

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

AUDIT REPORT

OF

CIVILIAN RADIOACTIVE WASTE MANAGEMENT SYSTEM
MANAGEMENT AND OPERATING CONTRACTOR

AT

RENO, NEVADA AND
LAS VEGAS, NEVADA

AUDIT NUMBER UNR-ARP-97-17

MAY 19 THROUGH 21, 1997 AND
JUNE 4, 1997

Prepared by:

Daniel A. Klimas

Daniel A. Klimas
Audit Team Leader
Office of Quality Assurance

Date:

6/20/97

Approved by:

James Blaylock

Donald G. Horton
Director
Office of Quality Assurance

Date:

7/3/97

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ENCLOSURE

1.0 EXECUTIVE SUMMARY

As a result of performance based Quality Assurance (QA) Audit UNR-ARP-97-17, the audit team determined that the Civilian Radioactive Waste Management System Management and Operating Contractor (CRWMS M&O) supplemental staff implementation of the QA program at the University of Nevada, Reno (UNR), Nevada Bureau of Mines and Geology (NBMG), was inadequate and the QA process controls were inadequate for work performed under Work Breakdown Structure (WBS)

1.2.3.7.2.1, "Assessment of Natural Resources Potential for Yucca Mountain." The Technical Specialist, however, stated the work performed was effective if compared to industry standards for the evaluation of areas for their mineral potential. The documented CRWMS M&O program examined at UNR and in Las Vegas, Nevada, during the audit is in accordance with U. S. Department of Energy (DOE) Office of Civilian Radioactive Waste Management (OCRWM) Quality Assurance Requirements and Description document (QARD) DOE/RW-0333P, Revision 5. However, overall adequacy and compliance to selected CRWMS M&O implementing procedures were found to be unsatisfactory.

The audit team identified numerous deficient conditions during the audit that resulted in the issuance of two Deficiency Reports (DR). One DR covered the deficient areas found in various program elements of the QA program. For the most part, the QA program had not been implemented. The second DR discussed the incomplete review documentation of the Natural Resource Assessment report submitted to the DOE as a deliverable. Section 5.5 of this report specifies the deficiencies found during the audit. In addition, one condition adverse to quality was identified for inadequate management of the procurement process and oversight of the contracted work. This condition is being incorporated into existing, open OCRWM Corrective Action Request (CAR) YM-97-C-001 which addresses similar conditions adverse to quality at the CRWMS M&O. No deficiencies were corrected during the course of the audit (most of the work had been completed prior to the audit).

Additionally, three recommendations resulting from this audit are provided in Section 6.0 of this report.

2.0 SCOPE

The performance based audit was conducted to evaluate the adequacy and effectiveness of CRWMS M&O QA and technical controls at UNR for performing activities that result in the development of the Assessment of Metallic Resources Potential for Yucca Mountain. Since most of the work had been completed, the audit was intended to determine the adequacy of the processes used in accordance with program requirements and the pertinent sections of the QARD.

The work evaluated was part of the Study Plan 8.3.1.9.2.1, which included the Natural Resource Assessment, and was described in the Fiscal Year 1997 Statement of Work, Revision 2, which included the geotechnical assessment, geophysical/geologic appraisal, and appraisal of metallic resource potential. The Metallic and Mined Energy Resources and Remote Sensing activities, which are specific tasks in the Statement of Work, were evaluated during the audit. Other work related to Hydrocarbon Resources, Geothermal Assessment, and Water Resources were being performed at locations other than Reno, Nevada and were not evaluated.

The process activities associated with the end product evaluated during the audit, in accordance with the approved audit plan, are as follows:

PROCESS/ACTIVITY/OR END-PRODUCT

Activities involving the Natural Resource Assessment tasks were selected for evaluation from Work Breakdown Structure (WBS) element 1.2.3.7.2.1, "Assessment of Natural Resources Potential for Yucca Mountain."

The performance based evaluation of process effectiveness and product acceptability was based upon:

1. Satisfactory implementation of the critical process steps
2. Acceptable results and quality of the end product
3. Documentation that substantiates the quality of products
4. Performance of trained and qualified personnel
5. Implementation of applicable QA Program elements

The CRWMS M&O critical process steps involved in the development of the audited deliverable were as follows:

- Planning
- Sample Collection
- Sample Analysis
- Data Analysis
- Data Interpretation/Modeling
- Metallic Resources Report Development for the Natural Resource Assessment Report

TECHNICAL AREAS

The audit included a technical evaluation of the process steps, performed by the CRWMS M&O staff in Reno, to generate data for use in the Natural Resource Assessment report. Details of the technical evaluation are included in Section 5.4.

In addition, a sample of QA program elements was evaluated as directly related to the technical areas. These program elements included:

- 1.0 Organization
- 2.0 QA Program
- 4.0 Procurement Document Control
- 5.0 Implementing Documents
- 6.0 Document Control
- 7.0 Control of Purchased Items and Services
- 12.0 Control of Measuring and Test Equipment
- 15.0 Nonconformance
- 16.0 Corrective Action
- 17.0 Quality Assurance Records
- Supp. I Software
- Supp. II Sample Control
- Supp. III Scientific Investigation
- Supp. V Control of the Electronic Management of Data

3.0 AUDIT TEAM AND OBSERVERS

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

<u>Name/Title/Organization</u>	<u>QA Program Elements/Requirements Process Activities or End Products</u>
Daniel A. Klimas, Audit Team Leader, OQA	QA Program Elements directly related to the critical process steps, QA Elements 1.0, 4.0, 7.0, 15.0, 16.0
Stephen D. Harris, Audit Team Leader in Training, OQA	QA Program Elements directly related to the critical process steps, QA Elements 2.0, 5.0, 6.0, Supplement I, Supplement V
James E. Clark, Auditor OQA	QA Program Elements directly related to the critical process steps, QA Elements 12.0, 17.0, Supplement II, Supplement III
Jefferson McCleary, Technical Specialist, CRWMS M&O	Critical Process Steps for the Metallic Resource Assessment activities

George Lindenburg, Department of Energy	Observer
Bimal Mukhopadhyay, Booz-Allen and Hamilton	Observer
Susan Zimmerman, State of Nevada	Observer
Darrell Porter, M&O/SAIC	Observer

4.0 AUDIT MEETINGS AND PERSONNEL CONTACTED

The pre-audit meeting was held at the UNR NBMG, Reno, Nevada, on May 19, 1997. A daily debriefing and coordination meeting was held with the Reno CRWMS M&O staff management, and daily audit team meetings were held to discuss issues and potential deficiencies. The audit was concluded with a post-audit meeting held at the UNR NBMG, in Reno, Nevada, on May 21, 1997 and in Las Vegas, Nevada, on June 4, 1997. Personnel contacted during the audit are listed in Attachment 1. The list includes those who attended the pre-audit and post-audit meetings.

5.0 SUMMARY OF AUDIT RESULTS

5.1 Program Effectiveness

The effectiveness of the work performed was presented from two perspectives: First - the technical specialist concluded the conduct of a metallic resources assessment of the conceptual controlled area by methods such as remote sensing interpretation, conservative (biased) sampling, sample analysis, and comparison to other mining districts, had been effectively completed, reflecting industry standards. However, UNR did not implement many of the objectives of the study plan; Second - the quality assurance auditors concluded the QA program implementation was not effective. Little or no implementation of the QA procedures had been performed.

5.2 Stop Work or Immediate Corrective Actions Taken

There were no stop work orders, immediate corrective actions or related additional items resulting from this audit.

5.3 QA Program Audit Activities

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

5.4 Technical Audit Activities

The focus of the technical audit activities at the NBMG was to evaluate the effectiveness of the critical process steps that lead to the completion of the report on the metallic resource potential of the conceptual controlled area at Yucca Mountain. The critical process steps leading to the completion of the product (report) are listed in section 2.0. The following discussion provides an evaluation of each of the six critical process steps in terms of contributing to a technically adequate report on metallic resources that meets project quality requirements.

Planning - A study plan had been developed and approved for the metallic resources work as well as the assessment of other natural resources at Yucca Mountain. The study plan was approved on November 6, 1992. However, by 1994 a decision was apparently made within the project to conduct resource assessments in a more commercial manner than was described in the study plan and the NBMG was asked to submit a proposal on the metallic resources work. The short proposal that NBMG developed, which was accepted and funded by the project, guided the metallic resources work. The study plan was not revised and the NBMG proposal does not meet QARD planning requirements as specified in section 2.2.5. As a result of the above actions, there are numerous deviations from the approved study plan in terms of the technical work that was preformed. For example, no systematic sampling was performed, no surface sediment samples were collected, and no plant or water samples were collected. No new geophysical data was acquired and the geophysical interpretation that was performed did not guide the sampling program. Isotopic studies were not conducted, no anomaly maps were made, and there was no rigorous comparison of elemental values in the samples collected to average crustal abundances or average elemental abundances for rock types in the area. In addition to not performing work that was specified in the study plan, some studies were undertaken that had not previously been planned, such as the remote sensing investigation and the evaluation of mined energy resources. As far as NBMG personnel were aware, no downstream users of the metallic resources report were involved in the planning process. In summary, decisions to deviate from the approved study plan are not documented and no alternate plan, meeting QARD requirements, was developed so the work performed by NBMG was not controlled by approved plans.

Sample Collection - The sample collection philosophy adopted by the NBMG was to do conservative biased sampling of both surface and subsurface rock units. In other words, only those samples that showed some indication of mineralization were collected for analysis. The concept being that, if only the most promising samples (from an exploration/prospecting for metallic resources point of view) are collected, and they do not indicate the presence of any metallic resources, then the project can reach the conservative judgement that metallic resources are not present at the site. Several hundred samples were collected from surface outcrops

and numerous additional subsurface samples were collected from project boreholes and the ESF. Surface samples were numbered and described in field notebooks and the locations were numbered and plotted on topo maps or on orthophoto base maps. Subsurface samples are located by hole number and depth or by location in the ESF and are described in notebooks. It is therefore possible to determine the original locations of all samples collected and analyzed. However, written sample selection criteria were never developed nor were written sample description guidelines developed. In lieu of any written guidance, a training session was conducted at the start of field work. The Principal Investigator (PI) and all of the geologists who were collecting samples worked together for five days. The verbally transmitted criteria for sample selection included the presence of limonitic or hematitic alteration, brecciation, veining, and clay alteration. Given the training exercise, it appears likely that the same types of samples were selected by the individual investigators when they were collecting independently over the next year or so. However, this training was not documented. Unfortunately, without written checklists, guidelines or procedures, it would be difficult to retrace the investigation without recourse to the original investigators. It was also noted that contrary to project policy, none of the outcrop samples were processed through the Sample Management Facility, though the samples were adequately controlled at the NBMG facility. In summary, it appears that an industry standard, conservative biased sampling program was implemented by the NBMG, sample locations can be recovered from the notebooks and maps, and (with access to the original investigators) the sampling criteria can be discovered. The only potential weakness of the sampling program is that, since no unaltered samples were collected, normal or background elemental values for the rocks present will not be analyzed.

Sample Analysis - All of the samples collected were analyzed for the same suite of elements. This suite of elements included metals that were of interest such as gold, silver, and mercury; plus a number of "pathfinder" elements such as arsenic that may be indicators of metallic resources. The full suite of metals and pathfinder elements analyzed was intended to cover all of the ore deposit models that were considered possible for the Yucca Mountain area. Commercial labs and industry standard techniques were employed in the analyses. Techniques included Inductive Coupled Plasma (ICP)-Mass Spectroscopy, ICP-Emission Spectroscopy (ES), and graphite furnace Atomic Absorption. Quality checks by NBMG personnel indicated problems with analyses submitted by Activation Laboratories requiring re-running of some samples and the use of an additional lab (USML); however, that lab is not considered a qualified supplier. Some analyses were also performed at the NBMG Analytical Laboratory. This work was controlled by straightforward "cookbook" type procedures that appear to be adequate though they were never reviewed and approved for use on the study. At the time of the audit, NBMG personnel were satisfied that the final geochemical data set that had been obtained was adequate for subsequent data analysis and interpretation. In

addition to quantitative analyses, some of the samples were examined petrographically or by Scanning Electron Microscopy and X-ray Diffraction analysis to aid in mineral identification and provide information relative to probable ore deposit models. In summary, in spite of the significant effort expended on analytical work, there are some uncertainties about the data due to the use of an unqualified supplier (USML) and the use of unapproved procedures at NBMG.

Data Analysis - This critical process step considers analysis of all the different types of data used in the study. The emphasis so far has been on the geochemical data from sample analysis and the sample collection that preceded it. However, previously collected geophysical data were analyzed for the study from the exploration/prospecting perspective, and existing remote sensing data were also analyzed from this perspective. Apparently all of the data analysis activities were separate parallel efforts conducted by different investigators.

Howard Ross at the University of Utah performed the geophysical analysis as a subcontractor to the NBMG. Howard was not available for interview during the audit, but according to the PI (Steve Castor) the existing geophysical data was not reprocessed for this study. Howard used his experience and professional judgement to evaluate the Yucca Mountain area as to its metallic resource potential based on existing gravity, aeromagnetic, seismic, and electrical data. This data set was judged to be adequate for the purpose of the study and no specific exploration targets were identified based on comparisons to known mineralized areas in the region. Apparently the only documentation of the geophysical interpretation is Howard's report to the NBMG; procedures or scientific notebooks were not used in the study.

The remote sensing interpretation was conducted by Tom Lugaski at UNR. The work was controlled by scientific notebook. While the notebook does a good job of documenting the mechanics of which thematic mapper (TM) data bands were combined and ratioed from which scenes, it provides no objective for the study and no rationale for the selection of bands and ratios. The interview with Tom Lugaski revealed that the objective of the study was to follow standard industry practices as described in text books and journal articles for selecting band combinations and ratios that were known to highlight certain types of alteration and mineralization. After this was performed, areas of known mineralization in the Yucca Mountain region (Bare Mountain, Bullfrog Hills, etc.) were compared to Yucca Mountain itself. The result was that Yucca Mountain appears to be unmineralized relative to known mining districts. It was observed that when the notebook was started in July of 1995 a page of "Remote Sensing Notebook Procedures" was taped into the front of the notebook. However, they did not meet QARD requirements for scientific notebooks. When the CRWMS M&O procedure on scientific notebooks

(QAP-SIII-3) became available in October of 1996, the remote sensing notebook did not transition to that procedure (this was the case with all of the scientific notebooks examined for the metallic resources study).

Analysis of the geochemical data set was performed by the PI. Data was tabulated and some simple statistics and comparisons applied. With the exception of one sample which indicated very high tin values, the geochemical data indicated that there were no significant metallic resources at Yucca Mountain. The tin rich sample came from a fumarolic altered area of very limited extent and it was concluded that no significant tin resource is present. It is noted, however, that the threshold values for geochemical anomalies are judgmental, and that background values in the area are unknown because no unaltered samples were collected and analyzed, therefore no statistics could be developed relative to average elemental abundances in the Yucca Mountain region.

In summary, it appears that industry standard data analysis techniques were applied to the geochemical, geophysical, and remote sensing data sets for Yucca Mountain and that no anomalies indicative of significant metallic resources were identified. However, this work was not performed in accordance with QARD requirements.

Interpretation/Modeling - One of the goals of the metallic resources investigation was to evaluate the potential for undiscovered resources. There were two approaches to this goal, the first has already been covered in that the Yucca Mountain area was actively explored/prospected by collecting and analyzing samples from the surface and from available deep boreholes and the ESF. This approach is valuable and necessary, but still leaves a significant volume of rock unsampled. To address this situation, the rock types, structure, geophysics, and geochemistry of Yucca Mountain were interpreted in the context of various ore deposit models in an effort to estimate the likelihood of undiscovered metallic resources and mined energy resources. The results of this effort indicated that for the Tertiary sequence, the most likely model was the volcanic hosted low sulfidation gold model and the potential for this model is low. For the Pre-Tertiary sequence, the most likely model was the sediment hosted gold model and the potential for this model is also low. In summary, the interpretation indicated that for every deposit model considered, the potential for Yucca Mountain was low to very low.

Report Development - The report on metallic resources prepared by the NBMG was not developed under any procedure, not all of the authors had an opportunity to see the report as a whole, and it received no review at NBMG prior to being transmitted to the CRWMS M&O in Las Vegas. At the time of the close of the audit (June 4, 1997), a technical reviewer had been selected for the metallic resources report by the CRWMS M&O and the review was in process. A portion

of the metallic resources report had already been utilized as input to the overall natural resources report which had been submitted to the DOE on June 2, 1997. The natural resources report, including those portions from the metallic resources report, had been reviewed prior to submittal to DOE but review documentation was not complete. Apparently reviewers had indicated verbally that their concerns had been addressed. In summary, for the metallic resources report, report development was not procedurally controlled, the selection of one reviewer to cover all aspects of the metallic resources report (geophysics, remote sensing, geochemistry, ore deposit modeling) is questionable, and the report review was in process at the close of the audit.

Observations and Recommendations - It is clear (based on interviews with the PI, statements made by the DOE observer during the audit, and examination of the NBMG proposal for the metallic resources work) that it was the intent of the project to abandon the approved study plan. The approved plan is very systematic, very thorough, and follows an academic or research approach to the resource evaluation. It includes a number of items such as isotopic studies of oxygen, hydrogen, and sulfur to evaluate paleomovement of fluids, that have little direct relevance to the existence of metallic resources at Yucca Mountain. Unfortunately, the decision to follow a more industry standard approach to the metallic resource evaluation is not well documented, the study plan was never revised, and no alternate planning document that meets QARD requirements was developed. If the primary use of the study is as one of several inputs to a probabalistic assessment of the likelihood of future human intrusion, then QA controls may not have been appropriate. Based on the evaluation of the six critical process steps for the metallic resources study and the above discussion of the existing study plan, there are three observations: (1) An industry standard evaluation of the metallic and mined energy resource potential of the Yucca Mountain conceptual controlled area has been effectively completed by the NBMG, with the result that no commercially valuable resources were identified and the potential for undiscovered resources is low to very low. (2) The only potential technical weakness of the study is that no unaltered samples were collected and analyzed so it is not possible to evaluate any anomalies relative to average elemental abundances of rocks in the area. (3) The industry standard resource evaluation completed by the NBMG was not planned, conducted, or documented in accordance with QARD requirements. Relevant to these observations, recommendations number 2 and 3 are offered and presented in Section 6.0

5.5 Summary of Deficiencies

The audit team identified deficient conditions in all QA program elements evaluated except the following:

- Section 6, Document Control, appeared to be controlled satisfactorily
- Section 16, Corrective Action, had not been implemented at the time of the audit
- Section 17, Quality Assurance Records, had not been submitted at the time of the audit and therefore could not be evaluated
- Supplement I, Software, was determined not to be applicable to their scope of work

5.5.1 Corrective Action Requests (CAR)

One condition adverse to quality was identified relative to the lack of CRWMS M&O management direction and control resulting in the UNR performing quality affecting activities with little or no implementation of the OCRWM QA program and the CRWMS M&O implementing procedures. Similar conditions had been identified during previous verification activities of organizations procured by the CRWMS M&O to perform quality affecting activities in accordance with the CRWMS M&O implementing procedures. These conditions are documented on open, existing OCRWM CAR YM-97-C-001. The condition identified during this audit will be incorporated into CAR YM-97-C-001.

5.5.2 Deficiency Reports (DR)

As a result of the audit, two DRs were issued. YM-97-D-053 was issued to the CRWMS M&O and UNR for resolution, and was based on the specific areas within the QA program elements that were not adequately implemented at UNR. YM-97-D-058 was issued to the CRWMS M&O for resolution relative to the review process for scientific documents. The final report for Natural Resource Assessment had been reviewed; however, the process described in the implementing procedure, QAP-SIII-2, Review of Scientific Documents and Data, had not been completed.

5.5.3 Performance Reports (PR)

None

5.5.4 Deficiencies Corrected During the Audit

None

6.0 RECOMMENDATIONS

The following recommendations resulted from the audit and are presented for consideration by the CRWMS M&O management:

1. Two procedures exist for activities related to review: QAP-3-1, Document Review, and QAP-SIII-2, Review of Scientific Documents and Data. These procedures were written to meet the QARD, section 2.2.10. In addition, two procedures exist that can be used for development of technical documents: QAP-3-5, Development of Technical Documents, and QAP-SIII-1, Scientific Investigation Control. It seems excessive to have two procedures for one activity. The CRWMS M&O needs to consolidate these procedures into one for each activity. In addition, the CRWMS M&O Requirements Matrix does not indicate use of QAP-SIII-1 in section 2.2.10 implementation. This should be added.
2. In view of the current program approach to the assessment of natural resources, and the follow-on activity of estimating the likelihood of future human intrusion, revisit the determination that QA controls were required for these studies. If it is determined that QA controls are still required, then it is recommended an attempt be made to qualify the report for use in accordance with appropriate project procedures.
3. If any additional work on metallic resources is conducted, collect and analyze some unaltered samples so that anomalies can be evaluated in the context of average elemental abundances of rocks in the area.

7.0 LIST OF ATTACHMENTS

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

ATTACHMENT I

Personnel Contacted During the Audit

<u>Name</u>	<u>Organization/Title</u>	<u>Pre-Audit Meeting</u>	<u>Contacted During Audit</u>	<u>Post-Audit Meeting</u>
Steve Castor	UNR/Research Geologist	X	X	X
Mario Desilet	UNR/Assistant Chemist/QA	X	X	X
Larry Garside	UNR/Research Geolist	X	X	X
Thomas Lugaski	Museum Director and Curator		X	
Judy Justice	CRWMS M&O/Training Manager		X	
Richard Quitmeyer	CRWMS M&O/SPO Staff		X	X*
Jan Rasmussen	CRWMS M&O/SPO Staff		X	X*
Norma Biggar	CRWMS M&O/Geology Technical Lead		X	X*
Ron Smith	M&O/ATRS Manager		X	X*

*Post-audit meeting in Las Vegas, Nevada, June 4, 1997

LEGEND:

ATRS Ambient Testing and Regulatory Support
SPO Scientific Program Operations

ATTACHMENT 2
Summary Table of Audit Results
For Procedural Compliance Evaluations

ELEMENT	IMPLEMENTING DOCUMENTS	DETAILS (Checklist)	DEFICIENCIES	RECOMMENDATIONS	PROGRAM ADEQUACY	PROCEDURE COMPLIANCE	OVERALL
1.0	QAP-1-0, rev. 4	pg. 1	YM-97-D-053		SAT	UNSAT	UNSAT
2.0	QAP-2-0, rev. 3 QAP-2-1, rev. 5 QAP-2-2, rev.2,PO3 QAP-3-1, rev. 6 QAP-3-5, rev. 6 QAP-SIII-1, rev. 0 QAP-SIII-2, rev. 0	pg. 2 pg. 2 pg. 2 pg. 5 pg. 3-4 pg. 4 pg. 5	YM-97-D-053 YM-97-D-053 YM-97-D-053 YM-97-D-058 YM-97-D-058	Rec. #1 Rec. #1 Rec. #1 Rec. #1	SAT SAT SAT N/A N/A SAT SAT	UNSAT UNSAT UNSAT N/A N/A UNSAT UNSAT	
4.0	QAP-7-0, rev. 0	pg. 6-7	YM-97-D-053		SAT	UNSAT	
5.0	QAP-5-5, rev. 5 NLP-5-1, rev. 2	pg. 8 pg. 8	YM-97-D-053 YM-97-D-053		SAT SAT	UNSAT UNSAT	
6.0	QAP-6-1, rev. 3	pgs. 8-9			SAT	SAT	
7.0	QAP-7-0, rev. 0	pg. 6	YM-97-D-053		SAT	UNSAT	
12.0	QAP-12-1, rev. 4	pg. 10	YM-97-D-053		SAT	UNSAT	
15.0	YAP-15.1Q, rev. 3	pg. 11	YM-97-D-053		SAT	UNSAT	
16.0	AP-16.1Q, rev. 1	pgs. 12-13			SAT	SAT	
17.0	AP-17.1Q, rev. 0	pg. 14			SAT	SAT	
SI	QAP-SI-0, rev. 1 QAP-SI-3, rev. 1	pg. 15 pg. 15			N/A N/A	N/A N/A	
SII	YAP-SII-4Q, rev. 0	pg. 17-19	YM-97-D-053		SAT	UNSAT	
SIII	QAP-SIII-3, rev. 1	pgs. 20-22	YM-97-D-053		SAT	UNSAT	
SV	NONE	pg. 16	YM-97-D-053		UNSAT	UNSAT	

ATTACHMENT 2
Summary Table of Audit Results
For Process/Product Evaluations

ACTIVITY	PROCESS STEPS	DETAILS (Checklist)	DEFICIENCIES	RECOMMENDATIONS	PROCESS EFF.	PRODUCT ADEQUACY	OVERALL
Natural Resource Assessment	Planning	pgs. 1-3	YM-97-D-053	Rec. #2	UNSAT	UNSAT	SAT
	Sample Collection	pgs. 4-9	YM-97-D-053	Rec, #3	SAT	SAT	
	Sample Analysis	pgs. 10-16			SAT	SAT	
	Data Analysis	pgs. 17-19			SAT	SAT	
	Data Interpretation/Modeling	Pgs. 20-24			UNSAT	SAT	
	Natural Resource Assessment Report	pgs. 25-28	YM-97-D-053 YM-97-D-058		UNSAT	SAT	
TOTAL	Pages - QA Program: 22 Technical Process: 28				UNSATISFACTORY SATISFACTORY		

"DOCUMENTS REVIEWED" includes the referenced procedure or process step and the associated records/objective evidence

CARs.....Corrective Action Requests	ADEQUACY..... Meets Requirements or Expectations
DRs..... Deficiency Reports	COMPLIANCE..... Procedures Implemented
PRs..... Performance Reports	EFF..... Effectiveness - Satisfies Measurement Criteria
CDA..... Corrected During Audit	OVERALL..... Summary of Element or Process
REC..... Recommendation	