program element was based on personnel interviews and a review of controlled documents identified on SNL's List of Active Controlled Documents, which is a comprehensive listing of all active controlled documents (i.e., Department Operations Procedures [DOPs], QAIPs, QAGRs, WAs, and TPs) and any related ICNs. This list also includes APs directly implemented by SNL YMP.

A total of 373 controlled documents consisting of QAIPs, QAGRs, WAs, and TPs assigned to six SNL staff members were selected for verification. The verification process included verifying that each of the six selected SNL individuals were maintaining those controlled documents assigned to him or her in a current state. As a result of this verification, it was concluded that each of the 373 procedures selected for review were properly being maintained. Considering the large number of controlled documents reviewed, the auditor was more than satisfied with the maintenance of each procedure reviewed. The audit of this program element, resulted in no problems and/or concerns being identified.

Summary for the QA Program Element:

Based on interviews and objective evidence, implementation of QA Program Element 6.0 is considered satisfactory.

7.0 CONTROL OF PURCHASED ITEMS AND SERVICES

The evaluation of this QA program element was based on interviews with SNL QA organization management, procurement personnel and examination of objective evidence to determine the degree of compliance with selected requirements from QAIP 07-01 and QAIP 07-03. Selected requirements from the QARD were examined and a review of the SNL implementing procedures referenced by the RTN Matrix was performed. The specific requirements selected for evaluation of compliance and effectiveness are listed below.

Requirements:

QARD, Section 7.0, Control of Purchased Items and Services

- Supplier quality assurance programs shall be evaluated either before or after contract placement, and any deficiencies that would affect quality shall be corrected before starting work subject to QARD requirements.
- Supplier generated documents shall be controlled, processed, and accepted in accordance with the requirements established in the procurement documents.
- Methods for accepting supplier furnished items or services shall include one or more of the following, as appropriate to the items or services being procured:
 - Performing one or a combination of source verification, receiving inspection, or post-installation test
 - Technical verification of the product produced
 - Surveillance or audit of the work

Procurement Acceptance Verification (QAIP 07-01)

- **Methods used to accept a service from a contractor shall be identified in procurement documents (Procedure 4-1) and are any one or a combination of the following: acceptance verification, certificate of conformance, receiving inspection, source verification, or post-receipt testing.**
- **A service shall be accepted by one of the following methods:**
 - **Technical verification of data produced**
 - **Surveillance and/or audit of the activity**
 - **Review of objective evidence for conformance to procurement document requirements, such as reports, contractor documents, etc. and shall be documented on the SNL Invoice Action form**

Evaluation of Contractor QA Program Documents (QAIP 07-03)

- **The contractor's QA program document and transmittal letter along with DRC forms shall be sent to:**
 - **QA staff for review and recommendation for acceptance**
 - **Department Manager for review and acceptance**
- **The QA Staff shall develop a checklist or other form to identify acceptance criteria to ensure the adequacy, completeness, and relevance of the document and indicate conformance or nonconformance to each requirement.**
- **The QA staff shall develop an evaluation transmittal letter containing the review comments and the evaluation results.**
- **The Department Manager shall sign SNL's document acceptance letter and send it to the contractor via the SNL delegated representative.**
- **The QA staff shall maintain the records of the documentation activities, retaining review comments and transmittal letters on deficient documents until deficiencies are resolved.**

Results:

Five QA procurement documents were reviewed. The deliverables identified were a Life Cycle Plan, a SNL Report and calibration reports. One deficiency was documented in CAR YM-94-097 which addressed the acceptance of calibration certifications without being in conformance with the requirements. See Page 97 of this report.

One supplier Quality Assurance Program Plan (QAPP) was reviewed and implementation was determined to be satisfactory.

Summary for QA Program Element:

Based on the interviews conducted and review of the objective evidence, the implementation by SNL of QA Program Element 7.0 is considered as satisfactory.

12.0 CONTROL OF MEASURING AND TEST EQUIPMENT

The evaluation of this QA program element was based on selected requirements of SNL implementing procedures reflecting QARD requirements as referenced by the RTN Matrix. Compliance with the QARD and SNL procedures was based upon a review of requirements and an examination of objective evidence for procedure QAIP 12-01.

The specific requirements selected for evaluation of compliance and effectiveness are listed below:

Requirements:

QARD, Section 12.0, Revision 0, Control of Measuring and Test Equipment

- Measuring and Test Equipment (M&TE) shall be calibrated, adjusted, and maintained at prescribed intervals or prior to use, against reference calibration standards having traceability to nationally recognized standards. If no nationally recognized standards or physical constants exist, the basis for calibration shall be documented.
- Calibration standards shall have a greater accuracy than the required accuracy of the M&TE being calibrated.
- The method and interval of calibration of each device shall be defined, based on the type of equipment, stability characteristics, required accuracy, intended use, and other conditions affecting measurement control. For M&TE used in one-time-only applications, the calibration shall be done both before and after use.

- Calibrated M&TE shall be labeled, tagged, or otherwise suitably marked or documented to indicate due date or interval of the next calibration.
- Calibrated M&TE shall be uniquely identified to provide traceability to its calibration data.
- The use of M&TE shall be documented. As appropriate to equipment use and its calibration schedule, the documentation shall identify the processes monitored, data collected, or items inspected or tested since the last calibration.

Measuring and Test Equipment Control (QAIP 12-01)

- M&TE is calibrated, adjusted, and maintained at prescribed intervals or prior to use, against reference standards having traceability to nationally recognized standards.
- Calibration standards are of a greater accuracy than the required accuracy of the M&TE being calibrated.
- Method and interval of calibration for each device is defined, based on the type of equipment, stability characteristics, required accuracy, intended use, and other conditions affecting measurement control. For M&TE used in one time only applications, the calibration should be done both before and after use.
- Calibrated M&TE is labeled, tagged or otherwise suitably marked or documented to indicate the due date or interval of the next calibration.
- Calibrated M&TE is uniquely identified to provide traceability to its calibration date.
- Use of M&TE is documented and the documentation identifies the processes monitored, date collected, or items inspected or tested since the last calibration.
- PI(s) or designee(s) have ensured that M&TE needed or utilized in the collection of data in support of the YMP have fully integrated that equipment into the calibration and control program.
- Organizations engaged in establishing design or characterization parameters in support of the YMP have determined which of the M&TE is used directly for these purposes and label the equipment appropriately.
- Calibration certificate contains the following minimum information:
 - Identification of M&TE
 - Procedure used, with revision(s)

- Calibration data - standards versus device readings
 - Identification of standards used
 - Calculations - independent review
 - Statement of accuracy and acceptability
 - Due date if required
 - Printed name and signature of person responsible for calibration
- Out-of-calibration and past due devices have been/are tagged or segregated and not used until they have been calibrated.
 - Personnel performing calibrations are trained to their procedure and any subsequent instructions/procedures.

Results:

The evaluation of this QA program element was based on interviews with respective personnel and examination of M&TE records for calibrated equipment. In addition, selected pieces of M&TE were examined for current calibration identification. OCRWM CAR YM-94-098 (refer to Pages 97 and 98 of this report) was initiated due to a Certificate of Calibration not containing all the information as required by both the QARD and the SNL implementing procedure.

Summary for the QA Program Element:

With the exception of the deficiency, it was deemed that implementation and effectiveness of QA Program Element 12.0 was satisfactory.

16.0 CORRECTIVE ACTION

The evaluation of QA Program Element 16.0 was based on selected requirements from the QARD and a review of the SNL implementing procedures as referenced by the RTN Matrix. Compliance with SNL procedures was based upon personnel interviews, review of the procedural requirements, and evaluation of applicable documentation produced as a result of procedural implementation. The evaluation included a review of selected requirements from the QARD to determine flowdown of requirements and compliance with selected requirements of SNL procedures QAIP 16-01 and QAIP 16-03. The specific requirements selected for evaluation of adequacy and compliance are listed below.

Requirements:

QARD, Section 16.0, Revision 0, Corrective Action

- **Conditions adverse to quality shall be documented and reported to the appropriate levels of management responsible for the conditions and to the QA organization for tracking.**
- **Significant conditions adverse to quality shall be documented and reported to management responsible for the condition, their upper management, and to the QA organization for tracking.**
- **Responsible management shall determine, document, and complete remedial action. Responsible management shall also determine the root cause of the problem and take corrective action to prevent recurrence in a timely manner.**
- **The QA organization shall verify implementation of corrective actions taken for all reported conditions adverse to quality and close the related corrective action documentation in a timely manner when actions are complete.**
- **The QA organization shall establish criteria for determining adverse quality trends.**

Corrective Action (QAIP 16-01)

- **SNL YMP QA shall determine if the deviation is a significant condition adverse to quality as defined in Subsection 3.8. If the condition is significant, shall notify the SNL TPO of the deviation and any corrective action taken.**
- **SNL YMP QA obtains a CAR number and records this number on the CAR form, then forwards the CAR to responsible management and maintains a copy of the CAR.**
- **SNL YMP QA/responsible management shall evaluate the condition for a Stop Work. SNL YMP QA is to establish a corrective action due date approximately ten working days for significant conditions, 20 working days for other deviations and thirty calendar days for audit CARs and observations.**
- **SNL YMP QA shall enter a description of the CAR into the QA corrective action tracking system for CARs.**
- **Responsible management shall promptly evaluate and investigate the condition to determine the root cause (when required), identify the proposed remedial actions, and actions to prevent recurrence, if applicable, then document the**

results of the investigation including the extent of the condition and impact on previous work.

- Responsible management shall sign, date and forward the CAR to SNL YMP QA for evaluation and concurrence. At any time during the course of determining the cause and corrective action, or during accomplishment of corrective action, due dates or commitment dates for corrective action cannot be met, provide justification with a written request for a new due date.
- SNL YMP QA shall review the proposed corrective actions documented on the CAR to assure that the adverse condition has been adequately addressed. If acceptable, sign and date and return the CAR to responsible management.
- Responsible management shall sign and date the CAR form when all actions are completed and notify SNL YMP QA of completion along with a copy of the completed CAR. SNL YMP QA shall verify satisfactory completion of corrective actions and document objective evidence that was used to verify completion and effectiveness of those actions.
- SNL YMP QA shall sign and date the CAR form when all actions are satisfactorily complete to document closure of the CAR.

Quality Assurance Program Report (QAIP 16-03)

- Results shall be reported to the SNL YMP TPO.
- QA Department Manager is to prepare and submit a QA Program Report at least quarterly to the SNL YMP TPO and a copy to the YMP QA Division to summarize the status of the QA program and provide information on surveillance activities, status of any open significant conditions adverse to quality, audit activities, adverse quality trends, and corrective action report status as appropriate.
- QA Department Manager, on a semiannual basis, shall analyze corrective action reports for quality trends and identification of root causes that may not have been previously identified and document the analysis results in the QA Program Report.

Results:

The results of the review revealed that SNL has adequately addressed the QARD for those selected requirements listed above. In the area of implementation, procedural compliance was found to be satisfactory based upon interviews and the review of several SNL CARs; except for three conditions adverse to quality noted during the audit. One condition related to responses to CARs not including impact on previous

work and the extent of the adverse condition, as well as verification of completed corrective actions which did not provide details of the objective evidence reviewed. The other two conditions adverse to quality related to observations which should have been classified as deficiencies and QA Program Reports that were not issued to YMP QA Division or in a timely manner. These conditions were documented on CARs YM-94-087, YM-94-090, and YM-94-091 and details can be found in Section 5.0 of this report. Also, one recommendation was made which related to the responsibility of responding to CARs and is discussed in detail as Programmatic, Item 8, Section 6.0 of this report.

Summary for the QA Program Element:

Based on the above, QA Program Element 16.0 was determined to be satisfactory.

17.0 QUALITY ASSURANCE RECORDS

This QA program element was evaluated based on interviews with SNL representatives and examination of objective evidence to determine compliance with selected requirements taken from implementing procedures QAIP 17-01 and QAIP 17-03. In addition, selected requirements from the QARD were examined and a review of the SNL implementing procedures referenced by the RTN Matrix was performed. Yucca Mountain Administrative Procedure YAP-17.1Q, Records Management Requirements and Responsibilities, was not included in the scope of the audit because the document had not been implemented by SNL at the time of the audit (CAR YM-94-061). The specific requirements selected for evaluation of compliance and effectiveness are listed below:

Requirements:

QARD, Section 17.0, Records Management Program

- Implementing documents shall:
 - Identify those documents that will become QA records
 - Identify the organization responsible for submitting the QA records to the records management system
- Corrections to QA records shall be approved by the originating organization.
- Organizations originating quality assurance records shall develop implementing documents that identify means for replacement, restoration, or substitution of lost or damaged QA records.

Protection, Preparing, and Submitting YMP QA Records (QAIP 17-01)

- Record source protects materials destined to become QA records against loss or degradation until they have been completed.
- Once authenticated the record source places QA records in temporary storage until submitted to the LRC.
- Record source corrects/documents legibility issues by:
 - Enhancing or transcribing the illegible portions, or if it cannot be corrected,
 - sign and date a description of the impact on YMP work, and obtain the signature of the record sources's immediate supervisor.
- Record Packages are prepared to include:
 - Table of Contents,
 - WBS number,
 - Record package identifier designation that the records package is QA or QA: N/A,
 - Pagination of the Table of Contents,
 - Record date,
 - Records package title,
 - Listing of all records in the package with the date and number of pages of each record,
 - Total number of pages,
 - "Privileged" designation for training, qualification, and certification records,
 - SNL YMP file code, and
 - YMP CRF code.

- Individual records not included in a record package and record packages are marked "Privileged" to designate training, qualification, and certification records and record packages include cross reference sheets for privileged records.
- QA records/record packages are authenticated by stamping, signing, or initialing and dating the document.
- Records source corrects errors on records by scribing a single line through the incorrect information and entering the correct information in close proximity, and dates and initials or signs the correction.

Processing, Storing, and Protecting YMP QA Records (QAIP 17-03)

- LRC staff verify and acknowledge receipt of submitted records and record packages.
- LRC staff ensure the record is legible and complete, and that any corrections have been made in accordance with QAIP 17-01.
- LRC staff obtain accession number from the Records Management System and indicate on all individual records and completed record packages.
- LRC staff duplicates all records and record packages and protects duplicates until receipt of the records is acknowledged by the YMP CRF.
- LRC staff transmits records within 30 working days of acceptance of the LRC.
- LRC staff places QA records in temporary storage until accepted by the YMP CRF.
- LRC staff stores one-of-a-kind QA records in a two-hour fire-rated safe or container until transmitted to the YMP CRF.
- LRC staff precludes entry of unauthorized personnel in storage areas by posting a list that designates those personnel who shall have access to records, including privileged records.
- LRC staff maintains control and accountability for records within the LRC by posting a notice advising individuals that all records removed from the LRC must be logged out, and that records should be logged in before the close of business the same day.

- LRC staff maintains control and accountability for records within the LRC by verifying at the close of business each day that all QA records logged out have been logged in and, if not, contacts the individual who logged out the records to assure that the record is under the individual's control and protection.
- QA records generated by QAIP 17-03 include the records center access list and documentation of access to DOE-28 records.

Results:

Several SNL QAIPs, as identified in SNL CAR 94-71, are being revised to identify the organization responsible for submitting the QA records to the records management organization. The SNL implementing procedures were found to adequately incorporate the QARD requirements.

It was identified that record packaging practices are not reflected sufficiently in the procedures that generate the records, nor is the handling of these record packages by the records management organization sufficiently addressed in the appropriate records procedure. This issue is addressed in QA Program Element 5.0 under the issue of sufficient detail in procedures. Discrepancies were identified between the two sets of training records maintained in dual storage. Procurement records are not being transmitted to the CRF. Results were satisfactory.

Summary for the QA Program Element:

Two deficiencies, CARs YM-94-093 and YM-94-094, were identified during the audit as described in Section 5.0 of this report. In addition, three recommendations were identified as described in Programmatic Recommendations 9 through 11 of Section 6.0 of this report. Based on interviews and review of objective evidence, the implementation of QA Program Element 17.0 is satisfactory.

18.0 AUDITS

The evaluation of this QA program element was based upon interviews with SNL QA personnel and examination of objective evidence to determine adequacy and effectiveness of implementation of selected requirements from QAIP 02-07 and QAIP 18-01. In addition, a sampling of requirements from the QARD was selected to verify adequate incorporation into SNL implementing procedures as referenced in the RTN Matrix. The specific requirements selected for evaluation of compliance and effectiveness are listed below:

Requirements:

QARD, Section 18.0, Audits

- Regularly scheduled internal audits shall be supplemented by additional audits of specific subjects when necessary to provide an adequate assessment of compliance or effectiveness.
- Internal audits of work to verify QA program compliance shall be performed annually or at least once during the life of the work, whichever is shorter.
- In the case of internal audits, personnel having direct responsibility for performing the work being audited shall not be involved in the selection of the audit team.
- Technical specialists selected for auditing assignments shall be indoctrinated and trained according to the requirements of Section 2.0 and shall have the level of experience or training commensurate with the scope, complexity, or special nature of the work being audited.
- The prospective Lead Auditor shall have verifiable evidence that a minimum of ten credits have been accumulated.
- The prospective Lead Auditor shall have participated in a minimum of five QA audits or equivalent verifications (such as management assessments, pre-award surveys, or comprehensive surveillances, providing the parameters of the audit process are met) within a period of time not to exceed three years prior to the date of certification. One audit shall be a nuclear-related QA audit or equivalent verification within the year prior to certification.
- Lead Auditors shall maintain their proficiency through one or a combination of the following:
 - Regular and active participation in the audit process
 - Review and study of codes, standards, implementing documents, instructions, and other documents related to the QA program and program auditing
 - Participation in training programs
- Management of the auditing organization shall evaluate the proficiency of Lead Auditors annually. Based on the evaluation, management may choose to extend the qualification, require retraining, or require requalification. Management evaluations shall be documented.

Qualification of Quality Assurance Program Audit Personnel (QAIP 02-07)

- The QA Department Manager has documented the qualification of auditors/technical specialists on the appropriate forms.
- The QA Department Manager has documented the accumulated points for each Lead Auditor and that all the requirements of this procedure have been met.
- Lead Auditor (candidates) have participated in the minimum of five QA audits within the last three years, one nuclear related.
- The SNL TPO has certified each Lead Auditor indicating that all training and qualification requirements have been met.
- Auditors and Lead Auditors have maintained their qualifications in accordance with requirements.
- The requalification of Auditors/Lead Auditors has been performed in accordance with requirements.
- QA Department Manager/TPO have performed an annual assessment of Auditors/Lead Auditors.
- QA records generated as a result of this procedure have been prepared and submitted as required.

Quality Assurance Audits (QAIP 18-01)

- The PI for audits shall evaluate QA programs of SNL contractors who are performing quality-affecting activities at least annually.
- The PI for audits shall, on an annual basis, develop an audit schedule for internal and external audits and periodically review and revise the audit schedule as necessary to assure coverage is maintained or to update the schedule as changes occur.
- The PI for audits shall obtain the QA Manager's approval of the audit schedule and changes.
- The audit team shall perform audits in accordance with written procedures or checklists.
- The audit team shall prepare an audit report including the following information, as appropriate: description of the audit scope; identification of the auditors; identification of persons interviewed or contacted during audit activities; identification of documents reviewed; summary of audit results,

including a statement on the effectiveness of the QA program elements audited; description of each reported condition adverse to quality in sufficient detail to enable corrective action to be taken by the audited organization; and a summary of the specific audit results, review, and interviews from the contents of the audit checklists.

- The audit team shall document each condition adverse to quality, deviation, or observation on a CAR form, and issue the CAR in accordance with QAIP 16-01. Include a copy of the CAR in the audit report.
- The ATL and the QA Manager shall sign and date the audit report.
- QA records, records package segments, and records packages include: rationale for not performing an external audit, audit schedule, copy of closed-out CARs, annual contractor evaluations (QA records) and audit plans, audit report (QA record package).
- Contractor audits shall be scheduled and performed on a triennial basis, when supplemented by annual evaluations.
- The annual evaluation shall include a review of subcontractors to SNL contractors who work under the SNL YMP QA Program to determine whether they must be audited.
- At least annually (triennial for contractors) or at least once during the life of the activity affecting quality, whichever is shorter, an audit of the adequacy and effectiveness of the QA program shall be performed.
- A determination may be made that external audits are not necessary for procuring items that are relatively simple and standard in design, manufacture, and test; adaptable to standard or automated inspection or test of the end product to verify quality characteristics after delivery; an activity less than four months in duration based on complexity or importance of the activity; services provided by consultant specialist for which no deliverables are provided. The rationale for not performing an external audit shall be documented.
- Audits conducted on a supplier by an external organization for the SNL YMP, or for a group of purchasers that includes SNL, are an acceptable alternative to an SNL conducted audit providing the scope of the audit meets the needs of the program, and the audit report is provided to the affected organization. The SNL YMP remains responsible for the adequacy of these audits.

Results:

The evaluation of Criterion 18 was conducted by interviews with personnel and the review of objective evidence and included three areas: internal audits, external audits, and auditor/lead auditor qualification. No CARs were issued; however, one adverse condition regarding qualification of lead auditors was corrected during the audit. (See Item 4 in Section 5.5.2 of this report.) Two recommendations were documented in areas of performance of internal audits, external audit planning, and QA records as designated in QAIP 18-01. See Programmatic Recommendations 12 and 13, Section 6.0 of this report.

Internal Audits:

SNL has opted to conduct a full-scope annual audit as opposed to smaller audit scopes of applicable criteria and WBS elements. Because the SNL QA support staff perceives its independence as compromised due to QA liaison activities with SNL technical staff, internal auditors are selected from outside the YMP organization. Internal Audit SNL-A94-1 was conducted June 6 through 10, 1994, and the report was available for review during this audit. The internal audit was broken down by applicable criteria and WBS elements. All areas audited were stated as effective, however, adequacy and effectiveness for individual areas evaluated were not indicated in the report. The audit was conducted in accordance with QAIP 18-01, Revision 02, Quality Assurance Audits, and audit team members were appropriately trained to that procedure prior to conducting the audit.

Three areas of concern regarding internal audits are noted in Recommendation 12 in Section 6.0 of this report as follows:

- It could not be established by reviewing the 1994 internal audit report whether results of previous audits were considered by the audit team.
- Since the internal audit resulted in issuance of several CARs (20 findings and eight observations), the determination and value of a general effectiveness statement is questionable.
- A single full-scope audit performed by a team unfamiliar with the activities challenges the effectiveness of the SNL internal audit process. In the time allowed to perform the internal audit, it is unlikely that scoped areas could be examined to the depth necessary to establish adequacy and effectiveness of work products. Supplemental audits of selected areas or enhanced surveillance activity is viewed as necessary.

External Audits:

SNL schedules and conducts external audits of its subcontractors who perform work activities with specified deliverables. Many of SNL's subcontractors, however, provide consultant services without specified deliverables or perform work under the direction of an SNL PI who will be evaluated during the annual internal audit. The PI of Audits reviews the SNL procurement database for inclusion of subcontractors on the audit schedule, reviews internal grading reports noting applicable criteria and procedures for performance of work under a given WBS element, and maintains the "YMP SNL Procurement Screening" document indicating criteria applicable to an SNL subcontractor and whether an external audit will be performed.

External audits and annual evaluations reviewed were thorough and addressed applicable QARD and procedural requirements. Subcontractors that are determined to require an external audit are placed on the audit schedule which is periodically revised to reflect the completion of audits, schedule changes, and the triennial evaluation status. Recommendation 14 in Section 6.0 of this report documents that QAIP 18-01 does not adequately specify the criteria or method used to determine whether a subcontractor audit is required. However, criteria is established in the "SNL YMP Procurement Screening" document and the audit schedule cover sheet. It should be noted that all subcontractors, with exception of one, work to the SNL QA Program when performing YMP work activities.

Summary for the QA Program Element:

The SNL implementing procedures were found to adequately address QARD requirements. One deficiency was identified and corrected during the audit and described in Item 4, Section 5.5.2 of this report.

Based on the interviews conducted and the review of objective evidence, the implementation by SNL of QA Program Element 18.0 is considered to be satisfactory.

SUPPLEMENT I. SOFTWARE CONTROL

The evaluation of this QA program element was based on interviews with SNL Software QA, PIs, and examination of objective evidence to determine the degree of compliance with selected requirements from the QARD as referenced in the RTN Matrix and implementing procedure QAIP 19-01. The specific requirements selected for evaluation of compliance and effectiveness are listed below.

Requirements:

QARD DOE/RW-0333P Supplement I, Software

- Each affected organization shall document and approve a specific life cycle plan for

each software item prior to development or modification of software or the qualification of acquired software.

- Software life cycles shall be defined by control points at which software baseline elements shall be documented.

Software Quality Assurance Requirements (QAIP 19-01)

- A life cycle plan shall be prepared and submitted to Software QA.
- For acquired software the life cycle plan shall meet the requirements for:
 - A.2.1 Acquisition Phase
 - A.2.2 Documentation Phase
 - Requirements Information
 - User Information
 - A.2.3 Validation Information
 - Validation must be independent
 - The plan shall describe: tasks, methods, implementing documents, and acceptance criteria for the validation activities, including installation testing.
 - A.2.4 Modification Phase
 - Change request
- Software QA shall assign a unique identifier to the software item and approve the life cycle plan for entry into Configuration Management.

Results:

Software life cycle plans for RegCM2 (Regional Climate Model 2) and FEHM (Finite Element Heat and Mass Transfer Code) were reviewed and interviews conducted with Software QA and the PIs. These life cycle plans indicate a very limited implementation of QAIP 19-01, Revision 01, which became effective May 31, 1994.

Summary for the QA Program Supplement I:

Based on the interviews conducted, review of the objective evidence and the lack of implementation of QAIP 19-01 by SNL QA Program Element 19.0, is considered indeterminate.

SUPPLEMENT II. SAMPLE CONTROL

The evaluation of the QA program element was based on selected requirements of SNL implementing procedures reflecting QARD requirements as referenced by the RTN Matrix. Compliance with the QARD and SNL procedures was based upon a review of requirements

and an examination of samples and chain-of-custody forms for SNL procedures QAIP 20-04 and QAIP 20-03. The specific requirements selected for evaluation of compliance and effectiveness are listed below:

Requirements:

QARD Supplement II, Sample Control

- Sample traceability shall ensure that the sample can be traced at all times from its collection through final use.
- Identification (ID) shall be maintained on the samples or in a manner which ensures that ID is established and maintained.
- Sample ID methods shall include use of physical markings. If physical markings are either impractical or insufficient, other appropriate means shall be employed (such as physical separation, labels or tags attached to containers, or procedural control).
- Physical markings, when used, shall:
 - Be applied using materials and methods that provide a clear and legible ID.
 - Be transferred to each identified sample part when the sample is subdivided.
- If samples have limited use or storage life, then methods shall be established that preclude using the sample beyond its intended use or storage life.
- If required for critical, sensitive, perishable, or high-value samples, specific measures for handling, storage, cleaning, packaging, shipping, and preservation shall be identified and used.
- Measures shall be established for the marking and labeling for packaging, shipping, handling, and storage of samples as necessary to adequately identify, maintain, and preserve the sample. Markings and labels shall indicate the presence of special environments or the need for special controls if necessary.
- The disposition for nonconforming samples shall be identified and documented and shall be limited to "use-as-is," "limited use," or "discard."

Sample Control (QAIP 20-03) and Operation of the SNL YMP Samples Library (QAIP 20-04)

- Sample ID methods shall ensure that traceability is established and maintained from the samples and can be traced at all times from collection through final use.

- **Sample ID methods shall include the use of physical markings, or other suitable means, i.e., tags on labels attached to containers.**
- **Physical markings, when used, shall provide a clean and legible ID, do not detrimentally affect the sample, and are transferred to each part when the sample is subdivided.**
- **Samples have not been used beyond intended use of storage life.**
- **Maintenance or replacement of markings and ID tags are performed when tags/ID have been damaged during handling or aging.**
- **Handling, storage, cleaning, packaging, shipping, and preservation of samples shall be conducted in accordance with established work and inspection documents.**
- **If required for critical, sensitive, perishable, or high-value samples, specific measures have been identified and are being utilized.**
- **Requirements pertaining to the submittal of samples are being implemented.**

Log Updated:

- **Name/organization**
- **Date received**
- **Sample ID**
- **Name of company providing sample**
- **Instructions for special handling/storage**
- **Comments**

- **The Samples Library Manager has performed and documented checks to assure proper storage, no damage, no seals broken, ID maintained. Copy to LRC with copy in Logbook.**
- **The Samples Library Facility is maintained in an area of controlled access.**
- **The requirements pertaining to "check-out" of samples are being implemented properly.**
 - **Chain-of-custody form**
 - **Log-out contains the following:**
 - * **Sample IDs as written on custody forms**
 - * **DRMS data set ID for activity**
 - * **Verification that special handling/storage have been met**

- * Name/company obtaining sample
- * Data sample relinquished
- * Comments
- * Name/organization of person making entry, including date

- The requirements pertaining to records are being implemented.
 - Sample Library Logbook
 - Reports of Sample Library checks
 - Additional documents received with samples (shipping/receiving documents)

Results:

No samples were identified during this audit as requiring special handling, limited lifetime, critical sensitive, perishable, or high value. All samples were identified per the requirements with date received shown. The Samples Library personnel were thorough in their record keeping and knowledgeable of their responsibilities.

NOTE: 1) The Samples Library Facility is currently located in Building 823 at Kirtland Air Force Base, 2) access was controlled - locked, and 3) a new location is being considered and should be available by the end of calendar year 1994

Summary for the QA Program Supplement II:

Based on personnel interviews and review of objective evidence, SNL implementation of QA Program Supplement II is considered satisfactory.

SUPPLEMENT III. SCIENTIFIC INVESTIGATION

The evaluation of this QA program element was based on selected requirements of SNL implementing procedures that implement QARD requirements as referenced in the RTN Matrix as well as interviews with personnel and review of objective evidence. Whereas, SNL has QAIP 03-05, Revision 07, Design Analysis and Verification, all implementation occurred via QAIP 20-02, Scientific Notebooks; and by reference QAIP 02-04, Conducting and Documenting Analysis and QAIP 03-10, Routine Calculations. The specific requirements selected for evaluation of compliance and effectiveness are listed below:

Requirements:

Scientific Notebooks (QAIP 20-02)

- Ensure appropriate planning documented in approved WA.
- Ensure SN written and reviewed for each scientific investigation.

- Ensure SN includes minimum information.
- Ensure SN contains sufficient detail that a technically qualified reviewer can retrace the investigation and confirm the results.

Routine Calculations (QAIP 03-10)

- Use of QAIP 03-10 specified in WA.
- Calculations performed and documented.
- Independent technical review of calculations.

Results:

The governing QAIPs lacked implementation details and generally seemed to be geared to the absolute minimum requirements. The QAIPs were very general and as such contributed to practices that the auditors viewed as inadequate, such as looseleaf SN entries that were undated and did not identify the author and descriptions and results that appeared to be incomplete in allowing a qualified individual to retrace the methodology. This condition is documented on CAR YM-94-099 (see Page 99 of 99 of this report).

There were also technical concerns on approaches and results. There was no oriented core from the NRG series of boreholes; no discussion of the bias frequency of fractures due to the vertical discontinuities in the core, a subjective visual determination for rock hardness rather than an appropriate field test, and use of Schmidt-Hammer test for rock strength rather than better methods. Refer to technical Recommendations 2 through 11 of Section 6.0 of this report.

Summary for the QA Program Supplement III:

The evaluation regarding QA program implementation is based upon the details of conditions identified and documented in the two CARs and additional observations. Criterion 3/ Supplement III is deemed marginally satisfactory based on the interviews and objective evidence examined during the week of the audit.

TECHNICAL ACTIVITIES

WBS 1.2.5.4.1 Total System Performance Assessment

The work being done under this WBS element is not quality-effecting because of the lack of qualified data as input to these calculations. Most of the computer codes used in performing these calculations have not been qualified. Most of the data used in calculating total system performance comes from work in the early 1980s by Peters and Klavetter. This work was done before there was a QA program in place. Work is being done using quality procedures;

however, one of the main purposes of this work is to develop the process of performing total system performance calculations. None of these results will be used in licensing; however, in future work, qualified codes and qualified data will be used where they are available. The actual codes to be used for licensing have not been selected. We looked at the documentation for the codes that were qualified and they seemed to meet the requirements of SNL's implementing procedures: QAIP 03-02 which has recently been superseded by QAIP 19-01, Revision 01. This latter procedure has a statement that says the procedure does not apply to "model validation." The opinion of those interviewed was that model validation is not possible.

CONCLUSIONS:

The effectiveness of the QA program seems reasonable, but must be judged as indeterminate because of the lack of qualified data and computer programs.

WBS 1.2.5.4.6 Development and Validation of Flow and Transport Models

As the title of this WBS element suggests, this work involves the development of models, and consequently does not develop data that will be used in licensing.

One experiment done under this WBS element used two slabs of Topopah Spring Tuff to measure imbibition into the matrix from a fracture (simulated by a saw cut). Core plugs were cut from the rock and hydraulic properties were measured on these plugs. The block of rock that was cut into slabs for the experiment was not collected under proper Sample Management Facility procedures, and the traceability of core samples is not well documented. The fact that this activity is considered a development activity is the reason that a quality paper trail of sample traceability was not maintained.

This work was reported in several published reports, for example: SAND94-044C and SAND93-2774C. When these reports were examined there was no indication in the reports that the results were not quality-affecting. SNL procedure DOP 3-17, Revision 0, specifically requires that technical information documents contain a specific reference to the origin of the data and the quality assurance level." SAND90-2261 was also examined and did not contain reference to the QA level. This is discussed more in CAR YM-94-094 that was issued as a result of this finding. It was discussed with several people, including the TPO and QA Manager. Many SNL people felt that this requirement was meant to be for formal SNL reports and letter reports, not conference papers. The procedure does not specifically exclude conference papers. The SNL system for tracking publications even lists conference papers with a SNL number.

The technical auditor examined SN: CB-1, and the programmatic auditor examined others. These notebooks were inadequate as SNs. The SNL procedure for SNs, QAIP 20-02, is too general to provide adequate guidance on the preparation of notebooks that might be used in court. The procedure allows the use of loose leaf pages, and entries in pencil. Other examples of the inadequacy of these notebooks are as follows:

1. SN CB-1 begins with several entries but no statement of the objective or purpose of these entries.
2. The above notebook occasionally used the back side of notebook pages and numbered the pages with a letter (e.g., 19a, 19b, and 19c). Blank pages were not lined out or annotated that the page was meant to be blank.
3. Data Notebook "Gas Permeability Notebook" consists of a loose leaf, three-ring binder.
4. The above notebook contains tables and graphs with no headings or labels. It contains signatures that are not legible. It contains pages that have two sets of page numbers that do not agree.

CONCLUSIONS:

The effectiveness of this portion of the QA program must be judged as indeterminate because of the lack of qualified data and computer programs. The SNs that were examined were unsuitable for use in licensing. The procedure that governs SNs, QAIP 20-02, does not contain enough detail to produce a satisfactory SN. This deficiency is discussed further in CAR YM-94-096. A recommendation for improving SNL's SNs is included as Technical Recommendation No. 1 of Section 6.0 of this report.

WBS 1.2.5.4.7 Supporting Calculations for Postclosure Performance Analyses

Work under this WBS number involves sensitivity studies on the analyses of water movement in the Exploratory Studies Facility (ESF). They are looking at different models of rock drying from ventilation, examining different conceptual models of flow in fractures and matrix, and studying the spatial variability of rock properties.

Report SAND93-1182 contains a statement that says the work is suitable for licensing, yet the input data used in the calculations were not collected under the QA program. The TL said that the work followed the SNL quality procedures so some of the reviewers insisted that the report be designated as acceptable for licensing. This is an isolated case and other reports developed under this WBS element did not contain this designation. Some reports (journal articles) developed under this WBS did not contain a statement defining the quality of the report in accordance with the SNL procedure. As in WBS 1.2.4.4.6, this is discussed more in CAR YM-94-095 issued as a result of this finding. This was discussed with several people, including the TPO and QA Manager. Many SNL people felt that this requirement was meant to be for formal SNL reports and letter reports, not conference papers. The procedure does not specifically exclude conference papers. The SNL system for tracking publications even lists conference papers with a SNL number.

Most of the data used in these calculations was developed before there was a QA program in place (work of Peters and Klavetter in the early 1980s). SNL plans to examine the sensitivity to the values and assumptions in this work by making sensitivity calculations in the near future.

There is an inconsistency in the level of detail described in the WAs. In one case, WA 0041, the work description merely refers to the most recent Planning and Control System documents. In another case, WA 0089, there is good and adequate information describing the work to be performed.

CONCLUSIONS:

The effectiveness of this portion of the QA program must be judged as indeterminate because of the lack of qualified data and computer programs. None of the work produced under this WBS element is suitable for use in licensing.

WBS 1.2.3.2.6.2, Soil and Rock Properties of Potential Locations of Surface Facilities

WBS 1.2.3.2.6.2.1, Surface Facilities Exploration Program

WBS 1.2.3.2.6.2.2, Surface Facilities Laboratory Tests and Material Property Assessments

WBS 1.2.3.2.6.2.3, Surface Facilities Field Tests and Characterization Measurements

WBS 1.2.3.2.7.1.3, Laboratory Determination of Mechanical Properties of Intact Rock;

WBS 1.2.3.2.7.1.4, Laboratory Determination of Mechanical Properties of Fractures;

WBS 1.2.4.2.1.1.4, Insitu Design Verification:

The evaluation of WBS Elements 1.2.3.2.6.2, 1.2.3.2.7.1.3, 1.2.3.2.7.1.4, and 1.2.4.2.1.1.4 is a result of a programmatic and technical specialist review of technical activities. The process included interviews with PIs and TLs and reviews of procedures, SNs, technical processes, and staff qualifications.

**WBS 1.2.3.2.6.2 Soil and Rock Properties of Potential Locations of Surface Facilities
(Includes Subsets 1.2.3.2.6.2.1, 1.2.3.2.6.2.2, and 1.2.3.2.6.2.3)**

Current activities in this WBS focus on acquiring geotechnical data for the design of the North and South Ramps. The data acquisition activities are broken into the following three areas: 1) exploration, 2) laboratory tests and material property measurements, and 3) field tests and characterization measurements. The primary data provided by SNL to the M&O design group is Rock Mass Quality Indices based on the core log data from the NRG and SRG boreholes and surface outcrop fracture mapping. This data was provided by SNL to the M&O design group by means of a TDIF. During the process of the audit, the TL and PI were interviewed and the appropriate SNs for NRG-7/7A and NRG-2B were reviewed. Data transmitted in TDIFs 303139, 303136, 303146, and 303148 were traced back to their origin in SNs: "Rock Mass Quality Indices Derived from NRG Core Data," "Rock Structure Summary for NRG Series Core Holes," and "North Ramp Geotechnical Core Hole Logging UE25 NRG-2B, Volume V of XI," and "North Ramp Geotechnical Core Hole Logging USW NRG-7/7A,

Volume XI of XI." The SNs were generally satisfactorily documented and traceable from the TDIF back to the SN or from the SN to the TDIF. However, there were a few instances where the documentation was not adequate to show traceability from the SN to the TDIF. These instances of unsatisfactory documentation are identified in CAR YM-94-099.

WBS 1.2.3.2.7.1.3 Laboratory Determination of Mechanical Properties of Intact Rock

Current activities in this WBS have been primarily directed towards providing the M&O design group the results of physical and mechanical laboratory test properties for intact rock core taken from the NRG and SRG boreholes. During the course of the audit, the following TDIFs were examined: 303340, 302232, 303091, 303167, and 303384. No problems were noted in these TDIFs; however, the laboratory notebooks or SNs were not examined since they were at New England Research and unavailable to the auditors.

WBS 1.2.3.2.7.1.4 Conduct Fracture Experiments to Support ESF Design

Current activities in this WBS consist of characterizing fractures to support ESF design. Natural fractures from ESF design-related drillholes are characterized and tested for stiffness and strength. SNL provided the M&O design group natural fracture shear strength data in TDIF 303454. The traceability of this data from its source document was checked. The source document was "Laboratory Notebook for: YMSCP Fracture Properties Experiments, WBS 1.2.3.2.7.1.4, WA 0091, Task 4 - Fracture Surface Testing in Support of ESF Design." During the checking process the overall documentation of the Laboratory Notebook was generally satisfactory; however, in certain instances, as described in CAR YM-94-099, documentation problems were found. In addition, WA 0091, Revision 02 indicates that a SAND report deliverable for the aforementioned fracture data was due on July 31, 1994 to the YMSCO. This deliverable had not been provided to the YMSCO.

WBS 1.2.4.2.1.1.4 Insitu Design Verification

Current activities in this WBS are directed towards supporting design validation efforts in the North Ramp and the ESF, in addition to developing the short term and long range planning for their support to Performance Confirmation. Two WAs have provided direction for their work in the Starter Tunnel, Alcoves, and North Ramp. WA 0065 addresses design validation activities in the Starter Tunnel, while WA 0116 addresses design validation activities in the North Ramp, the North Ramp Starter Tunnel Alcove, all data collected after March 1994 from instruments installed under WA 0065, and the SAND report containing data collected up to the end of March 1994. During the course of the audit, TDIFs 302348, 302347, and 302002 were examined and the following SNs: "North Ramp Starter Tunnel Rock Mass Quality Estimation (Top Heading and Bench) WA 0065, Section 3" and "Alcove Blast Project, WA 0116, Section 4 (Video logs of Boreholes) and Section 6 (Analyses)." During the course of auditing SN North Ramp Starter Tunnel Rock Mass Quality Estimation (Top Heading and Bench), it appeared that the methodology used to determine "Q" was not entirely consistent with the methodology used to determine "Q" in WBS 1.2.3.2.6.2. The term "appeared" is used here since the auditor did not have access to both of the SNs from both WBSs at the

same time so that an exact comparison could be made; however, a recommendation was made to determine if such a difference exists, and if it does exist then make both methodologies consistent. An examination of SN "Alcove Blast Project," WA 0116, Sections 4 and 6, found numerous documentation problems. Examples of these problems are as follows: 1) Lack of column headings, titles, originator names, and units. 2) Acronyms not defined. 3) Very low level of neatness and the process is not adequately described (very hard to follow). This condition is detailed in CAR YM-94-099 on Page 99 of 99 of this report.

CONCLUSIONS:

The auditing process of these WBSs went very well and SNL and J.F.T. Agapito and Assoc. personnel were very cooperative and informative in the process. The overall attitude and responsiveness of the SNL and J.F.T. Agapito and Assoc. personnel was very much appreciated by the auditors. The most significant problems noted during the course of auditing these WBSs, was the lack of adequate documentation in the laboratory notebooks or SNs. Examples of these problems are identified in CAR YM-94-099. Ten recommendations were also written regarding topics associated with these WBSs and are included as Technical Recommendations 2 through 11 of Section 6.0 of this report. For the most part, these recommendations address technical issues. It is strongly suggested that SNL address these issues even though there is no requirement that SNL formally respond to recommendations.

ATTACHMENT 3

Objective Evidence Reviewed During the Audit

QA PROGRAM ELEMENT 1.0. "ORGANIZATION"

Procedures:

Compliance with the following document and procedures was reviewed:

OCRWM QARD DOE/RW-0333P, Section 1.0, "Organization"
QAIP 01-02, Revision 06, "Organization"
QAIP 01-03, Revision 03, "Stop Work Orders"
QAIP 01-04, Revision 00, "Resolution of QA Disputes"
QAIP 01-05, Revision 07, "Establishing Work Agreements"

Objective Evidence:

Work Agreements:

WA 0087 (lower-tier), Rev. 01, Polished Thin Section Preparation of Samples from NRG-6 (reference upper-tier WA-0016), dated 1-10-94
WA 0016, Rev. 01, Laboratory Thermal Properties, dated 4-28-93
WA 0130 (upper-tier), Rev. 01, Design Package 2C Support, dated 3-23-94
WA 0038 (lower-tier), Rev. 00, Conduct Studies to Support Calculations of Ground Water Travel Time (GWTT) (reference WA-0038 UT), dated 3-28-94
WA 0083 (lower-tier), Rev. 01, Thermal-Expansion Testing of Samples from NRG-6 (reference UT-WA-0017), dated 1-24-94
WA 0040 (upper-tier), Rev. 01, Development & Validation of Flow and Transport Models, dated 9-7-93
WA 0131 (upper-tier), Rev. 00, Integrated Reactive Transport Experiments, dated 3-16-94
WA 0095, Rev. 00, Geochemical Analyses and Reviews, dated 9-10-93
WA 0096, Rev. 00, Supporting Calculations for Caisson Experiment, dated 9-17-93
WA 0097, Rev. 00, Develop/Validate Reactive Transport Model, dated 9-17-93

Miscellaneous:

Initiation of Work Stoppage for all activities associated with QAIP 10-1, memorandum dated 8-19-94
Disposition of work stoppage associated with CAR 94-47, memorandum dated 8-23-94
SNL YMP Surveillance Report, dated 8-26-94
Recision of Work Stoppage, memorandum dated 8-26-94

SNL WA (lower-tier), WA 0135, Rev. 00, Flow in Discrete Fractures/Performance
-Assessment-Process-Level Integration Task, effective date 9-16-94.
WA (upper-tier), WA 0038, Rev. 03, Site Performance Assessment, dated 9-2-94
(In-process document)
QAGR 045 for WBS No. 1.2.5.4.6, Rev. 00, dated 9-3-93

QA PROGRAM ELEMENT 2.0. "QUALITY ASSURANCE PROGRAM"

Procedures:

Compliance with the following document and procedures was reviewed:

OCRWM QARD DOE/RW-0333P, Section 2.0, "Quality Assurance Program"
QAIP 02-02, Revision 01, "Study Plan Requirements"
QAIP 02-04, Revision 01, "Conducting and Documenting Analyses"
QAIP 02-05, Revision 02, "Training"
QAIP 02-06, Revision 01, "Qualification and Certification of Personnel"
QAIP 02-08, Revision 03, "Conduct and Reporting of Management
Assessments"
QAIP 02-09, Revision 00, "Readiness Reviews"
QAIP 02-10, Revision 01, "Determination of Applicable QA Controls"

Objective Evidence Examined:

Training and Qualification Record Packages:

Daniel J. Zimmerer	Joe F. Schelling
Ronald H. Price	William A. Olsson
Ruby C. Cochrell	David S. Kessel
Michael Riggins	

Training and Qualification Records contained in the Training and Qualification Records
Packages listed above were:

Certification of Personnel Qualifications
SNL YMP Training Assignments (computer printouts)
Training Confirmation forms (computer printouts)
Training Assignments
Authorization to Change or Archive YMP Training
Personnel Assignments

Miscellaneous:

Conduct 1993 SNL/YMP Management Assessment, memorandum, dated 3-25-94
Results of Management Assessment Meeting (attachment to memorandum, 3-25-94)

SNL-YMP Management Assessment (Summary Conclusions of FY93 Management Assessment), memorandum, dated 5-13-94
Readiness Review for Onset of ESF Construction, memorandum, dated 6-23-94
Readiness Review Plan for ESF Testing & Safety Issues Interface with Tunnel Construction, memorandum, dated 6-21-94
Contents for Readiness Review, WBS 1.2.4.2.1.1.1, 1.2.4.2.1.1.4, and 1.2.6.1.1 (attachment to memorandum, dated 6-21-94)

QA PROGRAM ELEMENT 3.0. "DESIGN CONTROL"

QA Program Element 3.0, Design Control, is covered in Supplement III, Scientific Investigations

QA PROGRAM ELEMENT 4.0. "PROCUREMENT DOCUMENT CONTROL"

Procedures:

Compliance with the following document and procedure was reviewed:

OCRWM QARD DOE/RW-0333P, Section 4.0, "Procurement Document Control"
QAIP 04-01, Revision 05, "Procurement"

Objective Evidence:

WA 0106, Numerical Climate Model Validation

QA Procurement Records:

Contracts: 35-0035 and CR 5, AB-9836, AE-6737, AH-0563, AF-9277; and Amendment 8, AE-6961 and CR 3, AG4078, and Amendment 2, 66-1662, WA 091, and Amendment 6, 05-6677B
Letter, Hunter to Whelchel, 3-14-90, Federal Agency Order Letter
Training Records to verify training to contractual requirements for: W. Zelinski, M. Cromer, D. Engstrom, J. Gauthier, Craig Ginn, T. Robey and Lee Skinner
Climatology Life Cycle Plan (Validation Plan) and Validation Report for Regional Climate Model 2, CM Number 110.179.000

QA PROGRAM ELEMENT 5.0. "IMPLEMENTING DOCUMENTS"

Procedures:

Compliance with the following document and procedures was reviewed:

OCRWM QARD DOE/RW-0333P, Section 5.0, "Implementing Documents"
QAIP 05-01, Revision 04, "Quality Assurance Implementing Procedures"

QAIP 06-02, Revision 02, "Reviewing, Approving, and Issuing Technical Information Documents"

Objective Evidence:

Rationale for Revisions:

QAIP 01-03, "Stop Work Orders," Rev. 04
QAIP 01-04, "Resolution of Quality Assurance Dispute," Rev. 00
QAIP 01-05, "Establishing Work Agreements," Rev. 07
QAIP 02-02, "Study Plan Requirements," Rev. 02
QAIP 02-06, "Qualification And Certification of Personnel," Rev. 01
QAIP 02-09, "Readiness Review," Rev. 00
QAIP 03-04, "Design Investigation Control," Rev. 01
QAIP 10-01, "Surveillances," Rev. 03
QAIP 05-01, "Quality Assurance Implementing Procedures," Rev. 04
QAIP 06-01, "Document Control System," Rev. 01
QAIP 18-01, "Quality Assurance Audits," Rev. 02

Reference Sections:

QAIP 03-04, "Design Investigation Control," Rev. 01, dated 2-26-93
QAIP 02-09, "Readiness Review," Rev. 00, dated 4-30-93
QAIP 02-06, "Qualification and Certification of Personnel," Rev. 01, dated 3-19-93
QAIP 02-02, "Study Plan Requirements," Rev. 02, dated 8-26-94
QAIP 01-05, "Establishing Work Agreements," Rev. 07, dated 8-26-94
QAIP 01-04, "Resolution of Quality Assurance Disputes," Rev. 00, dated 8-26-94
QAIP 01-03, "Stop Work Orders," Rev. 04, dated 8-19-94
QAIP 10-01, "Surveillances," Rev. 03, dated 10-22-93
QAIP 06-03, "Conducting and Documenting Reviews of Documents," Rev. 01, dated 8-9-93

Procedures Examined:

QAIP 01-02, "Organization," Rev. 06, dated 12-23-93
QAIP 02-04, "Conducting and Documenting Analyses," Rev. 01, dated 5-27-94
QAIP 02-08, "Conducting and Reporting of Management Assessments," Rev. 03, dated 6-3-94
QAIP 03-04, "Design Investigation Control," Rev. 01, dated 2-26-93
QAIP 03-10, "Routine Calculations," Rev. 00, dated 6-11-93
QAIP 04-01, "Procurement," Rev. 05, dated 5-31-94
QAIP 07-03, "Evaluation of Contractor QA Program Documents," Rev. 01, dated 6-11-93
QAIP 16-01, "Corrective Action," Rev. 03, dated 5-31-94
QAIP 18-01, "Quality Assurance Audits," Rev. 02, dated 12-23-93

QAIP 20-01, "Technical Procedures," Rev. 02, dated 6-3-94
QAIP 20-03, "Sample Control," Rev. 00, dated 7-8-93
QAIP 03-05, Draft Revision, "Design Analysis and Verification," Rev. 02,
dated 9-1-94
QAIP 02-04, Draft Revision, "Conducting and Documenting Analysis/Calculations,"
Rev. 02, dated 8-15-94
QAIP 01-03, "Stop Work Order," Rev. 04, dated 8-1-94
QAIP 06-01, "Document Control System," Rev. 01, dated 5-27-94
QAIP 02-05, "Training," Rev. 02, dated 5-31-94

Letters:

(Letter) L. E. Shephard to Richard Spence, Subject: QARD Transition Implementation
- Revision to Exceptions/Not Applicable, dated 5-11-94, to QARD DOE/RW-0333P,
Rev. 0, Requirements, dated 7-18-94

RTN Reports:

RTN Report No. 007 Mark-up - QARD DOE/RW-0333P - OQA, DOE/RW-0333P
QARD, Rev. 0, dated 6-20-94
RTN Report No. 007 Requirements Traceability Network - Requirements Matrix
Report - OQA, DOE/RW-0333P QARD, Rev. 0, dated 7-18-94
RTN Report No. 008 - Requirements Traceability Network - Affected Documents Due
To Requirement Change for QAIP 03-05 (Draft Rev. 02), dated 8-15-94
RTN Report No. 008 Requirements Traceability Network - Affected Documents Due
To Requirement Change for QAIP 02-04 (Draft Rev. 02), dated 8-15-94

Document Review and Comment Forms:

QAIP 01-05, Rev. 07, dated 7-29-94 - QA Review (R. R. Richards)
QAIP 01-05, Rev. 07, dated 7-29-94 - Management Review (L. E. Shephard)
QAIP 02-06, Rev. 01, dated 2-17-93 - QA Review (D. Hawkinson)
QAIP 02-06, Rev. 01, dated 2-23-93 - Management Review (L. E. Shephard)
QAIP 02-06, Rev. 01, dated 2-23-93 - Management Review (S. Sharpton)
QAIP 03-04, Rev. 01, dated 1-25-93 - QA Review (R. R. Richards)
QAIP 03-04, Rev. 01, dated 1-31-93 - Management Review (L. E. Shephard)
QAIP 02-09, Rev. 00, dated 3-25-93 - QA Review (J. Friend)
QAIP 02-09, Rev. 00, dated 4-3-93 - Management Review (L. E. Shephard)

Interim Change Notices:

ICN 01 for QAIP 02-06, Qualification and Certification of Personnel, Rev. 01,
dated 5-12-93
ICN 01 for QAIP 02-10, Determination of Applicable QA Controls, Rev. 01,
dated 8-20-93

ICN 01 for QAIP 03-04, Design Investigation Control, Rev. 01, dated 2-26-93
ICN 01 for QAIP 04-01, Procurement, Rev. 05, dated 7-1-94

Work Agreements:

WA 0042 - Request to Provide Training - "Development & Verification of Flow & Transport Codes," Rev. 02, dated 9-2-94
WA 0042 - Request for Distribution/Recall of a Controlled Document, Rev. 02, dated 8-26-94
WA 0038 - Request to Provide Training - "Site Performance Assessment," Rev. 03, dated 9-2-94
WA 0038 Request for Distribution/Recall of a Controlled Document. Rev. 03, dated 8-26-94
WA 0135 - Request to Provide Training - "Flow in Discrete Fractures Performance - Assessment Process - Level Integration Task," Rev. 00, effective date 9-16-94
WA 0135 Request for Distribution/Recall of a Controlled Document, Rev. 00, dated 8-25-94

Miscellaneous:

Request to Provide Training for QAIP 16-01, "Corrective Action," Rev. 04, dated 9-2-94
Request for Distribution/Recall of a Controlled Document for QAIP 16-01, "Corrective Action," Rev. 04, dated 8-23-94
Request to Provide Training for QAIP 06-02, "Preparing, Reviewing, Approving & Issuing Technical Information Documents," Rev. 03, new revision, effective date 9-16-94
Request for Distribution/Recall of a Controlled Document Cancelling DOP 3-17, Rev. 0, dated 8-23-94
Request for Distribution/Recall of a Controlled Document Distributing QAIP 06-02, Rev. 02, dated 5-14-93 became the replacement for DOP 3-17

Documentation Pertaining to Sandia Documents:

SAND 94-0278 - Test Interference Calculations for the YMP ESF Thermomechanical Experiments (In progress - Not yet issued)
SAND 94-0278 - Manuscript Review Sheet for Test Interference Calculations for the YMP ESF Thermomechanical Experiments, dated 1-25-94
DOE Letter - SAND 94-0278 - Programmatic and Policy Review of Technical Report Entitled: Test Interference Calculations for the YMP ESF Thermomechanical Experiments, by John F. Holland and John Pott, dated 8-11-94
SAND 94-0278 DRC Independent Technical Review, Randy Longenbaugh, dated 6-7-94
SAND 94-0278 DRC Independent Technical Review, Joe Jung, dated 6-3-94
SAND 94-0278 DRC QA Review, Jim Voigt, dated 6-27-94

SAND 94-0278 DRC Management Review, Larry Costin, dated 6-27-94
SAND 94-0278 - Section 5.0, References, dated 6-27-94
SAND 94-0278 DRC Independent Technical Review, Randy Longenbaugh,
dated 6-7-94
SAND 94-0278 DRC Independent Technical Review, Joe Jung, dated 6-3-94
SAND 94-0278 DRC QA Review, Jim Voigt, dated 6-27-94
SAND 94-0278 DRC Management Review, Larry Costin, dated 6-27-94
SAND 94-0278 Manuscript Review Sheet for - Test Interference Calculations for the
YMP ESF Thermomechanical Experiments, dated 6-27-94
SAND 94-2214A TDIF number 200236 - 9-Track tape of UNE-Generated Ground
Motion from UNE Delamar, dated 9-15-92
SAND 93-1184 - A Strategy to Seal Exploratory Boreholes in Unsaturated Tuff
(SCP: 8.3.3.2.2.1) Transmittal Package to YMPO (Table of Contents), dated 8-19-94
SAND 93-1184 Manuscript Review Sheet, dated 4-29-94
SAND 93-1184 YMP Site Distribution List, dated 4/94
SAND 94-2214A TDIF number 200239 - 9-Track Tape of UNE-Generated Ground
Motion from UNE Hardin, dated 9-15-92
SAND 94-2214A TDIF number 200240 - 9-Track Tape of UNE Generated Ground
Motion from Takoha, dated 9-15-92
SAND 93-2365 TDIF number 303455 - Experimental Measurements of Frictional
Sliding in a Polycarbonate Rock Mass Model, dated 8-11-94

Documentation Pertaining to Sandia Letters:

SLTR94-0004 - Letter Report Review Sheet, dated 7-14-94
SLTR94-0004 - Advances in Geostatistical Research by the Stanford Center
for Reservoir Forecasting, dated 8-4-94

QA PROGRAM ELEMENT 6.0. "DOCUMENT CONTROL"

Procedures:

Compliance with the following document and procedures was reviewed:

OCRWM QARD DOE/RW-0333P, Section 6.0, "Document Control"
QAIP 06-01, Revision 01, "Document Control System"
QAIP 06-03, Revision 01, "Conducting and Documenting Reviews"

Objective Evidence:

Procedures Examined for Distribution:

QAIP 02-10, "Determination of Applicable QA Controls," Rev. 01, dated 3-19-93
QAIP 20-01, "Technical Procedures," Rev. 02, dated 6-3-94
TP-060, "SNL NWRT Department Technical Procedure for Preparation of

Polished Thin Sectors," Rev. B, dated 2-2-90
TP-061, "Procedure for Laboratory Sample Bulk Chemical Determination,"
Rev. A, dated 2-2-90
TP-064, "Procedure for Vacuum Saturation of Geologic Core Samples," Rev. A,
dated 5-18-90
TP-090, "Procedure for Confined Compression Experiments," Rev. 0, dated 3-1-90
TP-091, "Procedure for Unconfined Compression Experiments," Rev. A, dated 4-2-90
TP-093, "Load Cell Calibration at New England Research, Inc.," Rev. 0, dated 3-1-90
TP-200, "Inspection of Samples Used in Thermal Properties Measurements,"
Rev. 0, dated 4-16-90

Quality Assurance Grading Reports:

QAGR 004, "Future Regional Climate and Environment," Rev. 1, dated 9-27-93
QAGR 007, "Laboratory Thermal Properties," Rev. 0, dated 4-28-93
QAGR 009, "Container/WP Interface Analysis," Rev. 1, dated 11-18-93
QAGR 013, "Quality Assurance Verification - Surveillance," Rev. 0, dated 6-14-93
QAGR 015, "Quality Assurance Program Development," Rev. 0, dated 6-14-93
QAGR 018, "Sealing Design and Design Requirements," Rev. 0, dated 6-15-93
QAGR 024, "Laboratory Determination of Mechanical Properties of Fractures," Rev. 0,
dated 2-23-93
QAGR 035, "Regulatory Coordination and Planning," Rev. 0, dated 8-27-93
QAGR 031, "Information Management Coordination And Planning," Rev. 0,
dated 8-18-93
QAGR 028, "Operate Document Control," Rev. 0, dated 8-18-93
QAGR 027, "Support Services Coordination and Planning," Rev. 0, dated 8-18-93

Work Agreements:

WA 0072, "Preparation of Future Regional Climate and Environmental Transition
Plan," Rev. 00, dated 4-7-93

Document Review And Comment Form:

QA Review for QAIP 01-03, Rev. 04, dated 8-1-94
Management Review for QAIP 01-03, Rev. 04, dated 8-4-94
QA Review for QAIP 01-05, Rev. 07, dated 7-29-94
Management Review for QAIP 01-05, Rev. 07, dated 7-29-94
Independent Technical Review for SAND 94-0278
QA Review of SAND 94-0278, dated 6-27-94

Miscellaneous:

SNL 6300 Controlled Documents Center YMP Controlled Documents List of
Active Controlled Documents, dated 8-25-94
SNL 6300 Controlled Document Center Transmittal/Acknowledgment Forms for
QAIP 03-05, Rev. 02, "Design Analysis and Verification," dated 8-24-94
SNL 6300 Controlled Documents Center YMP Controlled Documents - List of
Controlled Documents, dated 8-31-94
Request to be Added To/Deleted From Controlled Document Distribution Forms

Personnel Certification:

Clifford K. Ho - PI: Analysis and Testing, dated 9-1-93
Vince Tidwell - PI: Analysis and Testing, dated 6-19-90
Sean McKenna - dated 7-13-94
Steve Sobolik - PI: Analysis, dated 1-24-91

Controlled Document Sets:

Matthew Shain	Robert Richards
David Hawkinson	James Voigt
Connie Chocas	John Friend

QA PROGRAM ELEMENT 7.0, "CONTROL OF PURCHASED ITEMS AND SERVICES"

Procedures:

Compliance with the following document and procedures was reviewed:

OCRWM QARD DOE/RW-0333P, Section 7.0, "Control of Purchased Items and
Services" QAIP 07-01, Revision 01, "Procurement Acceptance Verification"
QAIP 07-03, Revision 01, "Evaluation of Contractor QA Program Documents"

Objective Evidence:

Letter, dated 4-8-94, L. S. Costin, SNL Manager. to M. Hardy J.F.T. Agapito &
Assoc. Inc., acceptance of J.F.T. Agapito and Assoc. QAPP
LifeCycle Plan (Validation Plan) for the Regional Climate Model 2 (Reqmt. CM 2),
CM No. 110.179.000
Calibration Report, dated 7-12-94, for System ID No. 110KIPA/T
Calibration Report, dated 7-17-94, for System ID No. 220KIPA/T
Calibration Report, dated 7-12-94, for System ID No. 220KIPA/T
Letter, dated 3-29-94, R. R. Richards to J. Jung, J. Pott, and E. Ryder, SNL review
of J.F.T. Agapito and Assoc. QAPP, Rev. 10
J.F.T. Agapito and Assoc. QAPP, Rev. 10

QA PROGRAM ELEMENT 12.0. "CONTROL OF MEASURING AND TEST EQUIPMENT"

Procedures:

Compliance with the following document and procedures was reviewed:

OCRWM QARD DOE/RW-0333P, Section 12.0, "Control of Measuring and Test Equipment"
QAIP 12-01, Revisions 03 and 04, "Measuring and Test Equipment Control"

Objective Evidence:

The following M&TE was verified and checked:

Device: Compression/Rotary Shear

<u>Device Model No.</u>	<u>Serial No.</u>	<u>Date Calibrated</u>
ADT-458-11 - Rotary	017165A	7-13-94
662-10A-10 - Compression	2814	7-13-94

NOTE: M&TE was limited to this piece of equipment as the other PIs contacted are prototype testing with no M&TE currently under SNL's QAIP 12-01 program.

QA PROGRAM ELEMENT 16.0. "CORRECTIVE ACTION"

Procedures:

Compliance with the following document and procedures was reviewed:

OCRWM QARD DOE/RW-0333P, Section 16.0, "Corrective Action"
QAIP 16-01, Revisions 01, 02, and 03, "Corrective Action"
QAIP 16-03, Revision 02, "Quality Assurance Program Report"

Objective Evidence:

QAIP 16-01, Revision 03
QAIP 16-03, Revision 02
SNL CARs: 93-23, 93-32, 93-38, 93-36, 94-25, 94-11, 94-12.
SNL Observation Reports (CARs): 93-24, 94-02, 94-04, and 94-05
SNL QA Program Reports: May 93 through July 93, August 93 through October 93,
November 93 through January 94, and February 94 through April 94

QA PROGRAM ELEMENT 17.0, "QUALITY ASSURANCE RECORDS"

Procedures:

Compliance with the following document and procedures was reviewed:

OCRWM QARD DOE RW/0333P, Section 17.0, "Quality Assurance Records"
QAIP 17-01, Revision 01, "Protection, Preparing, and Submitting YMP QA Records"
QAIP 17-03, Revision 01, "Processing, Storing, and Protecting YMP QA Records"

Objective Evidence Examined:

Procedures:

QAIP 01-05, Revision 07, Establishing Working Agreements
QAIP 03-10, Revision 00, Routine Calculations
QAIP 04-01, Revision 05, Change 1, Procurement
QAIP 05-01, Revision 04, Quality Assurance Implementing Procedures
QAIP 07-01, Revision 01, Procurement Acceptance Verification
QAIP 17-01, Revision 01, Protecting, Preparing, and Submitting YMP QA Records
QAIP 17-03, Revision 01, Processing, Storing, and Protecting YMP QA Records
QAIP 20-01, Revision 02, Change 1, Technical Procedures
QAIP 20-02, Revision 00, Scientific Notebooks

Training Records:

Lesson Plan, There was a Perfect Record, dated 3-4-94
Training Attendance Record for Basic Records Requirements for YMP Submittal, dated
3-10-94, 3-15-94, and 3-18-94

Records and Record Packages Reviewed:

CAR 94-17	CAR 94-16
CAR 94-15	CAR 94-32-02
SAND 94-0261C	SAND 92-1810
SAND 92-1370C	Data Tracking Number (DTN) SNF29041993002.011
DTN SNF29041993002.015	TDIF 303384

Training Packages identified as "Privileged" for following individuals:

Paula Adams	Thomas E. Blejwas
Carl Brechtel	Janette Dirickson

Corrected Records:

CAR 94-32-02
CAR 94-22
CAR 94-18
Controlled Document Supporting Information for QAIP 02-08, Rev. 02
SAND 94-0261C

Verified for duplicate storage:

Software Package 110 178
Training File, Connie S. Chocas:

YMP Training Assignment, dated 6-1-90
Personnel Assignment: Position, Category and WBS, dated 6-1-90
Confirmation of Familiarization Activities, dated 6-15-90 for QAIP 03-02, R 00
Test Completion Record for QAIP 03-02, Rev. 00, dated 6-21-90
Confirmation of Familiarization: Interim Change Notice DOP 03-06, ICN 2
Confirmation of Familiarization: Interim Change Notice DOP 02-01, ICN 2
Confirmation of Familiarization: Interim Change Notice DOP 03-01, ICN 1
Confirmation of Familiarization: AP-3.03Q, Rev. 1
Confirmation of Familiarization: AP-1.06Q, Rev. 0
Confirmation of Familiarization - ICN for Quality Assurance Procedure QAP
02-05, ICN 1

Training File, John H. Gauthier:

Certification of YMP/NWRT Personnel Qualifications, dated 8-24-89
Recertification - 1990
Recertification - 1991
Recertification - 1992
Training Confirmation Form: Manual - Guidebook for Interactions Between
DOE and NRC, signed 7-18-94

Miscellaneous:

Memo, "Approved Access to YMP Records in the SNL Nuclear Waste Management
Information Program Local Records Center," dated 6-27-94
Memo, "Approved Access to YMP Records in the SNL Nuclear Waste Management
Information Program Local Records Center," dated 9-9-93
Memo, "Approved Access to YMP Records in the SNL Nuclear Waste Management
Information Program Local Records Center," dated 1-13-94
Submittal Form Log - Vol 15, November 23, 1993 to current (8-29-94)
SNL Accession numbers SL 138637, SL 138638, SL 138639

SNL transmittal numbers:

531 (SNL accession numbers: SL 139313, SL 139316, SL 139318)

535 (SNL accession numbers: SL 139301, SL 139303)

547 (SNL accession numbers: SL 139645, SL 139646)

Document Accountability Form (log)

Record Request Form, dated 8-29-94 for training information for the auditor

Training Information Request Form, dated 8-29-94 for evaluation of QA Program
Element 4.0

Supporting Information for Close-Out Package for Purchase Requisition 23-9583

Supporting Information for Close-Out Package for Purchase Requisition 78-6654

QA PROGRAM ELEMENT 18.0, "AUDITS"

Procedures:

Compliance with the following document and procedures was reviewed:

OCRWM QARD DOE/RW-0333P, Section 18.0, "Audits"

QAIP 18-01, Revision 02, "Quality Assurance Audits"

QAIP 02-07, Revision 00, "Qualification of QA Program Audit Personnel"

Objective Evidence:

QAIP 18-01, Revision 02, Quality Assurance Audits

SNL YMP QA Audit Schedule for FY 94 (Revisions 0, 1, and 2)

SNL YMP Internal QA Audit (SNL-94-1) Audit Plan

SNL Annual YMP Internal QA Audit (SNL-94-1) Report

SNL Annual YMP Internal QA Audit (SNL-93-1) Report

SNL YMP Procurement Screening Document

SNL External Audit of MTS Systems Corporation (MTS-A94-1)

SNL External Audit of Disposal Safety, Inc. (DSI-A94-1)

SNL External Audit of University of New Mexico (UNM-A94-01)

SNL External Audit of NCAR (NCAR-A93-1)

SNL Annual Evaluation of New England Research (NER-E93-1)

SNL Annual Evaluation of J.F.T. Agapito & Associates, Inc. (AGA-E93-1)

Qualification/Certification for the Following Personnel:

Curtis Barnes, Lead Auditor Certification, 5-31-94

John Friend, Lead Auditor Certification, 2-28-94

David Hawkinson, Lead Auditor Certification Recertification, 9-28-93

Kelly Bitner, Technical Specialist/Auditor Qualification, 6-3-94

SUPPLEMENT I. "SOFTWARE CONTROL"

Procedures:

Compliance with the following document and procedure was reviewed:

OCRWM QARD DOE/RW-0333P, Supplement I, "Software"
QAIP 19-01, Revision 01, "Software Quality Assurance Requirements"

Objective Evidence:

FEHM (Finite Element Heat and Mass) Transfer Code, M#110.178.000, Life Cycle Plan, Requirements Information, and User Information
RegCM2 (Regional Climate Model), CM#110.179.000, Life Cycle Plan (and Validation Plan) and Validation Report

SUPPLEMENT II. "SAMPLE CONTROL"

Procedures:

Compliance with the following document and procedures was reviewed:

OCRWM QARD DOE/RW-0333P, Supplement II, "Sample Control"
QAIP 20-03, Revision 00, "Sample Control"
QAIP 20-04, Revision 00, "Operation of the SNL YMP Samples Library"

Objective Evidence:

Reviewed Sample Inventory Log, dated 8-16-94 and "Log-In" "Log-Out" Notebooks
A random sampling was taken from the three sources to track and assure that
"Chain-of-Custody" forms were up-to-date

Samples and Chain-of-Custody forms reviewed:

<u>Sample ID</u>	<u>Custody</u>	<u>Location</u>
NRG-6 81.1 through 81.6/BC#29377	R. Price	Rock Mechanics Lab
NRG-5 830.3 through 830.9/BC#29389	R. Price	Rock Mechanics Lab
NRG-6 485.9 through 486.3/BC#29371	R. Price	Rock Mechanics Lab
NRG-4 608.7 through 609.2/BC#29387	R. Price	Rock Mechanics Lab
NRG-4 670.5 through 671.1/BC#29388	R. Price	Rock Mechanics Lab
NRG-6 935.0 through 935.3/BC#29373	R. Price	Rock Mechanics Lab
USW G-1 1230.8 - E	C. Chocas	SNL Office
USW G-1 1230.8 - F	C. Chocas	SNL Office
USW G-1 1230.8 - G	C. Chocas	SNL Office

WA-082 1313 - A	C. Chocas	SNL Office
WA-122 1322.6 through 1323.2 A	C. Chocas	SNL Office
WA-122 1322.6 through 1323.2 B	C. Chocas	SNL Office
WA-122 1322.6 through 1323.2 C	C. Chocas	SNL Office
WA-122 1322.6 through 1323.2 D	C. Chocas	SNL Office

<u>Sample ID</u>	<u>Box</u>	<u>Location</u>
BB #10AE 10AZ	A-04	Samples Library
BB 1D TOP	B-05	Samples Library
BB 3A TOP	B-05	Samples Library
USW G4 2A	BG-5	Samples Library
USW G4-3 1741.8 through 1742.9	BG-4	Samples Library
BB 10AE 5/Y	H-1	Samples Library
BB 10AE 76-A1	H-1	Samples Library
LIE 25A-1 1544.00	L-2	Samples Library
USW G-4 496.60	L-3	Samples Library
USW G4-3 126.8 through 127.0	M-1	Samples Library
USW G4-3 1351.3	M-4	Samples Library
USW G-2 906.0	N-3	Samples Library
USW G-1 460.2 through 461.1	P-2	Samples Library
USW G-1 1218.2	Q-4	Samples Library

**SUPPLEMENT III. "SCIENTIFIC INVESTIGATION" AND QA PROGRAM ELEMENT
 3.0. "DESIGN CONTROL"**

Procedures:

Compliance with the following document and procedures was reviewed:

OCRWM QARD DOE/RW-0333P, Supplement III, "Scientific Investigation"
 QAIP 20-02, Revision 00, "Scientific Notebooks"
 QAIP 03-10, Revision 00, "Routine Calculations"

Programmatic Objective Evidence:

QA Grading Reports:

1.2.3.2.6.2.1, 1.2.3.2.6.2.2, and 1.2.3.2.6.2.3

Scientific Notebooks:

SN-0071, Characterization of Nonlithified Tuffs, Rainier Mesa and Pre Rainier Mesa
 on the West Side of Exile Hill
 SN-0071, Rock Structure Summary for NRG Series Core Holes

SN-0065, Volumes I through III
SN-01116, Installation Alcove North Ramp, past March 1994
SN-01116, Blast Monitoring Activities in the Alcove/North Ramp Testing Tunnel
and North Ramp

DTN: SNF 29041993002.016	TDIF No. 303136
29041993002.017	TDIF No. 303139
29041993002.018	TDIF No. 303146
29041993002.019	TDIF No. 303148
29041993002.020	TDIF No. 303150
29041993002.025	TDIF No. 303195

Technical Objective Evidence:

WBS 1.2.3.2.6.2: Soil and Rock Properties of Potential Locations of Surface Facilities. Subelements 1.2.3.2.6.2.1, Surface Facilities Exploration Program, 1.2.3.2.6.2.2, Surface Facilities Laboratory Tests and Material Property Measurements, and 1.2.3.2.6.2.3, Surface Facilities Field Tests and Characterization Measurements.

TDIF 303139, Estimated Rock Mass Quality Indices Based on Core Log Data for Hole USW NRG-7/7A

TDIF 303136, Core Hole Rock Structural Data Summary for Hole USW NRG-7/7A

TDIF 303146, Core Hole Rock Structural Data Summary for Hole UE25 NRG-2B

TDIF 303148, Estimated Rock Mass Quality Indices Based on Core Log Data for Hole UE25 NRG-2B

SN: Rock Mass Quality Indices Derived from NRG Core Data

SN: Rock Structure Summary for NRG Series Cores Holes

SN: North Ramp Geotechnical Core Hole Logging UE25 NRG-2B, Volume V of XI

SN: North Ramp Geotechnical Core Hole Logging USW NRG-7/7A, Volume XI of XI

WBS 1.2.3.2.7.1.3: Laboratory Determination of Mechanical Properties of Intact Rock

TDIF 303340, Mechanical Properties Data (Grain Density, Porosity, Unconfined Strength, Confined Strength, Elastic Properties, and Indirect Tensile Strength) for Drillhole USW NRG-7/7A Samples from Depth 507.4 ft. to 881.0 ft

TDIF 302232, Mechanical Properties Data (Ultrasonic Velocities, Static Elastic Properties, Unconfined Strength, Tensile Strength, & Porosity) for Drillhole UE25 NRG-2B Samples from Depth 2.7 ft. to 87.6 ft

TDIF 303091, Mechanical Properties Data (Ultrasonic Velocities, Static Elastic Properties & Unconfined Strength) for Drillhole USW NRG-7/7A Samples from Depth 18.0 ft. to 472.9 ft

TDIF 303167, Mechanical Properties Data for Drillhole NRG-7/7A Samples from Depth 344.4 ft

TDIF 303384, Mechanical Properties Data for Drillhole USW NRG-7/7A Samples from Depths of 554.7ft. to 1450.1 ft

WBS 1.2.3.2.7.1.4: Conduct Fracture Experiments to Support ESF Design

TDIF 303454, Results from Shear Stress Experiments on Natural Fractures from NRG-4 & NRG-6

Laboratory Notebook: YMSCP Fracture Properties Experiments, WBS 1.2.3.2.7.1.4, WA 0091, Task 4 - Fracture Surface Testing in Support of ESF Design

WBS 1.2.4.2.1.1.4: Insitu Design Verification

TDIF 302348, Rock Mass Classification Results for the Alcove/North Ramp Starter Tunnel

TDIF 302347, Rock Mass Classification Data for the Alcove/North Ramp Starter Tunnel

TDIF 302002, Estimation of Rock Mass Quality of the North Ramp Starter Tunnel (Rock Mass Classification using the "Q" System)

SNs: North Ramp Starter Tunnel Rock Mass Quality Estimation (Top Heading and Bench) WA-0065, Section 3

SNs: Alcove Blast Project, WA-0016, Section 4 (Video logs of Boreholes) and Section 6 (Analyses) WBS 1.2.5.4.1: Total System Performance Assessment

SAND93-2675, "Total-System Performance Assessment for Yucca Mountain - SNL Second Iteration (TSPA - 1993)"

SAND93-0852, "The Appropriateness of One-Dimensional Yucca Mountain Hydrologic Calculations"

QAIP 19-01, Rev. 01, "Software QA Requirements," dated 5-31-94

QAIP 03-02, Rev. 02, "Software Quality Assurance Requirements" dated 9-1-92 (Note: This procedure was replaced by QAIP 19-01)

WA 0117, "Expert Panel Review of Report Entitled: Total System Performance Assessment for Yucca Mountain-SNL Second Iteration (TSPA-1993)"

WBS 1.2.5.4.6: Development and Validation of Flow and Transport Models

DOP 3.17, and 3 ICNs, last dated 10/28/92, "Preparing Technical Information Documents"

WA 0138, "Geochemical Retardation Performance Assessment Process Level Integration Task"

W 0040, "Development and Validation of Flow and Transport Models"

SN: "CB-1: Test/Establish Procedures for Running Column Experiments for the Validation of the Kd (Linear Equilibrium) Transport Model" by Connor Boyle, dated 6-2-93

SAND94-044C, "Fracture-Matrix Interaction in Topopah Spring Tuff: experiment and Numerical Analysis"

SAND93-2774C, "Wetting Phase Permeability in a Partially Saturated Horizontal Fracture"

SAND93-3903, "Modeling Infiltration into a Tuff Matrix from a Saturated Vertical Fracture"

SAND90-2261, "Research Program to Develop and Validate Models for Flow and Transport Through Unsaturated, Fractured Rock"

QAIP 20-02, "Scientific Notebooks"

WBS 1.2.5.4.7: Supporting Calculations for Postclosure Performance Analyses

SAND93-1182, "Evaluation of the Effect of Underground Water Usage and Spillage in the Exploratory Studies Facility"

SAND90-2261

QAIP 19-01, Rev. 01, "Software QA Requirements," dated 5-31-94

QAIP 03-02, Rev. 02, "Software Quality Assurance Requirements" dated 9-1-92 (Note: This procedure was replaced by QAIP 19-01)

DOP 3.17, and 3 ICNs, last dated 10-28-92, "Preparing Technical Information Documents"

WA 0062, "ESF Performance Assessment Analysis No. 13, Evaluation of Underground Waste Usage and Spillage in the ESF"

WA 0089, "ESF PA Analysis #14 -- Sensitivity of ESF Hydrological Analyses to Variations in Ventilation Models, Conceptual Models and Material Properties" dated 1-10-94

WA 0041, "Supporting Calculations for Postclosure Performance Analyses," signed 9-25-92

ATTACHMENT 4

Information Copies

of

Corrective Action Requests

ORIGINAL
 THIS IS A RED STAMP

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT U.S. DEPARTMENT OF ENERGY WASHINGTON, D.C.		CAR NO.: <u>YM-94-087</u> PAGE: <u>1</u> OF <u>2</u> GA
CORRECTIVE ACTION REQUEST		
1 Controlling Document QAP 16-01, Revisions 1, 2 and 3, Corrective Action		2 Related Report No. YMP-94-09
3 Responsible Organization SNL	4 Discussed With J. Voight/C. Jaramillo/D. Hawkinson	
5 Requirement:		
A. Section 6.1, Step 2 states: SNL YMP QA shall determine if the deviation is a significant condition adverse to quality as defined in Subsection 3.8." B. Section 6.2, Step 1 states in part: "Responsible Mgt PI/TL shall...identify proposed remedial actions...." (Note: Section 3.6 indicates remedial actions are to include a determination of impact on previously completed work and an investigation into the extent of the adverse condition.) C. Section 6.4, Step 1 states in part: "...shall verify satisfactory completion of corrective actions and document objective evidence that was used to verify completion and effectiveness of those actions.... Verify all deviation remedial actions were completed as specified...."		
6 Adverse Condition:		
Contrary to the above, objective evidence (SNL CARs 93-23, 93-32, 93-36, 93-38, 94-11, 94-12, and 94-25) reviewed reveals that: (1) there was one case noted where determination of significance was not addressed, (2) in all but one case reviewed, remedial actions did not include a determination of impact on previously completed work and an investigation into the extent of the adverse condition, (3) in all but one instance, verifications of corrective action do not detail specific objective evidence that was used to verify completion and effectiveness of those actions, (4) in two instances CARs were closed without verification of completion of all corrective action.		
9 Does a Significant Condition Adverse to Quality exist? Yes <u>X</u> No <u> </u> If Yes, Check One: <input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	10 Does a stop work condition exist? Yes <u> </u> No <u>X</u> ; If Yes - Attach copy of SWO If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C	13 Response Due Date: 20 Working Days From Issuance
11 Required Actions: <input checked="" type="checkbox"/> Remedial <input checked="" type="checkbox"/> Extent of Deficiency <input checked="" type="checkbox"/> Preclude Recurrence <input checked="" type="checkbox"/> Root Cause Determination		
12 Recommended Actions:		
1. For Item 1 in Block 6, evaluate CAR 93-36 for significance and document results (remedial only). 2. For Item 2 in Block 6, the following is recommended: A. Determine that extent of this deficiency.		
7 Initiator Richard L. Maudlin <i>RMaudlin</i> 09/08/94	14 Issuance Approved by: QADD <i>[Signature]</i> Date 9/12/94	
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 _____	

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8 CAR NO.: YM-94-087
PAGE: 2 OF 2
QA

CORRECTIVE ACTION REQUEST (CONTINUATION PAGE)

13 Recommended Action(s) (continued)

- B. Identify the cause of the condition.
 - C. Determine what actions are necessary to preclude recurrence.
 - D. Identify the impact on quality due to not implementing this requirement.
3. For Item 3 in Block 6, the following is recommended: (see recommended actions for Item 2 above)
 4. For SNL CARs 93-36 and 94-25 in Item 4 of Block 6, take the necessary action to complete verification of ALL items identified in the response to the CARs. Also, evaluate the extent of the identified condition and what actions will be taken to preclude recurrence.

ORIGINAL
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OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT U.S. DEPARTMENT OF ENERGY WASHINGTON, D.C.		6 CAR NO.: <u>YM-94-088</u> PAGE: <u>1</u> OF <u>1</u> QA
CORRECTIVE ACTION REQUEST		
1 Controlling Document QAP 01-05, Revision 07		2 Related Report No. YMP-94-09
3 Responsible Organization SNL	4 Discussed With R. Richards	
5 Requirement: QARD DOE/RW-0333P, Revision 0, Section 5.2.2, A through I, specifies the "Content of Implementing Documents." SNL QAP 01-05, Revision 07, Section 4.1 states in part that if Work Agreements (WAs) govern scientific investigation work, then the WA needs to reference Technical Procedures (TPs) that address elements a. through k., or if a scientific notebook is used without TPs, then elements a. through k. need to be addressed in the WA.		
6 Adverse Condition: Contrary to the above requirements, WAs are not referencing TPs or if the Scientific Notebook method is used, the WAs are not addressing the required Section 4.1, Step 1, Note 2, No. 2, a. through k. elements. A review of the WAs produced numerous examples of the deficient condition. Some examples of this condition include: WA-0040, WA-0131, and WA-0095, -0096 and -0097.		
9 Does a Significant Condition Adverse to Quality exist? Yes ___ No <u>X</u> If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E		10 Does a stop work condition exist? Yes ___ No <u>X</u> ; If Yes - Attach copy of SWO If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
13 Response Due Date: 20 Working Days From Issuance		
11 Required Actions: <input checked="" type="checkbox"/> Remedial <input checked="" type="checkbox"/> Extent of Deficiency <input checked="" type="checkbox"/> Preclude Recurrence <input type="checkbox"/> Root Cause Determination		
12 Recommended Actions:		
7 Initiator James George <i>for</i> <u>Kenneth McFall 9/8/94</u>		14 Issuance Approved by: QADD <i>[Signature]</i> for Date <u>9-12-94</u>
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 _____

ORIGINAL
 THIS IS A RED STAMP.

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT U.S. DEPARTMENT OF ENERGY WASHINGTON, D.C.		8 CAR NO.: <u>YM-94-089</u> PAGE: <u>1</u> OF <u>1</u> QA
CORRECTIVE ACTION REQUEST		
1 Controlling Document QAIP 02-04, Revision 1, Conducting and Documenting Analysis		2 Related Report No. YMP-94-09
3 Responsible Organization SKL	4 Discussed With C. Brechtel/D. Kessel	
5 Requirement: QAGR 1.2.3.2.6.2.3, Surface Facilities Field Tests and Characterization Measurements, invoked QAIP 02-04 for calculations associated with rock quality measurement.		
6 Adverse Condition: Calculations associated with the NBS identified above, use a Monte Carlo subroutine. There is no evidence that the calculations were conducted in accordance with the requirements of QAIP 02-04.		
9 Does a Significant Condition Adverse to Quality exist? Yes ___ No <u>X</u> If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	10 Does a stop work condition exist? Yes ___ No <u>X</u> ; If Yes - Attach copy of SWO If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C	13 Response Due Date: 20 Working Days From Issuance
11 Required Actions: <input checked="" type="checkbox"/> Remedial <input checked="" type="checkbox"/> Extent of Deficiency <input checked="" type="checkbox"/> Preclude Recurrence <input type="checkbox"/> Root Cause Determination		
12 Recommended Actions:		
7 Initiator James Blaylock <i>Blaylock</i> 9/9/94	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 _____	

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OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT U.S. DEPARTMENT OF ENERGY WASHINGTON, D.C.		8 CAR NO.: <u>YM-94-090</u> PAGE: <u>1</u> OF <u>1</u> QA
CORRECTIVE ACTION REQUEST		
1 Controlling Document QAP 16-03, Revision 2		2 Related Report No. YMP-94-09
3 Responsible Organization SNL	4 Discussed With R. Richards	
5 Requirement: QAP 16-03, Revision 2, Section 5.0, Paragraph 5.1 states in part: "Prepare and submit a QA Program Report at least quarterly to SNL YMP TPO and a copy to the YMP QA Division...."		
6 Adverse Condition: Contrary to the above, (1) Quarterly QA Program Reports for May 1993 through July 1993 and August 1993 through October 1993 do not provide documented evidence of being copied to YMP QA Division, and (2) Quarterly QA Program Report for May 1993 through July 1993 (2nd quarter report) was not issued until 11/10/93 which fell into the 4th quarter period (i.e., 11/93 - 1/94).		
9 Does a Significant Condition Adverse to Quality exist? Yes ___ No <u>X</u> If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	10 Does a stop work condition exist? Yes ___ No <u>X</u> ; If Yes - Attach copy of SWO If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C	13 Response Due Date: 20 Working Days From Issuance
11 Required Actions: <input checked="" type="checkbox"/> Remedial <input type="checkbox"/> Extent of Deficiency <input type="checkbox"/> Preclude Recurrence <input type="checkbox"/> Root Cause Determination		
12 Recommended Actions: Take the necessary actions to transmit the copies of the noted QA Program Reports to YMP QA Division. Provide the reason why the 2nd quarter report was not issued until the 4th quarter.		
7 Initiator Richard L. Maudlin <i>R. Maudlin</i> 09/28/94	14 Issuance Approved by: QADD <i>[Signature]</i> for Date <u>9-12-94</u>	
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 _____	

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OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT U.S. DEPARTMENT OF ENERGY WASHINGTON, D.C.		8 CAR NO.: <u>YM-94-091</u> PAGE: <u>1</u> OF <u>1</u> QA
CORRECTIVE ACTION REQUEST		
1 Controlling Document QAIIP 16-01, Revision 2, Corrective Action		2 Related Report No. YMP-94-09
3 Responsible Organization SNL	4 Discussed With R. Richards	
5 Requirement: QAIIP 16.01, Section 6.1, Step 1 states in part: "Initiator shall promptly identify deviations...and initiate the corrective action process by completing the Corrective Action Request (CAR)...." (Section 3.1, Defines adverse conditions as deviations, failures, malfunctions, deficiencies, etc.)		
6 Adverse Condition: Contrary to the above, CARs 94-02, 94-04 and 94-05 address an explicit deviation (condition adverse to quality) from specified requirements (i.e., shall); however, this CAR has been classified as an "observation" which is defined in QAIIP 16-01, Section 3.4 as an observed and documented potential adverse condition. QAIIP 16-01, Section 3.5 further defines that potential adverse conditions are conditions which if left uncorrected, could lead to an adverse condition (i.e., deviation).		
9 Does a Significant Condition Adverse to Quality exist? Yes ___ No <u>X</u> If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	10 Does a stop work condition exist? Yes ___ No <u>X</u> : If Yes - Attach copy of SWO If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C	13 Response Due Date: 20 Working Days From Issuance
11 Required Actions: <input checked="" type="checkbox"/> Remedial <input checked="" type="checkbox"/> Extent of Deficiency <input checked="" type="checkbox"/> Preclude Recurrence <input checked="" type="checkbox"/> Root Cause Determination		
12 Recommended Actions: Take action to review all observations. If the observation identifies a departure from an approved procedure, document the deviation in accordance with approved procedures. Include in your response the cause and actions to preclude reoccurrence.		
7 Initiator Richard L. Maudlin <i>R. Maudlin</i> 09/08/94	14 Issuance Approved by: QADD <i>[Signature]</i> for Date 9-12-94	
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 _____	

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OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT U.S. DEPARTMENT OF ENERGY WASHINGTON, D.C.		8 CAR NO.: <u>YM-94-092</u> PAGE: <u>1</u> OF <u>1</u> QA				
CORRECTIVE ACTION REQUEST						
1 Controlling Document QAP 02-05, Revision 02		2 Related Report No. YMP-94-09				
3 Responsible Organization SNL	4 Discussed With R. Richards					
5 Requirement: QARD DOE/RW-0333P, Section 2.2.11.C, specifies that affected organization programs ensure that personnel are indoctrinated and trained to achieve initial proficiency, maintain proficiency, and adapt to changes. QAP 02-05, Revision 02, Sections 5.3 and 5.4, Steps 1, state in part that the SNL YMP Manager determines what additional orientation and training is required to ensure that proficiency is maintained for changes in WBS assignment, procedures, responsibilities, positions, or technology.						
6 Adverse Condition: Contrary to the above requirements, no objective evidence could be found to demonstrate that individuals, performing work subject to QARD requirements, are evaluated to determine if changes in WBS assignments, procedures, responsibilities, positions or technology require additional training for the individuals to maintain proficiency. Examples of failure to demonstrate any type of evaluation to determine maintenance of proficiency include: <table style="width:100%; border: none;"> <tr> <td style="width: 50%;">- Joe F. Schelling</td> <td style="width: 50%;">- Daniel J. Zimmerer</td> </tr> <tr> <td>- Ronald E. Price</td> <td>- William A. Olsson</td> </tr> </table>			- Joe F. Schelling	- Daniel J. Zimmerer	- Ronald E. Price	- William A. Olsson
- Joe F. Schelling	- Daniel J. Zimmerer					
- Ronald E. Price	- William A. Olsson					
9 Does a Significant Condition Adverse to Quality exist? Yes ___ No <u>X</u> If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E		10 Does a stop work condition exist? Yes ___ No <u>X</u> ; If Yes - Attach copy of SWO If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C				
		13 Response Due Date: 20 Working Days From Issuance				
11 Required Actions: <input checked="" type="checkbox"/> Remedial <input checked="" type="checkbox"/> Extent of Deficiency <input checked="" type="checkbox"/> Preclude Recurrence <input type="checkbox"/> Root Cause Determination						
12 Recommended Actions:						
7 Initiator <i>Kenneth McFall for James George</i> 9/8/94		14 Issuance Approved by: <i>[Signature]</i> Date 9.12.94				
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 _____					

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CORRECTIVE ACTION REQUEST		
1 Controlling Document QAP 17-3, Revision 1		2 Related Report No. YMP-94-09
3 Responsible Organization SNL		4 Discussed With M. Tucker
5 Requirement: QAP 17-3, Revision 1, Section 4.1, Step 7. states the LRC staff "...shall complete processing of records/record packages by:...transmitting the records within 30 days of acceptance by the LRC."		
6 Adverse Condition: Contrary to the identified requirement, procurement records are not being forwarded to the M&O Records Management Organization (Central Records Facility) for retention but are retained by SNL. For example, refer to: Supporting Information for Close-Out Package for Purchase Requisition 23-9583 Supporting Information for Close-Out Package for Purchase Requisition 76-6654		
9 Does a Significant Condition Adverse to Quality exist? Yes ___ No <u>X</u> If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E		10 Does a stop work condition exist? Yes ___ No <u>X</u> ; If Yes - Attach copy of SWO If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
		13 Response Due Date: 20 Working Days From Issuance
11 Required Actions: <input checked="" type="checkbox"/> Remedial <input checked="" type="checkbox"/> Extent of Deficiency <input checked="" type="checkbox"/> Preclude Recurrence <input type="checkbox"/> Root Cause Determination		
12 Recommended Actions: Take action to submit procurement records to CNF or identify in appropriate SNL procedures how quality-related procurement records are being managed and preserved. Address applicable requirements of QARD DOE/RW-0333P.		
7 Initiator Mary G. McDaniel <i>Mary G. McDaniel</i> 4/8/94		14 Issuance Approved by: QADD <i>[Signature]</i> for Date 9.12.94
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 _____

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OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT U.S. DEPARTMENT OF ENERGY WASHINGTON, D.C.		8 CAR NO.: <u>YM-94-094</u> PAGE: <u>1</u> OF <u>1</u> QA
CORRECTIVE ACTION REQUEST		
1 Controlling Document QARD DOE/RW-0333P		2 Related Report No. YMP-94-09
3 Responsible Organization SNL	4 Discussed With M. Tucker	
5 Requirement: QARD DOE/RW-0333P, Section 17.0, Revision 0, Subsection 17.2.10A, states, "Quality assurance records shall be temporarily stored in a container or facility with a fire rating of 1 hour, or dual storage shall be provided."		
6 Adverse Condition: Contrary to the identified requirement, the following records were missing from one of the copies of the identified training files maintained in dual storage: Connie S. Chocas - Confirmation of Familiarization Activities, dated 6/15/90 for QAFP 03-02, Revision 00, signed by C. Chocas 6/21/90 Test Completion Record, dated 6/21/90 for QAFP 03-02, Revision 00, signed by Warren Miller 6/25/90 John E. Gauthier - Training confirmation Form, dated 4/29/94 for Manual - Guidebook for Interactions Between DOE and NRC, signed by J. E. Gauthier 7/18/94		
9 Does a Significant Condition Adverse to Quality exist? Yes ___ No <u>X</u> If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E		10 Does a stop work condition exist? Yes ___ No <u>X</u> ; If Yes - Attach copy of SWO If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
		13 Response Due Date: 20 Working Days From Issuance
11 Required Actions: <input checked="" type="checkbox"/> Remedial <input checked="" type="checkbox"/> Extent of Deficiency <input type="checkbox"/> Preclude Recurrence <input type="checkbox"/> Root Cause Determination		
12 Recommended Actions:		
7 Initiator Mary G. McDaniel <i>Mary G. McDaniel</i> 9/18/94		14 Issuance Approved by: QADD <i>[Signature]</i> for Date 9.12.94
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 _____

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CORRECTIVE ACTION REQUEST		
1 Controlling Document DOP 3-17, Revision 0		2 Related Report No. YMP-94-09
3 Responsible Organization SNL	4 Discussed With V. Tidwell	
5 Requirement: DOP 3-17, Revision 0, Preparing Technical Information Documents, Section 5.1.1 requires, "...technical information documents...contain a specific reference to...the quality assurance level assigned...."		
6 Adverse Condition: Several published papers examined did not contain reference to the quality assurance level. Examples of this are SAND94-0443C: "Fracture-Matrix Interaction in Topopah Spring Tuff: Experiment and Numerical Analysis" and SAND90-2261: "Research Program to Develop and Validate Models for Flow and Transport Through Unsaturated, Fractured Rock."		
9 Does a Significant Condition Adverse to Quality exist? Yes ___ No <u>X</u> If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	10 Does a stop work condition exist? Yes ___ No <u>X</u> ; If Yes - Attach copy of SWD If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C	13 Response Due Date: 20 Working Days From Issuance
11 Required Actions: <input checked="" type="checkbox"/> Remedial <input checked="" type="checkbox"/> Extent of Deficiency <input checked="" type="checkbox"/> Preclude Recurrence <input type="checkbox"/> Root Cause Determination		
12 Recommended Actions:		
7 Initiator Keith Kersch <i>Robert E. Hanes</i> 9/21/94	14 Issuance Approved by: QADD <i>[Signature]</i> for Date <u>9.12.94</u>	
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 _____	

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OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT U.S. DEPARTMENT OF ENERGY WASHINGTON, D.C.		8 CAR NO.: <u>YM-94-096</u> PAGE: <u>1</u> OF <u>2</u> QA
CORRECTIVE ACTION REQUEST		
1 Controlling Document OCRM: QARD DOE/RW-0333P, Revision 0		2 Related Report No. YMP-94-09
3 Responsible Organization SNL	4 Discussed With L. Shephard	
5 Requirement: <p>Section 5.0, Paragraph 5.2.2, "Contents of Implementing Documents" states in part: "Implementing documents shall include the following information as appropriate to the work to be performed: (C) A sequential description of the work to be performed including controls for altering the sequence of required inspections, tests, and other operation. The organization responsible for preparing the document shall determine the appropriate level of detail. (D) Quantitative or qualitative acceptance criteria sufficient for determining that activities were satisfactorily accomplished...."</p>		
6 Adverse Condition: Contrary to the above, SNL's QAIPs do not meet all of the requirements of the OCRM: QARD as identified by those specific examples cited and referenced below: <ol style="list-style-type: none"> 1. The record packaging process implemented for procurement records is not addressed in QAIP 04-01 or QAIP 17-03. QAIP record sections do not clearly identify what records are processed individually and what records are processed as record packages. The record packaging process should be reflected in all applicable procedures. 2. The detail in QAIP 20-02 (Scientific Notebooks) is insufficient to provide a Scientific Notebook that would be suitable for use in licensing. The instructions in the QAIP are merely a restatement of the guidance provided in the QARD. Scientific Notebooks should be of a type and quality that would be suitable in a court of law. Unsatisfactory conditions that were found included: (1) use of looseleaf notebooks, (4) non-sequentially 		
9 Does a Significant Condition Adverse to Quality exist? Yes ___ No <u>X</u> If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	10 Does a stop work condition exist? Yes ___ No <u>X</u> ; If Yes - Attach copy of SWO If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C	13 Response Due Date: 20 Working Days From Issuance
11 Required Actions: <input checked="" type="checkbox"/> Remedial <input checked="" type="checkbox"/> Extent of Deficiency <input checked="" type="checkbox"/> Preclude Recurrence <input type="checkbox"/> Root Cause Determination		
12 Recommended Actions: <ol style="list-style-type: none"> 1. Correct the identified deficiency. 2. Evaluate all QAIPs to determine level of detail needed to adequately implement them. 3. Evaluate for impact to quality. 		
7 Initiator <i>Kenneth Metcal</i> Charles E. Betts <i>for</i> 9/2/94	14 Issuance Approved by: QADD <i>Montalvo for</i> Date <u>9/2/94</u>	
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 _____	

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8 CAR NO.: YM-94-096
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CORRECTIVE ACTION REQUEST (CONTINUATION PAGE)

6 Adverse Condition (continued)
numbered pages.

3. The detail in QALP 01-05, although incorporating the appropriate requirements from QARD 5.2.2 A through I, is not clearly delineated and confusing by providing several options for inclusion of requirements in work agreements. Consequently, work agreements are written that do not address, either by incorporation or reference as not applicable, all of the procedural/QARD requirements.
4. The level of detail in QALPs 02-05 and 02-06, although addressing the appropriate QARD 2.2.1.1 requirements, is not sufficient for personnel to adequately implement the procedures. The procedures incorporate the QARD requirements, but do not include sufficient implementing details or process steps for people to adequately comply with the requirements. For example, SNL staff do not adequately assign training to achieve or maintain proficiency and do not adequately complete training and qualification requirements.
5. The detail in QALP 19-01 (Software) is insufficient to provide that acquired or developed software would be suitable for use in licensing. The requirements in the QALP are merely a restatement of the QARD Supplement I requirements. Unsatisfactory conditions were in verification and validation control of acquired and developed software, change control and use of software.

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CORRECTIVE ACTION REQUEST		
1 Controlling Document OAR 07-01, Revision 01		2 Related Report No. YMP-94-09
3 Responsible Organization SNL	4 Discussed With R. Price	
5 Requirement: OAR 07-01, Revision 01, Procurement Acceptance Verification, Section 4.1.1 - When procurement of services such as engineering and consulting or analysis are involved, the Delegated Representative (1) shall accept the service by one or all of the following methods: ...review of objective evidence for conformance to procurement document requirements, such as reports, contractor documents, etc.		
6 Adverse Condition: Contrary to the above requirements calibration certificates were accepted by the SNL Delegated Representative when they did not conform to the procurement document requirements Amendment 6 to Contract No. 66-1662. The calibrations were on Torque, Serial No. 2814, dated 7-13-94, 662-10A-10, Serial No. 1814, dated 7-12-94, ADJ, Serial No. 0-5, dated 7-13-94. The following was missing from the calibration certificates: <ul style="list-style-type: none"> - Results of calibration and statement of acceptability. - Identification of the implementing document (including revision level) used in performing the calibration. Also, the method and interval of calibration for each device was not defined, based on the type of equipment, stability characteristics, required accuracy, intended use, and other conditions affecting measurement control.		
9 Does a Significant Condition Adverse to Quality exist? Yes ___ No <u>X</u> If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	10 Does a stop work condition exist? Yes ___ No <u>X</u> ; If Yes - Attach copy of SWO If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C	13 Response Due Date: 20 Working Days From Issuance
11 Required Actions: <input checked="" type="checkbox"/> Remedial <input checked="" type="checkbox"/> Extent of Deficiency <input checked="" type="checkbox"/> Preclude Recurrence <input checked="" type="checkbox"/> Root Cause Determination		
12 Recommended Actions: Extent of deficiency should evaluate reports and contractor documents in addition to calibration certificates.		
7 Initiator John R. Matras <i>John R Matras</i> 9/12/94	14 Issuance Approved by: <i>[Signature]</i> for <i>[Signature]</i> Date <u>9/12/94</u> OADD <i>[Signature]</i>	
15 Response Accepted OAR _____ Date _____	16 Response Accepted OADD _____ Date _____	
17 Amended Response Accepted OAR _____ Date _____	18 Amended Response Accepted OADD _____ Date _____	
19 Corrective Actions Verified OAR _____ Date _____	20 Closure Approved by: OADD _____ Date _____	

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CORRECTIVE ACTION REQUEST		
1 Controlling Document QARD Section III, Paragraph 12.2.6		2 Related Report No. YMP-94-09
3 Responsible Organization SNL	4 Discussed With R. Richards/J. Voight/R. Price/W. Olson	
5 Requirement: <p>QAP-12.1, Revisions 3 and 4, Section 4.2, Step 3-g states, A requirement to generate a signed certification regarding the calibration performed that contains the following minimum information: 3rd Bullet - "Identification of the calibration procedure and revision used;" 7th Bullet - "A quantitative statement of the accuracy and precision of the device including results of the calibration and a statement of acceptability."</p> <p>QARD Section III, Paragraph 12.2.6 states, "Measuring and Test Equipment calibration shall include the following information:</p> <p>F. Results of the calibration and statement of acceptability.</p> <p>H. Identification of the implementing document (including revision level) used</p>		
6 Adverse Condition: <p>The calibration performed by MTS System's Corporation on July 13, 1994, for the following equipment located in Building No. 849, Model No. 662-IBA-10; S/N No. 2814 and Model No. LVDT; S/N 106, Model No. AD7; S/N D-5 exhibited the following deficiencies: (1) does not indicate procedure used with revision (2) no quantitative statement of the accuracy and precision of the device including results of the calibration, and a statement of acceptability (3) no indication whether it was with tolerance and (4) some line-outs and write overs.</p>		
9 Does a Significant Condition Adverse to Quality exist? Yes ___ No <u>X</u> If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	10 Does a stop work condition exist? Yes ___ No <u>X</u> ; If Yes - Attach copy of SWO If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C	13 Response Due Date: 20 Working Days From Issuance
11 Required Actions: <input checked="" type="checkbox"/> Remedial <input checked="" type="checkbox"/> Extent of Deficiency <input checked="" type="checkbox"/> Preclude Recurrence <input type="checkbox"/> Root Cause Determination		
12 Recommended Actions:		
7 Initiator Steven P. Nolan <i>Steven P. Nolan 98.94</i>	14 Issuance Approved by: QADD <i>[Signature]</i> for Date <u>9.12.94</u>	
15 Response Accepted QAR _____ Date _____	16 Response Accepted QADD _____ Date _____	
17 Amended Response Accepted QAR _____ Date _____	18 Amended Response Accepted QADD _____ Date _____	
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8 CAR NO.: YM-94-098
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CORRECTIVE ACTION REQUEST (CONTINUATION PAGE)

5 Requirements (continued)
in performing the calibration."

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CORRECTIVE ACTION REQUEST		
1 Controlling Document OAP 20-02, Paragraph 4.1		2 Related Report No. YMP-94-09
3 Responsible Organization SNL	4 Discussed With D. Kessel/J. Potts	
5 Requirement: Scientific Notebooks shall be reviewed by a competent independent individual to verify there is sufficient detail to retrace the investigation and confirm the results, if feasible, or report the investigation and achieve comparable results without recourse to the original investigator.		
6 Adverse Condition: Contrary to the requirement above:		
1. WA-0071 SN, "Rock Mass Quantitative Index Derived from NRG Core Data," Section 2, the methodology for determining the parameter Jc in the RMR rock mass classification process was not traceable. 2. Documentation is insufficient in the WA-0116 SN, "Alcove Blast Project," Section 4 (Video Logs of Boreholes), and Section 6 (Analysis); missing titles of name, column headings, data units, acronyms, and insufficient description of methodology. 3. Laboratory Notebook: YMSCP Fracture Properties Experiments, WA-0091, Task 4 (Fracture Surface Testing in Support of ESF Design), NRG-4-537.8, Test ID YMP No. 4. Test control parameters delta and zero were not defined.		
9 Does a Significant Condition Adverse to Quality exist? Yes ___ No <u>X</u> If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	10 Does a stop work condition exist? Yes ___ No <u>X</u> ; If Yes - Attach copy of SWO If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C	13 Response Due Date: 20 Working Days From Issuance
11 Required Actions: <input checked="" type="checkbox"/> Remedial <input checked="" type="checkbox"/> Extent of Deficiency <input checked="" type="checkbox"/> Preclude Recurrence <input checked="" type="checkbox"/> Root Cause Determination		
12 Recommended Actions:		
7 Initiator James Blylock <i>James Blylock</i>	9/7/94	14 Issuance Approved by: QADD <i>[Signature]</i> Date 9.12.94
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 _____	