



Department of Energy  
Washington, DC 20585

NOV 03 1997

R. W. Craig, Technical Project Officer  
for Yucca Mountain Site  
Characterization Project  
TRW Environmental Safety Systems, Inc.  
1180 Town Center Drive, M/S 423  
Las Vegas, NV 89134

ISSUANCE OF SURVEILLANCE RECORD USGS-SR-97-062 RESULTING FROM THE OFFICE  
OF QUALITY ASSURANCE (OQA) SURVEILLANCE OF U.S. GEOLOGICAL SURVEY  
(USGS)

Enclosed is the record of Surveillance USGS-SR-97-062 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 SPC332M4.

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 SPC332M4,  
"Synthesis of Quaternary Response of the Yucca Mountain Unsaturated and Saturated Zone  
Hydrology to Climate Change."

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.

*James Blaylock for*  
Donald G. Horton, Director  
Office of Quality Assurance

OQA:JB-0228

Enclosure:  
Surveillance Record USGS-SR-97-062

NH 33%  
102.7  
WM-11

9711120297 971103  
PDR WASTE  
WM-11 PDR

199075



Printed with soy ink on recycled paper



RECIPT. MISS PAHL

cc w/encl:

L. H. Barrett, DOE/HQ (RW-1) FORS  
R. A. Milner, DOE/HQ (RW-2) FORS  
T. A. Wood, DOE/HQ (RW-55) FORS  
J. O. Thoma, NRC, Washington, DC  
W. L. Belke, NRC, Las Vegas, NV  
R. R. Loux, NWPO, Carson City, NV  
S. W. Zimmerman, NWPO, Carson City, NV  
Jim Regan, Churchill County Commission, Fallon, NV  
D. A. Bechtel, Clark County, Las Vegas, NV  
Susan Dudley, Esmeralda County, Goldfield, NV  
Sandy Green, Eureka County, Eureka, NV  
Tammy Manzini, Lander County, Austin, NV  
Kim Packard, Mineral County, Hawthorne, NV  
P. A. Niedzielski-Eichner, Nye County, Chantilly, VA  
Wayne Cameron, White Pine County, Ely, NV  
B. R. Mettam, County of Inyo, Independence, CA  
Mifflin and Associates, Las Vegas, NV  
T. H. Chaney, USGS, Denver, CO  
A. M. Whiteside, OQA/USGS, Denver, CO  
D. J. Sinks, OQA/USGS, Denver, CO  
L. A. Souza, OQA/LANL, Los Alamos, NM  
J. M. Ziemba, OQA/LBNL, Berkeley, CA  
J. F. Graff, OQA/SNL, Albuquerque, NM, M/S 1325  
M. J. Clevenger, M&O/LANL, Los Alamos, NM  
D. C. Mangold, M&O/LBNL, Berkeley, CA  
R. E. Monks, M&O/LLNL, Livermore, CA  
F. J. Schelling, M&O/SNL, Albuquerque, NM, M/S 1325  
L. R. Hayes, M&O, Las Vegas, NV  
H. R. Cox, M&O, Las Vegas, NV  
R. A. Morgan, M&O, Las Vegas, NV  
R. W. Clark, DOE/OQA, Las Vegas, NV

Surveillance No. USGS-SR-97-062

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

**QUALITY ASSURANCE SURVEILLANCE RECORD**

**SURVEILLANCE DATA**

<b>1. ORGANIZATION/LOCATION:</b> United States Geological Survey (USGS), Denver, Colorado	<b>2. SUBJECT:</b> Verify compliance with USGS procedures in the production of Milestone Report SPC332M4 "Synthesis of Quaternary Response of the Yucca Mountain Unsaturated and Saturated Zone Hydrology to Climate Change".	<b>3. DATE:</b> September 29 through October 3, 1997
<b>4. SURVEILLANCE OBJECTIVE:</b> Verify compliance to USGS technical and implementing procedures in the production of Milestone SPC332M4.		
<b>5. SURVEILLANCE SCOPE:</b> Examine scientific notebooks and other records to verify compliance with YMP and USGS procedures.		<b>6. SURVEILLANCE TEAM:</b> Team Leader: Kenneth T. McFall  Additional Team Members:  N/A
<b>7. PREPARED BY:</b> <i>Kenneth T. McFall</i> Kenneth T. McFall Surveillance Team Leader	<b>8. CONCURRENCE:</b> <i>James B. Blaylock for Donald G. Horton</i> Donald G. Horton Director, OQA	9/11/97 Date
		10/7/97 Date

**SURVEILLANCE RESULTS**

<b>9. BASIS OF EVALUATION/DESCRIPTION OF OBSERVATIONS:</b>  See Page(s) <u>2 through 5</u>	
<b>10. SURVEILLANCE CONCLUSIONS:</b> 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 SPC332M4, "Synthesis of Quaternary Response of the Yucca Mountain Unsaturated and Saturated Zone Hydrology to Climate Change". There were no deficiency documents issued as a result of this surveillance.	
<b>11. COMPLETED BY:</b> <i>Kenneth T. McFall</i> Surveillance Team Leader	<b>12. APPROVED BY:</b> <i>James B. Blaylock for</i> Director, OQA
10/23/97 Date	10/31/97 Date

## Block 9 (continued) BASIS OF EVALUATION/DESCRIPTION OF RESULTS

Surveillance USGS-SR-97-062 was conducted 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 the revision to Milestone 3GCA102M, "Synthesis of Quaternary Response of the Yucca Mountain Unsaturated and Saturated Zone Hydrology to Climate Change". This new milestone becomes 1997 Milestone SPC332M4, with a Summary Account Title, "Paleoclimate/Paleoenvironmental Synthesis"; Work Breakdown Structure (WBS) Number is 1.2.3.6.2.1.5.

The objectives of this activity are to refine existing climate estimates for the last glacial period (40ka [thousand years ago] to 10ka) and to transform into climate parameters the existing relative climate estimates of maximum and minimum levels of mean precipitation, temperature, and other parameters as appropriate. The refinement of climate estimates from the last glacial period are based on both aquatic (ostracodes and diatoms) and terrestrial (woodrat middens) records. The synthesis report emphasizes those past extreme climate conditions which, should they occur again in the future, would have the most significant impact on the performance of a potential repository at Yucca Mountain. Additional data needs are identified for future completion. The data and report are organized and presented so as to be directly usable in regional and site-scale hydrologic models and by performance assessment.

This surveillance examined aquatic and terrestrial investigations for compliance with 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. *Adequate employment of the nonconformance process for samples*
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 of results 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 Richard M. Forester (Principal Investigator [PI]), John Platt Bradbury (diatom investigator), and Leonid Neymark (uranium-thorium investigator) were examined for training in the technical and programmatic disciplines required for the performance of the activities pertinent to the development of this milestone. All three investigators were found to be adequately trained to perform their duties relative to this milestone. A training matrix for these individuals can be found as Attachment 1 to this surveillance report.

2. Prior to this surveillance, there was some concern about the number of scientific analyses conducted and the status of those organizations which performed them. It was found that during the development of this milestone that all the analyses performed were done by USGS personnel working either as YMP assigned personnel or as augmented staff working to USGS procedures. There were no procurements beyond off-the-shelf and non quality affecting items/services involved in the development of this milestone.

3. The laboratory where the ostracode and diatom identification and enumeration studies were carried out has been moved and there is currently no YMP work going on. However, the new laboratory for ostracode studies was visited and the procedure NWM-USGS-HP-78, Revision 1, "Nonmarine Calcareous Microfossil Sample Preparation and Data Acquisition Procedures" was on file and available for use by laboratory personnel. The diatom studies area of the laboratory has not yet been set up.

4. On examination of the laboratory it was noted that there was no measuring and test equipment involved in the preparation of the ostracode samples. The equipment used was reference equipment such as a Tyler sieve set and a balance and performed no quality function. The sieves were for size sorting and the scale was used to get approximate weights, neither of which had any bearing on the studies being performed.

5. There were no samples which were deemed to be unacceptable due to contamination, loss, or any other reason. The nonconformance process therefore was not required to be initiated.

6. There were no software or codes used in this milestone other than administrative (spread sheet) software. There was no statistical or manipulative software used.

7. There were no special shipping, handling, or environmental requirements associated with the samples used for the development of this milestone. Four Sample Collection Reports for ostracode sample collection that were sent to the Sample Management Facility (SMF) for tracking were copied for comparison with the records retained by the SMF. The copies and the SMF records matched. The SMF bar code assigned to the PI which served as tracking numbers were as follows:

SPC00009008  
SPC00009010  
SPC00009140  
SPC00009144

8. There were no scientific notebooks used in the preparation of this milestone. All work was done in accordance with USGS approved technical procedures. The procedures used for the activities reviewed during this surveillance were as follows:

NWM-USGS-HP-76, Rev.1, "Diatom Enumeration Studies"  
NWM-USGS-HP-78, Rev.1, "Nonmarine Calcareous Microfossil Sample Preparation and Data Acquisition Procedures"

Other procedures were used in the collection of samples and additional analyses (Carbon 14 analyses) but those procedures and their associated activities were not the subjects of this surveillance.

9. The quality status of this milestone is clearly identified in the preface of the milestone report. The milestone contains both qualified and unqualified data and the quality status of the report is therefore classified by the authors as "non-Q". Each data source, whether acquired or developed, is clearly identified in Table B, "Source Data" and is identified by author, title, YMP product, and quality status.

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 Technical Data Base (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:**

**Richard M. Forester, USGS, Research Geologist (PI)**  
**Marc G. Paquette, Pacific Western Technologies (PWT), Physical Sciences Technician**  
**Kelly Conrad, USGS, Physical Science Technician**  
**Sounia K. Darnell, PWT, Quality Assurance Implementation Specialist**  
**Martha H. Mustard, USGS, Hydrologist**  
**Thomas H. Chaney, USGS, Hydrologist**

**YMP-USGS TRAINING COMPLETION REPORT**

**ATTACHMENT 1**

<b>Training Number</b>	<b>J. P. Bradbury</b>	<b>R. M. Forester</b>	<b>L. Neymark</b>
GCP-02			10/04/93
GCP-03			07/30/97
GCP-09			10/05/93
GCP-12			02/09/94
GCP-13			04/28/97
GP-27	05/03/95	07/03/91	
HP-37	01/31/97	01/31/97	
HP-76	01/31/97	01/31/97	
HP-78	05/08/95	04/16/90	
QMP-3.04 Highlights	03/29/97		
QMP-3.04		10/01/97	10/01/97
QMP-3.07	04/04/96	05/04/96	06/17/96
QMP-6.01 Highlights	05/12/97		
QMP-6.01		05/12/97	
QMP-7.01	05/24/95	05/14/93	
QMP-8.01	05/08/95	04/28/94	07/14/97
QMP-8.03	04/26/90	11/27/91	
QMP-12.01 Highlights	5/12/97	05/12/97	05/12/97
QMP-17.01			09/19/96
QMP-17.01 Highlights			09/19/96
YAP-15.1Q	06/11/96	06/11/96	06/11/96
YAP-SIII.1Q	05/14/95	03/11/94	
YAP-SIII.3Q Highlights	06/19/96	08/01/96	08/13/96