



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

MAR 10 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

ISSUANCE OF SURVEILLANCE RECORD YMP-SR-94-023 RESULTING FROM YUCCA MOUNTAIN
QUALITY ASSURANCE DIVISION (YMQAD) SURVEILLANCE OF REYNOLDS ELECTRICAL &
ENGINEERING CO., INC. (REECO) (SCP: N/A)

Enclosed is the record of Surveillance YMP-SR-94-023 conducted by the YMQAD at
the REECO facilities in Las Vegas and the Yucca Mountain Site, Nevada,
January 21, 1994 through February 25, 1994.

The purpose of the surveillance was to verify compliance to procedural and
specification requirements relative to the load testing of rockbolts.

One corrective action request (CAR) was issued as a result of this
surveillance. Response to the CAR (which was transmitted via separate letter)
is due by the date indicated in Block 11 of the CAR.

This surveillance is considered completed and closed as of the date of this
letter; however, the open CAR will continue to be tracked until it is closed
to the satisfaction of the quality assurance representative and the Director,
YMQAD.

If you have any questions, please contact either Robert B. Constable at
794-7945 or Fred H. Lofftus at 794-7190.

Richard E. Spence, Director
Yucca Mountain Quality Assurance Division

YMQAD:RBC-2341

Enclosure:
Surveillance Record YMP-SR-94-023

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

QUALITY ASSURANCE SURVEILLANCE RECORD

SURVEILLANCE DATA

¹ORGANIZATION/LOCATION:
Reynolds Electrical and
Engineering Company, Inc.
(REECO)/Yucca Mountain Site
(YMS)

²SUBJECT:
Pull Testing of Rock Bolts

³DATE: 1/21/94 through 2/25/94

⁴SURVEILLANCE OBJECTIVE:
To verify compliance to procedural and specification requirements for the load testing of rockbolts.

⁵SURVEILLANCE SCOPE:
The scope of the surveillance will consist of witnessing in place load testing of rockbolts within the Exploratory Studies Facility (ESF) and review of associated procedures and test records.

⁶SURVEILLANCE TEAM:
Team Leader:

Fred H. Lofftus
Additional Team Members:

Patout H. Cotter

⁷PREPARED BY:
F. H. Lofftus/P. H. Cotter
Surveillance Team Leader
1-20-94
Date

⁸CONCURRENCE:
[Signature]
QA Division Director
1-20-94
Date

SURVEILLANCE RESULTS

⁹BASIS OF EVALUATION/DESCRIPTION OF OBSERVATIONS:
See Pages 2 and 3

¹⁰SURVEILLANCE CONCLUSIONS:
See Page 4

¹¹COMPLETED BY:
F. H. LOFFTUS
Surveillance Team Leader
3/4/94
Date

¹²APPROVED BY:
[Signature]
QA Division Director
3/9/94
Date

9 BASIS OF EVALUATION/DESCRIPTION OF OBSERVATIONS

On January 21, 1994, load testing of rockbolts within the ESF performed by REECo, was observed. The process of reporting the results of testing was reviewed and verification of training of personnel and control of measuring and test equipment (M&TE) to applicable procedures, was performed during the month of February 1994.

During the course of the surveillance, selected requirements of Specification YMP-025-1-SP09, Revision 3, Section 02165, Rock Bolts and Accessories, and the procedures listed below were verified to assure compliance. The Requirements verified are listed in Attachment 1 of this report:

1. Procedure TC-581-TP-0002, Revision 1, Interim Change Notice (ICN) 1, Testing of Underground Rock Bolt Ground Support (SCP: 8.3.1).
2. Procedure MC-07.5, Revision 0, Test Control.
3. Procedure MC-10.0, Revision 1, Measuring and Test Equipment (SCP: N/A).
4. Procedure TC-581-SP-0011, Revision 2, Exploratory Studies Facility Ground Support (SCP: 8.3.1).
5. Procedure TC-515-CP-GEN-1, Revision 1, Measuring and Test Equipment - General (SCP: N/A).
6. Procedure TC-515-CP-PRES-1, Revision 0, Pressure Gauges 1-1000 psig (SCP: N/A).
7. Yucca Mountain Site Characterization Project (YMP) Inspection Checklist (IC), Control No. 0007, Revision 2, Rock Bolt Installation and Pull Testing.

The following personnel were contacted during the surveillance:

J. W. Hays, Quality Assurance, Management and Operating (M&O) contractor
D. L. Busick, Quality Control, REECo
S. L. Loftfield, Quality Control, REECo
R. Kehrman, Construction Department, REECo
A. R. Passalacqua, Architect/Engineer, M&O
B. Williams, Training Section, REECo
J. Keating, Field Engineering, REECo
G. Erickson, Physical Standards and Calibration Laboratory (PSCL), REECo
W. Glasser, Quality Assurance, REECo
D. Hembree, Superintendent, REECo

Visual observation consisted of witnessing the load testing of 11 cement grouted rockbolts (the specific rockbolts and the results of each test is listed in Attachment 1 to this report). During the observation, all procedural and specification requirements that were verified were found to be in compliance.

Documentation reviewed in addition to the procedures listed in Attachment 1, were Rock Bolt Installation and Testing Log (RBITL), Inspection Reports IC No. :0007, Revision 2, Issue No. :QC 0172, Training Records and Calibration Reports. The review of these documents disclosed that the requirements of the applicable procedure were being met with few exceptions. These exceptions were:

1. The RBITL and Inspection Reports did not identify the hydraulic jack (RH 303) as a piece of test equipment. They only identified the pressure gauge used.
2. Procedure TC-581-TP-0002, Revision 1, ICN 1 did not specify the accuracy of the pressure gauges. Note the gauge used was +/-100 psi full scale. If the gauge pressure was reading low i.e., 9600 psi was actually 9500 psi, the force on the bolt could have been as low as 55,950lb (9500 x 5.89, effective area of jack).

The acceptance force identified on the Inspection Report was 56,000 lbs. The minimum force as calculated per procedure and specification, is $91,000(\text{ys}) \times 680$ (bolt CS area) $\times .9 = 55,692$ lbs.

3. The current Calibration Report for gauge Y 10618 could not be found. The initial Calibration Report, dated March 26, 1993, was reviewed and found acceptable. Note procedure TC-515-CP-PRESS-1, Revision 0, states that it is only applicable to 1-1000 psig gauges, is in error. It should have stated it is applicable to 1-10,000 psig gauges. An ICN has been issued to correct this.
4. The Inspection Report IC No. :0007, Revision 2, Issue No. : QC-0172 identified the required and attained pull test load in units of psi instead of lbs. This report and the others are being revised prior to issue. Anticipated completion date is March 31, 1994.

Personnel interviews were conducted to determine the overall knowledge of individuals relative to procedural and specification requirements. As a result of these interviews, it was ascertained that personnel in charge of the load testing had an overall understanding and knowledge of procedural requirements and prerequisites. Training records for R. Kehrman, Engineer, REECo and D. Hembree, Superintendent, REECo, were verified as current relative to their training for procedure TC-581-TP-002.

10 SURVEILLANCE CONCLUSION

Based on observations of actual testing and review of procedures and records, the pull testing of rockbolts was in compliance with specification and procedure requirements except for the control of M&TE and two minor editorial errors which have been corrected. The conditions adverse to quality associated with the control of M&TE are described below and are documented on Corrective Action Request YM-94-024.

1. A current Calibration Report could not be found for pressure gauge Y 10618 to provide objective evidence that the calibration was current as stated on the sticker i.e., was calibrated on September 30, 1993 and recalibration was required by March 30, 1994.
2. The hydraulic jack should have been identified as a piece of testing equipment and submitted to PSCL with the pressure gauge.
3. The accuracy of the pressure gauge should have been specified in procedure TC-581-TP-0002, Revision 1.

ATTACHMENT 1

Specification and procedure requirements verified:

1. YMP-025-1-SP09, Revision 3, Section 02165, Paragraphs 3.0.2E 1, 2, and 3.
2. TC-581-TP-0002, Revision 1, ICN 1, Paragraphs 5.4, 5.5, 6.2.6, 6.3.1, 6.3.2, 6.3.2.2, 6.3.3, 6.6.5, 6.7.4, 6.8.1 and 6.9.
3. TC-581-SP-0011, Revision 2, ICN 1, Paragraphs 5.4, 6.5.1.8 and Exhibits I and II.
4. MC-10.0, Revision 1, Paragraphs 6.1, 6.2, 6.4 and 6.6.
5. TC-515-CP-GEN-1, Revision 1, Paragraph 6.1.10, Exhibit 1, Paragraphs 5.4.2 and 5.6.2.
6. YMP Inspection Checklist No. 0007, Revision 2 - Portions specific to pull testing and reporting results.
7. TC-515-CP-PRESS-1, Revision 0, Paragraphs 6.1.3 and 6.1.4.
8. Procedure MC-07.5, Revision 0, Paragraphs 6.3.4 and 6.5.

Rockbolts observed and documentation reviewed for:

<u>Rockbolt Ring No/offset</u>	<u>(Force) Pounds Attained</u>	<u>Accept/Reject</u>
3/RL3	56,000	Accept
13/R1	56,000	Accept
14/R2	56,000	Accept
16/RR2	56,000	Accept
17/RL3	56,000	Accept
17/RL2	56,000	Accept
26/RL1	56,000	Accept
27/RL2	56,000	Accept
29/RL1	56,000	Accept
30/RL1	56,000	Accept
30RCL	56,000	Accept

Based on a gauge reading of 9600 psi and an effective jack area of 5.89 in².