



Department of Energy
Washington, DC 20585

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for Yucca Mountain Site
Characterization Project
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**ISSUANCE OF SURVEILLANCE RECORD USGS-SR-97-061 RESULTING
FROM THE OFFICE OF QUALITY ASSURANCE (OQA) SURVEILLANCE OF
U.S. GEOLOGICAL SURVEY (USGS)**

Enclosed is the record of Surveillance USGS-SR-97-061 conducted by the OQA of the USGS facility in Denver, Colorado, September 29 through October 3, 1997.

The purpose of the surveillance was to verify compliance with USGS technical and implementing procedures in the production of Milestone SPC333M4.

There were no Corrective Action Requests, Deficiency Reports, or Performance Reports issued as a result of the surveillance.

The results of the surveillance were that USGS has adequately implemented the Quality Assurance program as it applies to the activities conducted in association with Milestone SPC333M4, "Evaluation of Paleo Ground-Water Discharge."

This surveillance is considered completed and closed as of the date of this letter. A response to this surveillance record is not required.

If you have any questions, please contact either James Blaylock at (702) 794-1420 or Kenneth T. McFall at (702) 295-2832.

R.W. Craig
for Donald G. Horton, Director
Office of Quality Assurance

OQA:JB-0248

Enclosure:
Surveillance Record USGS-SR-97-061

Recip: NMSS/PAHL



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cc w/encl:

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Surveillance No. USGS-SR-97-061

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

QUALITY ASSURANCE SURVEILLANCE RECORD

SURVEILLANCE DATA

1. ORGANIZATION/LOCATION: United States Geological Survey (USGS), Denver, Colorado	2. SUBJECT: Verify compliance with USGS procedures in the preparation of "memorandum report" Milestone SPC333M4 "Evaluation of Paleo Ground-Water Discharge"	3. DATE: September 29 through October 3, 1997
4. SURVEILLANCE OBJECTIVE: Verify compliance with USGS technical and implementing procedures in the production of Milestone SPC333M4.		
5. SURVEILLANCE SCOPE: Examine scientific notebooks and other records to verify compliance with USGS procedures.		6. SURVEILLANCE TEAM: Team Leader: Kenneth T. McFall Additional Team Members: N/A
7. PREPARED BY: <i>Kenneth T. McFall</i> Kenneth T. McFall Surveillance Team Leader	8. CONCURRENCE: <i>R.W. Carl</i> Donald G. Horton Director, OQA	9/18/97 Date
		10/7/97 Date

SURVEILLANCE RESULTS

9. BASIS OF EVALUATION/DESCRIPTION OF OBSERVATIONS: See Page(s) <u>2-5</u>	
10. SURVEILLANCE CONCLUSIONS: Based on the examination of objective evidence and discussions with USGS personnel, it is determined that the USGS has adequately implemented the Quality Assurance program as it applies to the activities conducted in association with Milestone SPC333M4, "Evaluation of Paleo Ground-Water Discharge". No deficiency documents were issued as a result of this surveillance.	
11. COMPLETED BY: <i>Kenneth T. McFall</i> Surveillance Team Leader	12. APPROVED BY: <i>R.W. Carl</i> For Director, OQA
10/23/97 Date	11/6/97 Date

Block 9 (continued) BASIS OF EVALUATION/DESCRIPTION OF OBSERVATIONS

Surveillance USGS-SR-97-061 was held in Denver, Colorado from September 29 through October 3, 1997. The purpose of the surveillance was to verify compliance with procedures during the development of Milestone Memorandum Report SPC333M4 "Evaluation of Paleo Ground-Water Discharge". The Milestone is part of Work Breakdown Structure (WBS) Number 1.2.3.6.2.2.1, "Quaternary Regional Hydrology". The object of the milestone was to perform uranium-series disequilibrium dating, thermoluminescence dating, strontium-rubidium isotope dating, and carbon and oxygen isotope dating on materials deposited from hydrogenic, eolian, and biogenic materials to establish a defensible chronology for the stratigraphic framework. Additionally, stable isotope analyses (carbon and oxygen) and radiogenic isotope analyses (strontium and uranium) from hydrogenic materials were performed to establish origins of the ground waters and likely physical parameters.

The surveillance examined the solid and liquid age dating for the following Quality Assurance (QA) attributes:

1. *Confirmation of training of personnel*
2. *Procurement of suppliers of services*
3. *Proper and up-to-date procedures are in place at the locations where work took place*
4. *Measuring and Test Equipment in the various laboratories are up-to-date in their calibration*
5. *Employment of the nonconformance process for samples found to be unacceptable*
6. *Software codes used were under the QA Program*
7. *Samples were controlled adequately*
8. *Scientific notebooks were maintained correctly under the QA Program*
9. *The quality status of the milestone is identified*
10. *There is adequate documentation to allow repeatability by someone other than those that did the work*
11. *The documentation and submittal of data were carried out under the QA Program*

1. The Yucca Mountain Project (YMP) -USGS Training Completion Reports dated 10/1/97 for James B. Paces (Principal Investigator [PI]) and Shannon A. Mahan (thermoluminescence dating investigator) were examined for training in the technical and programmatic disciplines required for the performance of the activities of this milestone. Both James Paces and Shannon Mahan were found to be adequately trained to perform their duties concerning this milestone. A training matrix for these two individuals can be found in Attachment 1 to this surveillance report.
2. The personnel performing the analyses for this deliverable were USGS personnel working either permanently on the YMP or as temporary augmented staff for YMP. There were no outside laboratories or service vendors involved with the preparation of this milestone.
3. Proper and up-to-date procedures were in each laboratory examined that performed analyses for this milestone. Specifically:

Strontium/Rubidium and Uranium/Thorium laboratory contained GCP-12, R4, "Rb-Sr Isotope Geochemistry" dated 2/9/94 and GCP-03, R3-M2, "Uranium-Thorium Disequilibrium Studies" dated 6/5/97. These are the latest revisions of the documents as indicated by the USGS Master List of Controlled Documents dated 8/19/97 (the last list printed while the work was going on).

Mass Spectrometer Laboratory contained NWM-USGS-GCP-17, R. 3, "Determination of the Isotopic Ratio H/D in H₂O", dated 5/9/94, YMP-USGS-GCP-16, R. 5, "Carbonate Carbon and Oxygen Isotope Analyses, dated 7/29/97, and NWM-USGS-GCP-15, R3,

"Oxygen Isotope Analysis of Opal, Chalcedony, and Quartz", dated 5/31/94. These revisions were the latest available at the time the analyses were performed.

4. Measuring and test equipment in both laboratories examined were found to be within their required calibration intervals. Specifically:

Item:	Metler Balance	Item:	Weight set
Ident. #:	K59633	Ident. #:	30471
Last Cal:	1/30/97	Last Cal:	12/10/96
Next Cal:	1/30/98	Next Cal:	12/10/97
Procedure:	GCP-12, Rev. 4	Procedure:	GCP-12, Rev. 4
Calibrated By:	USGS (user)	Calibrated By:	Colo. State Dept. Of Agriculture

Item: Finnigan Mass Spectrometer Model #262
Ident. #: 0491
Last Cal: 5/29/97
Next Cal: 5/29/98
Procedure: GCP-12, Rev. 4
Calibrated By: Operator

Item: Finnigan Mass Spectrometer Model #252
Ident.: SC-16-252
Last Cal: 1/28/97
Next Cal.: 1/28/98
Procedure: GCP-16, Rev. 5
Calibrated By: Operator

Item: Finnigan Mass Spectrometer Model #251
Ident: SC-16
Last Cal.: 8/28/97
Next Cal.: 8/28/98
Procedure: GCP-16, Rev. 5
Calibrated By: Operator

The Finnigan mass spectrometers are checked prior to, during, and after use by the insertion of blanks or spikes of known concentration. Actual calibration to a nationally recognized standard is performed annually.

5. There were no samples found to be unacceptable due to loss, contamination, or other reasons. The nonconformance process therefore was not required to be initiated.
6. All software used in this milestone were proprietary software integral to the functioning of a particular piece of equipment such as the mass spectrometers or was over the counter administrative software such as spreadsheet development software.
7. There were no special shipping, handling, or environmental requirements associated with the samples used for this milestone, with the exception of the samples collected for the thermoluminescence analyses. These samples required the prevention of exposure to light; especially sunlight. The samples were taken by investigators and transported to their offices in Denver, Colorado. The Sample Management Facility (SMF) did not and will not have custody. Four sample description sheets that were sent the SMF for tracking were copied for comparison to the records retained at the SMF. The copies and the SMF records matched.

The SMF bar codes on the sample description sheets served as the tracking numbers and were as follows:

SPC00516824
SPC00516817
SPC00516816
SPC00502975

8. There were no scientific notebooks used in the preparation of this milestone. All work was done according to USGS approved technical procedures. The procedures used were as follows:

NWM-USGS-GCP-03, Rev. 3, "Uranium-Thorium Disequilibrium Studies"
NWM-USGS-GCP-12, Rev. 4, "Rb-Sr Isotope Geochemistry"
NWM-USGS-GP-27, Rev. 2, "Trench Wall and Natural Outcrop Sampling for Coordinated Studies"
YMP-USGS-GCP-16, Rev. 5, "Carbonate Carbon and Oxygen Isotope Analyses"
YMP-USGS-GCP-29, Rev. 1, "Thermoluminescence Dating"

9. The quality status of the Milestone can not be determined from the milestone report itself. The Technical Data Information Sheets (TDIF) must be accessed to determine the quality status of the individual data packages which were sent to the Technical Data Base (TDB) in association with this milestone. The milestone was designated as a Level 4 and therefore is considered to be under internal review at the time of the surveillance. The TDIFs are assigned a Data Tracking Number (DTN) and sent to the TDB. All TDIFs are marked "QA: yes" and are as follows:

DTN# GS970608315142.002
DTN# GS970808315213.001
DTN# GS970808315213.002
DTN# GS970808315213.003

10. With the procedures given in #8 above there is adequate instruction to allow a qualified individual to repeat the sampling and analyses without recourse to the original investigators or laboratory technicians. Everything needed to repeat the process appears to be contained in the procedures. There were no scientific notebooks used to record activities.
11. The USGS Data Coordinator represents the Technical Project Officer for the purposes of conducting the Management Review. The Data Coordinator receives the data package after completion of the Technical Review and processes it in accordance with QMP-3.04, Rev. 9, "Review and Approval of YMP USGS Data, Interpretations of Data and Manuscripts". Only the data is submitted to the TDB. The USGS takes the data in tabular form and adds data base recognizable units, parameters, and attributes. The data is then sent to the Yucca Mountain Project Office, specifically the Data Base Administrator and is electronically entered into the TDB after reformatting.

Personnel Contacted during the surveillance:

James B. Paces, USGS-YMP, Hydrologist (Principal Investigator)
Sounia K. Darnell, Pacific Western Technologies (PWT), Quality Assurance Implementation Specialist
Richard J. Moscati, USGS, Physical Science Technician
Martha H. Mustard, USGS, Hydrologist

ATTACHMENT 1

YMP-USGS TRAINING COMPLETION REPORT

TRAINING NUMBER	J. B. PACES	S. A. MAHAN
GCP-02	11/13/91	04/16/90
GCP-03	07/28/97	
GCP-07	11/13/91	
GCP-09		09/19/90
GCP-29		02/26/97
GP-27		10/25/90
QMP-3.04	10/01/97	10/01/97
QMP-3.07	11/15/93	11/08/93
QMP-4.01 Highlights	05/12/97	
QMP-6.01 Highlights		05/12/97
QMP-8.01	07/14/97	07/29/97
QMP-8.03	11/22/91	01/03/92
QMP-12.01, Highlights	05/12/97	05/12/97
YAP-15.1Q	07/11/95	07/11/95
YAP-SIII.3Q	08/20/96	08/05/96