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

WBS 1.2.9.3

AUG 2 0 1992

Richard L. Bullock
Technical Project Officer
for Yucca Mountain
Site Characterization Project
Raytheon Services Nevada
101 Convention Center Drive
Phase II, Suite P-250
Las Vegas, NV 89109

EVALUATION OF RESPONSE TO CORRECTIVE ACTION REQUEST (CAR) YM-92-050 RESULTING FROM YUCCA MOUNTAIN QUALITY ASSURANCE DIVISION (YMQAD) AUDIT YMP-92-18 OF RAYTHEON SERVICES NEVADA (RSN)

The YMQAD staff has evaluated the response to CAR YM-92-050. The response has been determined to be unsatisfactory based on the following:

1. RSN Project Procedure 03-03, Revision 0, Procedure Interim Changes 1-3, titled "Analysis and Studies," Section 6.5.5, Assumptions, states in part, "The originator may have to make assumptions which are not clearly identified as controlled by the design inputs or other source of information. These assumptions, along with the bases for the assumptions must be clearly stated within the analysis . . . ."

2. A search of Nuclear Quality Assurance 1 and industries standards American National Standards Institute (ANSI) N18.7, Section 5.27.2, ANSI N45.2.11, Section 6.3.1, and the American Society of Mechanical Engineers Code, Section III, NCA-4000, Article 4134.3(a), contain identical requirements: "Are assumptions necessary to perform the design adequately described and reasonable."

3. The Quality Assurance Program Description Document (DOE/RW-0215), Section 3, paragraph 3.2.3(b), states in part, "Sufficient detail as to purpose, method, assumptions, design input, references and units to enable an individual technically qualified in the subject, to review and understand the analysis and verify adequacy without recourse to the originator."

   With the bases for the assumption described as engineering judgment, the reviewer must take the assumption for granted as a statement of fact unless the reviewer confers with the designer. This does not meet the intent of the cited requirements.

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4. The RSN response, Section B, states that the RSN Design Department does not concur with the CAR finding as described in YM-92-050, because the examples are misleading in that not all values stated are assumptions, rather, some are calculated results using assumptions.

   The YMQAD disagrees with this statement. The ST-MN-209, Revision A, Table 2, Joint Friction Angle, started with an assumption in which calculations were run to provide the 30.96 degree results. This is still an assumption, even though RSN thinks it is misleading, the resultant angle will still require verification because it is based on an assumption.

5. The term "Engineering Judgment" does not, in the opinion of YMQAD, appear to satisfy the stated requirements and is open to interpretation. Either meet the requirement in the text of the procedure, or clarify the requirement.

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, Science Applications International Corporation, Las Vegas, Nevada. 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 Donald J. Harris at 794-7356.

R.E. Spence

Richard E. Spence, Director
Yucca Mountain Quality Assurance Division

YMQAD:RBC-5094

Enclosure:
CAR YM-92-050

cc w/encl:
K. R. Hooks, NRC, Washington, DC
S. W. Zimmerman, NWPO, Carson City, NV
M. J. Regenda, RSN, Las Vegas, NV
J. H. Rusk, MACTEC, Las Vegas, NV
N. J. Brogan, SAIC, Las Vegas, NV, 517/T-12
W. B. Simecka, YMP, NV

cc w/o encl:
J. W. Gilray, NRC, Las Vegas, NV

ORIGINAL
THIS IS A RED STAMP

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

8 CAR NO.: YM-92-050
DATE: 6/26/92
SHEET: 1 OF 2
QA

CORRECTIVE ACTION REQUEST

1 Controlling Document
QAPD-002, Rev 0, Change Notice B; PP-03-03, Rev 0 PIC 1, 2, & 3

2 Related Report No.
Audit YMP-92-18

3 Responsible Organization
RSN

4 Discussed With
B. Stanley, A. Ali

5 Requirement:

1. QAPD Section 3, Paragraph 3.2.3-b, states in part; "Includes the following features; b- Sufficient detail as to purpose, method, assumptions, design input, references and units to enable an individual technically qualified in the subject to review and understand the analysis and verify adequacy of the results without recourse to the Originator."

   PP-03-3, Rev. 0, PIC 1, 2 & 3 Analysis and Studies

2. PP-03-03, Para, 6.5.5. states: "Assumptions - In order to complete the analysis , the Originator may have to make assumptions which are not clearly identified or controlled by the design inputs or other sources of information. These assumptions, along with the basis for the assumptions, must be clearly stated within the analysis. Those assumptions which require verification as the design proceeds must be identified. The assumptions used must be listed in

6 Adverse Condition:

Contrary to the stated requirements, inadequate justification was provided for how some design input rock mechanics properties were assumed. The Originator of Design Analysis ST-MN-209 (Highwall Stability Analysis) justified the selection of certain rock mechanics properties by stating their selection was based on "engineering experience."

Example of inadequately justified assumptions are as follows:

Design Analysis ST-MN-209, Rev. A, p. 8
Rock Mass Tensile Strength = 10 MPa.
Joint Cohesion = 1 MPa
Joint Friction Angle = 30.96
Joint Tensile Strength= 0.5 MPa
Joint Angle = 80

9 Does a significant condition adverse to quality exist? Yes___ No_X_
If Yes, Circle One: A B C

10 Does a stop work condition exist? Yes___ No_X_; If Yes - Attach copy of SWO
If Yes, Circle One: A B C D

11 Response Due Date: 20 days from issuance.

12 Required Actions: [X] Remedial [X] Extent of Deficiency [X] Preclude Recurrence [ ] Root Cause Determination

13 Recommended Actions:

7 Initiator D. Harris D. M. Harris Date 7-1-92	14 Issuance Approved by: QADD [signature] Date 7/6/92
15 Response Accepted QAR Date	16 Response Accepted QADD Date
17 Amended Response Accepted QAR Date	18 Amended Response Accepted QADD Date
19 Corrective Actions Verified QAR Date	20 Closure Approved by: QADD Date

REV. 08/91

ENCLOSURE

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

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QA

CORRECTIVE ACTION REQUEST (Continuation Page)

5 Requirements (continued)

this section and the pages or paragraphs where the assumptions are located shall be annotated in this section."

6 Adverse Condition (continued)

Design Analysis ST-MN-217, Rev A, p. 2
Tensile Strength of the rock mass = 10 MPa

By simply stating that "engineering experience" was used to make design input assumptions does not provide a clear description of the basis for the assumption selection as described in PP-03-03, Section 6.5.5.

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CORRECTIVE ACTION REQUEST (Continuation Page)

A. Remedial

For the analyses already performed and in place, RSN will not change the wording of "engineering judgement" as the basis for assumptions. Assumptions made in these analyses have been identified as needing to be verified prior to use for their intended purpose. Parameters used in stability analyses will be correlated with field data from final soils and rock investigative reports, and changed of necessary.

B. Extent of Deficiency

The RSN design department does not concur with the CAR finding as described in YM-92-050. The examples given are misleading in that not all values stated are assumptions, rather, some are calculated results from using an assumption. The issue remains whether the reason for choosing an assumed value given as "engineering experience" is an adequate basis for selection. The source for rock mechanics properties as shown in the CAR is the Reference Information Base (RIB) which gives a range of values for a given geologic unit. The design process should have values that are more location specific, such as for opening stability analysis of the ramp portal. These parameters are scheduled to be determined through a rock and soil program that derives the values from actual site specific pits and drill holes. The results from these investigations have not yet been supplied for use in the analyses. Until then, assumed values must be used and tagged for subsequent verification.

The term "engineering judgement" at this stage of investigation is deemed to be a valid and clearly stated basis for assumption. As noted in the referenced CAR, no significant adverse condition to quality exists. This is because the assumed values must be verified prior to use of a designed item for its intended purpose.

C. Preclude Recurrence

Since RSN believes that "engineering judgement" is an adequate statement for the basis of assumed values, no corrective action will be taken. RSN design process will continue to flag all assumptions according to internal procedure, and verify that the assumed values are reasonable and adequate.

Response Approved: Bruce T. Stanley Date: 8-4-92
Responsible Manager

8/4/92 RSN-YMP-1367