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

QA: L

SEP 22 1994

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

PARTIAL VERIFICATION OF CORRECTIVE ACTION FOR CORRECTIVE ACTION REQUEST (CAR) YM-94-066 RESULTING FROM YUCCA MOUNTAIN QUALITY ASSURANCE DIVISION (YMQAD) AUDIT YMP-94-01 OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT SYSTEM MANAGEMENT AND OPERATING CONTRACTOR (SCPB: N/A)

The YMQAD staff has partially verified the corrective action to CAR YM-94-066 and determined the results to be satisfactory for completion of remedial actions 1a and 1b to extent of deficiency. However, the CAR will not be closed until all corrective actions are complete.

If you have any questions, please contact either Robert B. Constable at 794-7945 or Robert L. Howard at 794-7820.

Catherine Hampton for
Richard E. Spence, Acting Director
Yucca Mountain Quality Assurance Division

YMQAD:RBC-5154

Enclosure:
CAR YM-94-066

cc w/encl:
T. A. Wood, HQ (RW-14) FORS
R. L. Johnson, NRC, Washington, DC
S. W. Zimmerman, NWPO, Carson City, NV
R. L. Robertson, M&O/TRW, Vienna, VA
R. P. Ruth, M&O/TRW, Las Vegas, NV
Richard Jiu, M&O/Duke, Las Vegas, NV

cc w/o encl:
W. L. Belke, NRC, Las Vegas, NV
D. G. Sult, YMQAD/QATSS, Las Vegas, NV

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THIS IS A RED STAMP

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

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CORRECTIVE ACTION REQUEST

1 Controlling Document
OCRWM QARD, DOE/RW-0333P, Revision 01

2 Related Report No.
YMP-94-01

3 Responsible Organization
M&O

4 Discussed With
C. Statton/E. Distel

5 Requirement:

NLP-3-16, Revision 0, Paragraph 5.2.2 requires TIE reviews in accordance with the TIE Attachment II. Attachment II, Item 8 requires applicability and completeness of stated limitations of the technical work. Paragraph 5.3.2 requires the Site Characterization Manager to examine the TIE to determine that it conforms to requirements,...that the TIE, WIE and DIE preparers worked together to resolve any discrepancies with waste isolation and determination

6 Adverse Condition:

TIE for the Tunnel Boring Machine (TBM) Operation, Utilities Installation and Support for TBM Operation for Construction of the North Ramp of the Exploratory Studies Facility-Design Package 2C DI#BAB000000-01717-2200-00001, dated 6/24/94, Page 22 of the TIE states that "As long as the controls identified in this test interference evaluation are adhered to, either no construction to test, installation to test, and operation to test results are expected, or interference can be adequately identified in test results for those tests planned within the conceptual repository parameter drift boundary." Not all of the controls identified in the TIE have been incorporated into the DIE. No evaluation has been performed to determine the test interference impacts resulting from not adhering to the controls specified.

9 Does a Significant Condition Adverse to Quality exist? Yes___ No X
If Yes, Check One: ☐A ☐B ☐C ☐D ☐E

10 Does a stop work condition exist? Yes___ No X ; If Yes - Attach copy of SWO
If Yes, Check One: ☐A ☐B ☐C

3 Response Due Date: 20 Working Days From Issuance

11 Required Actions: ☒ Remedial ☒ Extent of Deficiency ☒ Preclude Recurrence ☐ Root Cause Determination

12 Recommended Actions:

7 Initiator
Robert L. Howard [signature] 8/3/94

14 Issuance Approved by:
QADD [signature] for Date 8.5.94

15 Response Accepted
QAR [signature] Date 8/19/94

16 Response Accepted
QADD [signature] for Date 8.24.94

17 Amended Response Accepted
QAR Date

18 Amended Response Accepted
QADD Date

19 Corrective Actions Verified
QAR Date

20 Closure Approved by:
QADD Date

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CORRECTIVE ACTION REQUEST (CONTINUATION PAGE)

5 Requirements (continued)

of importance evaluations of the same or similar activities, items, and facilities, including TFM use.

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CORRECTIVE ACTION REQUEST (CONTINUATION PAGE)

Corrective Action Report YM-94-066:

Remedial Action:

Background. This Corrective Action Report was written because some recommended Test Interference controls for Package 2C were not incorporated into the Determination of Importance QA requirements. As NLP-3-16 states the Site Characterization Manager shall determine that TIE, WIE and DIE preparers worked together to resolve any discrepancies, one might assume that all TIE recommended controls would be incorporated into DIE QA requirements. This, however, is not required to mitigate the potential for undetected test interference.

The purpose of a Test Interference Evaluation is (1) to examine testing, construction, and operational activities with respect to their potential to cause test interference and (2) recommend controls that either (a) mitigate the potential for test interference or (b) allow test interference to be identified if it occurs. The recommended controls in TIEs do not ensure that test interference will be avoided, but rather represent ways in which the possibility of undetected test interference can be lowered. As test interference is not the only concern in carrying out site characterization (other concerns are practicality, constructibility, cost-effectiveness), it is not unexpected that some recommended controls will not be implemented as QA requirements.

To address the issue of recommended TIE controls that are not adopted as QA requirements in the DIE, the following remedial action will be taken: For controls not implemented as QA requirements in the DIE, a qualified TIE preparer will review the potential impact of the unimplemented controls and, if deemed necessary, notify potentially affected testing organizations. Specifically:

(a) For those controls recommended in the TIE for Package 2C that were not implemented by the DIE, review the impact of the unimplemented controls and, if deemed necessary, notify potentially affected testing organizations in writing. The review of impacts will be documented in a memorandum to file. (Biggar, to be completed by 26 August 1994).

(b) Compare the TIE for the Procurement of Materials for the Surface and Subsurface Conveyor Belt System with the Package 2C DIE to determine if any recommended controls were excluded. If any recommended controls were not implemented, review their impact and, if deemed necessary, notify potentially affected testing organizations in writing. The review of impacts, if required, will be documented in a memorandum to file. (Biggar, to be completed by 26 August 1994)

(c) Examine other DIEs to determine whether all TIE recommended controls were implemented. Document the results of the examination in a memorandum to file. For any recommended controls that were not implemented by the DIE, review their impacts and, if deemed necessary, notify potentially affected testing organizations in writing. The review of impacts, when required, will be documented in a memorandum to file. (Biggar, to be completed 30 October 1994).

8/17/94 LV.SC.CTS.8/94-099

CORRECTIVE ACTION REQUEST (CONTINUATION PAGE)

Extent of the Deficiency:

(a) For the Test Interference Evaluation (TIE) for TBM Operation, Utilities Installation, and Support for TBM Operation for Construction of the North Ramp of the Exploratory Studies Facility (M&O Design Package 2C), six recommended controls were not implemented by the DIE. The test interference impact of excluding these six recommended controls is provided below:

Recommended Control: Section III,B - Activity-Specific Controls, Part 6

"Provide means for visual inspection and/or electrical sensors beneath the pre-cast invert sections to detect water and/or other fluids which may collect in various intervals of the tunnel bottom, to allow potential ponding to be mitigated to the extent practical".

Exclusion of this recommended control will not have a test interference impact because of the following design parameters:

1. The pre-cast invert segments will have visual inspection ports in various sections of the North Ramp interval or such inspection ports can be drilled, if required.

2. Periodic visual inspections can be carried out through visual inspection ports as part of tunnel support operations.

Recommended Control: Section III, A - Higher-Level Requirements-Derived Controls, Part 1

"Critical communications and data circuits shall be protected or shielded from electromagnetic interference from sources within the ESF, and from external sources to the extent specified by manufacturers of sensitive data processing and communications equipment used in the system. (ESFDR 3.2.1.15, Part A)"

Exclusion of this control from the DIE will not impact test interference because, as pointed out in the DIE, this control more appropriately belongs in relevant Test Planning Packages that will be developed for testing in the ESF. More specifically:

1. The Test Coordination Office for the ESF Program has identified that testing equipment can be relocated should measurements of electromagnetic fields indicate that interference could occur.

2. The Testing Organizations have requested that any determination of electromagnetic disturbance be done by designated scientists involved in the ESF Program.

This evaluation also applies to the excluded recommended control in TIE Section III, C.2.d.

Recommended Control Section III.B - Activity Specific Controls, Part 3

"Monitor dust suppression water applied at the conveyor transfer points to prevent excess water from overflowing the conveyor belt and spilling onto the tunnel floor".

CORRECTIVE ACTION REQUEST (CONTINUATION PAGE)

Exclusion of this recommended control will not impact test interference because of the design of the conveyor system transfer chutes and water metering at the spray heads.

Recommended Control Section III.B - Activity Specific Controls, Part 4

"Any perched water samples collected from inflow into the North Ramp tunnel shall be also evaluated for possible drilling polymer content, drilling mud contamination, and tracer presence".

Exclusion of this control from the DIE will not impact test interference because, as pointed out in the DIE, this control more appropriately belongs in relevant Test Planning Packages that will be developed for testing in the ESF.

Recommended Control Section III.B - Activity Specific Controls, Part 5

"Means shall be provided for disposal of oil/water contamination that are removed from compressed air".

As pointed out in the DIE, this excluded control will not impact test interference because of the stipulated design controls for the Wastewater Removal System.

(b) For the Test Interference Evaluation (TIE) for Procurement of Materials for the Surface and Subsurface Conveyor Belt System, one recommended controls was not implemented by the DIE. The test interference impact of excluding this recommended control is provided below:

Recommended Control Section III, Part 6

"Procurement of the spray headers of the dust control and suppression system shall ensure a calibrated method of measuring water usage. The calibrated method is intended to check, standardize, and systematically adjust measurements made by the flow meter".

As pointed out in the DIE, this excluded control will not impact test interference because the water used to suppress dust in the conveyor system will be carried out with the muck.

(c) The extent of the deficiency with respect to other DIE/TIEs will be identified in the remedial action undertaken under (c), described above.

Preclude Recurrence:

Revise NLP-3-16 to add an additional step in which DIEs are examined to determine which TIE recommended controls were implemented as QA requirements. For those controls that are not implemented by the DIE, review their impact and, if deemed necessary, notify affected testing organizations. In addition, revise NLP-3-16 to require that recommended controls be described in terms of potential test interference impacts and to require that quantitative or qualitative bases for the recommended controls be provided. (Biggar, to be completed by November 30, 1994).

CTStatton
Responsible Manager, C. Thomas Statton

17 August 94
Date

MEMORANDUM TO FILE

To: File Date: 26 August, 1994

From: Norma Biggar

Subject: Review of Impacts caused by Deficiency Identified in CAR YM-94-066

This Memorandum to File addresses two of the three remedial action items identified in response to Corrective Action Report (CAR) No. YM-94-066.

Background. The Corrective Action Report was written because some recommended Test Interference controls for Package 2C were not incorporated into the Determination of Importance QA requirements. As NLP-3-16 states that the Site Characterization Manager shall determine that TIE, WIE and DIE preparers worked together to resolve any discrepancies, one might assume that all TIE recommended controls would be incorporated into DIE QA requirements. This, however, is not required to mitigate the potential for undetected test interference.

The purpose of a Test Interference Evaluation is (1) to examine testing, construction, and operational activities with respect to their potential to cause test interference and (2) to recommend controls that either (a) mitigate the potential for test interference or (b) allow test interference to be identified if it occurs. The recommended controls in TIEs do not ensure that test interference will be avoided, but rather represent ways in which the possibility of undetected test interference can be lowered. As test interference is not the only concern in carrying out site characterization (other concerns are practicality, constructibility, cost-effectiveness), it is not unexpected that some recommended controls will not be implemented as QA requirements.

To address the issue of recommended TIE controls that are not adopted as QA requirements in the DIE, it was agreed with YMQAD that the following remedial actions were to be taken: For controls not implemented as QA requirements in the DIE, a qualified TIE preparer will review the potential impact of the unimplemented controls and, if deemed necessary, notify potentially affected testing organizations. Two of the three specific actions that were identified are:

(a) For those controls recommended in the TIE for Package 2C that were not implemented by the DIE, review the impact of the unimplemented controls and, if deemed necessary, notify potentially affected testing organizations in writing.

(b) Compare the TIE for the Procurement of Materials for the Surface and Subsurface Conveyor Belt System with the Package 2C DIE to determine if any recommended

controls were excluded. If any recommended controls were not implemented, review their impact and, if deemed necessary, notify potentially affected testing organizations in writing.

The results of these reviews are reported below:

A. Review of TIE for Package 2C

For the Test Interference Evaluation (TIE) for TBM Operation, Utilities Installation, and Support for TBM Operation for Construction of the North Ramp of the Exploratory Studies Facility (M&O Design Package 2C), six recommended controls were not implemented by the DIE. The test interference impact of excluding these six recommended controls is provided below:

1. Recommended Control: Section III,B - Activity-Specific Controls, Part 6

   "Provide means for visual inspection and/or electrical sensors beneath the pre-cast invert sections to detect water and/or other fluids which may collect in various intervals of the tunnel bottom, to allow potential ponding to be mitigated to the extent practical".

   Exclusion of this recommended control will not have a test interference impact because of the following design parameters:

   - The pre-cast invert segments will have visual inspection ports in various sections of the North Ramp interval or such inspection ports can be drilled, if required.

   - Periodic visual inspections can be carried out through visual inspection ports as part of tunnel support operations.

2. Recommended Control: Section III, A - Higher-Level Requirements-Derived Controls, Part 1

   "Critical communications and data circuits shall be protected or shielded from electromagnetic interference from sources within the ESF, and from external sources to the extent specified by manufacturers of sensitive data processing and communications equipment used in the system. (ESFDR 3.2.1.15, Part A)"

   Exclusion of this control from the DIE will not impact test interference because, as pointed out in the DIE, this control more appropriately belongs in relevant Test Planning Packages that will be developed for testing in the ESF. More specifically:

- The Test Coordination Office for the ESF Program has identified that testing equipment can be relocated should measurements of electromagnetic fields indicate that interference could occur.

- The Testing Organizations have requested that any determination of electromagnetic disturbance be done by designated scientists involved in the ESF Program.

3. The above evaluation also applies to the excluded recommended control in TIE Section III, C.2.d.

4. Recommended Control Section III.B - Activity Specific Controls, Part 3

   "Monitor dust suppression water applied at the conveyor transfer points to prevent excess water from overflowing the conveyor belt and spilling onto the tunnel floor".

   Exclusion of this recommended control will not impact test interference because of the design of the conveyor system transfer chutes and water metering at the spray heads.

5. Recommended Control Section III.B - Activity Specific Controls, Part 4

   "Any perched water samples collected from inflow into the North Ramp tunnel shall be also evaluated for possible drilling polymer content, drilling mud contamination, and tracer presence".

   Exclusion of this control from the DIE will not impact test interference because, as pointed out in the DIE, this control more appropriately belongs in relevant Test Planning Packages that will be developed for testing in the ESF.

6. Recommended Control Section III.B - Activity Specific Controls, Part 5

   "Means shall be provided for disposal of oil/water contamination that are removed from compressed air".

   As pointed out in the DIE, this excluded control will not impact test interference because of the stipulated design controls for the Wastewater Removal System.

B. Review of TIE for the Procurement of Materials for the Conveyor Belt System

For the Test Interference Evaluation (TIE) for Procurement of Materials for the Surface and Subsurface Conveyor Belt System, one recommended controls was not implemented by the DIE. The test interference impact of excluding this recommended control is provided below:

1. Recommended Control Section III, Part 6

"Procurement of the spray headers of the dust control and suppression system shall ensure a calibrated method of measuring water usage. The calibrated method is intended to check, standardize, and systematically adjust measurements made by the flow meter".

As pointed out in the DIE, this excluded control will not impact test interference because the water used to suppress dust in the conveyor system will be carried out with the muck.

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CORRECTIVE ACTION REQUEST (CONTINUATION PAGE)

Verification of Partial Remedial Action for CAR YM-94-066

The following two remedial action commitments are applicable to Release of Package 2C:

a)"for those controls recommended in the TIE for package 2C that were not implemented by the DIE, review the impact of the unimplemented controls and, if deemed necessary, notify potentially affected testing organizations in writing."

b)"Compare the TIE for the Procurement of Materials for the surface and Subsurface Conveyor Belt System with Package 2C DIE to determine if any recommended controls were excluded. If any recommended controls were not implemented, review their impact and, if deemed necessary, notify potentially affected testing organization in writing."

YMQAD staff has reviewed the memorandum from Norma Biggar to File dated August 26, 1994 "Review of Impacts caused by Deficiency identified in CAR YM-94-066" The memo identifies those requirements identified in the TIE for Package 2C and the TIE for the Procurement of Materials for the Surface and Subsurface conveyor Belt System not implemented by the DIE for Package 2C. The evaluation concluded that no impacts to test interference resulted in not implementing the proposed controls. The evaluation is consistent with the evaluation documented formally in the CAR Response under "Extent of Deficiency". Since no impacts were identified, there was no need to identify the testing This is considered satisfactory for completion of remedial actions 1a and 1b to extent of deficiency.

Robert L. Howard

Robert L. Howard

9/20/94

Date