

U.S. NUCLEAR REGULATORY COMMISSION  
OBSERVATION AUDIT REPORT 94-02  
OF THE YUCCA MOUNTAIN QUALITY ASSURANCE DIVISION  
AUDIT YMP-94-03  
OF RAYTHEON SERVICES NEVADA

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## **1.0 INTRODUCTION**

During January 24-28, 1994, members of the quality assurance (QA) staff of the U.S. Nuclear Regulatory Commission Division of High-Level Waste Management observed a U.S. Department of Energy (DOE), Office of Civilian Radioactive Waste Management (OCRWM), Office of Quality Assurance, Yucca Mountain Quality Assurance Division (YMQAD) audit of the Raytheon Services Nevada (RSN). The audit, YMP-94-03, was conducted at the RSN offices in Las Vegas, Nevada, and at the Nevada Test Site in Mercury, Nevada. The audit evaluated the adequacy of the RSN QA program in all applicable programmatic areas. Technical areas were not audited. This was the first YMQAD audit of an organization whose QA program has been accepted by YMQAD as meeting the requirements of OCRWM's revised QA program guide, DOE/RW-0333P, "Quality Assurance Requirements and Description," (QARD) Revision 0. RSN procedures developed to address the QARD had been reviewed by YMQAD and accepted as meeting the QARD in December, 1993. A State of Nevada representative was an observer at this audit.

This report addresses the effectiveness of the YMQAD audit and the adequacy and implementation of the QA controls in the audited areas of the RSN QA program.

## **2.0 OBJECTIVES**

The objectives of the audit by YMQAD were to determine whether the RSN QA program and its implementation meet the applicable requirements and commitments of the OCRWM QARD, the RSN QARD implementation matrix, and associated implementing procedures.

The NRC staff's objective was to gain confidence that YMQAD and RSN are properly implementing the requirements of their QA programs in accordance with the OCRWM QARD and Title 10 of the Code of Federal Regulations (10 CFR), Part 60, Subpart G (which references 10 CFR Part 50, Appendix B).

## **3.0 SUMMARY AND CONCLUSIONS**

The NRC staff based its evaluation of the YMQAD audit process and the RSN QA program on direct observations of the auditors; discussions with the audit team, and RSN personnel; and reviews of the audit plan, the audit checklists, and other pertinent documents. The NRC staff has determined that YMQAD Audit YMP-94-03 was useful and effective. The audit was organized and conducted in a thorough and professional manner. Audit team members were independent of the activities they audited. The audit team was well qualified in the QA discipline, and its assignments and checklist items were adequately described in the audit plan.

The NRC staff agrees with the preliminary YMQAD audit team finding that implementation of the RSN QA program is adequate in the programmatic areas audited. Two preliminary Corrective Action Requests (CARs) were discussed by the YMQAD audit team at the post-audit meeting. Eleven other deficiencies were acceptably resolved by the RSN organization during the audit. The preliminary CARs identified by the YMQAD audit team are not significant in terms of the overall RSN QA program.

YMQAD should continue to closely monitor implementation of the RSN QA program to ensure that the deficiencies identified during this audit are corrected in a timely manner and that future QA program implementation is effective. The NRC staff expects to participate in this monitoring as observers and may perform its own independent audits at a later date to assess implementation of the RSN QA program.

#### 4.0 AUDIT PARTICIPANTS

##### 4.1 NRC

Pauline P. Brooks	Observer	
John G. Spraul	Observer	
Robert D. Brient	Observer	Center for Nuclear Waste Regulatory Analyses

##### 4.2 DOE

Amelia I. Arceo	Audit Team Leader (ATL)	YMQAD
Sandra D. Bates	Auditor	YMQAD
Raul A. Hinojosa	Auditor	YMQAD/Quality Assurance Technical Support Services (YMQAD/QATSS)
John R. Matras	Auditor	YMQAD/QATSS
Kenneth T. McFall	Auditor	YMQAD/QATSS
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Richard L. Weeks	Auditor	YMQAD/QATSS

##### 4.3 STATE OF NEVADA

Susan Zimmerman	Observer
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#### 5.0 REVIEW OF THE AUDIT AND AUDITED ORGANIZATION

This YMQAD audit of RSN was conducted in accordance with OCRWM Quality Assurance Administrative Procedure (QAAP) 18.2, "Audit Program" (Revision 5 plus Interim Change Notice 1) and QAAP 16.1, "Corrective Action" (Revision 4). The NRC observation audit of this audit was based on the NRC procedure, "Conduct of Observation Audits," issued October 6, 1989.

## 5.1 Scope of Audit

The audit scope included the QA programmatic elements listed below:

- 1 Organization
  - 2 Quality Assurance Program
  - 3 Design Control
  - 4 Procurement Document Control
  - 5 Implementing Procedures
  - 6 Document Control
  - 7 Control of Purchased Items and Services
  - 10 Inspection
  - 11 Test Control
  - 12 Control of Measuring and Test Equipment
  - 14 Inspection, Test, and Operating Status
  - 15 Control of Nonconforming Items
  - 16 Corrective Action
  - 17 Quality Assurance Records
  - 18 Audits
- Supplement I, Computer Software  
Supplement II, Sample Control  
Supplement IV, Field Surveying

The following elements were determined to be not applicable since RSN has no activities to which these elements apply:

- 8 Identification and Control of Items
  - 9 Control of Processes
  - 13 Handling, Storage, and Shipping
- Supplement III, Scientific Investigation

Technical elements were not included in the scope of this audit.

The NRC staff observed the YMQAD audit team evaluation of Programmatic Elements 3, 4, 5, 6, 7, 10, 11, 12, and 17 and Programmatic Supplement IV. Only these areas are discussed in detail in this report.

## 5.2 Timing of the Audit

The NRC staff believes the timing of the audit was appropriate, as the RSN Yucca Mountain project procedures had recently been accepted by DOE as adequately addressing the OCRWM QARD. RSN was previously audited to the applicable criteria by YMQAD in July of 1993.

## 5.3 Examination of QA Programmatic Elements

The NRC staff observed that each of the auditors reviewed related documentation and interviewed at least a representative sample of RSN personnel to determine their understanding and degree of implementation of the procedures. The auditors observed were well prepared and knowledgeable of the QA program requirements. They used their checklists effectively and pursued issues beyond the checklists when appropriate. Included also was verification

that a sample of requirements from the QARD was adequately incorporated into RSN's implementing procedures. The auditors solicited comments and questions from the NRC observers in an appropriate manner. NRC staff observations regarding the audit and the implementation of each appropriate QA programmatic element are discussed below.

### 5.3.1 Design Control (Programmatic Element 3)

Limited portions of the audit of this programmatic element were observed. The checklist was extensive, addressing the design control requirements of the QARD as well as details of RSN Project Procedures (PPs) and Quality Assurance Procedures (QAPs). RSN was formerly responsible for the Exploratory Studies Facility, but that responsibility has been passed to the Management and Operating Contractor. RSN is currently responsible for surface based testing design, but this area (roads, etc.) has been designated quality assurance: not applicable. The other aspects of surface based testing, i.e., location, configuration, and depth of boreholes, are the responsibility of the cognizant Principal Investigator (from other OCRWM contractor organizations). RSN procedures appeared sufficient, but RSN had not been performing quality affecting design activities.

The auditor identified a discrepancy between PP-03-04 and the QARD, with the procedure allowing peer reviews to be substituted for other approved design verification methods. This was corrected during the audit through a revision of the procedure.

Design controls and their implementation were determined by the auditors to be effective.

### 5.3.2 Procurement Document Control and Control of Purchased Items and Services (Programmatic Elements 4 and 7)

Programmatic Elements 4 and 7 were audited simultaneously. The audit, conducted at RSN offices in Las Vegas, Nevada, included interviews with appropriate RSN management and examination of related documents, and comparison of RSN procedures with DOE's QARD requirements. The auditor examined documentation for nine procurements completed since the last audit in July, 1993 (YMP-93-13). With one exception, the procurement documentation was found to be in compliance with applicable procedural requirements in PPs and in QAPs. A deficiency relative to Programmatic Element 4 was noted in one procurement. This deficiency, a failure to document QA and technical review prior to the award of a subcontract, was corrected during the audit.

A check for compliance of a sample of purchase orders, supplier qualifications and associated documents, associated checklists and review forms required by the applicable procedures indicated that this documentation satisfactorily met RSN procedures for Programmatic Element 7. Finally, by examining a sample of implementing procedures, the auditor determined that DOE's QARD requirements for Programmatic Elements 4 and 7 were adequately incorporated in RSN's procedures.

The NRC observer agrees with the auditor's findings that RSN implementing procedures adequately incorporate QARD requirements and that RSN's implementation of QA Program Elements 4 and 7 is adequate.

### 5.3.3 Implementing Procedures and Document Control (Programmatic Elements 5 and 6)

Programmatic Elements 5 and 6 also were audited together. The audit was conducted at RSN offices in Las Vegas, Nevada, and included interviews with appropriate RSN management, examination of related project documents and determination of whether RSN procedures adequately incorporate DOE's QARD requirements. The auditor examined a sample of records packages for PPs and QAPs to determine compliance with procedural requirements. The auditor also examined an adequate sample of controlled copies of Project Procedures Manuals and Quality Assurance Procedures Manuals to determine whether they had been properly controlled and updated. A deficiency in updating two of the controlled copies was noted and corrected during the audit. The auditor determined, based on the sample of procedures examined, that DOE's QARD requirements for Programmatic Elements 5 and 6 were adequately incorporated in RSN's procedures.

The NRC observer agrees with the auditor's finding that RSN implementing procedures adequately incorporate QARD requirements and that RSN's implementation of QA Program Elements 5 and 6 is adequate.

### 5.3.4 Inspection (Programmatic Element 10)

RSN places its procedures controlling field and construction activities under Program Element 11, as well as QAPs more central to inspection control. The portion of the audit observed included evaluation of the implementation of PP-10-01, "Field Drilling Engineer Support Activities" and PP-10-02, "Field Logging Operations." The audit was conducted at RSN offices in Las Vegas, Nevada and at the Nevada Test Site (NTS), Yucca Mountain Field Operations Center.

In the process of the audit, the auditor interviewed RSN field drilling and logging engineers, and reviewed the various levels of documents controlling these activities. These documents ranged from Work Programs, which provide overall direction for the activity, through activity records, such as Core Run Logs, Daily Operations Reports, and Daily Drilling Reports. Significant numbers of records were reviewed, and the audit was thorough. RSN personnel appeared knowledgeable of the procedural requirements and of their QA responsibilities. RSN implementation of field operations controls appeared to be adequate.

### 5.3.5 Test Control (Programmatic Element 11)

The RSN Materials Testing Laboratory (MTL), located in Mercury, Nevada on the NTS, provides services to a number of OCRWM contractors in addition to support for non-OCRWM activities on the NTS. The MTL and its personnel are not dedicated to OCRWM activities, but have been trained in OCRWM procedures and

have OCRWM procedures for conducting their activities. The auditor evaluated the implementation of PP-11-01, General Testing Procedure for the Materials Testing Laboratory Support, through review of Work Initiation forms and Work Sheets, the Sample Control Log, and individual test records. MTL personnel qualifications were verified during the audit of PP-02-08, Training, Qualification, and Certification of Materials Testing Laboratory Personnel. The audit and checklist were thorough, and RSN implementation of test controls was adequate.

#### 5.3.6 Control of Measuring and Test Equipment (Programmatic Element 12)

The portion of the audit of Criterion 12 observed involved the calibration and control of MTL test instrumentation. MTL test equipment used for OCRWM activities were calibrated by REECO at the NTS, an OCRWM qualified supplier, and by an outside vendor (recently qualified) for load test. RSN responsibilities are primarily in identifying and recalling instruments for recalibration. PP-12-01, "Control of Measuring and Test Equipment, was the basis for the checklist and evaluation of this criterion. A large number of calibration certificates were reviewed and pieces of equipment observed in the audit. The auditor identified a correction to a instrument usage log that had been made in an unapproved manner. This minor discrepancy was corrected during the audit. RSN practices and records indicated adequate implementation of test equipment controls.

#### 5.3.7 Quality Assurance Records (Programmatic Element 17)

The observed portion of the audit of records involved implementation of PP-17-07, Log Data Handling. Field logging is performed by subcontractors for RSN. These organizations provide logging records, including field (or preliminary) prints and final prints of borehole logs, as well as data on electronic media. These records are reviewed by the RSN logging engineer and eventually submitted as QA records. The flow of these records-in-process was reviewed by the auditor. RSN control of logging records appeared adequate.

#### 5.3.8 Field Surveying (Programmatic Supplement IV)

The portion of the audit of activities governed by QARD Supplement IV, Field Surveying, associated with PP-01-02, Work Initiation (WI) were observed. WIs provide instructions for performing individual activities. WIs identify applicable procedures; codes and standards; and, for surveying, accuracy requirements. WIs are important instructions for controlling activities. A significant number of open quality-affecting WIs were reviewed to determine that controls were effectively implemented. One WI for surveying lacked accuracy requirements, but this was corrected during the audit. Controls and implementation appeared to be satisfactory.

#### 5.3.9 Conclusions

The audit was performed in a professional manner, and the auditors adequately evaluated activities and objective evidence. The audit was effective in determining the adequacy and degree of implementation of the RSN QA program. The audit team appropriately identified deficiencies, most of which were

corrected during the audit. RSN is adequately implementing its QA program in the areas audited. RSN staff displayed good understanding of their QA program and an interest in correcting deficiencies and enhancing its implementation.

#### **5.4 Conduct of Audit**

The audit was conducted in a professional manner. The audit team was well prepared and demonstrated a sound knowledge of the RSN QA program. In general the audit team personnel were persistent in their interviews, challenged responses when necessary, and performed an acceptable audit. Daily caucuses were held between auditors and observers, and daily audit status meetings were held between RSN management and the Audit Team Leader (with an NRC observer present) to discuss the preliminary findings.

#### **5.5 Qualification of Auditors**

The qualifications of the ATL and auditors were found to be acceptable in that each auditor and the ATL met the requirements of QAAP 18.1, "Qualification of Audit Personnel."

#### **5.6 Audit Team Preparation**

The auditors were prepared in the areas they were assigned to audit and were knowledgeable of the applicable procedures. The Audit Plan for this audit included the audit scope, the audit schedule, a list of audit team personnel, a list of the activities to be audited, and audit checklist references.

#### **5.7 Audit Team Independence**

The audit team members did not have prior responsibility for performing the activities they audited. The audit team members had sufficient independence to carry out their assigned functions without adverse pressure or influence.

#### **5.8 Review of Previous Audit Findings**

During this audit, ten previously issued CARs were reviewed to determine the effectiveness of corrective actions. The corrective action for the CARs was determined by the audit team to be effective.

#### **5.9 Summary of NRC Staff Findings**

##### **5.9.1 Observations**

The NRC staff did not identify any Observations relating to deficiencies in either the audit process or the RSN QA program.

##### **5.9.2 Good Practices**

No new good practices were identified.

### 5.9.3 Weaknesses

No weaknesses were identified in either the audit process or the RSN QA program.

### 5.10 Summary of YMQAD Audit Findings

Within the scope of this audit, the audit team concluded that the RSN QA program is adequate and that RSN's QA program implementation is adequate for Programmatic Elements 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 10.0, 11.0, 12.0, 14.0, 15.0, 16.0, 17.0, 18.0 and Supplements I, II, and IV. The NRC staff agrees with these conclusions. At the post-audit meeting, the audit team provided observations of the RSN QA program, discussed the two preliminary CARs resulting from the audit (listed below), and made two recommendations. Eleven other potential CARs were acceptably resolved by the RSN organization prior to the post-audit meeting. The two CARs are described below.

5.10.1 The latest version of Job Descriptions for matrixed RSN personnel located at the Yucca Mountain Site Offices were not forwarded to the Training Coordinator in the Las Vegas Offices. Thus these job descriptions are not placed in the training files or submitted to the records facility as required.

5.10.2 Contrary to the requirements of RSN Project Procedure PP-03-20, Revision 1, a statement describing existing conditions at the drill site is not included in Revision 0 of the USW-NRG-7 and USW SD-12 work program; lifetime records are not addressed in the USW-NRG-7 work program; and the covering of unattended holes is not adequately addressed: the time from spudding to rigdown is not covered. The only time it is covered is after capping.