OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

QUALITY ASSURANCE AUDIT PLAN

FOR AUDIT YMP-93-17

OF

SANDIA NATIONAL LABORATORY

ALBUQUERQUE, NEW MEXICO

SEPTEMBER 13 THROUGH 17, 1993

Prepared by: Charles C. Warren Date: 8-9-93
Charles C. Warren
Audit Team Leader
Yucca Mountain Quality Assurance Division

Approved by: Donald G. Horton Date: 8/12/93
Donald G. Horton
Director
Office of Quality Assurance

1027

ENCLOSURE

1.0 SCOPE

This audit, to be performed by a team of auditors from the Yucca Mountain Quality Assurance Division (YMQAD), will evaluate the Sandia National Laboratories (SNL) Quality Assurance (QA) Program to determine whether it meets the requirements and commitments imposed by the Office of Civilian Radioactive Waste Management (OCRWM). This will be accomplished by verifying implementation and effectiveness of the system in place, as well as verifying compliance with requirements.

In addition to follow-up of any open Corrective Action Requests, a representative sample of deficiencies identified during previous QA audits and surveillances of SNL will be included in the scope of the audit to determine the effectiveness of SNL corrective actions.

The programmatic and technical elements to be audited, as well as those programmatic elements not included in this audit, are identified in Section 4.0 of this audit plan.

2.0 AUDIT SCHEDULE

Pre-Audit Team/Observer Meeting	8:30 a.m., September 13, 1993 Albuquerque, New Mexico
Pre-Audit Conference	9:00 a.m., September 13, 1993 Albuquerque, New Mexico
Audit Activities	9:30 a.m. to 4:00 p.m. September 13, 1993 Albuquerque, New Mexico
	8:00 a.m. to 4:00 p.m. September 14-16, 1993
	8:00 a.m. to 11:30 a.m. September 17, 1993
Post Audit Conference	1:00 p.m., September 17, 1993 Albuquerque, New Mexico

There will be daily Audit Team Leader/Observer/SNL meeting at 8:15 a.m. and a daily YMQAD Audit Team/Observer meeting starting at 4:00 p.m. to discuss potential deficiencies and establish needed liaison. Both daily meetings will be held at locations provided by SNL.

3.0 REQUIREMENTS TO BE AUDITED AND APPLICABLE REFERENCES

The requirements to be audited will be contained in the programmatic and technical checklists. These checklists will be developed from the latest available revision of the following documents:

- OCRWM Quality Assurance Requirements and Description document
- SNL Yucca Mountain Site Characterization Project (YMP) Quality Assurance Program Description document
- SNL Software Quality Assurance Plan
- SNL Implementing Procedures
- Applicable YMP Administrative Procedures (Quality)

The conduct of the audit will be in accordance with the documents (latest revision) listed below:

- Quality Assurance Administrative Procedure (QAAP) 18.2, "Audit Program"
- QAAP 16.1, "Corrective Action"

4.0 ACTIVITIES TO BE AUDITED

QA Program Elements:

3.0 Design Control
4.0 Procurement Document Control
7.0 Control of Purchased Items and Services
8.0 Identification and Control of Materials, Parts, Components, and Samples
15.0 Control of Nonconforming Items
19.0 Computer Software
20.0 Scientific Investigations

The following QA program elements were considered during development of this audit plan and found to be not applicable, since the current SNL QA Program has no activities for which these elements apply:

10.0 Inspection
11.0 Test Control
14.0 Inspection, Test, and Operating Status

Technical Areas:

Technical Specialists will review and evaluate the processes used for the following technical activities:

Work Breakdown Structure (WBS) Number/Activity Number and Title

1.2.3.2.6.2.1/460, Surface Facilities Exploration Program
1.2.3.2.6.2.2/470, Surface Facilities Laboratory Tests and Material Property Measurements
1.2.3.2.6.2.3/490, Surface Facilities Field Tests
1.2.3.2.7.1.1/420, Laboratory Thermal Properties Develop Procedures and Conduct Tests
1.2.3.2.7.1.2/430, Laboratory Thermal Expansion Testing Develop Procedures and Conduct Tests
1.2.3.2.7.1.4/451, Scoping/Prep Activities for Mechanical Properties of Rock Fractures
1.2.4.2.1.1.4/621, Begin Starter Tunnel Construction Monitoring

In addition, the above technical activities will be evaluated to determine adequacy in the following areas:

1. Technical qualifications of scientific investigators and design personnel.

2. Understanding of procedural requirements as they pertain to scientific investigation activities.

3. Adequacy of technical procedures.

4. Development of scientific investigation planning documents, study plans, work supporting the Site Characterization Plan, and any related work products.

If the audit team identifies a need to verify additional program elements/technical areas during the audit, they will be added to the audit scope and verified accordingly.

5.0 AUDIT TEAM MEMBERS

Charles C. Warren, Audit Team Leader, Quality Assurance Technical Support Services (QATSS), Las Vegas, Nevada
Kenneth T. McFall, Lead Technical Specialist, QATSS, Las Vegas, Nevada
James Blaylock, Auditor, YMQAD, Las Vegas, Nevada

Robin N. Datta, Technical Specialist, Management & Operating Contractor, Las Vegas, Nevada
Mario R. Diaz, Auditor, YMQAD, Las Vegas, Nevada
John S. Martin, Auditor, QATSS, Las Vegas, Nevada
John R. Matras, Auditor, QATSS, Las Vegas, Nevada
Forrest D. Peters, Technical Specialist, Technical and Management Support Services, Las Vegas, Nevada
Richard L. Weeks, Auditor, QATSS, Las Vegas, Nevada

6.0 AUDIT CHECKLISTS

The following checklists will be used during the audit:

YMP-93-17-01, Programmatic Checklist
YMP-93-17-02, Technical Checklist

AUDIT YMP-93-17

SANDIA NATIONAL LABORATORIES TENTATIVE SCHEDULE OF AUDIT ACTIVITIES

MONDAY 9/13/93	TUESDAY 9/14/93	WEDNESDAY 9/15/93	THURSDAY 9/16/93	FRIDAY 9/17/93
8:30 am Team/Observer Meeting 9:00 am Pre-Audit Conference Diaz - 4 Martin - 15 Matras - 19 Blaylock - 3, 20 Weeks - 3, 20 Peters - 1.2.4.2.1.1.4 Ladd - 1.2.3.2.7.1.4	8:15 am TPO Meeting Diaz - 4 Martin - 8 Matras - 19 Blaylock - 3, 20 Weeks - 3, 20 Peters - 1.2.4.2.1.1.4 Ladd - 1.2.3.2.7.1.4	8:15 am TPO Meeting Diaz - 4/7 Martin - 8 Matras - 19 Blaylock - 3, 20 Weeks - 3, 20 Peters - 1.2.4.2.1.1.4 Ladd - 1.2.3.2.7.1.4	8:15 am TPO Meeting Diaz - 7 Martin - 10 (SURV) Matras - 3, 20 Blaylock - 3, 20 Weeks - 3, 20 Peters - 1.2.3.2.6.2.1, .2, .3 Ladd - 1.2.3.2.7.1.1, .2	8:15 am TPO Meeting Diaz - 7 Martin - 10 (SURV) Matras - 3, 20 Blaylock - 3, 20 Weeks - 3, 20 Peters - 1.2.3.2.6.2.1, .2, .3 Ladd - 1.2.3.2.7.1.1, .2
LUNCH 11:30 am-12:30pm	LUNCH 11:30 am-12:30pm	LUNCH 11:30 am-12:30pm	LUNCH 11:30 am-12:30pm	LUNCH 11:30 am-12:30pm
Diaz - 4 Martin - 15 Matras - 19 Blaylock - 3, 20 Weeks - 3, 20 Peters - 1.2.4.2.1.1.4 Ladd - 1.2.3.2.7.1.4	Diaz - 4 Martin - 8 Matras - 19 Blaylock - 3, 20 Weeks - 3, 20 Peters - 1.2.4.2.1.1.4 Ladd - 1.2.3.2.7.1.4	Diaz - 7 Martin - 8 Matras - 19 Blaylock - 3, 20 Weeks - 3, 20 Peters - 1.2.3.2.6.2.1, .2, .3 Ladd - 1.2.3.2.7.1.1, .2	Diaz - 7 Martin - 10 (SURV) Matras - 3, 20 Blaylock - 3, 20 Weeks - 3, 20 Peters - 1.2.3.2.6.2.1, .2, .3 Ladd - 1.2.3.2.7.1.1, .2	1:00 pm Post-Audit Conference
4:00 pm Team/Observer Caucus	4:00 pm Team/Observer Caucus	4:00 pm Team/Observer Caucus	4:00 pm Team/Observer Caucus	

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

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AUDIT/SURVEILLANCE
NO YMP-93-17-02

QUALITY ASSURANCE CHECKLIST

ORGANIZATION EVALUATED	[x] EXTERNAL	[x] AUDIT	PREPARED BY K.T. McGill/C.C. Wan DATE 9-2-93
SNL	[ ] INTERNAL	[ ] SURVEILLANCE	
DATES OF EVALUATION			
September 13-17, 1993			

CONTROLLING DOCUMENT (Title, Number, Revision)

ACTIVITY EVALUATED

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
	WBS 1.2.3.2.7.1.4, "Laboratory Determination of the Mechanical Properties of Fractures"		
T-1	Are the Site Characterization plan's objectives, as cited in this Study Plan, still those being pursued?		
T-2	What Subordinate/Supporting plans, procedures, and documents implement this study plan?		

* INDICATE RESULTS: SATISFACTORY (SAT), UNSATISFACTORY (UNSAT), NOT APPLICABLE (N/A)

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
T-3	How do you assure that the Study Plan's objectives satisfy the designer's needs? How do you interact with the designers?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
T-4	Explain the acquisition of samples for you measurements - starting at the borehole: - How are they chosen? - How do you specify what you need to the sample providers? - How do you assure that the sample's physical characteristics are not altered: -Before you receive them? -After you receive them?		
T-5	How do you assure that the test specimens chosen will provide the representative data required for design?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
T-6	Your measurement strategy is to measure the samples at dry and at saturated conditions. Justify the adequacy of this approach in terms of it ability to provide the designer with information of properties under partially saturated condition?		
T-7	What national standards for measurement and measurement technique have you adopted? Please describe and explain any techniques that you employ which do not follow such a standard.		
T-8	Describe the preparation of test specimens.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
T-9	Are test specimens archived and protected?		
T-10	Describe data reduction and the use of computer software.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	WBS 1.2.3.2.7.1.1, "Laboratory Thermal Properties"		
T-11	Are the Site Characterization Plan's objectives, as cited in this Study Plan, still those being pursued?		
T-12	What subordinate/supporting plans, procedures, and documents implement this study plan?		
T-13	How do you assure that the Study Plan's objectives satisfy the designer's needs? How do you interact with the designers?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
T-14	Explain the acquisition of samples for your measurements - starting at the borehole: - How are the chosen? - How do you specify what you need the sample providers? - How do you assure that the sample's physical characteristics are not altered: - Before you receive them? - After you receive them?		
T-15	How do you assure that the specimens chosen will provide the representative data required for design?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
T-16	How was the rock core preserved prior to testing?		
T-17	In Study 8.3.4.2.4.3, How were the samples (specimen's) treated prior to testing?		
T-18	How do you determine the orientation of the samples from ES -1 ? Vert. or radial conductivity?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
T-19	What lubricant is used in cutting the rock specimens?		
T-20	Your measurement strategy is to measure the samples at dry and at saturated conditions. Justify the adequacy of this approach in terms of its ability to provide the designer with information of properties under partially saturated conditions?		
T-21	What national standards for measurement and measurement technique have you adopted? Please describe and explain any techniques that you employ which do not follow such a standard.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
T-22	If the standard practice; established by ASTM, etc, for over drying is 110 degrees =5 degrees; Why is this project different? (pg 72).		
T-23	Describe the preparation of test specimens.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
T-24	Are test specimens archived and protected?		
T-25	Describe date reduction and the use of computer software.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	WBS 1.2.3.2.7.1.2, "Laboratory Thermal Expansion Testing"		
T-26	* Are the Site Characterization Plan's objectives, as cited in the Study Plan, still those being pursued?		
T-27	"Experiments discussed in this study are intended to provide all of the data on thermal expansion required by repository design...that can be obtained in a lab setting". Is this a defensible statement? Explain.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
T-28	What subordinate/supporting plans, procedures, and documents implement this study plan?		
T-29	How do you assure that the Study Plan's objectives satisfy the designer's needs? How do you interact with the designers?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
T-30	Figure 1.2-1 outlines the relationships among various studies for thermal stress analysis. Please explain the coordination of these studies.		
T-31	How do you assure that the test specimens chosen will provide the representative data required for design?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
T-32	Explain the acquisition of samples for you measurements - starting at the borehole: - How are they chosen? - How do you specify what you need to the sample providers? - How do you assure that the sample's physical characteristics are not altered: - Before you receive them? - After you receive them?		
T-33	Your measurement strategy is to measure the samples at dry and at saturated conditions. Justify the adequacy of this approach in terms of its ability to provide the designer with information of properties under partially saturated conditions?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
T-34	Page 2, outlines the emphasis of the program, should any other items be considered such as sample size, degree of saturation, test procedures, etc.		
T-35	What national standards for measurement and measurement technique have you adopted? Please describe and explain any techniques that you employ which do not follow such a standard.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
T-36	Page 30, section 2.2.5.1 states that the preferred measurement method use a tube-type dilatometer. How does this approach compare with that described in ASTM D 4535-85, "Measurement of the Thermal Expansion of Rock Using a Dilatometer"/ Discuss.		
T-37	Describe the preparation of test specimens.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
T-38	Page 31. The discussion states that saturated Tuff samples contract when exposed to a low relative humidity environment. It also states that the in-situ air will be humid. In light of these two statements, and the fact that in-situ rock is unsaturated, explain and justify the plan's conclusion that testing should occur under humid conditions.		
T-39	How are test specimens archived and protected?		
T-40	Describe data reduction and the use of computer software.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
	✓ Study Plan 8.3.1.14.2, "Studies to Provide Soil and Rock Properties of Locations of Surface and Subsurface Address Facilities" WBS 1.2.3.2.6.2		
T-41	What documents define the transition of responsibilities for the work, from the USGS to SNL, in addition to the letter from YMP redefining the responsibility for this work, and the SNL Transition Plan? a) Copies of Technical Directives from YMP? b) Copies of USGS Scientific Verification intended to identify remaining USGS/USBR actions needed to close out the technical activity by them? Copy of McKeown memo 8/15/91? c) What data and records were transferred to SNL from the USGS? Was this transmittal of data and records complete?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	d) Copy of SNL's review or TPP 92-1? e) Copy of SNL's preparedness (readiness) review? g) What specific deliverables for this study plan, were delivered by the USGS? h) What specific deliverables for this study plan have been or will be delivered by SNL?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
T-42	What personnel have been or are assigned to this work over the past year, and what are their responsibilities?		
T-43	What subcontractors have been or are used for this work over the past year, and what are their responsibilities?		
T-44	What documents (plans, procedures-EP's and TP's, Work Agreements, DIMs, PDMs, QA Grading Packages, etc.), other than ASTM standard procedures and the like, are used for the implementation of this work at SNL? Copies if requested. - SNL TP for Geotechnical Core Logging?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
T-45	Has any existing data from the previous studies by SNL been qualified in accordance with APQ 05.09? a) SAND 85-7017 (Ho)? b) SAND 90-2491 (Gibson)? c) SAND 84-2015 (Neal)? d) SAND 85-0815 (Neal)? Does the word validation in the title of this indicate "qualification"? ✓ e) The Reynolds geophysical work? The electrical work? f) What process is used to "upgrade" the non-QA field logs produced according to BTP-SMF-008 by the SMF?		
T-46	✓ Did the USGS "qualify any existing data?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
T-47	Who is the Principal Investigator for Study Plan 8.3.1.17.4.2, "...Location and Recency of Faulting near Prospective Surface Facilities"/ Is SNL's EP-0001 in use?		
T-48	Copies of information provided to SNL from 8.3.1.17.4.2?---Any recent faulting or unusual conditions?		
T-49	What information if any, on faulting has been provided by SNL to the PI for 8.3.1.17.4.2?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
T-50	What work has been done by SNL since they took over form the USGS? a) Anything in Activity 1 "Exploration Program Study? 1. Site Reconnaissance? Copy of final Report on results of site reconnaissance (input to Title I design)? From USGS? 2. Preliminary and detailed Exploration Activity? Is SNL solely responsible for the Final Report on the preliminary and detailed exploration, and when will it be delivered? a) Documentation, maps, logs, and scientific notebooks for test pits, soundings, trenches, borings, and surface sampling (SNL)? Relogging of RF Holes, particularly RF-8? Current updated cross-section for north ramp? b) Geophysical logs of borings?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	c) Surface geophysical surveys? d) Soil percolation tests? e) Soil resistivity tests? f) Lab and field tests for booster pump station and water storage facilities? g) Additional surface mapping for south ramp portal area? h) mineralogy data? i) pavement studies (NRG-1 or other)?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	b) What has been done by SNL within Activity 2 "Physical Property and Index Laboratory Test Activity" 1. Documentation for soil parameters: density, specific gravity, moisture content, soil classification, gradation, Atterbergs and compaction curves? 2. Documentation for rock parameters: density, moisture content, porosity, specific gravity? 3. Documentation for aggregate durability: sodium sulfate, abrasion, and petrographic analysis? 4. Documentation for triaxials, unconfined, shear compressibility, and resonant column for soils; ultrasonic pulse velocity, resonant velocity, unconfined, triax, tensile, and shear for rock?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	c) What has been done by SNL for Activity 3 "Field Tests and Characterization Measurements"? 1. Documentation for soil density and relative density, rock mass classifications, and rock discontinuity descriptions? 2. Documentation for SPT and Dutch cone tests and their correlation to soil modulii? Question: Are there any soils at this site with valid correlations of this sort? - Plate load tests? - Pile load tests? - Rock estimates from rock mass classification? - in-situ rock tests (plate load, direct shear)?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
	3. Any Becker hammer work done? 4. Have any seismic surveys, P or S or both been proposed or performed? - Documentation of seismic surveys in boreholes including so-called "VSP"? - Who will perform the dynamic loading evaluations especially for the static and dynamic stability of the portals? What documentation of this?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
T-51	What data, analysis, information, and reports, have been submitted thus far by SNL, and to who? What is in draft form? a) test pit and trench logs? b) geologic maps and cross-sections? c) test results? d) findings and conclusions?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	Study Plan 8.3.1.15.1.8 "In-Situ Design Verification" WBS 1.2.4.2.1.1.4 This work was reported under WBS 1.2.6.1.1, until funding was made available for WBS 1.2.4.2.1.1.4 in late April 1993.		
T-52	What documents (plans, procedures-EP's and TP's, work agreements, DIMs, PDMs, QA Grading Packages, etc.) are used for the implementation of this work at SNL? Copies if requested, See also Table 3.0-1 on page 23 of the Study Plan. a) Copy of Experimental procedure (EP) for monitoring? b) Copy of Test Planning Package (TPP)? c) Copy of Job Package (JP)? d) Copy of SNL letter regarding NRC SCA comments? e) Are there documents describing the design instrumentation and the data acquisition system? If so, copies?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	f) Documentation of additional temporary monitoring studies in the starter tunnel to address safety concerns under WBS 1.2.6.1.1, after WBS 1.2.4.2.1.1.4 was activated (Convergence monitoring, rock bolt load cells, tape extensometer pins)? How will this work by integrated with the work under this Study Plan? Copies of results? g) Copy of extended abstract "Construction Monitoring Activities in the Yucca Mountain ESF Starter Tunnel"?		
T-53	What personnel have been or are assigned to this work, and to what portions of the Study Plan are they assigned?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
T-54	What subcontractors have been or are used for this work, and for what portions of the Study Plan have they been used?		
T-55	What work as been performed under this Study Plan since May?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
T-56	Provide some documentation of input if any, transmitted to SNL for the starter tunnel, concerning: a) construction records kept by the ESF A&E? Does this include monitoring of water usage in the ESF? d) data on performance of openings gathered in other experiments? Who provides this information? Any data sent to SNL? c) Ventilation parameters monitored to ensure worker health and safety? Who provides this information? (radon; radon daughter products; particulate concentrations and character; airflow pressure, temperature, humidity ; rock temperatures) d) Geotechnical mapping of ESF drifts (SCP 8.3.1.4.2.2.4)? - Does the USGS use the rock mass classification systems specified by this Study Plan? - Who is the Site Engineer specified on page 3 of WA-0065, and what are his/her responsibilities? - Who provides the rock mass classifications in the workings? SNL or other?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	e) Who evaluates the extent of excavation induced fracturing in the ESF? SNL? or other? Documentation?		
T-57	What are the specific responsibilities of SNL for each of the four activities described in this Study Plan, as opposed to the responsibilities of other organizations? a) Activity 1? b) Activity 2? c) Activity 3? d) Activity 4? How in the work performed under this Study Plan to be integrated with the work performed by the A&E, the constructor, SCP 8.3.1.15.1.5, SCP 8.3.1.15.1.6, SCP 8.3.1.15.1.6.2, SCP 8.3.1.4.2.2.4, SCP 8.3.1.15.1.1, and SCP 8.3.1.15.1.2? Who is in charge of the integration of all of this work?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
T-58 1.	What work has been performed by SNL for Activity 1 "Evaluation of Mining Methods"? Documentation? a) Blast documentation including hole patterns, hole charges, delays etc.? b) Blast monitoring documentation? (by SNL) c) Comparisons of a) with b)? Documentation of blast monitoring results? d) have any evaluations of blast damage using borehole TV been completed? Documentation? e) Have the rock mass quality systems (JGI-Q and CSIR-RMR) been used in Tuff? f) What numerical modeling system will be used to evaluate the impacts of heat and seismic loading? (page 12 of Study Plan) Verification under actual conditions for this modeling? g) Borehole overcoring? By SNL under this Study Plan?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	h) Size gradations of mined tuff? i) Measurements of water saturation and changes thereof, between the floor, walls, and roof, of the excavation? What methods? Have the neutron probe measurements for moisture in partially saturated tuffs been verified by other measurements? j) Target is to limit the average over break to less that 0.5 ft??? (see k) k) Target is to limit blast induced fracturing to less than 3 meters on the average??? (see j)		
T-59	What work has been performed by SNL for Activity 2 "Evaluation of Ground Support Systems"? Documentation? a) Has any evaluation of the Ground Support Selection Process been made by SNL ? Documentation ? b) What methods will be used to monitor areas without ground support? c) How does the Peck observation method differ from what is normally done in the design and maintenance of under ground openings? Has this "method" been used for tunneling/drift operations elsewhere?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
T-60	What work has been performed by SNL for Activity 3 "Monitoring Drift Stability"? a) What is the status of the microseism network? Planning ? Implementation ? What is the situation on seismic monitoring of the portal (USGS of SNL)? Any records? b) Convergence tests? c) MPBXs? d) Monitoring drift stability by ultrasonics, fiber optics, lasers, and photogrammetry (page 27 of Study Plan)? Describe methods to be evaluated.		
T-61	What work has been performed by SNL on Activity 4 "Air Quality and Ventilation Evaluations"? Table 3.0-1 on page 23 implies that SNL will do all of the measurements. Is this true?		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
T-62	What milestones (deliverables) have been completed? (Table 6.0-1 on page 47 of Study Plan)? (Section 7.0 on page 6 of WA-0065)? Other documentation?		

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

AUDIT/SURVEILLANCE
NO YMP-93-17-01

QUALITY ASSURANCE CHECKLIST

ORGANIZATION EVALUATED	[x] EXTERNAL	[x] AUDIT	PREPARED BY C.C. Lehman DATE 9-2-93
SNL	[ ] INTERNAL	[ ] SURVEILLANCE	
DATES OF EVALUATION			
September 13-17, 1993			
CONTROLLING DOCUMENT (Title, Number, Revision)			ACTIVITY EVALUATED

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
	QAIP 1-5, Revision 03-Establishing Work Agreements Section 4.1, Note		
3-1	Verify that draft WA's that govern scientific investigation work and utilized a Scientific Notebook (SN), that the following elements, as applicable are addressed: a. Identification of scientific approach or technical methods used to collect, analyze, or study results of applicable work. b. Identification of applicable standards and criteria. C. Identification or development of implementing procedures. d. Identification of field and laboratory testing equipment, or other equipment.		

* INDICATE RESULTS: SATISFACTORY (SAT), UNSATISFACTORY (UNSAT), NOT APPLICABLE (N/A)

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	e. Identification of prerequisites, limits, precautions, special controls, environmental conditions, processes, or skills. f. ID of computer software. g. Technical and regulatory requirements. h. A sequential description of the work to be performed including controls for altering the sequence of required inspection, test, and other operations. i. Methods of demonstrating that the work was performed as required. j. ID of associated items and activities.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	Section 4.2		
3-2	Verify that technical and QA reviewers have signed and dated the WA to document review and resolution of concerns.		
	Sections.4		
3-3	Verify that a document identifier and effective date has been indicated on the WA.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	QAIP 2-2, Revision 01 Study Plan Requirements Section 5.0 Step 3		
3-4	Verify that a review of a draft SP or revision is performed by at least one Technical Reviewer and QA reviewer.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
3-5	QAIP 2-4, Revision 00 Conducting and Documenting Analyses Section 3.2 Step 2 Verify that analyses documentation for design includes the following: A. Analyst name, b. Analysis date, c. Analysis title, d. Purpose and objective e. Method used, f. QA control's applied, g. Input and input sources, h. Assumptions, i. Units, accuracy, and precision, j. Representative k. Identity of any software used utilizing the software unique identifier, and l. WA and QA Grading Report (QAGR) numbers.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
	QAIP 3-4, Revision 01 Design Investigation Control Section 4.1.1		
3-6	Verify that prior to the close-out of a DIM or DIM task, the work performed is evaluated.		
3-7	Verify that for tasks that develop an actual design, the process described in Procedure 3-5 is utilized.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
3-8	Verify that if the task is a study, evaluation or other design-related activity resulting in a report, the process described in Procedure 6-3 is utilized. Section 4.1.2		
3-9	Verify that for work that is accepted, a closing memo/letter for the DIM or DIM Task(s) is prepared and issued to the investigating organization or investigator and instructs the recipient to transmit the task files(s) to the SNL YMP Delegated representative.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
	Sections.1.3		
3-10	Verify that for work that continues, a Work Agreement, in accordance with Procedures 1-5, covering the unfinished work has been issued.		
	QAIP 3-5, Revision 00 - Design Analysis and Verification		
3-11	Section 3.1 Step 1 Verify that for design verification or analysis activities. A Work Agreement or Technical Procedure is prepared.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	Step 2		
3-12	Verify that method of calculation is specified in the analysis plan.		
	Step 3		
3-13	Verify that the analysis documentation contains the following information as a minimum: a. Definition of the objective of the analysis, b. Definition of design in puts and identification of their sources, c. Results of literature searches or other applicable background data, d. Identification of assumptions and designation of those that must be verified as the design proceeds, and e. Identification of reviewer and approver.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
	Section 3.2.1 Step 1		
3-14	Verify that the use of alternate calculations is justified and documented.		
	Step 3		
3-15	Verify that the results of the verification are documented by the controlling work document.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	Section 3.2.2 Step		
3-16	Verify that when qualification tests are used they are justified and documented.		
3-17	Verify that the individual (s) assigned to complete the qualification test (s) is qualified and independent.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
3-18	Step 2 Verify that the assigned verifier develops a test procedure using Procedure 20-1 and addresses the following elements as a minimum: a. The test configuration. b. Simulation of performance under conditions that represent the most adverse design conditions. c. Specification of the design features being tested. (refer to procedure for clarification) d. If models or mock-ups are used, scaling criteria shall be established and verified, e. Operating modes and environmental conditions in which the item must perform satisfactorily in determining the most adverse conditions.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	Step 3		
3-19	Verify that results of the test are documented in accordance with procedure 20-2 or as directed by work control documents.		
	Steps 4 and 6		
3-20	Verify that a qualified and independent evaluator documents the evaluation as required by the controlling work document.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	QAIP 3-10, Revision 00		
3-21	Section 3.1 Verify that the Work Agreement specify the use of the routine calculation procedure.		
3-22	Section 3.2 Verify that the routine calculation is documented in accordance with the criteria listed in Section 3.2, and that an independent technical review is conducted and documented. Records are to be submitted to the SNL		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
	QAIP 3-11, Revision 00 - Requirements for Submitting Data to the Yucca Mountain Project Site and Engineering Properties Data Base (SEPDB)		
3-23	Section 5.1.1 Verify that Data Compilation Forms (DCFs) contain the following information: a. Sample Location and Identification, as applicable 1. Sample origin such as drill-hole name of location identifier, 2. Sample depth interval, 3. Sample identification, and 4. Test number.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	b. Parameter (s) and Measurement Units, as applicable 1. Data values and 2. Estimated experiment uncertainty (or notation as to why it is not included) c. Experiment Conditions, as applicable 1. Type of experiment and 2. Conditions such as temperature, pressure, sample size,etc. that could affect interpretation of the data.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
	d. References and Supporting Information 1. Quality Assurance grading Report number of the activity that generated the data, 2. DRMS Data-Set ID of the SNL YMP data gathering activity, 3. Project participant name, the name and division number of the person submitting the DCRF, and the date the IDCF was completed, and 4. Sand Report reference.		
	Section 5.2.1		
3-24	Verify that Technical Data Information Forms (TDIFs) are completed each time a submittal is made to the SEPDB in accordance with AP 5.2Q.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	QAIP 3-12, Revision 00 Peer Reviews		
	Section 4.1		
3-25	Step 2		
	Verify that a peer review plan is prepared as required by paragraph 5.0 of Appendix A.		
	Step 6		
3-26	Verify that the plan is reviewed and approved by the TPO.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	Step 11		
3-27	Verify that the review notification letter includes a statement identifying the scope of each reviewer's activities and review criteria.		
	Section 4.2 Step 1		
3-28	Verify that comments are signed and dated by each reviewer.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
	Sections 4.3 Step 4		
3-29	Verify that signatures of all peer reviewers is on the report.		
	Step 8		
3-30	Verify that reasons that dissenting opinions could not be resolved are documented.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	Section 5.0		
3-31	Verify that for completed peer reviews the following records have been submitted to the SNL YMP LRC: a. Certification of Peer Reviewer Qualification and Independence, b. Peer Review Initiation Letter, c. Peer Plan and revisions, d. Peer Review Notification Letter and revision, e. Document Review Comment Sheets or equivalent, f. Peer Review Meeting Report (s) and revisions, g. Peer Review Report and revisions, h. Peer Review checklist (if used), i. All dissenting opinions, and j. Any related correspondence or data required to complete the record of the peer review and actions.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	QAIP 6-2, Revision 02 Reviewing, Approving, and Issuing Technical Information Documents Section 6.0		
3-32	Verify that prior to release of a SAND outside of SNL, it is reviewed and approved by SNL YMP, by YMPO and by Sandia Publications Representative.		
	Section 6.5 Step 1		
3-33	Verify that for each SAND document, two technical reviewers and one QA reviewer have been selected.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
3-34	Verify that for each SLTR document one technical and one QA reviewer have been selected. Section 6.6 Step 2		
3-35	Verify that a Technical Data Information Form (TDIF) number has been assigned to DRMS data Set (s).		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
3-36	Section 6.11 Step 1 Verify that for a SAND report the TPO indicates acceptance by signing the MRS.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	QAIP 4-1, Revision 03, Procurement		
4-1	Paragraph 4.1, Step 2 Verify that the Delegated Representative (DR) determines the procurement method to be used.		
4-2	Paragraph 4.2.3, Step 6 Verify that the QA Procurement Coordinator (QAPC) has reviewed the Procurement Planning Checklist (PPC) and he has concurred with it after all QA requirements have been incorporated into the procurement document.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
	QAIP 4-1, Revision 03		
4-3	Paragraph 4.2.5, Step 11 Verify that the QAPC has reviewed all procurement documents generated by Purchasing to ensure that documents transmitted to the Contractor include appropriate provisions to assure that the products or services will meet the specified requirements.		
4-4	Paragraph 4.3.2, Step 5 Verify that the DR ensure that requirements described in same paragraph are part of the Request for Quotation (RFQ).		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	QAIP 4-1, Revision 03		
4-5	Paragraph 4.3.2.5, Step 5 Verify that the RFQ includes requirements, for reporting nonconforming activities, and record requirements as described in same paragraph.		
4-6	Paragraph 4.4, Step 5, Verify that the QAPC review and concur with changes made to Post-award contract.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
	QAIP 4-1, Revision 03		
4-7	Paragraph 5.0 Verify that QA record packages include: - Material Requisitions - Purchased Requisitions - Procurement Planning Checklist - Request(s) for Quotations - Contracts (includes contracts that purchasing refer to as Purchase Orders) - Change Requisitions - Change Amendments to Contracts - All support documentation (e.g. memorandums, acquisition plans, etc.)		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
	QAIP 7-1, Revision 01, Procurement Acceptance Verification		
7-1	Paragraph 4.1 Verify that personnel performing verification activities for acceptance of procured items are qualified in accordance with Procedure 2-6.		
7-2	Paragraph 4.1.1, Step 2 Verify that the Delegated Representative (DR) documents the results of any of the methods used in accepting the service on the SNL Invoice Action Form.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
7-3	Paragraph 4.1.2 Verify that SNL personnel verify the Certificate of Conformance provided by the contractor.		
7-4	Paragraph 5.0 Verify that QA records packages include: - Documentation of Acceptance of Services - Certificates of Conformance		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	QAIP 7-3, Revision 01, Evaluation of Contractor QA Program Documents		
7-5	Paragraph 4.2, Step 1 Verify that the QA staff reviewed the contractor's QA program document to verify compliance with requirements and record the review on a checklist.		
7-6	Paragraph 4.2, Step 4 Verify that the QA Staff prepared a document evaluation transmittal letter containing the review comments and the evaluation results.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
	QAIP 7-3, Revision 01		
7-7	Paragraph 4.3, Step 6 Verify that the QA Staff maintain the records of the document evaluation activities, retaining review comments and transmittal letters on deficient documents until deficiencies are resolved.		
7-8	Paragraph 5.0 Verify that the following QA record are being maintained: - Contractor;s QA program document and transmittal letters - the final resolution copies of: - The DRC form, or review checklist - The QAR Program evaluation transmittal letter, and/or - The QA Program acceptance letter		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	QAIP 10-01, Revision 2, Surveillances		
10-1	Paragraph 3.1 Step 2 Verify that surveillance are scheduled.		
10-2	Paragraph 3.1 Step 3 Verify that on a periodic bases the schedule is reviewed and updated.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
10-3	Paragraph 3.1 Step 4 Verify how SNL determines which surveillances are to be performed based upon: - The schedule of performance of those activities; - Their relative importance to the project; - The complexity of the work; and - The request of SNL personnel.		
10-4	Paragraph 3.2 Step 2 Verify that personnel who perform surveillances are not directly responsible for, the activities being surveyed.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
10-5	Paragraph 3.3 Step 3 Verify that when surveillances are performed that nonconforming conditions are documented in accordance with QAIP 15-1 and deficiencies are documented in accordance with QAIP 16-1.		
10-6	Paragraph 3.4 Step 2 Verify that surveillance reports contain the following information: - date of surveillance, - results of the surveillance, including a statement of the acceptability of the item or activity, - names of surveillance team members, - personnel contacted and their organization, - equipment utilized, - surveillance criteria, - description of deficiencies, nonconformances, or potential problems, and summary of any immediate corrective actions.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
	QAIP 3-2, Revision 02, ICN 01		
19-1	SECTION 5.2 Verify that the master log (Figures 1 through 5, Appendix E) - is maintained by the Software Coordinator - consists of a data base and notebook that establishes traceable records regarding each version and release of each code. - Compare master log with CRWMS M&O List of Approved Quality Affecting Software Currently In Use		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
19-2	Section 5.2.1 Verify that master log files identify - the name of the code, - its version. release (update) number, - its date of entry into the configuration - management system, - name of Technical Contact, - status of proposed changes to the software, - implementation of approved modification-or-discrepancy (MOD)s (Appendix C), - the completion statues		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
19-3	Section 5.3 Verify that major changes are fundamental to the design and use of a code such that it would require a revision to such fundamental aspects as the basic structure, flow logic, or physics incorporated in code. Verify that major changes to a code result in a version number change.		
19-4	Section 5.3 Verify that minor changes do not alter the basic structure, flow logic, physics of the code and can be documented simply with an errata sheet or an update summary. Verify that minor changes to a code result in a change to the release number or update number and after five update changes the release number is changed.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
19-5	Section 5.3.1 Verify that anyone working with a code that has been entered in the Master log has submitted a MOD request (Appendix C).		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
19-6	Section 6.0 Verify that for existing and commercial scientific and engineering software the following life-cycle activities were completed: 6.1 Classification 6.2 Acquisition 6.3 Qualification 6.5 Documentation 6.6 Certification 6.7 Application Verification 6.8 Validation 6.9 Analysis 6.10 Completion		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
19-7	Section 6.0 Verify that for new development scientific and engineering software the following life-cyle activities were completed: 6.1 Classification 6.3 Development 6.4 Qualification 6.5 Documentation 6.6 Certification 6.7 Application Verification 6.8 Validation 6.9 Analysis 6.10 Completion		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
19-8	Section 6.1 Verify that during the first step of the Software QA process each piece of software used by the SNL YMP department is categorized as (see Appendix C Software Classification): - scientific and engineering software (SES) - calculational non-SES - auxiliary software - peripheral software		
19-9	Section 6.2.1 Software Evaluation Phase Verify that for acquired SES the PI prepares a memo stating the requirement he expects the software to meet.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
19-10	Section 6.2.1 Verify that the TC responsible for the code prepares a Software Evaluation Report that addresses the following: 1. Evaluate the ability of the software to meet the PI's requirements. 2. Describe the actual design of the code. 3. The software source code listing. 4. Review the testing, including test problem, that have been done for the code. 5. User instruction. (In a User Manual) 6. Describe the mathematical and numerical methods used in the code.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
19-11	Section 6.2 Acquired Software and 6.3 Developed Software Verify how the software related to Global Climate Modeling (presently controlled under the Pacific Northwest Laboratory software QA program) will transition to the SNL software QA program.		
19-12	Section 6.2 and 6.3 Verify how software developed under Contact 35-0035, WBS 1.2.3.6.2.1.6, will meet the SNL software QA program.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
19-13	Section 6.2.3.1 Requirements Phase Verify that the Software Requirements Specification (SRS) contains the following characteristics: 1. Understandable format and language, 2. Sufficient detail, 3. Adequate definition, 4. Information necessary to design the software without specifying the design, 5. The functions the software is to perform, 6. Performance requirements, 7. Design constraints, 8. Attributes, and 9. External interfaces.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
19-14	Section 6.3.2 Design Phase Verify that the Software Design Specification: 1. meets the SRS, 2. specifies the overall structure and the reduction of the over all logic into physical solutions, 3. describes the design in such a manner that it is traceable to the SRS requirements, 4. provide for descriptions of allowable and tolerable ranges for input and output data, 5. identifies coding standards and conventions that are applicable to the design, 6. describes verification activities by including plans for design-based test cases that will test the design in the test-and-debug phase (Section 6.3.4) and can be used in later life-cycle phases during verification exercises.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
19-15	Section 6.3.3 Programming Phase Verify that the PI reviewed the code for its adherence to good programming practices described in the SRS and verify that the code addresses all the requirements of the SDS.		
19-16	Section 6.3.4 Test-and-Debug Phase Verify that during this phase that it was determined that the code accurately performs the desired functions as described in the SRS and SDS, i.e., to ensure that the software performs the intended function and does not perform any degrading, unintended functions. Verify that the review of these activities includes a statement regarding the completeness and adequacy of the verification effort and the software's adherence to the coding standards identified in the SDS.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
19-17	Section 6.3.4 Test-and- Debug Phase Verify that at the conclusion of the Test-and-Debug activities, the software was independently validated and documented to ensure that the software meets the requirements contained in the SRS.		
19-18	Section 6.4 Qualification Phase Verify that the software qualification form Appendix C and the software qualification cover sheet has been correctly completed.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
19-19	Section 6.5.1 Scientific Engineering Software (SES) Verify that SES contains the documentation identified in Table 2 and Appendix D.		
19-20	Section 6.6 Certification of Software for Analysis Verity that a Statement of Analysis-Specific Software Certification (Appendix C) has been completed for all software used to perform quality affecting analysis.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
19-21	Section 6.7 Application Verification Verify that an application verification has been performed in accordance with a Statement Analysis-Specific Software Certification (Appendix C) or a problem-definition memo.		
19-22	Section 6.8 Model Validation Verify that models embedded in the software have been validated using established written procedures required by SNL YMP Procedure 2-4.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	QAIP 20-1, Revision 00		
20-1	Section 4.1 Verify that the scientific activity is planned, documented, reviewed, and approved in a Work Agreement (WA or in a WA and associated Technical Procedure(s) Scientific investigation may be done to nationally recognized standards as described in WA - any modification to the standard is to be defined in the WA.		
20-2	Section 4.2 Verify that if the staff or PI identify the need for a change to a procedure the change is initiated as proscribed in SNL YMP 5-1. NOTE: The PI may authorize an expected change per the steps in NOTE 2 of QAIP 20-1, Revision 00.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
20-3	Section 4.3 Verify each Technical Procedure in initiated, reviewed, approved, given an effectivity date, issued, and control in accordance with the step-by-step table in Section 4.3.		
	QAIP 20-2, Revision 00		
20-4	Section 4.1 Verify that the approved WA identifies that a Scientific Notebook (SN) will be used for the scientific investigation. Minimum information will include the technical information identified in Section 4.1 of the procedure. Verify that the SN is reviewed by a competent independent technical review on a periodic basis or prior to its completion.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
20-5	Section 4.2 Verify that the SN is secured in a suitably secure location (locked) when not in service.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
20-6	QAIP 20-3, Revision 00, "Sample Control" Paragraph 4.1, Step 3 Verify that documentation is generated for samples that contains the following information: - study plan or other procedure and revision under which the sample is being collected, - unique sample identification, - type of sample, - sampling location; type of site; hole identification and position within the hole, and specifics relative to orientation, - approximated weight, volume and dimensions, - sampling date and time, - purpose of sampling, - field observations, - references to relevant maps, photo or logs, - storage requirements, - name, signature and organization of collector,		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
20-7	Paragraph 4.1 Step 3 Verify that documentation is generated for calibration and manmade samples which contains the following: - the TP, WA and revision, for which the sample was obtained, - unique sample ID, - type of sample, - source of sample, - relevant portions for; sample history, sample composition and/or purity, know properties, approximate weight, volume and dimensions of the sample, - purpose for which the samples was obtained, - storage requirements, if any, and - name, signature, and organization of the person who obtained the sample,		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
20-8	Paragraph 4.2 Step 1 Verify that samples are identified with the use of physical markings.		
20-9	Paragraph 4.2 Step 4 Verify that traceability of samples is maintained from their initial collection through final use.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
20-10	Paragraph 4.3 Step 1 Verify that subdivided samples are identified with the original identification as that of the parent sample.		
20-11	Paragraph 4.4 Step 1, 2, and 3 Verify that a Chain of Custody report is generated when a sample is collected, when a sample becomes the responsibility of SNL, when a sample is transferred or subdivided.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	* RESULTS
20-12	Paragraph 4.5 Step 2 Verify that when special handling conditions are required for samples that procedures are developed prior to collection or obtaining the sample.		
20-13	Paragraph 4.6, Step 1 Verify that material that has a limited lifetime a identified as such.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
20-14	Paragraph 4.7, Step 5 Verify that when a CAR is issued to document a discrepancy for a sample that a correct disposition has been documented.		
20-15	Paragraph 4.7 Step 7 Verify that CAR numbers are referenced on Chain of Custody forms.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
	QAIP 20-4, Revision 00, Operation of SNL YMP Sample Library		
20-16	Section 4.1, Submittal of Samples (Receipt) Verify log-in of each sample in SNL YMP samples library logbook. Verify minimum information included per Step 2, Section 4.1. Verify sample identification maintained. Verify storage of sample protects sample form damage/ deterioration.		
20-17	Section 4.2, Sample Library Control Verify control access to Sample library facility. Verify that food, drinks, or other materials detrimental to storage not allowed in facility. Verify checks of samples library every twelve (12) months to check proper storage of samples and document in Samples Library Logbook with copy to SNL LRC. Verify replacement upgrading of sample marking if deterioration has occurred since last check.		

QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
20-18	Section 4.3, Sample Check-out Verify check-out of samples documented in Samples Library Logbook. Verify Chain-of-Custody form initiated at time of check-out. Verify log-out entries contain information shown in Step 3, Section 4.3 of procedure.		