



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 15 1994

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 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

EVALUATION OF RESPONSE TO CORRECTIVE ACTION REQUEST (CAR)
 YM-94-072 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 evaluated the response to CAR YM-94-072. The response has been determined to be satisfactory. Verification of completion of the corrective action will be performed after the effective date provided. Any extension to this date must be requested in writing, with appropriate justification, prior to the date. Please send a copy of extension requests to Deborah Sult, YMQAD/QATSS, 101 Convention Center Drive, Suite 640, Las Vegas, Nevada 89109.

If you have any questions, please contact either Robert B. Constable at 794-7945 or Richard E. Powe at 794-7749.

Robert B. Constable for

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

YMQAD:RBC-5064

Enclosure:
 CAR YM-94-072

- 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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**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
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3 Responsible Organization M&O	4 Discussed With J. Pye/S. Bonabien
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5 Requirement:

1) QARD, Section 3.2.1.B states: "Design input shall be specified and approved on a timely basis and to the level of detail necessary to permit the design work to be carried out in a correct manner that provides a consistent basis for making design decisions, accomplishing design verification, and evaluating design changes." (Continued on next page)

6 Adverse Condition:

A lack of documentation exists describing the rationale for making assumptions and selecting data.

Discussion:

Examples of the lack of documentation are:

Structure Steel Sets Analysis, BAEAB000-01717-0200-0002, Revision 00:

- No rationale for selection of a conservative "rock raveling" value in Attachment I, Page I-1.
- No rationale for the selection of conservative "Rock Conditions" as presented in Attachment 1, Table 3.
- No rationale for selecting conservative seismic mean peak horizontal acceleration (0.37) as presented in Attachment II, Table 1.

9 Does a Significant Condition Adverse to Quality exist? Yes ___ No <u>X</u> If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	10 Does a stop work condition exist? Yes ___ No <u>X</u> ; If Yes - Attach copy of SWO If Yes, Check One: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C	3 Response Due Date: 20 Working Days From Issuance
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11 Required Actions: Remedial Extent of Deficiency Preclude Recurrence Root Cause Determination

12 Recommended Actions:
Revise the Structural Steel Sets Analysis to document the rationale for the selection of appropriate conservative data and assumptions.

7 Initiator William R. Sublette <i>WR Sublette</i> 8-3-94	14 Issuance Approved by: QADD <i>[Signature]</i> for Date 8-8-94
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15 Response Accepted QAR <i>R. Stone</i> Date 9/12/94	16 Response Accepted QADD <i>[Signature]</i> for Date 9-14-94
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17 Amended Response Accepted QAR Date	18 Amended Response Accepted QADD Date
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19 Corrective Actions Verified QAR Date	20 Closure Approved by: QADD Date
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CORRECTIVE ACTION REQUEST (CONTINUATION PAGE)

5 Requirements (continued)

- 2) QARD, Section 3.2.2G states: "Design documents shall be sufficiently detailed as to purpose, method, assumptions, design input, references, and units such that a person technically qualified in the subject can understand the documents and verify their adequacy without recourse to the originator." (Also see M&O QAP-3-9, Revision 3, Attachment I, Paragraph 10)

RESPONSE TO CAR NO. YM-94-072

Remedial Action:

Structural Steel Sets Analysis, BABEA0000-01717-0200-00002, Revision 00 will be revised and checked to ensure explanations supporting the engineering judgment used in the preparation of the analysis are present.

No deficiency exists for Item 3. The ESFDR contains the 0.37g as a requirement for ESF Design.

Extent of Deficiency:

The investigative actions performed by J. Pye and S. Bonabian and the conclusions reached regarding Structural Steel Sets Analysis for response to CAR YM-94-072 are as follows:

Item 1: Engineering judgment was used to reduce the in situ bulk density from 137 lbs/cu ft to 120 lbs/cu ft as a result of the effects of disturbance during tunneling which is a reasonable assumption and consistent with typical published ranges of bulk densities. This was explained in the analysis as a 12% reduction in bulk density.

Item 2: A load factor was identified from a standard classical reference - "Rock Tunneling with Steel Supports", 1946 by Proctor and White, published by Commercial Shearing Inc., by the Geotechnical LDE as indicated in Attachment 1 of the Structural Steel Sets Analysis BABEAB000-01717-0200-00002.

The load factor of 0.25B with the corresponding description, "Massive moderately jointed" with a propensity for loads to change erratically from point to point were selected on the basis of engineering judgment and field inspection of trench NRT-1, taking into account the geomechanical properties of the Pre-Rainier Mesa material, method of excavation, excavation rate and support installation capabilities of the TBM. Also taken into consideration was the fact that the referenced material is based on 50 year old tunneling technology and practice and as such is not representative of the rapid excavation and support technology employed by the YMP TBM system. The Structural Steel Sets Analysis BABEAB000-01717-0200-00002, Attachment I has been revised to include an explanation based on the above.

Item 3: The use of 0.37g is consistent with the ESFDR seismic design criteria. No deficiency exists.

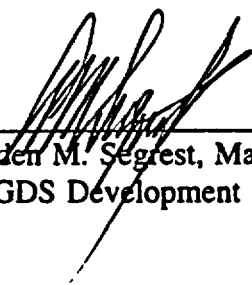
Review indicates that the deficiency does not extend to the 2C Early Release products.

Corrective Action to Preclude Recurrence:

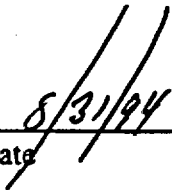
Assumptions and data used as input to design analyses based on engineering judgment will be explained in sufficient detail to clarify any subjective assessments, to the extent that a person technically qualified in the subject can understand the documents and verify their adequacy without recourse to the originator.

A documented training session will be conducted for all subsurface designers that are or will be involved in the preparation of analysis stressing the importance of providing the basis for assumptions and selecting data. Refer to QAP-3-9 Attachment I Item 7 requirements.

Responsible Individual: Bob Saunders
Date of Completion: 9/30/94



Alden M. Segrest, Manager
MGDS Development



Date

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CORRECTIVE ACTION REQUEST (Continuation Page)

1. AMENDED CORRECTIVE ACTION RESPONSE FOR CAR NO. YM-94049

- A. **REMEDIAL ACTION:** The Quality Assurance Management Information Reports generated under revision 3 of QMP-16.03, prior to the modification discussed under Corrective Actions to Prevent Recurrence, will be amended as necessary. The amendments will:
- o Discuss any differences in approach used in those reports and the approach specified in the modified QMP-16.03.
 - o Clearly identify any trends (using the criteria in the modified procedure) evident during those time periods, and
 - o State what actions are being taken in regards to those trends (which will be in compliance with the procedure as modified).
- B. **EXTENT OF DEFICIENCY:** There have been three quarterly Quality Assurance Management Information Reports produced under QMP-16.03, R3 prior to modification.
- C. **ROOT CAUSE DETERMINATION:** Not required.
- D. **CORRECTIVE ACTION TO PREVENT RECURRENCE:** YMP-USGS QMP-16.03, R3 will be modified to include qualitative criteria for trend identification and to change the definition of "condition adverse to quality" to become insistent with the QARD.
2. For each action above, identify the name of the individual assigned responsibility for completion of the action and the anticipated (or actual, if complete) completion date.

1.A. N.R. Karas

10/15/94

1.D. N.R. Karas


10/03/94

3. RESPONSE APPROVED:



Thomas H. Chaney
YMP-USGS Quality Assurance Manager

8/25/94
Date



Larry R. Hayes
Chief, Yucca Mountain Project Branch

8/23/94
Date