



Department of Energy  
Washington, DC 20585

QA: L

MAR 19 1997

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for Yucca Mountain Site  
Characterization Project  
U.S. Geological Survey  
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ISSUANCE OF SURVEILLANCE RECORD YM-SR-97-011 RESULTING  
FROM THE OFFICE OF QUALITY ASSURANCE (OQA) SURVEILLANCE  
OF THE U.S. GEOLOGICAL SURVEY (USGS)

Enclosed is the record of Surveillance YM-SR-97-011 conducted by the OQA at the USGS  
facilities at the Yucca Mountain Site, Nevada.

The purpose of the surveillance was verification of compliance to selected requirements from the  
YMP-USGS-HP-229, R3-M3, "Determination of Water Content and Physical Properties for  
Laboratory Rock Samples;" YMP-USGS-QMP-12.01, R7, "Control of Measuring and Test  
Equipment;" and YAP-SII.1Q, R1, "Submittal, Review, and Approval of Requests for Yucca  
Mountain Site Characterization Geologic Specimens."

One Performance Report (PR) was issued as a result of this surveillance. A response to the PR is  
due by the date indicated in Block 12 of the PR. 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  
Richard L. Weeks at (702) 794-1431.

Donald G. Horton, Director  
Office of Quality Assurance

OQA:JB-1192

Enclosure:  
Surveillance Record YM-SR-97-011

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R. W. Craig

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

Surveillance No. YM-SR-97-011**QUALITY ASSURANCE SURVEILLANCE RECORD****SURVEILLANCE DATA**

1. ORGANIZATION/LOCATION: United States Geological Survey (USGS)	2. SUBJECT: Matrix Properties Studies	3. DATE: February 3 - 18, 1997
4. SURVEILLANCE OBJECTIVE: Verify compliance to procedures that control matrix properties studies.		
5. SURVEILLANCE SCOPE:  The purpose of this surveillance was to verify effective implementation by USGS personnel of selected requirements described in Yucca Mountain Project (YMP)-USGS- Hydrologic Procedure (HP)-229, Revision 3-Modification 3, "Determination of Water Content and Physical Properties for Laboratory Rock Samples"; YMP-USGS-Quality Management Procedure (QMP) 12.01, Revision 7, Control of Measuring and Test Equipment (M&TE) and Yucca Mountain Project Administrative Procedure (YAP)-SII.1Q, Revision 1, Submittal, Review, and Approval of Requests for Yucca Mountain Site Characterization Project Geologic Specimens.		6. SURVEILLANCE TEAM: Team Leader: Richard L. Weeks  Additional Team Members:  N/A
7. PREPARED BY:  <i>Richard L. Weeks</i> Richard L. Weeks      2/3/97 Surveillance Team Leader      Date	8. CONCURRENCE:  N/A QA Division Director      Date	

**SURVEILLANCE RESULTS**

9. BASIS OF EVALUATION/DESCRIPTION OF OBSERVATIONS:  The purpose of this surveillance was to verify compliance to procedural controls for selected activities related to matrix properties studies. These studies are covered under Work Breakdown Structure (WBS) 1.2.3.3.1.2.3, Matrix Properties and further described in Study Plan 8.3.1.2.2.3, Revision 0, Section 3.1, Characterization of the Yucca Mountain Unsaturated-Zone Percolation. These studies are being conducted as part of an investigative program to characterize fluid flow in the unsaturated zone at Yucca Mountain, Nevada.  See Page(s) <u>2-7</u>	
10. SURVEILLANCE CONCLUSIONS:  Based on interviews with USGS personnel and examination of documentation it is concluded that except as noted in Performance Report Number (PR) YM-97-P-005, USGS is complying with procedural requirements and effectively implementing the Quality Assurance (QA) program for those activities evaluated. The PR is being issued to address incomplete calibration records. Examined calibration records provided by calibration vendors did not include the date of recalibration or indicate the recalibration interval as required by the Quality Assurance Requirements and Description Document (QARD). Additionally, one calibration record supplied by a vendor did not include a statement of acceptability by the responsible Principal Investigator (PI) reviewing the calibration documentation. The conditions are considered isolated, since other examined calibration documentation included required information. USGS personnel were very cooperative during all aspects of the surveillance.  See Page <u>8</u>	
11. COMPLETED BY:  <i>Richard L. Weeks</i> Richard L. Weeks      3/14/97 Surveillance Team Leader      Date	12. APPROVED BY:  <i>[Signature]</i> QA Division Director      3/18/97 Date

**Block 9 (continued) BASIS FOR EVALUATION/DESCRIPTION OF OBSERVATIONS:**

Following are specific activities that were verified for compliance during this surveillance. Italicized text states the requirement evaluated and standard text states the results of the evaluation and lists the documents examined.

**YMP-USGS-HP-229, Determination of Water Content and Physical Properties for Laboratory Rock Samples**

Section 4.2.2, 5)

*The temperature and humidity selected shall be recorded in a lab notebook, and shall be within the range limits of the ovens and temperature/humidity sensors. Sensors are for indication only and will be observed routinely and noted in the lab notebook to ensure correct operation of the oven.*

The temperature and humidity data is recorded in a laboratory notebook that is maintained by the PI. Since this data is for indication only, it is not submitted as a quality record; however, examination of the laboratory notebook indicated it is kept up-to-date. The temperature/humidity range capabilities of the Rotronics hygrometer meets those specified by the PI which is 60 degrees centigrade and 65 percent relative humidity. An examination of the Rotronics Instrument Corporation manual for the "HT205 Humidity-Temperature Transmitter Instruction Manual Specification", stated that the range for this instrument is: relative humidity= 0-100 percent and temperature= 0-100 degrees centigrade (C).

Section 4.3

*Weight measurements using analytical balances will be recorded to the nearest 0.01 grams.*

This data is recorded on a spreadsheet using Lotus 1-2-3 software. Computer file GTB-1A.WK4 was examined for samples obtained from borehole Exploratory Studies Facility (ESF)-Northern Access Drift (NAD)-Geothermal Test Borehole (GTB) #1A. Weight measurements were recorded to the nearest 0.01 grams.

### Section 5.1.1

*Balances are to be calibrated every 6 months to an accuracy of 0.02% full-range, the muffle furnace and ovens are to be calibrated every 18 months.*

A Sartorius balance, ID Number-10516, was examined. The calibration stickers attached to the balance indicated that calibration was current and completed within the past six months.

A Hotpack Environmental Chamber, Series 175, Model 417522, Serial No. 74577 was examined. The temperature and relative humidity of the oven are monitored by Rotronic Hygrometer (temperature/humidity sensor), Series 1 200 which assures that the environment within the oven is within prescribed tolerances. Three Calibration Maintenance Reports for Hygrometer, Serial No. 28252 were examined for the time periods beginning April 1994 through September 1997. The reports are designated by Test Numbers 002692, 018147 and 32216.

### Section 6.1

*Sample Identification: As part of the data records and documentation and in compliance with YMP-USGS-QMP-8.01, all samples shall be identified as follows: samples will be identified by borehole number, transect number or other field site designation, followed by a depth or location designation.*

This data is recorded on a spreadsheet using Lotus 1,2,3 software. File GTB-1A.WK4 was examined for samples obtained from borehole ESF-NAD-GTB#1A. Samples are identified by borehole number, Sample Management Facility (SMF) Number, and depth to top of sample.

### Section 6.2

*...A core tracking sheet will be developed for each sample removed to a location other than the SMF.*

All core samples are retained at the Hydrologic Research Facility (HRF) or returned to the SMF and therefore core tracking sheets were not developed.

YMP-USGS-QMP-12.01, Revision 7, Control of M&TE

Section 5.1.3

*Specific calibration procedures for individual equipment shall be established, as applicable, as a separate and complete technical procedure or included as a part of a technical procedure or scientific notebook of a wider scope.*

USGS technical procedures Nuclear Waste Management (NWM)-USGS-HP-255, Revision 0-M1, "Determination of Water Potential Using the Decagon CX-2 Water Activity System" describes the method for calibration of the chilled-mirror humidity sensor and the operational check for the CX-2 temperature sensor.

Section 5.1.4

*YMP-USGS personnel performing calibration shall have calibration procedures readily accessible at the site when the subject calibrations are conducted.*

It was verified that controlled copies of the procedures listed below were found to be up-to-date and readily accessible at the HRF. YMP-USGS-HP-266 is not currently in use however, a controlled copy is accessible for use which is anticipated in the near future.

YMP-USGS-QMP-12.01, Revision 7, Control of M&TE  
YMP-USGS-HP-229, Revision, M3, Determination of Water Content and Physical Properties for Laboratory Rock Samples  
NWM-USGS-HP-255, Revision 0-M1, Determination of Water Potential Using the Decagon CX-2 Water Activity System  
YMP-USGS-HP-266, Revision 0-M1, Method for Measuring Saturated Hydraulic Conductivity and Air Permeability on Rock Samples Using a Low-Pressure Hassler Permeameter

Section 5.1.12

*The PI shall review the results of calibration and include a statement of acceptability of results with the calibration documentation.*

Calibration documentation from three calibration vendors was examined and, except for the deficient condition identified in PR-YM-97-P-005, was found to be satisfactory and in compliance with the above requirement. The condition is considered isolated since other examined calibration documentation included the required statement of acceptability.

### Section 5.2.2

*When calibrations are to be performed by other than YMP-USGS or contractor personnel, the vendor or organization must be identified in the Approved Suppliers List. Documentation of calibrations shall contain the following:*

1. *Identification of the organization or vendor.*
2. *Identification of equipment being calibrated (such as manufacturer, type, model, serial number, or other unique number).*
3. *Identification of calibration standard (such as manufacturer, type, model, serial number, or other unique identifier) and standard's range and accuracy, and NIST traceability or similar information when using other recognized standards, and calibration procedure or method used. Alternatively, it is acceptable for calibration documentation to provide a reference to documentation containing the standard's identity, range, accuracy, and traceability, and the procedure or method used.*
4. *Date of calibration.*
5. *Records of actual calibration data values, when applicable, both before and after any adjustments, enabling the determination of whether the equipment was, and is, within required tolerance or accuracy. If adjustments are not performed, a second set of data is not required.*
6. *Identification of person performing calibration.*

The following vendors, which provide calibration services for the instruments examined, are listed on the current Qualified Suppliers List: Bechtel Nevada/REECO, Campbell Scientific, Inc., G. B. Tech (National Aeronautics and Space Administration (NASA), John C. Stennis Space Center).

Calibration documentation provided by the calibration vendors listed above was examined and, except for the deficient condition identified in PR-YM-97-P-005 was found to be satisfactory and in compliance with requirements that were verified. The calibration documentation that was examined is listed below.

<u>Report Title</u>	<u>Serial No</u>	<u>Date of Calibration</u>
Calibration Maintenance Report	28252	1/15/94
“	”	4/1/94
“	”	6/12/95
“	”	9/12/96
Campbell Scientific Inc.	1526	3/14/96
REECO Physical Standards and Calibration Facility Calibration Report	6776	8/15/95

Section 5.3.1

*All equipment shall be uniquely identified consisting of model No., serial No., or other unique description.*

The following equipment was examined and determined to be uniquely identified.

<u>Instrument</u>	<u>Serial/ID Number</u>
Sartorius scale	PTLY10516
Rotronic hygrometer	28251
Rotronic hygrometer	28252
Datalogger	1526
Carl Mayer drying oven	PTLY10687
Psychrometer	CX2#2
Thermocouple	PTLY10079

Section 5.3.2

*A calibration status sticker (see facsimiles, Attachment 1) shall be affixed to all calibrated equipment used for quality-affecting activities to show the calibration status unless an alternative method is implemented in accordance with Para. 5.3.3.*



The instruments listed below were examined to verify compliance to the stated requirements. Each examined instrument was properly stickered and stickers included appropriate information.

<u>Instrument</u>	<u>Serial/ID Number</u>
Sartorius scale	PTLY10516
Rotronic hygrometer	28251
Rotronic hygrometer	28252
Datalogger	1526
Carl Mayer drying oven	PTLY10687
Psychrometer	CX2#2
Thermocouple	PTLY10079

**YAP-SII.1Q, Revision 1, Submittal, Review, and Approval of Requests for Yucca Mountain Site Characterization Project Geologic Specimens**

Section 5.1, e)

*if special handling is required for packaging/preservation of samples at the drill site, submits a Field Packaging Approval (Exhibit YAP-SII.1Q.3) for [Sample Overview Committee] SOC approval;*

A completed Field Packaging Approval form, was examined for samples collected at borehole ESF-NAD-GTB #1. The form was complete and SOC approval indicated as September 3, 1996.

The following personnel were contacted during the surveillance:

David Hudson, USGS, PI  
Mary P. O'Neill, USGS, Clerk  
Thomas H. Chaney, USGS, QA Manager  
Wayne Rodman, USGS, QA Specialist

Block 10.      Surveillance Conclusions: (continued)

Based on the results of the surveillance, the following recommendation is provided. Calibration records received for calibration work by NASA, John C. Stennis Space Center should be annotated by USGS personnel to indicate that G.B. Tech, Inc. completed the equipment calibrations. Based on discussions with USGS personnel it is understood that it is the policy of NASA not to include a reference to G.B. Tech, Inc. on calibration records. Annotating calibration records would simplify traceability to the agent that actually performs the calibration services for NASA. G.B. Tech, Inc. is listed on the current QSL as an approved provider of calibration services.