



**Department of Energy**  
Washington, DC 20585

QA: QA

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**REPORT FOR AUDIT OQA-USGS-06-03 OF QUALITY ASSURANCE (QA) PROGRAM  
IMPLEMENTATION AT THE U.S. GEOLOGICAL SURVEY (USGS)**

Representatives of the Office of Civilian Radioactive Waste Management (OCRWM) conducted an audit of QA program implementation and effectiveness of the procedures applicable to the USGS scope of work in support of the Yucca Mountain Project. The audit was conducted from December 27 to 28, 2005, at the Western Earth Surface Processes Geologic Discipline Western Region of the USGS located in Menlo Park, California, and from January 9 to 12, 2006 in Denver, Colorado.

The audit team documented two conditions adverse to quality in Level B Condition Reports (CR) 7376 and 7377, and one recommendation in Level D CR 7409. These CRs are detailed in the enclosed report.

The audit team evaluated implementation of the applicable OCRWM Administrative Procedures, Bechtel SAIC Company, LLC Line Procedures, and USGS Quality Management Procedures (QMP), and technical procedures. The team concluded that the USGS QMPs were adequate, that implementation of all evaluated procedures was satisfactory, and that the USGS was effectively meeting the requirements of the QA program.

The identified conditions will be followed to closure. The audit is complete and closed and no response to this letter is necessary.

If you have any questions, please contact me at (702) 821-8409 or John R. Doyle at (702) 821-8421.

Kerry M. Grooms  
Team Lead, Quality Assessments  
Office of Quality Assurance

OQA:KMG-0523

Enclosure:  
Audit Report OQA-USGS-06-03

UMSS07  
WM-11



cc w/encl:

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QA: QA

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

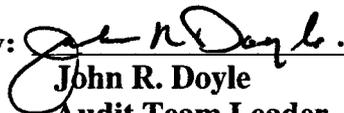
**REPORT FOR AUDIT OQA-USGS-06-03  
OF THE QUALITY PROGRAM IMPLEMENTATION  
AT THE U.S. GEOLOGICAL SURVEY**

**IN MENLO PARK, CALIFORNIA  
ON DECEMBER 27 - 28, 2005**

**AND**

**IN DENVER, COLORADO  
ON JANUARY 9 - 12, 2006**

Prepared by:

  
\_\_\_\_\_  
John R. Doyle  
Audit Team Leader

Date:

01/30/06.

Approved by:

  
\_\_\_\_\_  
Kerry M. Grooms  
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Date:

2/2/06

## EXECUTIVE SUMMARY

Representatives of the Office of Civilian Radioactive Waste Management (OCRWM) conducted an audit of quality assurance (QA) program implementation in support of the Yucca Mountain Project (YMP) by the U.S. Geological Survey (USGS) on December 27 and 28, 2005, at the Western Earth Surface Processes (WESP) Geologic Discipline Western Region of the USGS located in Menlo Park, California, and from January 9 to 12, 2006, in Denver, Colorado. The audit team evaluated the adequacy of USGS Quality Management Procedures (QMP) and the implementation and effectiveness of the USGS for compliance with the requirements described in DOE/RW-0333P, Revision 16, *Quality Assurance Requirements and Description* (QARD) and DOE/RW-0565, Revision 0, *Augmented Quality Assurance Program* (AQAP). Implementation of the AQAP was determined to be non-applicable since it has not been invoked in the currently approved Interagency Agreement (IA) DE-AI08-02RW12167 with OCRWM. This lack of AQAP detail in the current IA was documented during audit OCRWMC-OQA-06-16, of the Office of Repository Development as Level B CR 6330. In addition, the audit team evaluated implementation of the applicable OCRWM Administrative Procedures (AP), Bechtel SAIC Company, LLC (BSC) Line Procedures (LP), and USGS QMPs and technical procedures.

Two Level B Condition Reports (CRs) 7376 and 7377, and one Level D CR 7409 recommendation were documented by the audit team. Level B CR 7376 documents a condition where Task Agreement YM02003009937 was not followed for Argon (AR)39/40 basalt age dating at WESP. Level B CR 7377 identifies that a condition where verification documentation was missing for electronic data transfer in the records package for Data Tracking Number (DTN) GS040908315215.005. Level D CR 7409 recommends that the age date for basalts resulting from Potassium/Argon methodology at the USGS Menlo Park facility be submitted to the Technical Data Management System (TDMS) flagged as non-Q data until replaced by data derived from the Ar39/40 methodology.

With the exception of the two identified CRs described above, the audit team concluded that the USGS QMPs were adequate, that implementation of all evaluated procedures was satisfactory, and that the USGS was effectively meeting the requirements of the QARD. As follow-up to previously issued CRs, the team examined corrective actions for twelve CRs and found them satisfactory.

### 1.0 AUDIT DETAILS

Attachment A lists the personnel contacted during the audit and audit meeting attendees. Attachment B provides a summary of the audit results.

#### Audit Team Members

John Doyle	Audit Team Leader
Patrick Auer	Auditor
Robert Toro	Auditor

James Blaylock Office of Quality Assurance (OQA)/Observer  
Jack Parrot Nuclear Regulatory Commission (NRC)/Lead Observer  
Gene Peters NRC/Observer  
Rod Weber Southwest Research Institute (SWRI)/Observer

### **1.1 QARD SECTION 1.0, ORGANIZATION**

The audit team reviewed the organizational structure with the USGS laboratory lead. The team determined that functional organizations and responsibilities were consistent with an appropriately implemented quality program. The USGS organizational procedure YMP-USGS-QMP-1.01, Revision 9, Modification 1, *Organization*, was considered adequate.

The audit team reviewed the current delegation of authority from the laboratory lead and confirmed that it had been submitted to records.

It was determined that the USGS was satisfactorily implementing organization requirements.

### **1.2 QARD SECTION 2.0, QUALITY ASSURANCE PROGRAM**

The audit team evaluated the personnel training and qualification records for personnel who have been assigned to support YMP activities or changed assignments since the last audit of the USGS. In addition, the audit team verified applicable verification of education and experience for those personnel. The audit team determined that USGS has maintained satisfactory implementation of these requirements. These activities are governed by YMP-USGS-QMP-2.02, Revision 9, *YMPB Federal and Non-Federal Personnel Qualification*, which the team considered adequate.

Implementation of this section was satisfactory at USGS.

### **1.3 QARD SECTION 4.0, PROCUREMENT DOCUMENT CONTROL, QARD SECTION 7.0, CONTROL OF PURCHASED ITEMS AND SERVICES, AND QARD APPENDIX C MONITORED GEOLOGIC REPOSITORY**

Limited activity has occurred in these areas since the last audit. The audit team reviewed procurement documentation in accordance with YMP-USGS-QMP-4.01, Revision 11, *Procurement Document Control/Receipt of Procurements* for Purchase Order # 06CRSA0139 to Endress & Hauser and Task Agreement to WESP. This USGS procedure is considered adequate to meet requirements. Procurement documents reviewed were prepared by satisfactorily implementing applicable procedures.

USGS Task Agreement YM02003009937 and the attached quality control sample plan, between the Yucca Mountain Project Branch (YMPB), and the WESP located in Menlo Park, California, requires the YMPB to prepare basalt samples from bulk cuttings and submit one quality control sample as a blind standard with each submittal of basalt samples. The samples are to be dated

through a determination of Ar39/40 isotopic ratios. Contrary to the Task Agreement, WESP is preparing the basalt samples without submitting the standard as a blind. This CAQ was documented as Level B CR 7376.

In addition, Level D CR 7409 recommends that age dating for basalts resulting from the Potassium/Ar methodology at the WESP Menlo Park facility be submitted to the Technical Data Management System (TDMS) flagged as non-Q data until replaced by data derived from the Ar39/40 methodology.

With the exception noted above, implementation of this section was satisfactory at USGS.

#### **1.4 QARD SECTION 5.0, IMPLEMENTING DOCUMENTS**

Implementation of the QA program at the USGS requires that work be performed in accordance with applicable OCRWM APs, BSC LPs, USGS QMPs, and technical procedures. The audit team reviewed the preparation process and associated document review packages for one quality and two technical procedures that had either been developed or revised since the previous audit of the USGS. In accordance with QMP 3-07, Revision 7, *YMP-USGS Review Procedure*; QMP 5.01, Revision 9, *Preparation of Technical Procedures*; and QMP 5.03, Revision 12, *Development and Maintenance of Quality Management Procedures*, the preparation of the following procedures was found to be acceptable:

- YMP-USGS-HP-202, Revisions 1 and 2, Mod. 2, *Analysis of Water Samples for Anion, Cation and Silica Concentrations by Ion Chromatography*
- YMP-USGS-QMP-5.01, Revision 11, *Preparation of Technical Procedures*
- YMP-USGS-HP-300, Revision 1, *Extraction of Pore Waters by High Speed Centrifuge Methods – Manual Operation*

The procedure preparation process was determined to be both adequate and effective at the USGS.

#### **1.5 QARD SECTION 6.0, DOCUMENT CONTROL**

The audit team determined that USGS personnel use the YMP Controlled Documents Information System to obtain the correct version of documents. The USGS QMPs and technical procedures are managed by a Document Control Coordinator who implements the requirements of LP-6.3Q-BSC, Revision 0, ICN 0, *Document Control*, and oversees documentation on a local database for USGS personnel use. Only limited hard copies are produced and numbered. The auditors verified the process and verified that a selection of controlled procedures was properly maintained in three controlled manuals.

The audit team determined that the USGS was satisfactorily implementing document control.

## **1.6 QARD SECTION 12.0, CONTROL OF MEASURING AND TEST EQUIPMENT**

The audit team determined that implementation of LP-12.1Q-BSC, Revision 0, ICN 1, *Control of Measuring and Test Equipment*, at the USGS was acceptable. Measuring and Test Equipment (M&TE) was found to be controlled in an acceptable manner, nonconforming M&TE was segregated, and status indicators were in use. Equipment available for use was found to be within its acceptable calibration period, stored, and maintained as required. M&TE was listed and tracked in a Master List. Instrument ID number, location, calibration dates, instrument status, and limited calibration information are documented in this list. The audit team evaluated the laboratory areas and found calibrated instrumentation (ion chromatograph, balances, etc.) to be in good working order, stored properly, displaying correct calibration status indicators, and nonconforming equipment was segregated as required.

The audit team determined that the USGS was satisfactorily implementing control of M&TE.

## **1.7 QARD SECTION 16.0, CORRECTIVE ACTION**

Review of the Corrective Action Program (CAP) database indicated 26 CRs (19 Level C and 7 Level D CRs) were issued during the timeframe covered by this audit. Four Level C CRs (6576, 6593, 7009, and 7221) samples for evaluation during this audit were processed in accordance with AP-16.1Q, Revision 8, ICN 6, *Condition Reporting and Resolution*. Corrective actions were taken by responsible management and the extent and impact of condition were determined for CAQ. There were no significant CAQs identified during this audit period that warranted issuance of a "Stop Work" notice. There have been no Level A or Level B CRs issued since the previous OQA audit. Implementation of the correction actions was verified prior to closeout of the corrective action documentation.

The audit team determined that the implementation of AP-16.1Q for this section has been adequately implemented.

## **1.8 QARD SECTION 17.0, QUALITY ASSURANCE RECORDS**

The audit team evaluated the implementation of AP-17.1Q, Revision 4, ICN 0, *Records Management*, at USGS. The audit team evaluated the records file plan, records storage, and examples of records packages and transmittals as submitted by USGS.

The audit team determined that implementation of records management at the USGS was satisfactory.

## **1.9 QARD SUPPLEMENT I, SOFTWARE**

The USGS is currently entering software MODFLOW-2000, Version 1.15.01, into the software qualification process, as requested per an approved USGS memorandum to the BSC Licensing and Nuclear Safety Department. USGS has prepared 11206-RD-1.15.01-00, Software

Requirements Document, and 11206-DD-1.15.01-00, Software Design Document, in compliance with LP-SI.11Q-BSC, Revision 0, ICN 1, *Software Management*; and LP-SI-12Q-BSC, Revision 0, ICN 2, *Qualification of Software*.

The audit determined that implementation of software control was satisfactory at the USGS.

#### **1.10 QARD SUPPLEMENT II, SAMPLE CONTROL**

The audit team evaluated the sample control process from initial receipt of samples through storage and analyses. The audit team inspected ten samples received at USGS and compared identification numbers on the label on the sample container to the number on the Sample Management Facility Specimen Custody Sheet. Samples reviewed were properly labeled, chain of custody was maintained, and the storage of the samples was found acceptable. Eight samples were also tracked through two laboratory facilities. The audit team evaluated samples that were undergoing ion chromatograph analysis and isotopic analysis. It was determined that the samples were tracked and controlled as required by USGS procedure YMP-USGS-QMP-8.01, Revision 4, *Identification and Control of Samples*. The audit team considered this procedure adequate.

The audit team determined that the USGS was satisfactorily implementing sample control.

#### **1.11 QARD SUPPLEMENT III, SCIENTIFIC INVESTIGATION**

The audit team determined that USGS currently manages eight active scientific notebooks at the Denver facility. Four of the notebooks were evaluated for compliance to LP-SIII.11Q-BSC, *Scientific Notebooks* and found to be in compliance with the procedure requirements.

The audit team determined that the USGS implementation of these scientific investigation activities was satisfactory.

#### **1.12 QARD SUPPLEMENT V, CONTROL OF ELECTRONIC MANAGEMENT OF DATA**

LP-SV.1Q, Revision 0, *Control of the Electronic Management of Information*, describes the process controls for the electronic management of data. The audit team reviewed several Technical Work Plans (TWPs) and Test Plans (SITPs) mandating controls. The responsible managers had reviewed and documented the adequacy of the individual controls in the form of Supplement V evaluations. All evaluations were adequate. Storage requirements, backup medium, confirmation of data, and security measures were reflected in the TWPs reviewed were also deemed adequate.

Level B CR 7377 was initiated to document that electronic files 04SHRMP1.XLS and 04SHRMP2.XLS contained in data package DTN GS040908315215.005 were transferred from the SHRMP to an excel spreadsheet file without a record of the data transfer being maintained.

With the exception noted above, USGS implementation of Supplement V controls was satisfactory.

### **1.13 AUGMENTED QUALITY ASSURANCE PROGRAM**

Implementation of the AQAP was determined to be non-applicable since it has not been invoked in the currently approved Interagency Agreement (IA) DE-AI08-02RW12167 with OCRWM. This lack of AQAP detail in the current IA was documented during audit OCRWMC-OQA-06-16, of the Office of Repository Development as Level B CR 6330.

### **2.0 FOLLOW-UP ON PREVIOUSLY IDENTIFIED CONDITION REPORTS**

During the evaluation of the quality program elements at USGS, the audit team evaluated previously identified CRs for recurrence of the originally identified conditions. The audit team found no recurrence of the previously identified conditions. The evaluated CRs:

- CR 6578 - Out of Calibration Report not issued to document out of calibration condition
- CR 6579 – Data logger not calibrated to specific tolerances
- CR 6576 – Condition not issued for impact on data
- CR 6532 – Procurement Documents not submitted to the Project Records Center
- CR 5545 - Technical work performed prior to the initiation of a Scientific Notebook
- CR 5503 – Scientific Notebook SN-0026 not closed in accordance with applicable procedure
- CR 5909 – QA designation missing on first page of Scientific Notebook
- CR 5807 – Inadequate documentation for review and impact of Expedited Change
- CR 5808 – Inappropriate signature for procedure dispute resolution
- CR 5806 – Mandatory review comments dispositions not accepted by reviewer
- CR 5805 – Inaccurate procedure records package submitted to records
- CR 6593 - Impact boxes checked where impacts were non-existent

Corrective actions were deemed effective.

### **3.0 PROGRAM ADEQUACY, IMPLEMENTATION, AND EFFECTIVENESS**

The audit team concluded that the USGS QMPs were adequate and with the exception of the CRs identified during this audit that implementation of all evaluated procedures was satisfactory, and that the USGS was effectively meeting the requirements of the QA program.

### **4.0 ATTACHMENTS**

- Attachment A – Personnel Contacted
- Attachment B – Summary of Audit Results

Attachment A - Personnel Contacted

COMPANY	NAME	PRE-AUDIT MEETING	CONTACTED DURING AUDIT	POST-AUDIT MEETING
BSC	Robert Habbe <sup>1</sup>	X		X
BSC	Sandra Feldman <sup>1</sup>	X		
NQS	Marilyn Kavchak			X
NRC	Jack Parrot	X	X	
NRC	Gene Peters	X	X	X
OQA	James Blaylock	X	X	X
SWRI	Rod Weber	X	X	X
USGS	Alexandria Anderson		X	
USGS	William Scott <sup>1</sup>			X
USGS	Kenneth Skipper	X	X	
USGS	Loretta Kwak		X	
USGS	Clay Hunter	X		X
USGS	Kate Larsen	X	X	X
USGS	Kristi Lewis	X	X	X
USGS	Zell Peterman		X	
USGS	Tom Oliver		X	
USGS	Cynthia Miller-Corbett	X	X	X
USGS	Peter Striffler		X	
USGS	Martha Mustard	X	X	X
USGS	Donna Sinks	X	X	X
USGS	Kevin Scofield		X	
USGS	James Paces		X	
USGS	Robert Fleck		X	
USGS	Debbie Showalter		X	
USGS	Gary Patterson		X	
USGS	Rick Moscati		X	
USGS	Robin Diehl		X	

<sup>1</sup>Attended via telephone

**Attachment B - Summary of Audit Results**

QARD Section	Implementing Documents	Condition Reports	Noteworthy Practices	Program Adequacy	Implementation	Overall Effectiveness
1.0	YMP-USGS-QMP-1.01, Rev. 9,-Mod. 1			Adequate	Satisfactory	Effective
2.0	YMP-USGS-QMP-2.02, Rev. 9			Adequate	Satisfactory	Effective
	YMP-USGS-QMP-3.07, Rev. 7					
4.0 & 7.0	YMP-USGS-QMP-4.01, Rev. 11	7376, 7409		Adequate	Satisfactory	Effective
	YMP-USGS-QMP-4.02, Rev. 8					
5.0	YMP-USGS-QMP-3.07, Rev. 7			Adequate	Satisfactory	Effective
	YMP-USGS-QMP-5.01, Rev. 11					
	YMP-USGS-QMP-5.03, Rev. 13					
6.0	LP-6.3Q-BSC, Rev. 0, ICN 0			Adequate	Satisfactory	Effective
7.0	See above 4.0			Adequate	Satisfactory	Effective
12.0	LP-12.1Q-BSC, Rev. 0, ICN 0			Adequate	Satisfactory	Effective
	YMP-USGS-GCP-13, Rev. 3					
	YMP-USGS-GCP-38, Rev. 0					
	NWM-USGS-GCP12, Rev. 4					
16.0/15.0	AP-16.1Q, Rev. 8, ICN 4			Adequate	Satisfactory	Effective
17.0	AP-17.1Q, Rev. 4, ICN 0			Adequate	Satisfactory	Effective
Supplement I	LP-SI.11Q-BSC, Rev. 0			Adequate	Satisfactory	Effective
	LP-SI.12Q-BSC, Rev. 0					
	LP-SI.13Q-BSC, Rev. 0					
Supplement II	YMP-USGS-QMP-8.01, Rev. 5			Adequate	Satisfactory	Effective
	YMP-USGS-HP-23, Rev. 5, Mod. 1					
Supplement III	LP-SIII.11Q-BSC, Rev. 0			Adequate	Satisfactory	Effective
Supplement V	LP-SV.1Q-BSC, Rev. 0	7377		Adequate	Satisfactory	Effective
Appendix C	See Section 4.0/7.0			Adequate	Satisfactory	Effective
Previously issued CRs	CRs 6578, 6579, 6576, 6532, 5545, 5503, 5909, 5807, 5808, 5806, 5805, and 6593			Adequate	Satisfactory	Effective
	AQAP			N/A	N/A	N/A