

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

YUCCA MOUNTAIN QUALITY ASSURANCE DIVISION

QUALITY ASSURANCE SURVEILLANCE REPORT

OF

LOS ALAMOS NATIONAL LABORATORY AND

UNITED STATES GEOLOGICAL SURVEY

SURVEILLANCE YMP-SR-93-043

CONDUCTED AT THE YUCCA MOUNTAIN SITE, NEVADA,
LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NEW MEXICO
AND UNITED STATES GEOLOGICAL SURVEY, DENVER, COLORADO

SEPTEMBER 30 THROUGH OCTOBER 26, 1993

ACTIVITIES SURVEILLED:

CONTROL OF THE EXPLORATORY SHAFT FACILITIES BULK ROCK SAMPLES
AND CORE FROM THE SURFACE BASED TESTING PROGRAM

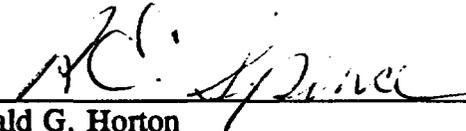
Prepared by:



Date: 11-3-93

John S. Martin
Surveillance Team Leader
Yucca Mountain Quality Assurance Division

Approved by:



Date: 11/5/93

Donald G. Horton
Director
Office of Quality Assurance

1.0 EXECUTIVE SUMMARY

This surveillance of the United States Geological Survey (USGS) and Los Alamos National Laboratory's (Los Alamos) control of samples was conducted at the Yucca Mountain Site, USGS in Denver, Colorado; and at Los Alamos in Los Alamos, New Mexico on September 30 through October 26, 1993. During the surveillance, effectiveness of implementation of the USGS and Los Alamos Quality Assurance (QA) Program relative to sample control was assessed. Although one Corrective Action Request (CAR), YM-94-004, was issued to identify a procedural noncompliance, overall measures implemented to date for the control of samples were found to be effective. This surveillance also evaluated the controls established for handling Radial Borehole core from the Exploratory Studies Facility (ESF). As a result of this evaluation, it was determined that procedural controls have not yet been revised to eliminate the need for centralized control of the Sample Management Facility (SMF) and the Sample Overview Committee (SOC). A description of CAR YM-94-004 is included in Paragraph 5.1 of this report and an information copy of the CAR is attached.

2.0 PURPOSE AND SCOPE

Core and bulk rock samples are the primary source of much information obtained from studies and laboratory testing to date. The information ultimately derived from core and bulk rock sampling will not be defensible in support of a license application if the record of the core and bulk rock samples from source to destination is not available and complete.

Recent decisions by the United States Department of Energy (DOE) have resulted in a new methodology for the handling of core which will be extracted from the ESF via Radial Borehole Drilling. This methodology involves circumventing the SOC for the allocation of core and provides for the direct transfer of core to participants. Surveillance YMP-SR-93-043 was conducted to assess the USGS and LANL's ability to control samples from the ESF without the utilization of a centralized core processing facility (i.e. SMF and SOC) and to assess programmatic implementation of the system now in place.

3.0 SURVEILLANCE TEAM

John S. Martin, Surveillance Team Leader, Yucca Mountain Quality Assurance Division (YMQAD)/Quality Assurance Technical Support Services (QATSS)

John R. Doyle, Surveillance Team Member, YMQAD/QATSS

4.0 PERSONNEL CONTACTED DURING THE SURVEILLANCE

Steve Beason, Principal Investigator, United States Bureau of Reclamation (USBR)
Murray Beasley, Lab Assistant, USGS
Steve Bolivar, Quality Assurance Manager, Los Alamos
Andrew Burningham, Quality Assurance Liaison, Los Alamos Technical Associates
(LATA)
Steve Chipera, Associate Investigator-Mineralogy Analyst, Los Alamos
Uel Clanton, Branch Chief Site Investigations (Retired), DOE
John Day, Quality Assurance Manager, LATA
Alan Flint, Principal Investigator, USGS
Chris Lewis, Curator SMF, Science Applications International Corporation (SAIC)
Roy Long, Engineer Site Investigation Branch, DOE
Candace Lugo, SMF and Drilling Support Department Manager, SAIC
Shanon Mahan, Lab Assistant, USGS
Dave Merritt, SMF Geologist, SAIC
Allen Mitchell, Technical Specialist for Surface Based and ESF Testing, Los Alamos
Martha Mustard, Hydrologist, USGS
Ron Oliver, Equipment and Field Test Coordinator, Los Alamos
Marilyn Pabst, Quality Assurance Implementation Specialist, USGS
Zel Peterman, Principal Investigator, USGS
Patricia Reilly, Quality Assurance Implementation Specialist, USGS
Wayne Rodman, Quality Assurance Specialist, USGS
Kevin Scoffield, Lab Assistant, USGS
Nick Stellavato, Nye County On Site Geo-Technical Representative, Nye County
Dave Vaniman, Principal Investigator, Los Alamos
Tracy Mendez-Vigo, Quality Assurance Implementation Specialist, USGS
Lyle Wichman, Quality Assurance Liaison, LATA
Joseph Whelan, Principal Investigator, USGS
Dennis Williams, Branch Chief Site Investigations, Yucca Mountain Site
Characterization Project Office (YMPO)
Al Yang, Principal Investigator, USGS

5.0 SURVEILLANCE RESULTS

The surveillance consisted of visual observation of USGS and Los Alamos control of bulk rock samples/specimens from the ESF and core samples/specimens taken from surface based drilling, personnel interviews and review of applicable documentation. Attachment 1 details the objective evidence observed and documents reviewed and utilized during the course of this surveillance.

Documentation reviews consisted of a review of procedures, Test Planning Packages (TPPs), Job Packages (JPs), standards and letters to extract sample/specimen control criteria and needs, and to assure adequate sample/specimen controls are in place.

As a result of this review, standard criteria and marked-up procedures tailored to USGS and Los Alamos were utilized. The standard criteria and marked up procedures, in general, included: chain of custody from collection to use; traceability to parent sample or collection point; storage, shipping and handling requirements; internal handling by the participant and controls for inter-participant samples/specimens transfer. Compliance and effectiveness were evaluated of USGS and Los Alamos based on these requirements. As a result, one deficiency was found and CAR YM-93-004 issued to document a procedural violation in maintaining core temperatures for transportation and storage.

Personnel interviews were conducted of both USGS and Los Alamos personnel to determine their cognizance of program requirements. The results of these interviews provided positive evidence of their overall knowledge and understanding of program controls for samples/specimens.

Based upon the results of this surveillance it was determined that, overall, USGS and Los Alamos have effectively implemented sample control activities in accordance with their procedures and those established by YMPO.

This surveillance also evaluated whether adequate controls are in place to satisfactorily control core samples obtained via Radial Borehole drilling in the ESF without utilizing the SMF or the SOC. As a result of this evaluation, it was determined that procedural controls have not yet been revised to eliminate the need for centralized control of the SMF and the SOC.

5.1 CAR YM-93-004

USGS technical procedure NWM-USGS-HP-131 reviewed during the surveillance, requires core to be to be shipped and stored within specific temperature parameters and that a log be kept as a record of storage facility temperatures. Contrary to these requirements, USGS has not developed a methodology for assuring that temperature parameters are maintained when core is shipped via commercial carrier; the storage facilities lack calibrated instrumentation to assure temperature requirements are met and a log has not been maintained of storage temperatures.

6.0 RECOMMENDATIONS

- 1) As noted within Section 2.0 of this report, DOE is planning to transfer Radial Borehole core from the starter tunnel alcove directly to Los Alamos without the use of the SMF or the SOC. The SMF and SOC as they now exist, were chartered by DOE to assure that the control and traceability of project core and specimens were maintained and could be defended during a licensing process. This charter was established as a result of the Yucca Mountain Site Characterization Project (YMP) lacking control and traceability of core in the past and concerns by the United States Nuclear Regulatory Commission. In addition, in discussions with Uel Clanton, it was stated that all core, including subsurface, would be processed by the SMF and SOC.

During discussions with individuals responsible for sample planning within the ESF, it was stated that USGS is the primary recipient of the Radial Borehole core for the "Characterization Of The Yucca Mountain Unsaturated Zone In The Exploratory Studies Facility," Study Plan 8.3.1.2.2.4. It was also stated that if other YMP entities wanted any of this core, that it would be unavailable and that new boreholes would have to be drilled. It seems improbable that USGS would consume all the Radial Borehole core for this one study and that sections of the core would be left over and available for other studies.

In review of documentation for the ESF, it was found that over 10,000 feet of core will be taken via underground borehole drilling. This amount is equivalent to the qualified core taken from the surface based program to date. Core samples are the same whether taken from the surface or underground, and it is not recommended to have two systems to monitor core. Control of core should remain centralized to prevent recurrence of past mistakes.

It is recommended that DOE reconsider taking the SMF and SOC out of the control loop.

- 2) Quality Assurance Requirements and Description DOE/RW-0333P, Supplement II, Paragraph 2.5, states: "Implementing documents shall specify the representative samples to be archived if the need to archive samples is identified."

In review of documents in preparation for and during the surveillance, no documented policy or requirement for the archiving of samples could be located. Based upon this review, it is recommended that YMPO evaluate the need for archiving of representative samples and revise existing implementing documents as necessary.

- 3) **Samples/specimens are initially identified in the field or SMF and given a unique identifier (bar code). Once a sample/specimen is controlled under a participant's program, it has become standard practice to provide the sample/specimen with a new identifier which is cross referenced to the original. In addition, if the sample/specimen is transferred from one participant to another, as was noted during the surveillance, it is again given a new identifier. While it was found that samples/specimens were traceable to the original identifier, it is felt that there is a potential for confusion and or error when dealing with multiple identifiers. As such, it is recommended that YMPO consider developing a system where the original identifier would be maintained through out the sample/specimens life cycle.**

- 4) **USGS is retaining remnant core samples that have been consumed during testing which appear to have no intrinsic value to YMP. These samples appear to take up essential space in a controlled laboratory area.**

Presently there is no mechanism in place to either dispose of these samples or return them to the SMF. It is recommended that relevant Administrative Procedures (APs) for sample control be revised to include the disposition of samples subsequent to testing.

- 5) **Samples/specimens that are collected under the control of AP-6.26Q, utilize a Sample Collection Report (SCR), a QA record, to document collection. In review of the SCR, it was noted that the form does not contain an area or require the collector's signature. It is recommended that YMPO consider revising this form to include the collector's signature during the next revision to AP-6.26Q.**

7.0 ATTACHMENTS

- Attachment 1: List of objective evidence examined during the course of the surveillance**
- Attachment 2: Information Copy of CAR YM-94-004**

ATTACHMENT 1

Procedures Utilized During The Course of The Surveillance:

YMPO Procedures:

AP-6.4, Revision 2, "Procedure For The Submittal, Review, and Approval Of Requests For Geologic Specimens"

AP-6.26Q, Revision 1, "Submission And Documentation Of Core And Non-Core And Non-Cuttings Samples To The Sample Management Facility For Site Characterization"

Los Alamos Procedures:

LANL-YMP-QP-08.1, Revision 2, "Identification And Control Of Samples"

LANL-ESS-DP-101, Revision 2, "Sample Collection, Identification And Control for Mineralogy-Petrology Studies"

USGS Procedures:

YMP-USGS-QMP-8.01, Revision 3, "Identification And Control Of Samples"

NWM-USGS-HP-131, Revision 2, "Methods For Handling And Transporting Unsaturated Core And Rubble Samples For Hydrochemical Analysis"

NWM-USGS-HP-229, Revision 3, "Determination of Water Content and Physical Properties For Laboratory Rock Samples"

NWM-USGS-HP-249, Revision 0, "Method For Pore-Water Extraction Using High-Pressure One-Dimensional Compression"

NWM-USGS-GCP-02, Revision 2, "Labeling, Identification And Control Of Samples For Geochemistry And Isotope Geology"

Other documentation utilized during the course of the surveillance:

TPP 92-014, Revision 1, "Consolidated Sampling in the Exploratory Studies Facility"

JP 92-20C, "Consolidated Sampling in the Starter Tunnel Extension and Alcove No. 1"

JP-92-20E, "Hydrochemistry Tests In The ESF North Ramp Starter Tunnel Alcove No. 1"

Study Plan 8.3.1.2.2.4, "Characterization Of The Yucca Mountain Unsaturated Zone In The ESF"

American Society of Testing and Materials (ASTM) Designation D 5079-90, "Standard Practice For Preserving And Transporting Core Samples"

Letter: John Trapp to Malcolm Knapp, dated October 3, 1985, Subject: Trip Report to Yucca Mountain (memorandum detailing list of questions regarding the handling of core)

Letter: Linehan to Vieth, dated November 16, 1985, U.S. Nuclear Regulatory Commission recommendations for core handling and documentation

Objective Evidence examined during the course of the surveillance:

Samples at Sample Management Facility Area 25 Yucca Mountain Site

Bulk rock samples collected by USBR for Los Alamos in accordance with TPP 92-14 and retained by the SMF. Examined samples and collection documentation (SCRs from AP-6.26Q) and USBR Field Notebook for the following samples:

COLLECTOR	FOR	SMF ID #
J. Bowen	D. Vaniman	00009477
J. Mcgirt	B. Carlos	00100497
J. Mcgirt	B. Carlos	00100495
S. Beason	D. Vaniman	00008149
S. Beason	SOC	00008147
L. Rood	SOC	00008148
J. Bowen	S. Levy	00009478
J. Bowen	D. Vaniman	00009474
J. Bowen	S. Levy	00009475
J. Bowen	S. Beason	00009476

Samples controlled by LANL

ESF samples stored at Los Alamos Sample Storage Room and X-Ray Diffraction Laboratory. Examined samples, SCRs (AP-6.26Q), Los Alamos Sample Log Book and data base for the following samples:

LANL # 1070	BULK SAMPLE	SMF # 0008120
LANL # 1071	BULK SAMPLE	SMF # 0008121
LANL # 1072	BULK SAMPLE	SMF # 0008122

Core samples at Los Alamos Sample Storage Room. Examined samples, Specimen Removal Requests (AP-6.4Q) and Los Alamos Sample Log book for:

LANL # 1039 BOREHOLE UE-25 UZ-16 INTERVAL 30.3 TO 31.0 SMF #
0021972

LANL # 1040 BOREHOLE UE-25 UZ-16 INTERVAL 31.0 TO 31.7 SMF #
0021973

LANL # 1041 BOREHOLE UE-25 UZ-16 INTERVAL 39.4 TO 39.8 SMF #
0021974

Examined Sample Log Book TWS-ESS-1-9-91-14 for samples of core sent from D. Vanimin of Los Alamos to J. Whelan of USGS and associated Specimen Removal Requests (AP-6.4) for the following:

LANL # 1005 BOREHOLE UE-25 UZ-16 INTERVAL 99.3 TO 99.4 SMF #
21185, USGS # HD 1022

LANL # 1006 BOREHOLE UE-25 UZ-16 INTERVAL 105.1 TO 105.2 SMF #
21186, USGS # HD 1023

LANL # 1007 BOREHOLE UE-25 UZ-16 INTERVAL 449.5 TO 450.0 SMF #
21213, USGS # HD 1046

LANL # 1008 BOREHOLE UE-25 UZ-16 INTERVAL 492.8 TO 493.1 SMF #
21214, USGS # HD 1048

LANL # 1009 BOREHOLE UE-25 UZ-16 INTERVAL 539.2 TO 539.8 SMF #
21210, USGS # HD 1051

Samples Controlled by USGS

USGS samples and Log Book examined at Hydrologic Research Facility (HRF), Area 25 of the Yucca Mountain Site. Samples and associated Log Book entries examined are for:

BOREHOLE UE-25 UZ-16

HRF ID # 316.9S SMF # 020713
HRF ID # 379.5S SMF # 020816
HRF ID # 388.1S SMF # 020818
HRF ID # 390.7S SMF # 020819

HRF ID # 1638.1 SMF # 024157
HRF ID # 1642.2 SMF # 024158
HRF ID # 1644.6 SMF # 024159
HRF ID # 1647.2 SMF # 024160
HRF ID # 1650.6 SMF # 024161
HRF ID # 1653.6 SMF # 024162
HRF ID # 1656.0 SMF # 024163
HRF ID # 1663.3 SMF # 024164
HRF ID # 1668.9 SMF # 024165
HRF ID # 1671.8 SMF # 024166
HRF ID # 1674.8 SMF # 024167
HRF ID # 1676.9 SMF # 024168
HRF ID # 1681.0 SMF # 024169
HRF ID # 1684.0 SMF # 024170

Borehole USW UZ-14 samples in cold storage at USBR Building 56 at Denver Federal Center waiting to be processed. Examined samples and tracking documentation (Scientific Notebook) for:

USGS # 429.7 - 430.2 SMF # 0024973
USGS # 430.2 - 430.7 SMF # 0024974
USGS # 430.7 - 431.3 SMF # 0024975
USGS # 444.4 - 445.0 SMF # 0025011
USGS # 436.7 - 437.2 SMF # 0024982

Borehole UE-25 UZ-16 samples, in cold storage at Building 56 Hydrochem Laboratory which had been tested. Examined samples and documentation (Scientific Notebook) for:

USGS # 1434.38 - 1434.62 SMF # 0023145
USGS # 1317.86 - 1318.24 SMF # 0022335
USGS # 1397.7 - 1398.03 SMF # 0023010
USGS # 1428.1 - 1428.42 SMF # 0023142

Samples transmitted from D. Vanimin of Los Alamos to J. Whelan of USGS retained in J. Whelan's office. Examined samples and tracking documentation (Log Book) for:

USGS # HD 1022 BOREHOLE UE-25 UZ-16 INTERVAL 99.3 TO 99.4 SMF # 21185, LANL # 1005

USGS # HD 1023 BOREHOLE UE-25 UZ-16 INTERVAL 105.1 TO 105.2 SMF # 21186, LANL # 1006

USGS # HD 1046 BOREHOLE UE-25 UZ-16 INTERVAL 449.5 TO 450.0 SMF #
21213, LANL # 1007

USGS # HD 1048 BOREHOLE UE-25 UZ-16 INTERVAL 492.8 TO 493.1 SMF #
21214, LANL # 1008

USGS # HD 1051 BOREHOLE UE-25 UZ-16 INTERVAL 539.2 TO 539.8 SMF #
21210, LANL # 1009

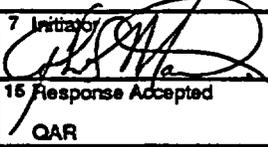
Bulk samples collected by USGS. Examined samples and associated tracking
documentation (Hydrogenic Deposits Project Sample Description Sheets form NWM-
USGS-GP-27, Revision 2) for the following:

USGS # HD 1014 SMF # 0005585
USGS # HD 1478 SMF # 0055002
USGS # HD 1111 SMF # 0005472
USGS # HD 1105 SMF # 0005466

ATTACHMENT 2

Information Copy
of
Corrective Action Request

ORIGINAL
 THIS IS A RED STAMP

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT U.S. DEPARTMENT OF ENERGY WASHINGTON, D.C.		CAR NO.: <u>YM-94-004</u> DATE: <u>10/15/93</u> SHEET: <u>1</u> OF <u>2</u> GA
CORRECTIVE ACTION REQUEST		
1 Controlling Document NNM-USGS-HP-131, R2		2 Related Report No. YMP-SR-93-046
3 Responsible Organization USGS		4 Discussed With Martha Mustard
5 Requirement: USGS procedure NNM-USGS-HP-131, R2, "Methods for Handling and Transporting Unsaturated Core and Rubble Samples for Hydrochemical Analysis" para 4.2.4 states in part that during transportation: "The core and rubble shall be kept at a temperature no less than 8°C and no greater than 24°C." In addition, para 4.2.6 states in part that once the core or rubble is delivered to the USGS: "The temperature inside the storage room shall be held between 8°C and 10°C." Para 4.2.6 also states that: "A list of temperatures shall be kept in a logbook at the storage facility."		
6 Adverse Condition: Contrary to the above requirements, no methodology has been developed by the USGS to verify that core and rubble samples shipped by commercial carrier do not extend beyond the acceptable ranges of 8°C and 24°C. <i>10-17-93</i> In addition, during the examination of three storage coolers at the USGS facilities, it was found that neither a calibrated device was used to indicate storage temperature nor was a logbook kept of storage temperatures.		
9 Does a significant condition adverse to quality exist? Yes ___ No <u>X</u> If Yes, Circle One: A B C		10 Does a stop work condition exist? Yes ___ No <u>X</u> ; If Yes - Attach copy of SWO If Yes, Circle One: A B C D
11 Response Due Date: 20 Working Days from Issuance		
12 Required Actions: <input checked="" type="checkbox"/> Remedial <input checked="" type="checkbox"/> Extent of Deficiency <input checked="" type="checkbox"/> Preclude Recurrence <input type="checkbox"/> Root Cause Determination		
13 Recommended Actions: 1. Determine the remedial action necessary to correct the above deficiencies. 2. Determine the extent and report the results of like deficiencies. 3. Provide a methodology to preclude recurrence.		
7 Initiator  Date <u>10/17/93</u>		14 Issuance Approved by:  QADD <u>10/28/93</u> Date
15 Response Accepted QAR _____ Date _____		16 Response Accepted QADD _____ Date _____
17 Amended Response Accepted QAR _____ Date _____		18 Amended Response Accepted QADD _____ Date _____
19 Corrective Actions Verified QAR _____ Date _____		20 Closure Approved by: QADD _____ Date _____

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

CAR NO.: YM-94-004
DATE: 10/15/93
SHEET: 2 OF 2
QA

CORRECTIVE ACTION REQUEST (Continuation Page)

13 Recommended Action(s) (continued)

4. Determine the need for a nonconformance report and the impact on data and report the results thereof.