



DEPARTMENT OF ENERGY

Office of Civilian Radioactive Waste Management
Office of Geologic Disposal
Yucca Mountain Site Characterization Project Office
P.O. Box 98608
Las Vegas, NV 89193-8608

WBS 1.2.11
QA: N/A

APR 07 1994

Robert F. Pritchett
Technical Project Officer
for Yucca Mountain
Site Characterization Project
Reynolds Electrical & Engineering Co., Inc.
P.O. Box 98521
Las Vegas, NV 89193-8521

VERIFICATION OF CORRECTIVE ACTION AND CLOSURE OF CORRECTIVE
ACTION REQUEST (CAR) YM-93-058 RESULTING FROM YUCCA MOUNTAIN
QUALITY ASSURANCE DIVISION (YMQAD) AUDIT YMP-93-12 OF REYNOLDS
ELECTRICAL & ENGINEERING CO., INC. (SCP: N/A)

The YMQAD staff has verified the corrective action to
CAR YM-93-058 and determined the results to be satisfactory. As
a result, the CAR is considered closed.

If you have any questions, please contact either Robert B.
Constable at 794-7945 or Stephen R. Dana at 794-7176.

Richard E. Spence, Director
Yucca Mountain Quality Assurance Division

YMQAD:RBC-2918

Enclosure:
CAR YM-93-058

cc w/encl:
K. R. Hooks, NRC, Washington, DC
S. W. Zimmerman, NWPO, Carson City, NV
W. J. Glasser, REEC Co, Las Vegas, NV
H. K. Elder, YMSCO, NV

cc w/o encl:
J. W. Gilray, NRC, Las Vegas, NV
N. J. Brogan, YMQAD/QATSS, Las Vegas, NV

Add: K Hooks 4/11

*NH03
102.7
WM-11*

9404130169 940407
PDR WASTE
WM-11 PDR

ORIGINAL
THIS IS A RED STAMP

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

8 CAR NO.: YM-93-058
DATE: 07/02/93
SHEET: 1 OF 1
QA

CORRECTIVE ACTION REQUEST

1 Controlling Document REECo QAPP, 568-DCO-115, Revision 8		2 Related Report No. YMP-93-12	
3 Responsible Organization REECo Construction		4 Discussed With T. Leonard/D. Koss	
5 Requirement: REECo QAPP, Section II, "Quality Assurance Program," Paragraph 1.2 states, "The Quality Assurance Program of REECo consists of the QAPP plus appropriate implementing procedures required to provide and implement control over activities affecting quality."			
6 Adverse Condition: Contrary to the above, survey activities of quality-affecting items are being performed in accordance with procedures that are not part of the REECo Yucca Mountain QA Program.			
9 Does a significant condition adverse to quality exist? Yes <u>X</u> No <u> </u> If Yes, Circle One: A B <u>C</u>		10 Does a stop work condition exist? Yes <u> </u> 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 checked="" type="checkbox"/> Root Cause Determination			
13 Recommended Actions: 1) Bring present procedures for survey activities under the REECo QA Program.			
7 Initiator Gerard Heaney <i>Gerard Heaney</i> Date <i>7-1-93</i>		14 Issuance Approved by: <i>[Signature]</i> Date <i>07-01-93</i>	
15 Response Accepted QAR <i>N/A</i> Date <i>7-1-93</i>		16 Response Accepted QADD <i>[Signature]</i> Date <i>11/19/93</i>	
17 Amended Response Accepted QAR <i>Gerard Heaney</i> Date <i>8-31-93</i>		18 Amended Response Accepted QADD <i>[Signature]</i> Date <i>9/1/93</i>	
19 Corrective Actions Verified <i>[Signature]</i> Date <i>4/28/94</i>		20 Closure Approved by: <i>[Signature]</i> Date <i>4/6/94</i>	

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

* CAR NO. YM-93-058

DATE: 08/04/93

PAGE: _____ OF _____
QA

CORRECTIVE ACTION REQUEST (Continuation Page)

CORRECTIVE ACTION RESPONSE for CAR # YM-93-058

A. Remedial Action:

A starter tunnel "check survey" has been performed by Raytheon Services Nevada (RSN) to ensure that line, grade, and profile at "B line" are correct. Although the "check survey" report has not been issued, no deficiencies have been reported.

Responsible Individual: T. M. Leonard
Estimated completion date: August 30, 1993

B. Investigative Action:

Extent of Deficiency: The quality affecting survey work performed by REECO Engineering applies only to the establishment of line, grade, and profile within the starter tunnel.

Responsible Individual: T. M. Leonard
Estimated completion date: Completed

C. Root Cause Determination:

The intent of the REECO Quality Assurance Program Plan was misinterpreted. Surveying of line and grade (for marking the drill face center line and grade) is shot from control points set by a QA qualified organization (RSN). Our interpretation that surveying line and grade was not a QA activity was deemed incorrect.

D. Corrective Action to Preclude Recurrence:

The REECO matrixed surveyors, supervision, and party chief will be qualified to perform quality affecting survey work in accordance with the YMP QA program.

The instruments (total station and level) will be calibrated at a QA qualified calibration facility at an interval established by the manufacturer.

Ltr dtd 8/4/93 - 580-01-587

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

CAR NO. YM-93-058
DATE: 08/04/93
PAGE: _____ OF _____
QA

CORRECTIVE ACTION REQUEST (Continuation Page)

D. Corrective Action to Preclude Recurrence: - Continued

A Technical Control Procedure designated as "QA" will be written per MC-05.2 that describes the QA activity of surveying line, grade, and profile in the tunnel. Personnel will be trained to this procedure prior to implementation.

Responsible Individual: T. M. Leonard
Estimated completion date: September 30, 1993.

Response Approved: R. F. Butcher Date: 8/4/93

Ltr dtd 8/4/93-580-01-587

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

CAR NO. YM-93-058
DATE: 08/30/93
PAGE: OF
QA

CORRECTIVE ACTION REQUEST (Continuation Page)

AMENDED CORRECTIVE ACTION RESPONSE for CAR # YM-93-058

A. Remedial Action:

A starter tunnel "check survey" has been performed by Raytheon Services Nevada (RSN) to ensure that line, grade, and nominal size at "B line" are correct. Although the "check survey" report has not been issued, no deficiencies have been reported.

Responsible Individual: T. M. Leonard
Estimated completion date: August 30, 1993

B. Investigative Action:

Extent of Deficiency: The quality affecting survey work performed by REECo Engineering applies only to the establishment of line, grade, and nominal size within the starter tunnel.

Responsible Individual: T. M. Leonard
Estimated completion date: Completed

C. Root Cause Determination:

The intent of the REECo Quality Assurance Program Plan was misinterpreted. Surveying of line and grade (for marking the drill face center line and grade) is shot from control points set by a QA qualified organization (RSN). Our interpretation that surveying line, grade and nominal size was not a QA activity was deemed incorrect.

D. Corrective Action to Preclude Recurrence:

The REECo matrixed surveyors, supervision, and party chief will be qualified to perform quality affecting survey work in accordance with the YMP QA program.

The instruments (total station and level) will be calibrated at a QA qualified calibration facility at an interval established by the manufacturer.

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

CAR NO. YM-93-058
DATE: 08/30/93
PAGE: _____ OF _____
QA

CORRECTIVE ACTION REQUEST (Continuation Page)

AMENDED CORRECTIVE ACTION RESPONSE for CAR # YM-93-058

D. Corrective Action to Preclude Recurrence: - Continued

A Technical Control Procedure designated as "QA" will be written per MC-05.2 that describes the QA activity of surveying line, grade, and nominal size in the tunnel. Personnel will be trained to this procedure prior to implementation.

Responsible Individual: T. M. Leonard

Estimated completion date: September 30, 1993.

Response Approved: _____

RT Pritchett

Date: _____

8/31/93

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

CAR NO. YM-93-058
DATE: 09-30-93
PAGE: _____ OF _____
QA

CORRECTIVE ACTION REQUEST (Continuation Page)

AMENDED CORRECTIVE ACTION RESPONSE AND EXTENSION REQUEST for CAR # YM-93-058

D. Corrective Action to Preclude Recurrence:

The REEC Co matrixed personnel are in the process of being qualified. Additional time is necessary to complete their qualifications. Revised estimated completion date is October 22, 1993.

The calibration facility was surveyed and has been determined to be unacceptable and does not meet REEC Co/YMP requirements. Additional time is necessary to identify and qualify another survey instrument calibration facility. A report will be provided by October 29, 1993, documenting the status of qualifying a calibration facility.

The "QA" Technical Control Procedure has been written and has been through the "Draft" procedure review process. Comments are presently being resolved and the procedure should be approved by October 8, 1993.

Responsible Individuals: T. M. Leonard/W. J. Glasser

Response Approved:

RT Pritchett

Date:

9/30/93

Ltr dtd 9/30/93 - 580-01-715

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

CAR NO. YM-93-058
DATE: 10/29/93
PAGE: OF
QA

CORRECTIVE ACTION REQUEST (Continuation Page)

AMENDED CORRECTIVE ACTION RESPONSE AND EXTENSION REQUEST for CAR YM-93-058

D. Corrective Action to Preclude Recurrence:

The REECO matrixed personnel have been qualified in accordance with program requirements.

A Technical Control Procedure (TC-581-SP-0017) has been written, reviewed, approved, and issued for control of Starter Tunnel surveying.

Based upon a review of the Quality Assurance Requirements and Description (QARD), Section XII, it was determined that survey equipment should be classified as a "commercial device" and that this equipment be subjected to periodic maintenance and functional checks to confirm the proper operation of this equipment to adequately repeat measurements against known reference points. A procedure is being written to address the periodic maintenance and functional checks of the survey equipment. This procedure should be issued by December 10, 1993.

Responsible Individuals: T. M. Leonard/W. J. Glasser
Estimated completion date: December 10, 1993

Response Approved:

William T. Glasser
FOR RFP

Date: 10-29-93

Ltr dtl 10/29/93 - 580-01-054



DEPARTMENT OF ENERGY

Office of Civilian Radioactive Waste Management
Office of Geologic Disposal
Yucca Mountain Site Characterization Project Office
P.O. Box 98608
Las Vegas, NV 89193-8608

WBS 1.2.11
QA: N/A

DEC 14 1993

Robert F. Pritchett
Technical Project Officer
for Yucca Mountain
Site Characterization Project
Reynolds Electrical & Engineering Co., Inc.
P.O. Box 98521
Las Vegas, NV 89193-8521

EVALUATION OF RESPONSE TO CORRECTIVE ACTION REQUEST (CAR) YM-93-058 RESULTING FROM YUCCA MOUNTAIN QUALITY ASSURANCE DIVISION (YMQAD) AUDIT YMP-93-12 OF REYNOLDS ELECTRICAL & ENGINEERING CO., INC. (REECo) (SCP: N/A)

Reference: Ltr, Pritchett to Spence, dtd 10/28/93

The YMQAD staff has evaluated the response to CAR YM-93-058 and REECo's "Calibration Requirements for Survey Equipment" detailed in the referenced letter. The response has been determined to be unsatisfactory for the following reasons:

The YMQAD does not agree that survey instruments are a "Commercial Device," as stated in Quality Assurance Requirements and Description DOE/RW-0333P, Section 12.2.5. Therefore, the requirements of DOE/RW-0333P, Section 12, do apply for control, calibration, and maintenance of survey instruments.

Based on a meeting held November 18, 1993, between YMQAD, REECo, Raytheon Services Nevada, and the Civilian Radioactive Waste Management System Management and Operating Contractor (CRWMS M&O), those in attendance generally agreed that specific criteria should be established to address calibration of survey instruments used for location determination of quality-affecting items. In order to ensure that the REECo survey program meets the intent of DOE/RW-0333P, Section 12 requirements, YMQAD requests that REECo address the following actions, promulgated during the November 18 meeting:

1. Using a permanent baseline of survey monuments traceable to a national standard, REECo shall provide field calibration (verification) of survey instruments. If no nationally recognized standard exists, the basis for calibration shall be documented.
2. REECo, working with CRWMS M&O, shall investigate and define survey tolerances based on 1 above and actual field construction needs.
3. REECo shall establish maintenance of survey instruments based on 1 above and preestablished intervals.

Note: Since this activity is not a calibration, the requirements stated in DOE/RW-0333P, Section 7.2.6, are not required to assess the vendors capability of providing a calibration service for survey instruments.

4. All actions associated with Items 1 through 3 above shall be described in an implementing document.

Robert F. Pritchett

-2-

DEC 14 1993

Until the above actions are resolved, REECO shall not perform any survey activities associated with location determination of quality-affecting items. In addition, YMQAD requests REECO to determine if additional surveying was performed by REECO of quality-affecting items, subsequent to initiation of CAR YM-93-058. If additional surveying was performed, describe what actions have been taken to assure that no additional deficiencies exist.

An amended response is required to be submitted to this office within ten working days of the date of this letter. Send the original of your response to Nita J. Brogan, YMQAD/QATSS, 101 Convention Center Drive, Suite 640, Las Vegas, Nevada 89109. If an extension to the due date is necessary, it must be requested in writing, with appropriate justification, prior to that date.

If you have any questions, please contact either Robert B. Constable at 794-7945 or Stephen R. Dana at 794-7176.



Richard E. Spence, Director
Yucca Mountain Quality Assurance Division

YMQAD:RBC-1191

Enclosure:
CAR YM-93-0058

cc w/encl:
K. R. Hooks, NRC, Washington, DC
S. W. Zimmerman, NWPO, Carson City, NV
W. J. Glasser, REECO, Las Vegas, NV

cc w/o encl:
J. W. Gilray, NRC, Las Vegas, NV
N. J. Brogan, YMQAD/QATSS, Las Vegas, NV

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

CAR NO. YM-93-058
DATE: 12/29/93
PAGE: _____ OF _____
QA

CORRECTIVE ACTION REQUEST (Continuation Page)

AMENDED CORRECTIVE ACTION RESPONSE for CAR YM-93-058

D. Corrective Action to Preclude Recurrence:

It was erroneously reported in the 10/29/93 Amended Response that the REECo matrixed personnel had been qualified in accordance with program requirements. As a result, REECo CAR # CA-94-003 and a stop work notice was issued to preclude further quality affecting survey activities. As of 12/22/93 all survey personnel were qualified to perform quality affecting activities. The completion of this action was independently verified by REECo Quality Assurance.

Technical Control procedure, TC-581-SP-0006, has been written, reviewed, approved and issued for conducting Survey Instrument Repeatability Tests. The procedure confirms the proper operation of the survey equipment to adequately repeat measurements against known reference points. The survey instruments will be field checked against the survey monuments that are traceable nationally recognized standards in Kingman, Arizona on 12/29/93. Requirements for periodic maintenance checks will be added to the procedure by 01/28/94.

Survey activities were conducted subsequent to the initiation of this CAR. Another check survey of the Starter Tunnel was requested (Work Request No. 94073) to be performed by RSN Survey to assure that no additional deficiencies exist. A followup response will be provided by January 28, 1994 to indicate the status and results of the check survey.

The tolerance requirement specified in TC-581-SP-0006 will be reviewed with the CRWMS M&O to determine the acceptability of the field verification method for all anticipated uses of the survey equipment, without the specification of specific survey tolerances. If the CRWMS M&O agrees with the functional check requirements, then the tolerances given on drawings will be applicable to accuracies required of survey equipment. REECo will provide an update on the status of this review by January 28, 1994.

Responsible Individuals: T. M. Leonard/W. J. Glasser
Estimated completion date: January 28, 1994

Response Approved: RT Pritchett Date: 12/29/93

Ltr dtd 12/29/93 - 580-01-174

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

CAR NO. YM-93-058
DATE: 01/28/94
PAGE: OF
QA

CORRECTIVE ACTION REQUEST (Continuation Page)

AMENDED CORRECTIVE ACTION RESPONSE AND EXTENSION REQUEST for CAR YM-93-058

D. Corrective Action to Preclude Recurrence:

- ✓1. Requirements for periodic maintenance checks were to be added to the procedure by 01/28/94. Based on comments received from the M&O (see item no. 4) Technical Control Procedure, TC-581-SP-0006, will be revised to address both issues. The procedure should be revised by February 18, 1994.
- ✓2. The survey instruments were field checked against the survey monuments that are traceable nationally recognized standards in Kingman, Arizona on December 29, 1993.
3. Another check survey of the Starter Tunnel was performed by RSN Survey personnel to assure that no additional deficiencies exist. Preliminary results indicated no deficiencies with the Starter Tunnel and a written report of the check survey is being pursued by REECo. Written results of the check survey should be obtained by February 18, 1994.
- ✓4. The tolerance requirement specified in TC-581-SP-0006 was reviewed with the M&O who determined the acceptability of the field verification method stated in the procedure for all anticipated uses of the survey equipment, without the specification of specific survey tolerances. The M&O provided several additional comments based on their review of TC-581-SP-0006 which will be incorporated into the procedure. This procedure revision will be completed by February 18, 1994.

Responsible Individuals: T. M. Leonard/W. J. Glasser
Estimated completion date: February 18, 1994

Response Approved:

R. F. Pritchett

Date:

1/28/94

Stdd 1/28/94- 580-01-228

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

CAR NO. YM-93-058
PAGE: _____ OF _____
QA

CORRECTIVE ACTION REQUEST (Continuation Page)

VERIFICATION OF CORRECTIVE ACTION REQUEST (CAR) YM-93-058

Verification of corrective action was completed on 04/01/94 by Stephen Dana.
The following objective evidence was verified:

- A. **REMEDIAL ACTION** - Reviewed letter from Renegar to Leonard, dated 3/24/94, titled, "Survey Verification to Resolve CAR YM-93-058. The letter states that, "Based upon the attached cross section provided by RSN, the ESF Starter Tunnel meets the requirements for alignment, grade and nominal size."
- B. **INVESTIGATIVE ACTION** - No Verification Action Required
- C. **ROOT CAUSE** - No Verification Action Required
- D. **CORRECTIVE ACTION TO PRECLUDE RECURRENCE** -
 - Reviewed REEC Co surveyors, i.e., matrixed personnel, training files to verify that survey personnel have been trained to procedure TC-581-SP-0006. Training files for the following individuals were reviewed, no discrepancies were noted:
 - David B. Dusdal, signed 3/2/94
 - Alan H. Gelman, signed 2/24/94
 - B. L. Bennett, signed 2/24
 - M. C. Barker, signed 3/2/94
 - A. W. Barker, signed 2/24/94
 - R. A. West, signed 2/24/94
 - Reviewed REEC Co procedure TC-581-SP-0006, Revision 1, Survey Instrument Repeatability Tests. Requirements for periodic maintenance checks has been added to the procedure.

(Continued)

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

CAR NO. YM-93-058

PAGE: _____ OF _____
QA

CORRECTIVE ACTION REQUEST (Continuation Page)

- The M&O was provided a copy of procedure TC-581-SP-0006, Revision 0, for review, as noted in letter 581-01-010, Leonard to Renegar, dated January 11, 1994. The M&O's comments were transmitted to REEC Co via letter LV.YM.MLR.01/94-007, Renegar to Leonard, dated January 18, 1994. Verified that the M&O's comments were incorporated into Revision 1.
- The survey instruments were checked against survey monuments that are traceable to nationally recognized standards in Kingman, Arizona, as noted in REEC Co memorandum 94-000166, Azhikakth to Rommel, dated January 4, 1994. EDM Calibration Log sheets and the Kingman Calibration Baseline Observation Abstract were added as enclosures to the memorandum. Also, reference Calibration Report PTL No. Y11066, dated December 22, 1993.
- Reviewed REEC Co Corrective Action Report (CAR) No. CA-94-003, which identifies that actions documented in response to DOE CAR YM-93-058 were not accomplished as committed, i.e., REEC Co matrixed survey personnel were not appropriately qualified to perform quality-affecting survey activities. In addition to the CAR, REEC Co issued a Stop Work Notification, addressed in a memorandum, Glasser to Pritchett, dated December 7, 1993. The stop work directed REEC Co to stop all quality affecting survey activities until the significant adverse condition documented in CAR CA-94-003 is resolved. The CAR response has been accepted; however, a commitment in the CAR Response Evaluation requires that the CAR and the stop work notice remain open until CAR YM-93-058 is closed.

Signature

S. Dana

Date 4/01/94