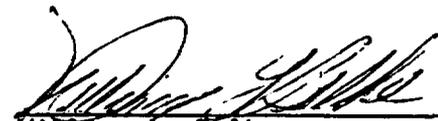


U. S. NUCLEAR REGULATORY COMMISSION  
OBSERVATION AUDIT REPORT NO. 90-7  
FOR THE YUCCA MOUNTAIN PROJECT OFFICE  
AUDIT NO. 90-04 OF SANDIA NATIONAL LABORATORIES

  
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## 1.0 INTRODUCTION

From August 20 through 24, 1990, members of the U.S. Nuclear Regulatory Commission (NRC) staff participated as observers in the U.S. Department of Energy (DOE)/Yucca Mountain Project Office (YMPO) Quality Assurance (QA) Audit No. 90-04 of Sandia National Laboratories (SNL), conducted in Albuquerque, New Mexico.

SNL is responsible for repository systems development; data management and analysis; systems performance assessment of the repository; conceptual design of the repository; determining the thermal and mechanical properties of the host rock; repository sealing performance requirements, materials evaluation, design, and testing; and providing assistance to other Yucca Mountain Project (YMP) participants in areas of specialized expertise.

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

## 2.0 OBJECTIVES

The objective of the DOE/YMPO audit was to determine the effectiveness of the SNL QA program in meeting the applicable requirements of the Nevada Nuclear Waste Storage Investigations (NNWSI) Project Quality Assurance Plan, NNWSI/88-9, Revision 4 (88-9 QA Plan) for the YMP. The NRC staff's objective was to gain confidence that DOE and SNL are properly implementing the requirements of their QA programs by evaluating the effectiveness of the DOE/YMPO audit and determining whether the SNL QA program is in accordance with the requirements of the 88-9 QA Plan and 10 CFR Part 50, Appendix B. The NRC staff recognizes that the 88-9 QA Plan has been superseded by Revision 2 of the DOE Quality Assurance Program Description Document (QAPD). It is expected that the impact of revising the SNL QA Program Plan (QAPP) to meet the requirements of the QAPD, when approved, will be minimal.

## 3.0 SUMMARY AND CONCLUSIONS

The NRC staff based its evaluation of the DOE/YMPO audit process and the SNL QA program on direct observations of the auditors, discussions with the audit team, and reviews of the pertinent audit information (e.g., audit plan, checklists, and SNL documents). The NRC staff has determined that, overall, DOE/YMPO Audit No. 90-04 of SNL achieved its purpose of determining the SNL QA program implementation is generally effective. The audit was conducted in a professional manner, and the programmatic and technical portions of the audit were effective and well integrated. The audit team was well qualified in the QA and technical disciplines, and their assignments and checklist items were adequately described in the audit plan.

The NRC staff agrees with the preliminary DOE/YMPO audit team findings that SNL generally has an adequate QA program for the areas that were audited, with the exception that certain criteria remain indeterminate due to limited implementation or limited effectiveness of implementation. QA and technical personnel were trained and qualified. The results of Audit 90-04 support the conclusion of our October 24, 1990 letter (Linehan to Shelor) that the SNL QA program is acceptable for implementation of new site characterization activities for the Yucca Mountain Project (YMP).

DOE must monitor the SNL program to ensure that future implementation is carried out in an adequate manner. The NRC staff expects to participate in this monitoring as observers and may perform its own independent audit at a later date to determine the adequacy and effectiveness of the SNL QA program.

#### 4.0 AUDIT PARTICIPANTS

##### 4.1 NRC

William Belke	Observer (Team Leader)
Robert D. Brient	Observer (Center for Nuclear Waste Regulatory Analyses)
John Buckley	Observer
Kenneth R. Hooks	Observer
John Peshel	Observer (Part time)

##### 4.2 DOE

James Blaylock	Audit Manager	DOE/YMPO
Albin Brandstetter	Technical Specialist	SAIC
Ed Cocoros	Auditor	MACTEC
Neil Cox	Auditor	SAIC
Steve Dana	Audit Team Leader	SAIC
Mario R. Diaz	Auditor	DOE/YMPO
Stephan Hans	Technical Specialist	SAIC
Steve Harris	Auditor	SAIC
John Martin	Auditor	SAIC
John Matras	Auditor-in-Training	SAIC
Joe Mikolajczak	Auditor-in-Training	CER Corporation
Martha Mitchel	Auditor	SAIC
Forrest Peters	Lead Technical Specialist	SAIC
Richard Powe	Auditor-in-Training	SAIC
Cynthia Prater	Auditor-in-Training	SAIC
Charles Warren	Auditor	MACTEC
Robert White	Technical Specialist	DOE/YMPO

##### 4.3 STATE OF NEVADA

Susan Zimmerman	Observer
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##### 4.4 CLARK COUNTY, NEVADA

Engelbrecht von Tiesenhausen	Observer
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#### 5.0 REVIEW OF THE AUDIT AND AUDITED ORGANIZATION

The DOE audit was conducted in accordance with procedures YMPO Quality Management Procedure (QMP) 18-01, "Audit System for the Waste Management Project Office," Revision 3, and YMPO QMP 16-03, "Standard Deficiency Reporting System," Revision 1. The NRC staff observation of the DOE/YMPO audit was based on the NRC procedure "Conduct of Observation Audits" issued October 6, 1989.

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

(a) Level 1

Failure of the audit team to independently identify either:

- ° Flaws in completed and accepted work important to safety or waste isolation which renders the work unuseable for its intended purpose. Denotes failure of the QA program to verify quality, or
- ° A breakdown in the QA program resulting in multiple examples of the same or similar significant deficiencies over an extended period of time in more than one work activity (technical area), or
- ° Multiple deficiencies of the same or similar significant deficiencies in a single work activity (technical area). Failure of the audit team to adequately assess a significant area of the QA program or its implementation, such as technical products, applicable 10 CFR Part 50, Appendix B criteria, or quality level classifications, without prior justification, such that the overall effectiveness of the QA program being audited is made indeterminate.

(b) Level 2

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

(c) Level 3

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

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

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

In general, weaknesses and items related to requests for information will be examined by the NRC staff in future audits or surveillances.

## 5.1 Scope of Audit

The audit scope was to verify that the SNL QA program meets the requirements of the SNL QAPP, Revision E dated August 23, 1989, and to verify the adequacy of implementation of the QA program. In addition, discrepancies identified during previous audits/surveillances that remained open were evaluated to determine whether SNL had taken effective corrective actions.

### (a) Programmatic Elements

The programmatic portion of the audit utilized checklists based on requirements in the 88-9 QA Plan, the YMPO Administrative Procedures (APs), the SNL QAPP, and SNL QA implementing procedures. The checklists covered SNL QA program controls for sixteen of the eighteen 10 CFR Part 50 Appendix B Criteria.

Criteria IX and XIV of 10 CFR Part 50, Appendix B (Sections 9.0, and 14.0 of the SNL QAPP) were not included in the scope of the audit since SNL currently is not performing activities in these areas. However, the NRC staff has accepted the eighteen programmatic elements addressing the Appendix B Criteria in their review of the SNL QAPP (ref. Linehan/Stein letter dated August 24, 1989).

### (b) Technical Areas

The two technical activities selected by DOE/YMPO to be reviewed during the audit were Systems Management and Integration and Exploratory Shaft Investigations. These included Work Breakdown Structure (WBS) Elements for Total System Performance Assessment, Pre-Waste Emplacement Ground Water Travel Time, Development and Validation of Flow and Transport Models, Support Calculation for Postclosure Performance Analysis, Development and Verification of Flow Transportation Codes, and Exploratory Shaft Plan, Design and Technical Assessment.

The Exploratory Shaft Facility (ESF) Alternatives Study was not originally scheduled in the scope reviewed by the NRC staff due to SNL key personnel not being available during the scheduled audit. The DOE/YMPO audit team planned to cover this aspect in a surveillance at another time. However, as circumstances changed, the ESF Alternatives Study was able to be accommodated into this audit by SNL and the DOE/YMPO audit team.

The technical checklists were developed from information contained in SNL Monthly Highlights and Status Reports, Technical Procedures, and WBS. The technical specialists were instructed to evaluate the following areas to determine adequacy of the technical areas:

- Technical Qualifications of Scientific Investigators and Design Personnel
- Understanding of Procedural Requirements as they Pertain to Scientific Investigation and Design Control Activities

- Adequacy of Technical Procedures
- Development of Study Plans, Work Supporting the Site Characterization Plan, and any Related Work Products

The audit plan required the audit team to determine whether SNL had taken effective corrective actions to resolve findings identified during previous DOE surveillances and audits.

## 5.2 Timing of the Audit

The NRC staff believes the timing of the QA audit was appropriate. SNL had made a number of improvements in their QA program since the September 1989 audit and it was beneficial to assess the adequacy of the improvements to date.

## 5.3 Examination of Programmatic Elements

The DOE/YMPO programmatic checklists covered the QA program controls for the sixteen elements listed below:

### Programmatic Elements:

- 1.0 Organization
- 2.0 Quality Assurance Program
- 3.0 Design Control
- 4.0 Procurement Document Control
- 5.0 Instructions, Procedures, Plans, and Drawings
- 6.0 Document Control
- 7.0 Control of Purchased Items, and Services
- 8.0 Identification and Control of Items
- 10.0 Inspection
- 11.0 Test Control
- 12.0 Control of Measuring and Test Equipment
- 13.0 Handling, Shipping, and Storage
- 15.0 Control of Nonconforming Items
- 16.0 Corrective Action
- 17.0 Quality Assurance Records
- 18.0 Audits

The NRC staff observed the DOE audit team's evaluation of selected programmatic elements of the SNL QAPP. Both QA auditors and technical specialists working together as a team were involved in many of the reviews observed by the NRC staff. Only portions of some elements were observed; the details of program deficiencies identified by the DOE/YMPO audit team members which were not part of the portion observed will not be discussed in this report.

### (a) Organization (Criterion 1)

The DOE auditors utilized the published audit checklists and were thorough in reviewing objective evidence presented. The auditors utilized in-depth questioning and interviewed the SNL QA Division Supervisor to obtain a

description of the SNL organizational structure and the responsibilities of persons and organizations performing quality affecting activities. The QA organization currently consists of ten personnel and six of these are contractor employees. The NRC staff considers the reorganization of the QA Division to be an improvement since the September 1989 audit. The addition of six more personnel to the QA organization should enhance the performance of compliance reviews, procedural reviews, audits, and surveillances. Sandia and contractor personnel appeared to be competent and familiar with QA requirements and their respective responsibilities. On a few occasions audit questions could only be answered by the QA Supervisor, suggesting a possible lack of familiarity with the total SNL QA program by contractor personnel.

The Management Assessment Report for determining the effectiveness of the system and management controls established to achieve and assure quality for the year 1989, was not issued until August 1990. The auditors also found that the Management Assessment Reports for 1989 and 1990 provided more of a status of the QA program as opposed to evaluating its effectiveness. A deficiency report will be issued for this discrepancy.

The NRC staff noticed that the checklist did not contain provisions to verify whether allegations concerning inadequate quality are being resolved in accordance with YMP AP-5.8Q, "Resolution and Reporting of Quality Concerns." The NRC staff submitted an Audit Observer Inquiry form and requested a response concerning the implementation of this procedure. The response from DOE was that YMP AP-5.8Q has not been issued for implementation due to the allegations program still being finalized. The NRC staff indicated that this will be an Observation and carried as an open item on the NRC/DOE Open Items list.

Other than the aforementioned Observation, based on the depth of questioning and satisfactory completion of the audit checklists, the auditor adequately reviewed and evaluated the SNL organizational structure for compliance to the 88-9 QA Plan and the QAPP.

(b) Quality Assurance Program (Criterion 2)

The review of personnel qualifications and training under Criterion 2 was programmatic, and did not involve the presence of DOE/YMPO technical specialists. The NRC observers consider this to be appropriate, as the DOE/YMPO technical specialists had been instructed to evaluate the SNL technical personnel during their review of technical areas.

The auditors had prepared checklists, based on the requirements of the 88-9 QA Plan, the SNL QAPP and SNL procedures. The checklists were used effectively, but not restrictively, and the auditors pursued questionable areas to an appropriate degree.

The SNL Position Descriptions (PDs) are encompassed in tables given in Department Operating Procedure (DOP) 2-6, Revision D. The use of tables to define PDs has limited the identification of specific duties and responsibilities associated with each job position, but the system appears to

satisfy the letter of the requirement of the SNL QAPP. The system of identifying and documenting training as required by DOP 2-6 and implemented by SNL appears adequate.

The NRC observers believe that the PDs would be more effective in demonstrating that SNL evaluates each position on its own requirements, and selects a person who meets these requirements to fill the position, if they contained more detailed job responsibilities and duties. The type of information which would be useful in demonstrating this effort appears in the job postings (e.g., basic job functions, education and experience required) carried in the Sandia Labs Weekly Bulletin distributed to all SNL employees, including contractor personnel.

The NRC staff observed that there are still some restrictions due to the Privacy Act issue. When the DOE/YMPO auditors requested specific personnel qualification forms from SNL, the release of these forms for review had to be approved in advance by the SNL Technical Project Officer. This resulted in some delay in obtaining these forms. The NRC expects the recently published Federal Notice on the Privacy Act, when finalized, will resolve this issue.

(c) Scientific Investigation Control (Criterion 3)

Observations were focused on the WBS elements associated with Performance Assessment, application of software controls, and the ESF Alternatives Study. The programmatic checklist included requirements from the SNL Software QA Plan and newly approved software QA implementing procedure. The auditors were familiar with the procedures under evaluation and applicable programmatic requirements, and were able to identify to SNL, the portions of the procedures needing refinement.

The technical audit found that quality-affecting activities had not been conducted and that all work to date has been "scoping." Quality-affecting activities within the Performance Assessment area require implementation of the Software QA Plan and implementing procedures. The technical audit evaluated current work (non-quality affecting, formerly termed QA Level 3) in the five Performance Assessment WBS elements to the extent possible. No peer review had been conducted within these work elements. SNL technical personnel appeared competent and familiar with QA requirements as applied to their work.

The technical and programmatic audits of Criterion 3 were able to determine the adequacy of QA controls, but due to the lack of implementation of the software program and little quality-affecting technical work, the auditors were unable to determine the effectiveness of the software QA program implementation. The programmatic auditors provided valuable guidance to SNL through the detailed critique and discussion of the SNL software controls.

For the ESF Alternatives Study portion of the audit, the auditors and technical specialists reviewed this activity together, operating effectively as a team to review and evaluate procedural and technical aspects of the activity. Separate programmatic and technical checklists had been prepared, and were used during the audit to guide the process and focus on important items. The

checklists were generally adequate; some portions of the programmatic checklist were not applicable due to the way in which SNL is performing the ESF Alternatives Study.

Although it was not clear at the beginning of the audit that SNL considered the ESF Alternatives Study to be a design activity under Criterion 3 of 10 CFR 50 Appendix B and the SNL QAPP, the audit team and SNL personnel later agreed that it was a design activity under Criterion 3. The process followed to date by SNL is basically compatible with a Criterion 3 design process, but the requirements of the SNL QAPP regarding formalization and documentation of such a process were not consistently or effectively observed by SNL.

SNL personnel explained the decision process being used to evaluate the ESF alternatives, including identification of requirements, identification of design options, identification of screening criteria, development of the decision methodology (use of decision trees/probabilities, evaluation of costs and benefits), etc. Specific Design Investigation Memos (DIMs) have been written for these activities, which were reviewed in detail by the audit team. Typical draft influence diagrams developed to identify and display the requirements and conditions affecting the decisions, were also reviewed in detail. (See section 5.4 for additional details.)

The SNL personnel involved in the ESF Alternatives Studies were knowledgeable in the technical aspects of their work, and had been and are still being trained in the process by which the alternatives are being evaluated. The process is clearly complex, and mixes both technical and management evaluation of alternative ESF designs. It is ongoing, and is considered by SNL to be an "in-process" activity which has not yet resulted in a draft report or been accepted by SNL management. The extent of the work necessary to complete the process was not clear at the time of the audit.

Considering the incomplete nature of the activity, the audit team performed effectively. They were well prepared, competent, and worked effectively as a team. The audit team's review at this point in time should enable SNL to develop a more credible final product.

Since the DOE/YMPO audit team was unable to complete the audit of the ESF Alternative Studies, a follow-up surveillance was scheduled to complete this portion of the audit. The surveillance was performed during the week of September 4-7, 1990.

(d) Procurement Document Control (Criterion 4) and Control of Purchased Items and Services (Criterion 7)

The DOE auditors followed Sections (4) and (7) of the published audit checklist which contained twelve and six standard quality requirements audit guidelines respectively. To determine the effectiveness of the SNL QA program in meeting the requirements of Section (4) of the SNL QAPP, the auditor selected six procurement contracts in an effort to examine the contractors which follow SNL QA requirements and those with established QA requirements of their own. In addition, DOP 04-01, "Procurement Document Requirements," DOP 07-01, "Procurement Planning," and DOP 07-02, "Evaluation for Acceptance of Purchased Items or Services" were selected. The auditors

generated two Standard Deficiency Reports (SDRs), one for SNL not specifying procurement requirements for those QA records that contractors must submit to SNL, and the second, that the SNL implementing procedure did not contain provisions for suppliers to submit a description of nonconformances from procurement requirements.

The auditors did not identify any observations in this area. However, due to the SDRs identified above, the auditors felt that the SNL program was ineffective in terms of procurement records management.

(e) Inspection (Criterion 10)

The SNL QAPP has included surveillances under this criterion instead of Criterion 18. The audit consisted of reviewing reports from seven of eleven surveillances conducted by SNL in 1990, and interviews with QA personnel.

During the interview, the auditors used checklists which identified nine areas of interest. The checklists were comprehensive and consistent with the procedures stated in Section 10 of the QAPP.

During the performance of the audit, the question of whether completed surveillance checklists should be retained as QA records was discussed with SNL by the audit team and NRC observers. It is worth noting that this identical problem was identified in Audit 89-3, and listed as a potential deficiency corrected during the audit, presumably by an Interim Change Notice to QAP 10-1 (see DOE/YMPO Audit Report 89-3, Section 6.3, Item 5, page 12 of 12). In addition, during the NRC staff review of the initial QA Plan for the YMPO, NVO 196-17 (superseded by NNWSI 88-9), the NRC requested a listing of the QA records to be retained under the QA program. A typical list of QA records was provided in Appendix E of the NNWSI 88-9 QA Plan. More importantly, the commitment in Section XVII, paragraph 1.1 of NNWSI 88-9 indicates "all records shall be retained for the NNWSI project." Likewise, Section 17.1.2 of the SNL QAPP commits to having all records into the YMP Records System for retention. It was the NRC staff's understanding, that without a definitive listing of QA records, the commitment would be "all QA records" including completed surveillance checklists. Without the retention of surveillance checklists, it becomes difficult to determine what was surveilled and to what extent. The NRC staff will enter this issue on the NRC/DOE Open Items List until clarification can be obtained.

(f) Test Control (Criterion 11)

The SNL QA program applies this criterion to equipment (acceptance testing) and to experiments. To date, procedures have been written only for experiments. No equipment testing is anticipated in the near future. The audit checklist was very brief, however, it was adequate considering the limited application of test controls in SNL's activities. Due to the limited implementation, effectiveness was indeterminate.

(g) Corrective Action (Criterion 16)

The trend analysis portion of the audit of Corrective Action was observed by the NRC staff. The auditor utilized a detailed checklist, but pursued uncertain areas diligently. The SNL QA Supervisor was interviewed to provide

a more complete explanation of trending activities. During the review of Corrective Action Reports, it appeared that the SNL analysis of the cause of the corrective action did not specifically address the "root cause" of the nonconforming condition. Although there were only four corrective action reports completed, the NRC staff felt that the "root cause" had not been totally addressed. This was discussed with the audit team and for future audits, the NRC staff will pursue this matter to verify that "root cause" is addressed.

The NRC staff observed that the tracking system for SNL's Corrective Action Reports, Standard Deficiency Reports, Audit Findings, and Deviation Reports were handwritten and somewhat hard to read. The NRC staff commented that this system would be better controlled if it were computerized. SNL QA management produced a draft QA Findings Tracking document which indicated this system will be placed on a computer tracking system and implemented within the next six months.

The conduct of the audit and SNL implementation of corrective action controls appeared to be effective with the exception of the discussions concerning "root cause."

(h) Audits (Criterion 18)

The evaluation of audit controls was somewhat hampered by delays in obtaining records and by SNL's position that audit checklists are not QA records. However, the auditors persevered and completed the extensive checklist, identifying some programmatic weaknesses. For the most part, the SNL audit program is managed and performed by the SNL contractor MACTEC. Internal audits were performed by MACTEC personnel not usually assigned to SNL, while most supplier audit team members were MACTEC personnel assigned to the SNL QA function. Of note is that the SNL FY 1990 internal audit identified many of the same findings that the DOE auditors identified on this audit. The DOE/YMPO audit of Criterion 18 was considered effective and SNL's implementation was likewise determined to be effective.

5.4 Examination of Technical Products

The audit team technical specialists reviewed to varying degrees, the technical areas listed below by WBS Number and Title:

<u>WBS Number</u>	<u>Title</u>
1.2.1.4.1	Total System Performance Assessment
1.2.1.4.4.1	Prewaste-Emplacement Ground Water Travel Time
1.2.2.4.6	Development/Validation of Flow and Transport Models
1.2.1.4.7	Support Calculation for Postclosure Performance Analysis
1.2.1.4.9	Development/Verification of Flow/Transport Codes
1.2.6.1.1	Exploratory Shaft Management Plan/Technical Assessment

Exploratory Shaft Management Plan/Technical Assessment (WBS 1.2.6.1.1)

The ESF Alternatives Study was initiated by DOE in the Fall of 1989. SNL was directed to lead the study by DOE/YMPO and developed WBS 1.2.6.1.1 and thirteen Design Investigation Memorandums (DIMs) to describe and control the effort. These DIMs are:

- |         |   |
|---------|---|
| DIM-240 | Development of a Decision Methodology for the ESF Alternatives Study                      |
| DIM-241 | Selection of Evaluation Panel Members   |
| DIM-242 | Development of Preliminary Screening Criteria and Method for the ESF Alternative Study    |
| DIM-243 | Identification of Repository Access and ESF Options                                       |
| DIM-244 | Identification of Repository and ESF Design Performance and Construction Requirements     |
| DIM-245 | Development of Influence Diagrams and Performance Measures for the ESF Alternative Study  |
| DIM-246 | Exploratory Shaft Facility (ESF) Alternatives Evaluation Study - Task 7 Subtask - Testing |
| DIM-249 | ESF Alternatives Study Task 1. Plan Management  |
| DIM-250 | ESF Alternatives Study Task 6. Final Report   |
| DIM-251 | Evaluation of Repository/ESF - Feature Performance Discriminators                         |
| DIM-252 | Application of Management and Policy-Based Judgements to the ESF Alternatives Study       |
| DIM-254 | Scoring of Options for the ESF Alternatives Study   |

These DIMs were reviewed and approved by the DOE/YMPO and the DOE Office of Civilian Radioactive Waste Management (OCRWM).

Software currently being used in the ESF Alternatives Study is all commercial purchased package programs (i.e., Lotus 123). Some performance assessment codes will be used later to allocate total usages to subsystems. Fenix and Scisson Nuclear (FSN) has provided input to SNL in the areas of cost and schedule for the ESF Alternatives. These FSN activities are scheduled to be reviewed during the September 25-28, 1990 DOE/YMPO audit of FSN.

The technical specialists reviewed and evaluated the technical activities for WBS 1.2.6.1.1. This WBS was not part of the original scope of the audit and consequently, given the short time to prepare for auditing WBS 1.2.6.1.1, the auditor's technical checklists were well prepared. The technical checklist

for the ESF Alternatives Study was distributed on Monday, August 20, 1990, prior to the start of the technical portion of the audit. The seventeen page checklist was based on the ESF Alternatives Study Implementation Plan, Rev. 0. The programmatic checklist (Criterion 3 - Design Control), which was included in the initial distribution of the DOE/YMPO Audit Books, was also appropriate for this portion of the audit.

The audit team asked extensive questions about documentation of the ESF Alternatives Study process, reviewed the influence diagrams which display the factors SNL considered important to decision making, and closely questioned specific assumptions made by SNL.

The technical specialists were well qualified and audited samples of complex work in an acceptable manner. The addition of WBS 1.2.6.1.1 to the audit proved to be an excellent contribution to the overall scope of the audit. The SNL technical personnel appeared to be well qualified, and the small sample of the complex ESF Alternatives Study which was audited, seemed to be of acceptable quality. (See section 5.3(c) for additional details.)

#### 5.5. Conduct of Audit

The overall conduct of the QA and technical portions of the SNL audit was productive and performed in a professional manner. The audit team was well prepared and demonstrated a sound knowledge of the QA and technical aspects of the SNL program. During the daily briefings given by the audit team leader to the SNL Technical Project Officer, the auditor with the finding was present to explain the details of the finding if necessary. The audit checklists included the important QA controls addressed in the 88-9 QA Plan that are applicable to SNL. The audit team used the comprehensive checklists effectively during the interviews with SNL personnel and review of documents. The team was persistent in their interviews, challenging certain SNL responses when necessary. The integration of the technical and programmatic portions of the audit was effective.

#### 5.6 Qualification of Auditors

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

Although no members of the DOE/YMPO audit team were knowledgeable in the area of decision analysis methodology, the audit team possessed extensive education and experience in the areas of geology, geophysics, geochemistry and mining engineering. The NRC staff believes that inclusion of a decision analysis expert on the audit team would have been useful. The DOE/YMPO audit team technical specialists demonstrated that they were knowledgeable in the technical areas which they reviewed and the SNL QA program requirements.

### 5.7 Audit Team Preparation

The QA auditors and technical specialists were well prepared in the areas they were assigned to audit and knowledgeable in the SNL QAPP and SNL implementing procedures. Audit Plan 90-04 overall was complete and included: (1) the audit scope; (2) a list of audit team personnel and observers; (3) a list of all the audit activities; (4) the audit notification letter; (5) the QAPP, and past audit report; and (6) the QA and technical checklists.

### 5.8 Audit Team Independence

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

### 5.9 Review of Previous Audit Findings

- (a) The previous audit identified fourteen SDRs. All these SDRs have been closed as a result of implementation of SNL corrective actions.
- (b) The NRC had no observations resulting from the September 1989 audit, and all NRC observations from previous audits were resolved prior to the September 1989 audit.
- (c) Based on discussions between the State of Nevada and NRC observers, the State of Nevada observations from previous audits appeared to have been resolved during this audit.

### 5.10 Summary of NRC Staff Findings

#### (a) Observations

- o The SNL QAPP contains provisions for resolving concerns regarding inadequate quality in accordance with YMP Administrative Procedure AP-5.8Q, "Resolution and Reporting of Quality Concerns." This procedure has not been developed by DOE and implemented by DOE and its program participants. NRC will carry this as an open item on the NRC/DOE Open Items List until this procedure is developed and implemented (Level 2). (Refer to Section 5.3(a) for details)
- o During the audit of Criteria 10 and 18, there was a discussion of whether audit and surveillance checklists are considered QA records. It was the NRC staff's understanding during the review and commitments described in Section 17 of the NNWSI 88-9 Project QA Plan, that all records would include audit and surveillance checklists. This subject was discussed at the September 18, 1990 NRC/DOE QA meeting and will be further discussed at the next NRC/DOE QA meeting in November 1990. This will be carried as an open item on the NRC/DOE Open Items List until clarification is obtained to define what types of QA records will be retained (Level 3). (Refer to Sections 5.3(e) and (h) for details)

(b) Weaknesses

- Although the education, experience, and training records were available for auditing, detailed job responsibilities and duties were non-existent. The NRC staff believes this type of information could be easily available as this information appears in the job postings published in the Sandia Labs Weekly Bulletin. (Refer to Section 5.3(b) for details)
- Corrective Action Reports need to be more carefully examined to assure the cause of a nonconforming condition addresses the "root cause." (Refer to Section 5.3(g) for details)
- The NRC staff believes that it would enhance their review of the audit scope if the technical areas which have ongoing quality-related work, and those being considered for inclusion in the audit, are identified to the NRC at least twenty working days in advance of the start of the audit. The NRC staff typically receive the audit announcement letter and Audit Books too late to make meaningful comments on the technical scope of the audit.
- The NRC staff believes that DOE/YMPO should include in the audit scope, any technical area in which significant quality-related work is being accomplished, or provide a rationale for choosing not to include such work. Since the NRC staff is unable to participate in many DOE/YMPO surveillances, the inclusion of significant technical activities in the annual audits is important to the NRC staff's ability to evaluate implementation of the audited QA program.

5.11 Summary - DOE/YMPO Audit Team Findings

During the course of the audit, the audit team identified eight deficiencies in the SNL QA program and prepared draft SDRs describing these deficiencies. In addition, nine observations were noted by the audit team. A summary statement of each of the eight deficiencies follows:

- (a) The Management Assessment Report for determining the effectiveness of the system and management controls established to achieve and assure quality for 1989, was not issued until August 1990. In addition, the Management Assessment Reports for 1989 and 1990 did not assess or evaluate the effectiveness of implementation the SNL QA program.
- (b) Grading requirements for the generation of design investigation memos were not imposed for the activities described and the appropriate section of the work plan.
- (c) SNL has not specified the procurement requirements for those QA records that subcontractors must submit to SNL.
- (d) SNL implementing procedure does not contain provisions for suppliers to submit a description of those nonconformances from the procurement requirements dispositioned "accept as is" or "repair."

- (e) Surveillance reports were not issued within 15 work days after completion of surveillance.
- (f) Several CAR's do not identify the required completion schedule, and the persons or organizations responsible for implementation and completion of corrective action.
- (g) Audit reports were not issued within 30 calendar days after completion of the audit.
- (h) Audit report packages did not contain sufficient documentation, such as checklists, from which to verify the extent of the audit and those areas audited.

These are preliminary findings which will be further evaluated by the audit team and the YMPO prior to being made final. The preliminary SDRs are not considered serious enough by the NRC staff to render the SNL QA program unacceptable.

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