



Department of Energy
Washington, DC 20585

QA: L

FEB 04 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

VERIFICATION OF CORRECTIVE ACTION AND CLOSURE OF DEFICIENCY REPORT
(DR) YM-96-D-074 RESULTING FROM OFFICE OF QUALITY ASSURANCE (OQA)
SURVEILLANCE YMP-SR-96-019 OF SANDIA NATIONAL LABORATORIES

The OQA staff has verified the corrective action to DR YM-96-D-074 and determined the results to be satisfactory. As a result, the Corrective Action Report is considered closed.

If you have any questions, please contact either James Blaylock at (702) 794-1420 or Patout H. Cotter at (702) 794-1332.

Donald G. Horton, Director
Office of Quality Assurance

OQA:JB-0821

Enclosure:
DR YM-96-D-074

cc w/encl:

- T. A. Wood, DOE/HQ (RW-55) FORS
- J. O. Thoma, NRC, Washington, DC
- S. W. Zimmerman, NWPO, Carson City, NV
- B. R. Justice, M&O, Las Vegas, NV
- R. A. Morgan, M&O, Las Vegas, NV
- S. Y. Pickering, M&O/SNL, Albuquerque, NM, M/S 1395
- Records Processing Center =

cc w/o encl:

- W. L. Belke, NRC, Las Vegas, NV
- P. H. Cotter, OQA/QATSS, Las Vegas, NV
- D. G. Sult, OQA/QATSS, Las Vegas, NV
- R. W. Clark, DOE/OQA, Las Vegas, NV

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Recip: NMSS/HLUR



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PERFORMANCE/DEFICIENCY REPORT

1 Controlling Document:
Quality Assurance Requirements and Description document (QARD), Revision 5

2 Related Report No.
YMP-SR-96-019

3 Responsible Organization:
CRWMS M&O/SNL

4 Discussed With:
M. Brady

5 Requirement/Measurement Criteria:

1. QARD, Section 2.0, Paragraph, 2.2.1 "Quality Assurance Program Documents," states in part:

"B. Affected Organizations shall establish implementing documents applicable to their scope of work that translate Quality Assurance Requirements and Description (QARD) requirements into work processes."

QARD, Section 5.0, Paragraph 5.2, "Requirements," states, "Work shall be performed in accordance with controlled implementing documents."

6 Description of Condition:

1. Contrary to requirement #1 above, the generic procedures identified in Work Agreement (WA)-0065, Revision 4, effective 2/26/96, "Exploratory Studies Facility Design Verification Activities," lacked the specificity of an implementing document; i.e., technical procedure or scientific notebook, required for the scope of their blast monitoring program. It is recognized that SNL did develop a monitoring plan; however, this plan falls outside of the SNL Quality Program.

2. Contrary to requirement #2 above, Vibra-tech, of Louisville, Kentucky was not qualified by the SNL Quality Assurance organization or listed on the Office of Civilian Radioactive Waste Management Qualified Suppliers List prior to the performance of calibration services for seismograph, Serial Number 3861, used for collection of "Far Field" blast data by SNL.

7 Initiator
Patout H. Cotter *P.H. Cotter* Date 7/19/96

9 Is condition an isolated occurrence?
 Yes No Unknown; Must be Yes if PR

10 Recommended Actions: (Not required for PR)

Evaluate the deficiency, perform remedial action, investigate the extent of deficiency, and perform root cause analysis to determine how the condition came about.

11 QA Review
QAR *P.H. Cotter* Date 7/19/96

12 Response Due Date
20 working days from issuance

13 Affected Organization QA Manager Issuance Approval: (QAR for PR)

Printed Name Richard E. Spence Signature *R. E. Spence* Date 7/19/96

22 Corrective Actions Verified
QAR *P.H. Cotter* Date 12/20/96

23 Closure Approved by: (N/A for PR)
AOQAM *James Blaylock* Date 12/20/96

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rdc
12/21/96

PERFORMANCE/DEFICIENCY REPORT RESPONSE

14 Remedial Actions:

Remedial actions for the first and second condition are shown on the first and second continuation page, respectively.

15 Extent of Condition: (Not required for PR)

The extent of condition is described and evaluated for the first and second conditions on the first and second continuation page, respectively.

16 Root Cause Determination: (Not required for PR) Required Yes No

Justification for not requiring a root cause analysis is provided in the discussion of the Extent of Condition for each of the two conditions.

17 Action to Preclude Recurrence: (Not required for PR) Required Yes No

Justification for not requiring additional action to preclude recurrence is provided in the discussion of the Extent of Condition for the two conditions.

18 Corrective Action Completion Due Date:

8/21/96

19 Response by:

Initial
 Amended

F J Schellberg
Date 8/8/96

Phone 505 848 0643

20 Response Accepted

QAR

[Signature]

Date 8/9/96

21 Response Accepted (N/A for PR):

AOQAM

[Signature]

Date 8-12-96

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Block 5, Requirements: (continued)

2. QARD, Section 7.0, Paragraph 7.2.2A, states, "Supplier selection shall be based on an evaluation, performed before the contract is awarded, of the supplier's capability to provide items or services in accordance with procurement document requirements."

Administrative Procedure (AP) 7.4Q, Revision 1, Interim Change Number (ICN) 1, "Maintenance of the Office of Civilian Radioactive Waste Management Qualified Suppliers List," Paragraph 5.1.2, states, "The Affected Organization QA Department: ensures that the supplier is either recently qualified by their organization or listed on the QSL for the procurement document identified scope of work prior to procurement award . . ."

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MAC 12/20/96

Condition 1. (Continuation of Response)

14. Remedial Action:

Existing memoranda, which have been identified as providing descriptive planning information for the blast monitoring activity, will be corrected by 8/15/96 to identify these records as QA records, and the corrected records submitted to the Central Records Facility. Work Agreement WA-0065 will be revised by 8/21/96 to incorporate the following changes as a minimum: (a) to identify a specific Technical Procedure for vibration monitoring and damage assessment; (b) to provide for the use of one or more scientific notebooks for unique elements of the work, controlled in accordance with SNL QAIP 20-2, "Scientific Notebooks," and to specify a review frequency of the notebook content; (c) to identify specific planning documentation, such as memoranda that are transmitted to the the TCO as quality records, as an acceptable part of the planning process; and (d) to impose a management requirement to subject descriptive planning documentation for this activity to SNL technical, quality, and management review, and to identify the file location for this documentation.

15. Extent of Condition:

First, contrary to the Description of Condition above, a minimum of 16 controlled procedures are identified in the controlled Work Agreement as potentially applicable to the blast monitoring work, including 9 of SNL's Quality Assurance Implementing Procedures, through which SNL has acceptably implemented the QARD, and two SNL technical procedures that are directly used in fielding the blast monitoring task. Secondly, no evidence has been cited that indicates that these implementing documents were not used in the performance of this work. Therefore, it does not appear that the cited requirements have been violated.

However, the perception that more detailed planning documentation (QARD Section 2.2.5) and implementation controls (QARD Section 5.2.2) should be used for this highly visible activity appears justified. The monitoring plan cited in the Description of Condition, for example, should more properly be identified as a QA record, which would allow it to be used as evidence of satisfaction of the QARD Section 2.2.5 planning requirements. QARD Supplement III, "Scientific Investigations," permits the use of implementing documents (content governed by QARD Section 5.22), scientific notebooks (content governed by QARD Supplement III), or a combination of both for the performance of scientific investigations. To counter the perception that the implementing documents used for this work were not specific enough, therefore, a Technical Procedure based on the content of the monitoring plan will be developed and issued for the blast monitoring and damage assessment work; scientific notebooks (developed per QAIP 20-2) are anticipated for use in the more unique supporting tasks of Spectral Analysis of Surface Waves (SASW) and crosshole wave velocity measurements. Work Agreement WA-0065 will be revised accordingly. Similar actions will also be implemented to ensure adequate control of Task 5 of WA-0065.

Because the concern expressed is clear and limited to the specificity of implementing controls for the blast monitoring component of the construction monitoring activity of WBS 1.2.3.2.7.3.4, a root cause analysis and corrective action to preclude recurrence are not considered necessary.

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PLC 12/2/96

Condition 2. (Continuation of Response)

14. Remedial Action:

First, a QA record will be generated by 8/20/96 to describe the selection of Vibra-tech for the purchase of this instrumentation. Second, since it is preferable that Vibra-tech provide post-experiment calibration services, a request to add Vibra-tech to the Qualified Suppliers list for the purpose of providing calibration services for their seismographs will be made by 8/20/96 in accordance with AP-7.4Q. Third, the Technical Procedure being written as an implementing document for blast monitoring will include conducting basic instrument operational performance checks before use. And fourth, as a performance check for the cited instrument, if blast monitoring is conducted in the near future, the performance of the instrument will be compared with data acquired with similar instrumentation, which has been recently purchased and calibrated before use by SNL's Primary Standards Lab, which is on the QSL for such services. This performance check is schedule dependent, and final results will be provided in the blast monitoring report, which will be produced within 60 days of completion of the blasting activity.

15. Extent of Condition:

The P.I. had suggested Vibra-tech as a source of this equipment based on the Supplier's past history as a supplier of similar instrumentation. The P.I. understood that Vibra-tech had been qualified under an approved YMP QA Program in FY95. Documentation of this supplier qualification is available, as is documentation that the new instrument had been calibrated traceable to NIST standards; unfortunately, documentation of the P.I.'s justification of the supplier does not appear to exist.

Because this condition is quite limited in scope and does not appear to meet the definition of a deficiency, a root cause analysis and action to preclude recurrence are not needed.

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-- SUPPLEMENTAL RESPONSE 12/18/96 --
PDC
12/20/96

Condition 2.

Block 14. Remedial Actions (Supplementary to original response).

To supplement the actions defined in the original DR response, the following additional four actions were taken:

1. An attempt on November 25, 1996, by the SNL Primary Standards Laboratory to perform a calibration check on the Vibra-tech MultiSeis V (S/N#3861), in which the readout of the instrument and then the individual geophones composing the instrument were checked, was not successful. This first attempt was observed by J. Blaylock (YMQAD). Following discussion with Vibra-tech personnel and development of a modified testing setup, acceptable results were obtained on December 4, 1996 and documented in a PSL report. In the PSL test configuration, repeatable readings within the nominal 10% accuracy described in SNL Technical Procedure TP-252, "Blast Monitoring," for a peak velocity of 1 in/sec were obtained at 50 Hz. The P.I. has determined that this calibration check was satisfactory for the intended application, and that these data may be considered qualified.
2. The checklist used by Vibra-tech to calibrate the instrument was obtained and is included as an enclosure to a November 6, 1996 memorandum from Schelling to Alzvedo, "Request for YMP Calibration of the Vibra-tech MultiSeis V (S/N 3861)."
3. An action defined in the original response to request placing Vibra-tech on the Qualified Suppliers List was withdrawn at the request of YMQATSS; the action was completed per a November 27, 1996 letter, Schelling to Hudson, "Withdrawal of Request to Place Vibra-Tech on the Qualified Suppliers List."
4. A vugraph was prepared and used during a November 13, 1996 All-Hands meeting to train staff on the importance of procurement planning.

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Supplemental Response

MYL
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The following provides the basis of acceptance for the SNL calibration of the Vibrotech Multiseis V seismograph S/N 3861 conducted by SNL Primary Standard Laboratory (PSL).

1. No commercially available system provides a perfect (i.e. flat) frequency response over the entire frequency range (2 to 250Hz). Generally a limited flat center region with the response curve falling off at lower and higher extreme boundaries. The calibration of this type of system provided by the manufacturer and accepted by the blasting industry consisting of a Peak Particle Velocity (PPV) value of unity at a given frequency. This frequency is preferably in the range where most of the measured seismic energy will be encountered. Since all the energy will not be in the range where the response curve is flat (at unity), the manufacturer also provides an acceptable error (3dB) at the extreme frequency range. This type of error is expected by the blasting industry since the instruments do not have a perfectly flat frequency response.
2. The manufacturer originally provided a calibration which showed unity PPV at 15 Hz and an error band of 3dB in the frequency specifications at the extreme boundaries. This is the type of calibration information provided by the manufacturer for these instruments. The SNL-PSL provides a calibration of 0.94 PPV (within 10% of unity) at 50Hz for all three transducers in the seismograph. This shift in frequency response from 15Hz to 50Hz is actually more suitable for our application since most of our seismic energy is between 40 Hz and 90 Hz which is where we could prefer the flat region of the frequency response curve. The calibrations at other extreme frequencies are not unity but this is expected and would also be the case for the manufacturers calibration process. This behavior is recognized in the blasting industry and an associated error is incorporated into the expected results.
3. The effect of this expected error on the seismic results is minimal due to the following reasons. First, the seismic results are typically plotted in scaled distance vs. charge weight in logarithmic scale. Based on SNL-PSL calibration results an expected error range of +/-3% for our measure frequency range (40 to 90 Hz) was applied to our far-field data. The results show that inclusion of possible errors in the reported data is insignificant on our PPV vs. Scaled distance relationship (see Figures 1 and 2). Second, these measurements are conducted in a rock mass which generally possesses a large degree of variabilities in behavior and properties. This results in a certain scatter of the seismic data which is significantly greater than the measurement error inherent in the seismograph. Thus this instrument error is absorbed within the natural variability of the rock mass properties which results in a minimal impact on the final attenuation relationship.

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MYL
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Figure 1. PPV vs. Scaled Distance ($R/W^{1/2}$) for TTF AOD

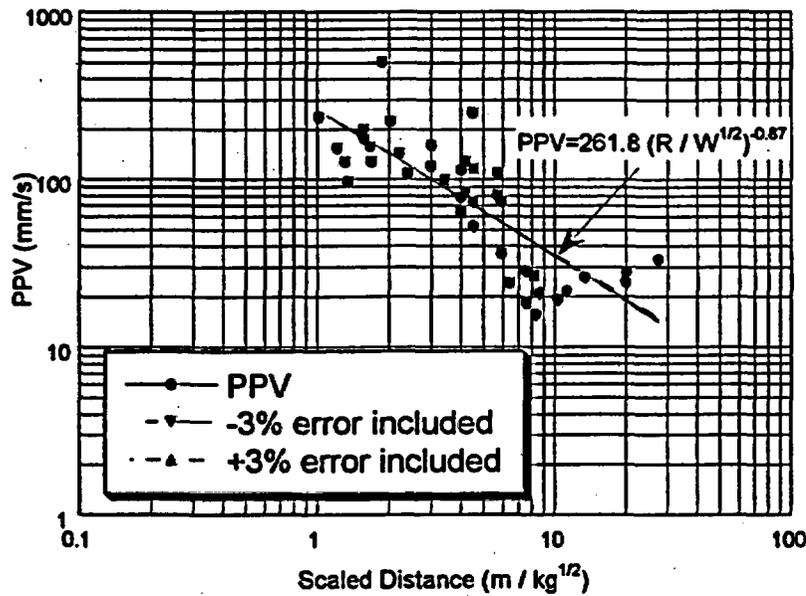
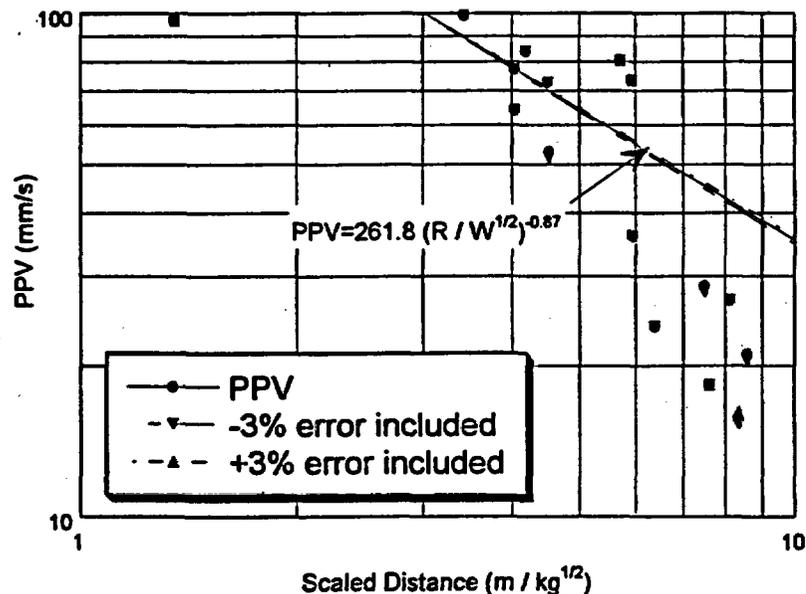


Figure 2. PPV vs. Scaled Distance ($R/W^{1/2}$) for TTF AOD
in the range of 10 - 100 mm/s PPV



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12/20/96

VERIFICATION STATEMENT FOR DR YMOAD-96-D-074

This DR is now considered closed based on the completion of all remedial actions identified in the initial response dated 8/896, Supplemental responses: transmitted 12/18/96 and 12/20/96


P. H. Cotter

12/20/96
Date

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Verification of Corrective Action - DR YM-96-D-074

Verification of this DR is based upon corrective action commitments made in the initial response (accepted 8/9/96) and two supplemental responses (submitted 12/18/96 and 12/20/96). The supplemental responses applied to Condition 2 only.

Condition 1.

Block 14. Remedial Action:

1. All memoranda identified as containing QA planning information for blast monitoring were corrected on 8/20/96 to reflect a QA designation and resubmitted as a corrected record.
2. Work Agreement WA-0065 was revised to Rev. 5, effective 8/23/96 to include TP-252, "Blast Monitoring"; provide for use of scientific notebooks; identify planning documentation to be submitted to the TCO; and provide for technical, quality, and management reviews of planning documentation (items a-d).

Block 15. Extent of Condition:

No additional actions were required based upon the approved response.

Blocks 16 & 17 were deemed were not considered necessary.

Condition 2

Block 14. Remedial Action:

Initial Response (8/9/96)

1. The response committed to generation of a QA record to describe the selection of Vibra-Tech for the purchase of instrumentation. This commitment was met based on SNL memorandum, Schelling to Data Set 55/F37-10/1/95, "Selection of Vibra-Tech as a Supplier of Instrumentation," dated 8/20/96.
2. The response committed to requesting that Vibra-tech be added to the Qualified Suppliers List as a supplier of calibration services. This request was made via SNL memorandum, Richards to Hudson, "Submittal of Supplier Evaluation Report for Inclusion of Vibra-Tech Engineers on the Qualified Suppliers List," dated 9/9/96. However, the request was withdrawn via SNL memorandum, Schelling to Hudson, "Withdrawal of Request to Place Vibra-Tech on the Qualified Suppliers List," dated 11/27/97. The decision to withdraw the request was based on a decision to have the instrument calibrated by PSL rather than Vibra-Tech, and was discussed in the supplemental response submitted 12/18/96.
3. The response committed to writing a Technical Procedure to include instrument operational performance checks before use. SNL Technical Procedure TP-252, "Blast Monitoring" was effective 8/23/96, and includes a reference to performance of instrument calibration/performance checks in accordance with TP-237, "Installation and Verification of Instrumentation Wiring."
4. The performance of comparison checks with data from similar instrumentation was completed as committed. The results were reported and discussed in the TDIF 305877, "Blast Monitoring in the North Ghost Dance Fault Alcove," DTN SNF371000195001.002.

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Supplemental Responses

Supplemental response (12/18/96) documented that a calibration check of the suspect instrument was performed by SNL PSL with satisfactory results. Supplemental response (12/20/96) provides the basis for acceptance of the PSL calibration. Based upon the results, the collected data was not impacted by the calibration status of the instrument; therefore, the data is considered by SNL to be qualified.

These supplemental responses provide additional information; however, other than the decision to have the instrument calibrated by PSL rather than Vibra-tech, there was no change in commitment from the initial response.

Block 15. Extent of Condition

No additional actions were required based upon the approved response.

Blocks 16 & 17 were not considered necessary.

Based upon the above verification, this DR is closed.



Patout H. Cotter, QAR

1/28/97

Date