



Department of Energy

Washington, DC 20585

NOV 05 1997

L. D. Foust, 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 M&O-SR-97-064 RESULTING FROM  
OFFICE OF QUALITY ASSURANCE (OQA) SURVEILLANCE OF THE CIVILIAN  
RADIOACTIVE WASTE MANAGEMENT SYSTEM MANAGEMENT AND OPERATING  
CONTRACTOR (CRWMS M&O)

Enclosed is the record of Surveillance M&O-SR-97-064, conducted by the OQA of the CRWMS  
M&O facility at the Yucca Mountain Site, Nevada, September 22 through October 8, 1997.

The purpose of the surveillance was to assess the effectiveness of Drilling and Sampling Activities at  
Borehole Underground Southern Nevada Waste (USW) Water Table (WT)-24.

Deficiency Reports (DR) LVMO-98-D-001 and LVMO-98-D-006 were issued as a result of this  
surveillance. Response to the DRs, which were submitted via separate letter, are due by the date  
indicated in Block 12.

The results of the surveillance were that the CRWMS M&O is adequate and effective in the  
implementation of the Field Work Package Process at USW WT-24, with the exceptions noted in  
DRs LVMO-98-D-001 and LVMO-98-D-006.

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  
John R. Doyle at (702) 295-2822.

Donald G. Horton, Director  
Office of Quality Assurance

OQA:JB-0260

Enclosure:  
Surveillance Record M&O-SR-97-064

9711170084 971105  
PDR WASTE  
WM-11 PDR

170027 Recip: NMSS/PAHL

NH33  
wm-11  
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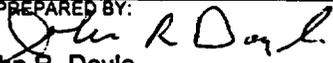
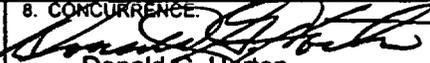
L. H. Barrett, DOE/HQ (RW-1) FORS  
R. A. Milner, DOE/HQ (RW-2) FORS  
T. A. Wood, DOE/HQ (RW-55) FORS  
J. O. Thoma, NRC, Washington, DC  
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R. R. Loux, NWPO, Carson City, NV  
S. W. Zimmerman, NWPO, Carson City, NV  
Jim Regan, Churchill County Commission, 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  
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Wayne Cameron, White Pine County, Ely, NV  
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Mifflin and Associates, Las Vegas, NV  
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R. W. Clark, DOE/OQA, Las Vegas, NV

Surveillance No. M&O-SR-97-064

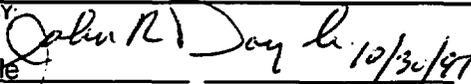
**OFFICE OF CIVILIAN  
RADIOACTIVE WASTE MANAGEMENT  
U.S. DEPARTMENT OF ENERGY  
WASHINGTON, D.C.**

**QUALITY ASSURANCE SURVEILLANCE RECORD**

**SURVEILLANCE DATA**

|  |   |  |
|--|---|--|
| <b>1. ORGANIZATION/LOCATION:</b><br>Civilian Radioactive Waste Management System Management and Operating Contractor (CRWMS M&O), Yucca Mountain Site, Nevada  | <b>2. SUBJECT:</b><br>Drilling and Sampling Activities at Underground Southern Nevada Waste (USW) Water Table (WT)-24                             | <b>3. DATE:</b><br>September 16, 1997  |
| <b>4. SURVEILLANCE OBJECTIVE:</b><br>To assess the effectiveness of Drilling and Sampling Activities at Borehole USW WT-24   |   |  |
| <b>5. SURVEILLANCE SCOPE:</b><br>To assess the effectiveness of implementation of quality assurance controls associated with the Field Work Package (FWP)-SB-97-005, "Drilling and Testing USW WT-24," Rev. 0, and its associated Work Program (WP) YMP/WP/97-02, "USW WT-24 Drilling Work Program," Rev. 0. |   | <b>6. SURVEILLANCE TEAM:</b><br>Team Leader:<br>John R. Doyle<br><br>Additional Team Members:<br><br>N/A |
| <b>7. PREPARED BY:</b><br><br>John R. Doyle<br>Surveillance Team Leader   | <b>8. CONCURRENCE:</b><br><br>Donald G. Horton<br>Director, OQA | Date: <u>9/10/97</u><br>Date: <u>9/16/97</u>   |

**SURVEILLANCE RESULTS**

|   |  |
|---|--|
| <b>9. BASIS OF EVALUATION/DESCRIPTION OF OBSERVATIONS:</b><br><br>On September 22 through October 8, 1997, a surveillance was performed to assess the effectiveness of drilling and sample collection performed by the CRWMS M&O during the operations at borehole USW WT-24. The surveillance consisted of witnessing the drilling and sampling operations, review of FWP-SB-97-005, Rev. 0 and WP YMP/WP/97-02, Rev. 0 documentation.<br><br>Continued on Pages 2-9 |  |
| <b>10. SURVEILLANCE CONCLUSIONS:</b><br><br>Based on personnel interviews and review of documentation, the CRWMS M&O is adequate and effective in the implementation of the FWP process at USW WT-24 with the exceptions noted on pages 8-9.  |  |
| <b>11. COMPLETED BY:</b><br><br>John R. Doyle<br>Surveillance Team Leader  | <b>12. APPROVED BY:</b><br><br>Donald G. Horton<br>Director, OQA |
| Date: <u>10/30/97</u>   | Date: <u>11/5/97</u>   |

## 9. BASIS FOR EVALUATION/DESCRIPTION OF OBSERVATIONS: (Continued)

### Background:

Borehole USW WT-24 is being drilled to determine the depth of the static water table, and to learn if the Large Hydraulic Gradient (LHG) and perched water are present in the area. An additional objective is to determine the thickness, water quality and hydraulic characteristics of the static water table and of any encountered perched water zones. Bulk and core samples are collected in accordance with Yucca Mountain Administrative Procedure (YAP) S.II.1 "Submittal, Review, and Approval of Requests for YMP Geologic Specimens" Rev. 2, ICN 0 and Sample Overview Committee (SOC) instructions for various site characterization studies. There are Tracers, Fluids and Materials (TFM) reporting requirements as per the FWP and WP during the drilling operations. In addition, to perform the drilling activities and other operations at the borehole, Kiewit/Parsons Brinckerhoff (Kiewit/PB) implements Compliance Assurance Procedure (CAP) 2.0 "Construction Planning and Control" which requires that prior to any work to be performed, a directive is required from the Construction Management Organization (CMO).

The surveillance was performed at the Yucca Mountain site and offices to ascertain the effectiveness and adequacy of the aforementioned activities.

The following attributes of FWP-SB-97-005, Rev. 0, were verified during the surveillance:

### 3.1 IMPLEMENTATION GENERAL ITEMS:

9. *QA: The TCO will check pads and access roads to prevent water ponding that may enter the borehole. In accordance with DIE controls, this task will be documented.*

Reviewed letter and July report S. Opp and K. Finnegan to R. Oliver # LV:SPO.TEST.AGB897-145.3 that satisfied the above requirement.

15. *QA: The TCO will visually check drill pads, test pits, and trenches for changes to drainage characteristics and for evidence of water ponding. These checks will be scheduled to the most restrictive of the following criteria: 1) at least monthly during construction/maintenance activities, 2) at least yearly during non-site disturbing activities, or 3) within 72 hours after 1 inch of liquid precipitation falls within a 24 hour period (as measured at meteorological station NTS-60).*

1). and 2.) Reviewed letter and report S. Opp and K. Finnegan to R. Oliver # LV:SPO.TEST.AGB.08/97-145 that satisfied the above requirement.  
3). N/A. Interviews with meteorology personnel indicate that the highest daily precipitation collected at the 60 meter tower during the drilling operations was 0.86 of an inch.

16. *QA: The CONSTRUCTOR/DRILLING SERVICE PROVIDER will check vehicles for hydrocarbon leaks at least monthly, and will contain, mitigate and repair hydrocarbon leaks in excess of drips from all site sources upon discovery.*

Visually verified that all machinery (e.g. air compressors, generators and the drilling rig) that is capable of leaking have berms and are lined with heavy duty plastic to collect any leaked hydrocarbons which satisfied the above requirement.

18. *QA: AFFECTED ORGANIZATIONS may not permanently emplace chlorine/ chloride-bearing compounds without documented evaluation and approval by the TCO prior to utilization.*

Interviews with TCO representatives reveal that no chlorine based compounds or approved compounds have been emplaced during the drilling of USW WT-24 which satisfies the above requirement.

19. *QA: The CONSTRUCTOR/DRILLING SERVICE PROVIDER may not use potable water nor DUSTAC for dust suppression, nor chlorine-containing salt grounding solutions.*

Water was visually observed being loaded into trucks from blue tanks located near the J-13 borehole and discharged for dust suppression on the USW WT-24 access road. These blue tanks are labeled Non-Potable Water and it was verified at the tanks that no chlorine is injected into the tank feed or discharge lines which satisfies the above requirement.

Verified letter B.W. Distel to G. Kimura LV.SPO.TEST.BWD.10/97-180 that the above requirements for non-chlorine containing salt grounding were satisfied.

20. *QA: The CONSTRUCTOR/DRILLING SERVICE PROVIDER will minimize use of water when approved for drilling activities and will transfer core samples to Sample Support Personnel.*

As of the surveillance, neither has water has been used for the drilling activities, nor any core collected and transferred to Sample Support Personnel.

23. **QA: The CONSTRUCTOR/DRILLING SERVICE PROVIDER will provide traced water in quantities as requested by TCO and record traced water use on a shift basis at the direction of the TCO. Re-circulated water shall not be re-traced with LiBr.**

As of the surveillance, no traced water has been used for the drilling activities.

### **BOREHOLE DRILLING**

3. **QA: The INJECTION COORDINATOR or DESIGNEE will halt drilling/ coring operation when the cylinder pressure drops below 500 psig.**

Gas bottles are changed out and drilling operations stopped prior to pressures reaching 500 pounds per square inch gauge (psig) During the surveillance, Matheson gauges (1-1000 psig P/N 63-3113 and 1- 4000 psig P/N 63-3143) measuring this pressure were not calibrated. While the procedure (YMP-USGS-HP-07) does not require them to be calibrated, the FWP mandates that this is a Q control and they require calibration. Interviews with TCO personnel reveal that this was an important Q control and that these gauges should be calibrated. (See Deficiency Report (DR) LVMO-98-D-006)

Verified training records for J. Zigler to YMP-USGS-HP-07 Rev. 3 M1.

15. **QA: The INJECTION COORDINATOR will provide to the SPS written documentation listing total volumes used including concentration of initial gas used for all dry drilling conducted in support of this FWP.**

Reviewed September Unsaturated Zone Drilling Tracer Gas Injection Data Reports that were submitted to the TCO that satisfied the above requirement.

24. **QA: The TCO or designee will visually examine drill core and cuttings for evidence of natural water sources during drilling and notify the PI if perched-water is suspected.**

Drill cutting are collected as per the SOC Field Packaging Approvals. A portion of these cuttings are visually examined under a binocular microscope by Drilling Support and Sample Management Personnel in their trailer located at the drill site. Any water is noted in the Daily Activities Log (DAL) and the Field Drilling Engineer (FDE) is notified immediately. During the surveillance at the drill rig, there was no evidence that perched water had been encountered.

25. *QA: Upon discovery of perched water, the TCO will stop drilling and invoke the perched water plan developed by the PI.*

Interviews with the TCO representatives reveal that as of the surveillance, no perched water has been detected in the borehole. The plan has been developed by the PI and is available for use.

**The following attributes of Yucca Mountain Site Characterization Project (YMP)/ WP-97-02, Rev. 0 were verified during the surveillance:**

- 4.1 *Non potable water shall be used for construction purposes (e.g., dust control) (Quality Assurance (QA), Determination of Importance Evaluation (DIE)/13.3.6, 13.3.6.6b, 13.3.6.6c and 13.3.7).*

Water was visually observed being loaded into trucks from blue tanks located near the J-13 borehole and discharged water for dust suppression on the USW WT-24 access road. These blue tanks are labeled Non-Potable Water and it was verified at the tanks that no chlorine is injected in the tank feed or discharge lines.

Reviewed previous Daily Operations Reports dtd. 8/6, 8/8, 8/12 and 8/14/97 that this activity was recorded which satisfies the above requirement.

- 4.4 *Perform periodic inspections (not less than monthly) for ponding or the potential for ponding of water to ensure that the drainage characteristics of the pad have not been altered in a way to create surface runoff impoundment areas that would result in ponded water that could be pumpable with standard equipment. Such areas shall be corrected/repared by Kiewit/PB upon discovery. Notify the TCO and Scientific Programs Support (SPS) Field Drilling Engineer (FDE) when this is performed. The FDE will report this on a Daily Operations Report. (QA, DIE/13.3.2.2c).*

Reviewed letter and July report from S. Opp and K. Finnegan to R. Oliver # LV:SPO.TEST.AGB897-145.3 that satisfies the above requirement.

- 4.6.1 *Perform periodic inspections (not less than monthly) on vehicles for hydrocarbon leaks or spills (QA, DIE/13.3.4.4b). Report results to the FDE for TFM evaluation and reporting.*

Interviews with Kiewit/PB drilling personnel reveal that these periodic inspections have been performed, however the results have not been reported to the FDE for TFM reporting. The requirements of TFM reporting were pointed out to the Drilling

Superintendent and the reply was that "We do not work to FWP's". During the surveillance, letters of direction were issued to Kiewit/PB to work to such documents. (See Corrected during the Surveillance and Deficiency Report (DR) LVMO-YM-98-D-001)

- 4.15. *Core samples and/or drill cuttings shall be taken and processed at the written direction of the appropriate Principal Investigator(s) (PI)/ UDR(s) and approval of the SOC according to CRWMS M&O/SPS sampling procedures. Sample containers shall be provided by the SMF.*

Satisfactorily verified implementation of YAP-SII.1Q through the review of the Yucca Mountain Site Characterization Sample Overview Committee Field Packaging Approval dtd. 7/17/97 located in the Drilling Support and Sample Management trailer on location at USW WT-24. Samples are collected for Matrix Hydrological Properties, Hydrochemistry, Water Movement Tests, Natural Resource Mineral Assessment, Characterization of the Yucca Mountain Quaternary Regional Hydrology and History of Mineralogical and Geochemical Alteration of YM studies. However, a review of the Daily Activities Log (DAL) entry on 8/14/97 indicates that the samples at 200' contained "grease". Management was aware of the contamination and were in the process of documenting this and contamination from fishing operations performed on 9/3 as a non-conformance report. During the course of the surveillance NCR-YMSCO-98-0003 was initiated by the M&O.

- 4.17 *Measure and record quantities and source of water used for construction, dust control, maintenance, and other operations (QA, DIE/13.3.2.2a). Provide daily records (on a monthly basis) to the FDE of water use by specific activity; these records shall include quantities and source. The FDE shall submit this data in accordance with the TFM Data Reporting and Management procedure (YAP-2.8Q, latest revision) (QA, DIE/13.3.2.2b).*

Reviewed Daily Operations Reports (DORs) dtd. 8/6, 8/8, 8/12 and 8/14/97. Although the water usage is reported and noted on the DOR, interviews with the TCO representatives and FDEs reveals that water usage has not been reported to the TFM Database. (See DR LVMO-98-D-001)

- 5.1 *Samples shall be continuously monitored by the wellsite geologists for any observable increase in moisture, clays, or drippings that might indicate the static water table or perched water zones. (QA, DIE/13.3.3a).*

Samples are collected by Drilling Support and Sample Management personnel from the discharge air of the drilling rig. Samples are visually examined by these personnel when collected at the sample collector. If water is detected the FDE is contacted and this is noted in the DAL and the DOR. Interviews with wellsite personnel and a review of the log and reports reveal that no perched water or the static water has been reached at this time.

6.4.1 *Chlorine based salt grounding materials (e.g., NaCl, MgCl) are prohibited as an electrical grounding improvements (QA, DIE/13.3.6.6a). Graphite-based materials, such as "GEM," are an acceptable grounding medium.*

Verified letter B.W. Distel to G. Kimura LV.SPO.TEST.BWD.10/97-180 that the above requirements were satisfied.

**The following attributes of CAP 2.0 were verified during the surveillance:**

*Paragraph 1.2 " ... Kiewit/PB is occasionally directed by the Construction Management Organization (CMO) to provide support (i.e., labor, equipment, services) to other organizations under the direction/supervision of the supported organization by way of Field Work Packages (FWP), Working Instructions (WI), etc. ... "*

No documentation from the CMO could be found to provide for this direction. During the course of the surveillance, a letter of direction, M. Eldred to J. Morris # LV.SC.KME.10/97-960 was issued giving direction to Kiewit/PB to meet the requirements of FWPs and WPs. In addition, CMO generated another letter of direction to Kiewit/PB, R. MacDonald to J. Morris, (dtd 10/7/97) for all other existing FWPs. (See Corrected During Surveillance).

**Documents reviewed during the course of the surveillance:**

FWP-SB-97-003, "Drilling and Testing USW-WT-24," Rev. 0  
YMP/WP/97-02, "USW WT-24 Drilling Work Program," Rev. 0  
YAP S.II.1Q, "Submittal, Review, and Approval of Requests for YMP  
Geologic Specimens," Rev. 2, ICN 0  
YAP 2.8Q, "Tracers, Fluids and Materials Data Reporting and Management," Rev. 1  
CAP 2.0, "Construction Planning and Control," Rev. 0  
YMP-USGS-HP-07, "Method to Inject Tracer Gas to Drilling Air," Rev. 3, M1  
Daily Activities Log for USW WT-24  
"Determination of Importance Evaluation for Surface-Based Testing Activities,"  
BAA000000-01717-2200-00101, Rev. 00

NWI-DS-002Q, "Field Drilling Support Activities," Rev. 0  
NWI-SMF-002Q, "Transport, Receipt, Admittance, and Processing of Borehole  
Samples for the Sample Management Facility," Rev. 1  
Letter and July Report from S. Opp and K. Finnegan to R. Oliver  
#LV.SPO.TEST.AGB897-145.3  
Letter, M. Eldred to J. Morris # LV.SC.KME.10/97-960  
Letter, R. MacDonald to J. Morris #LV.CM.RIL:10/97-306  
Letter, B.W. Distal to G. Kimura #LV.SPO.TEST.BWD.10/97-180  
Yucca Mountain Site Characterization Project Sample Overview Committee Field  
Packaging Approval dtd. 7/17/97

**Personnel Contacted during the course of the surveillance:**

Eddie Wright, Scientific Program Support Lead, CRWMS M&O  
David Wonderly, Drilling Superintendent, Kiewit/PB  
Allan Mitchell, TCO Test Planning Specialist, LANL  
Chris Lewis, Curator, Sample Management Facility, CRWMS M&O  
Richard Kovak, TCO Test Implementation Specialist Lead, LANL,  
Dennis Gustaphsen, Geologist, Bechtel Nevada  
Robert Law, Construction Management Manager, CRWMS M&O  
Jan Zigler, Principal Investigator, USGS  
Dave Lantz, Field Drilling Engineer, Bechtel Nevada  
Mary Nelson, Training Coordinator, USGS  
Rudy Johnson, TFM Coordinator, Kiewit/PB  
Kevin Krank, Quality Control Manager, Kiewit/PB  
Grover Prowell, Meteorologist, CRWMS M&O  
Andrew Burningham, TCO Technical Assurance Liaison, M&O

**Block 10. (Surveillance Conclusions continued)**

A summary of the deficiencies identified during the surveillance follows:

**Corrected During Surveillance**

CAP 2.0 para 1.2 requires that the CMO direct Kiewit/PB to provide support to FWP's. While a letter of direction was in existence for the surface drilling program (Letter, Eldred to Morris), there was no CMO directive for other Surface Based Testing and Exploratory Studied Facility (ESF) FWP's. During the course of the surveillance a CMO letter (MacDonald to Morris) was issued to Kiewit/PB to provide this support as per CAP 2.0.

**DR LVMO-98-D-001**

FWP-SB-97-005 requires that TFMs be reported to the TFM Database. During the surveillance it was noted that no reports have been submitted to this database as per the FWP requirements.

**DR LVMO-98-D-006**

FWP-SB-97-005, QA control: *QA: The INJECTION COORDINATOR or DESIGNEE will halt drilling/ coring operation when the cylinder pressure drops below 500 psig.*

To satisfy this control would require that calibrated gauges be installed on the Sulfur Hexa-Fluoride (SF6) tracer gas bottle. During the surveillance, Matheson gauges (1-1000 psig P/N 63-3113 and 1-4000 psig P/N 63-3143) measuring this pressure were not calibrated. Interviews with cognizant personnel reveals that this is a critical attribute to monitor because changes in pressure may damage the Mass Flow Controller which could either cause a surge of tracer gas or no gas at all injected into the airflow.