



Department of Energy
Office of Civilian Radioactive Waste Management
Yucca Mountain Site Characterization Office
P.O. Box 98608
Las Vegas, NV 89193-8608
JAN - 8 1996

L. Dale Foust
Technical Project Officer
for Yucca Mountain
Site Characterization Project
TRW Environmental Safety Systems, Inc.
Bank of America Center, Suite P-110
101 Convention Center Drive
Las Vegas, NV 89109

ISSUANCE OF SURVEILLANCE RECORD YMP-SR-96-007 RESULTING FROM
YUCCA MOUNTAIN QUALITY ASSURANCE DIVISION'S (YMQAD) SURVEILLANCE
OF THE CIVILIAN RADIOACTIVE WASTE MANAGEMENT SYSTEM MANAGEMENT
AND OPERATING CONTRACTOR (CRWMS M&O) (SCPB: N/A)

Enclosed is the record of Surveillance YMP-SR-96-007 conducted
by the YMQAD at the CRWMS M&O facilities at the Yucca Mountain
Site, Nevada, November 13-30, 1995.

The purpose of the surveillance was to evaluate the process
that led to the building of a Vertical Seismic Profile road
B.1 through the USW UN-55 borehole site location.

One Deficiency Report (DR) and one Nonconformance Report were
issued as a result of this surveillance. A response to the DR
is due by the date indicated in Block 13 of the DR.

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

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L. Dale Foust

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If you have any questions, please contact either Mario R. Diaz at 794-7974 or John R. Doyle at 794-7986.



Richard E. Spence, Director
Yucca Mountain Quality Assurance Division

YMQAD:MRD-877

Enclosure:
Surveillance Record
YMP-SR-96-007

cc w/encl:

D. A. Dreyfus, HQ (RW-1) FORS
R. W. Clark, HQ (RW-3.1) FORS
T. A. Wood, HQ (RW-14) FORS
W. L. Belke, NRC, Las Vegas, NV
~~H. G. Spraul, NRC, Washington, DC~~
C. J. Henkel, NEI, Washington, DC
T. H. Chaney, USGS, Denver, CO
R. R. Loux, NWPO, Carson City, NV
Cyril Schank, Churchill County Commission, Fallon, NV
D. A. Bechtel, Clark County Comprehensive, Las Vegas, NV
J. D. Hoffman, Esmeralda County, Goldfield, NV
Eureka County Board of Commissioners, Eureka, NV
Lander County Board of Commissioners, Battle Mountain, NV
Jason Pitts, Lincoln County, Pioche, NV
V. E. Poe, Mineral County, Hawthorne, NV
P. A. Niedzielski-Eichner, Nye County, Chantilly, VA
L. W. Bradshaw, Nye County, Tonopah, NV
William Offutt, Nye County, Tonopah, NV
Florindo Mariani, White Pine County, Ely, NV
B. R. Mettam, County of Inyo, Independence, CA
Mifflin and Associates, Las Vegas, NV
S. L. Bolivar, LANL, Los Alamos, NM
R. E. Monks, LLNL, Livermore, CA
J. D. Christensen, Kiewit/PB, Las Vegas, NV
R. R. Richards, SNL, Albuquerque, NM, M/S 1333
R. P. Ruth, M&O/Duke, Las Vegas, NV
File, YMQAD/QATSS, Las Vegas, NV
A. W. Rabe, YMQAD/QATSS, Las Vegas, NV

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

QUALITY ASSURANCE SURVEILLANCE RECORD

SURVEILLANCE DATA

¹ORGANIZATION/LOCATION:
 Civilian Radioactive Waste
 Management System
 Management and Operating
 Contractor (CRWMS M&O),
 Yucca Mountain Site, Nevada

²SUBJECT:
 Vertical Seismic Profiling (VSP) of UE-25
 UZ-16 and potential Natural Infiltration
 Studies Test Interferences regarding Test
 Planning Package (TPP) 91-34

³DATE: 11/13-30/95

⁴SURVEILLANCE OBJECTIVE: To evaluate the process that led to the building of a VSP road B.1 through the USW UN-55 borehole site location.

⁵SURVEILLANCE SCOPE:
 Review TPP, Job Packages (JP) and other pertinent documents to ascertain the effects of road construction on natural infiltration studies conducted at borehole USW N-55.

⁶SURVEILLANCE TEAM:
 Team Leader:

John R. Doyle

Additional Team Members:

N/A

⁷PREPARED BY:

John R. Doyle 11/12/95
 Surveillance Team Leader Date

⁸CONCURRENCE:

N/A
 QA Division Director Date

SURVEILLANCE RESULTS

⁹BASIS OF EVALUATION/DESCRIPTION OF OBSERVATIONS:

See Page(s) 2-5

¹⁰SURVEILLANCE CONCLUSIONS:

See Page(s) 5

¹¹COMPLETED BY:

John R. Doyle 12/22/95
 Surveillance Team Leader Date

¹²APPROVED BY:

R.C. Palmer 1/4/96
 QA Division Director Date

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

On November 13, through 30, 1995, a surveillance was performed at the Yucca Mountain Site Characterization Project (YMP) at the Yucca Mountain Site, Nevada to evaluate the process that led to the construction of VSP road B.1 through the USW UZN (N-55) borehole site location.

Background History**Neutron-Access Drilling and Testing**

In 1986, the Waste Management Project Office, Standard Deviation Report 18, was written against the U.S. Geological Survey (USGS) citing the lack of an acceptable calibration standard for neutron moisture meters in use for the Characterization of Unsaturated-Zone Infiltration Study. One of the corrective actions to this adverse condition was to generate a procedure, USGS Technical Procedure HP-254, Revision 0, "Development and use of a Hand Held Neutron Moisture Meter," which developed a calibration equation that converted neutron counts to water content for a hand held neutron moisture meter. Development of needed calibration standards was accomplished by core information and neutron logging results from Borehole N-55.

An additional purpose for N-55 was to develop a hydrologic model consisting of three boreholes. One borehole was located on the north slope of a wash south of Whale Back Ridge (USW-UZN-53), a second borehole in the center of the wash (USW-UZN-54), and a third borehole on the south slope of Whale Back Ridge (N-55). Maintaining as close to "pristine environmental" conditions as possible and not creating surface disturbances that interfere with this testing was essential to its success.

TPP 91-34, Revision 2, "Evaluation of Natural Infiltration (Neutron Access Boreholes)," was initiated and approved in July 1992. The purpose of this TPP was to characterize the natural present-day infiltration processes and to quantify net rates at Yucca Mountain. Subsequently, JP 91-9, Revision 0, "Neutron Access Boreholes," was initiated and approved to accomplish the testing as required by Administrative Procedure AP 5.21Q, Revision 0, "Field Work Activation," effective at that time.

During the drilling and coring of N-55, strict environmental and technical requirements were enforced so that "...surface disturbance at the neutron-access borehole sites was kept to a minimum." This included physically carrying core barrels from the drill rig to the sample handling facilities located on a road several hundred feet from the drill rig. USGS Criteria Letter YMP-USGS-33121G-01-C1, Revision 1, gives further direction that the "PI or his representative must concur with any proposed road construction."

Vertical Seismic Profiling

VSP is a borehole seismic technique used to construct a geologic cross-section of the earth. Seismic sources are energized at a multiplicity of locations via an omnipulse source ("thumper" truck) at the earth's surface. The resultant seismic wave is recorded at many levels at nearby UE-25 UZ#16 (UZ-16) which has sensor geophones grouted in place.

For off-road operations, an off-road path/trail, approximately 10 feet in width with source locations 22 feet wide and 40 feet wide at 100 feet intervals is to be provided. The "thumper" truck is energized along these locations and reflections from discontinuities and direct seismic arrivals from the "thumper" truck are sensed and recorded in the UZ-16 borehole geophones.

Cause for Concern:

VSP activities were conducted in accordance with JP 95-07, Revision 0, "Borehole UE-25 UZ#16 (VSP-2) Data Acquisition," and a Determination of Importance Evaluation (DIE) was performed prior to the JP approval to ensure that no ongoing tests were to be impacted. During the DIE process, it was determined that any disturbance around the N-55 borehole was considered a "logistical concern" because the borehole was cased to total depth and therefore judged that no QA controls were needed. Conversation with the Principal Investigator (PI) for Characterization of the Unsaturated-Zone Infiltration revealed that this was acceptable with the understanding that the "thumper" truck would be operating along a trail of the above referenced specified size and constructed with a "grader knocking out a few boulders." Webster's dictionary defines a trail as follows: Trail: A track (a path made by repeated footfalls) made by passage, especially through a wilderness.

During the construction phase of trail development and the collection of thumper data, a decision was made by the Construction Management Organization (CMO), the PI for VSP, and construction to construct a road 20-22 feet wide along the B.1 VSP line using a bulldozer, grader, and "sheep's foot" thus surrounding N-55 on all sides and disturbing the pristine environmental conditions. Interviews with the PI for Characterization of the Unsaturated-Zone Infiltration Study reveals that he was not contacted for concurrence as required by TPP 91-34. See Deficiency Report (DR) Yucca Mountain Quality Assurance Division (YMQAD)-96-D014.

Concerns were raised during the course of the surveillance whether there were adverse affects on the calibration calculations derived from the N-55 borehole and if this borehole was still useful for natural infiltration studies. Conversations with the PI for these studies revealed that this borehole was no longer needed for neutron moisture meter calibrations and that calibration standards have been constructed and are available at the Yucca Mountain Site.

Subsequent meetings with responsible management and the PI for Natural Infiltration Studies also revealed that because of the above conditions, N-55 borehole has been rendered "useless" for further infiltration studies. See Nonconformance Report (NCR) Yucca Mountain Site Characterization Office (YMSCO)-96-0013).

Documents reviewed during the course of the surveillance:

JP 91-9, Revision 0, "Neutron Access Boreholes" 9/1991
JP 95-07, Revision 0, "Borehole UE-25 UZ-16 (VSP-2) Data Acquisition"
TPP 91-34, Revision 2, "Evaluation of Natural Infiltration (Neutron-Access Boreholes)"
Work Package (WP) YMP/WP/95-03, Revision 0, "Vertical Seismic Profiling Line Construction and Data Acquisition Program"
DIE for UE-25 UZ#16, BAAA00000-01717-2200-00093, Revision 00, "Geophone Installation and Seismic Profiling"
Test Interference Evaluation (TIE) for UE-25 UZ#16, BAAAF0000-01717-2200-00003, Revision 01, "Instrumentation and Data Acquisition Phase-Vertical Seismic Profiling"
Lotus Notes, Wagg to Reynolds and Smith, dtd. 8/29/95
USGS Criteria Letter, YMP-USGS-33121G-01-C1, Revision 1, "Drilling Neutron-Access Boreholes, Provide Core Samples for Calibration of Neutron Probes"
YMP/CM-0022, Revision 1, "Surface-Based Testing Facilities Requirements Document"
Technical Procedure YMP-USGS-SP-20, Revision 0, "Technical Procedure for Vertical Seismic Profiles, Field Data Acquisition"
Technical Procedure YMP-USGS-HP-254, Revision 0, "Development and Use of a Calibration Equation for a Hand Held Moisture Meter"
Yucca Mountain Administrative Procedure (YAP) 3.4Q, Revision 2 "Field Change Control Process"
YAP 5.6Q, Revision 0, "Field Work Activation"
Implementing Line Procedure NLP-2-0, Revision 0, "Determination of Importance Evaluations"

Personnel contacted during the course of the surveillance:

Alan Flint, PI, USGS
Debra Edwards, Hydro-Geologist, USGS
Dan Soeder, Hydro-Geologist, USGS
Susan Jones, Assistant Manager for Scientific Programs, YMSCO
Dennis Williams, Deputy Assistant Manager for Scientific Programs, YMSCO
Nelson O'Connor, CMO, CRWMS M&O/Fluor Daniel
Ron Smith, Manager, Surface Based Testing Coordination Office, CRWMS M&O/
Woodward Clyde Federal Services
Derrek Wagg, Facilities Engineer, CRWMS M&O/Science Applications International Corporation (SAIC)

Terry Grant, Field Test Coordinator, CRWMS M&O/SAIC
William Hunt, Quality Assurance Specialist, CRWMS M&O/Duke
Norman Bartley, Staff Engineer, CRWMS M&O/Duke

Block 10 (continued) SURVEILLANCE CONCLUSIONS:

Based on documentation reviews, personnel interviews, and the issuance of one DR and one NCR, it has been determined that the overall adequacy and effectiveness of implementation of the quality program for DIE/TIE and Surface Based Testing activities is marginal. It appears that there was an abnormal amount of confusion when this condition was identified and this was compounded by the multiple organizations involved, organizational transitions, reorganizations, and personnel terminations taking place during this time.

The surveillance identified two conditions adverse to quality during the course of the surveillance. A summary is as follows:

DR YMQAD-96-D014

There appears to have been a breakdown in the DIE/TIE process involving contacting the PI for potential Test Interference for more recent tests that occur. Recommend that the governing procedure for this process be revised to notify affected PIs.

NCR YMSCO-96-0013

NCR identifies that N-55 is indeterminate as to what useable data can be collected from neutron logging of this borehole. The PI for Natural Infiltration will document this determination by disposition of this NCR.