



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

NOV 01 1994

Larry R. Hayes
Technical Project Officer
for Yucca Mountain
Site Characterization Project
U.S. Geological Survey
101 Convention Center Drive
Suite 860
Las Vegas, NV 89109

VERIFICATION OF CORRECTIVE ACTION OF CORRECTION ACTION REQUEST
(CAR) YM-94-045 RESULTING FROM YUCCA MOUNTAIN QUALITY ASSURANCE
DIVISION (YMQAD) AUDIT YMP-94-06 OF U.S. GEOLOGICAL SURVEY
(SCPB: N/A)

The YMQAD staff has verified the corrective action to CAR
YM-94-045 and determined the results to be unsatisfactory
because of reasons stated in the enclosed CAR.

Your response, indicating the appropriate corrective action
completion date, is required to be submitted to this office by
November 23, 1994. Verification of completion of the required
corrective action will be performed after the date provided.

If you have any questions, please contact either Robert B.
Constable at 794-7945 or Richard L. Maudlin at 794-7290.

Catherine Hampton
Richard E. Spence, Director

YMQAD:RBC-529

Yucca Mountain Quality Assurance Division

Enclosure:
CAR YM-94-045

cc w/encl:

J. G. Spraul, NRC, Washington, DC
S. W. Zimmerman, NWPO, Carson City, NV
T. H. Chaney, USGS, Denver, CO
R. W. Craig, USGS, Las Vegas, NV
D. D. Porter, SAIC, Golden, CO

cc w/o encl:

W. L. Belke, NRC, Las Vegas, NV
D. G. Sult, YMQAD/QATSS, Las Vegas, NV

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PDR WASTE
WM-11 PDR

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

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CORRECTIVE ACTION REQUEST

1 Controlling Document YMP-USGS-QMP-3.03, Revision 4		2 Related Report No. YMP-94-06	
3 Responsible Organization USGS		4 Discussed With D. Gockel/M. Wallendorf	
5 Requirement: QMP-3.03, Paragraph 5.3.2.3 states in part: "Software user documentation.... It shall include basic information such a installation procedures, hardware and software operating environments, input and output options, file formats and default parameters."			
6 Adverse Condition: Contrary to the above, no objective evidence in the form of user documentation could be provided to reflect all of the information required to be addressed in the user documentation for MAIN 130/1.			
9 Does a Significant Condition Adverse to Quality exist? Yes <u>No</u> If Yes, Circle One: A B C D E		10 Does a stop work condition exist? Yes <u>No</u> X; If Yes - Attach copy of SWO If Yes, Circle One: A B C	
8 Response Due Date: 20 Working Days From Issuance			
11 Required Actions: <input checked="" type="checkbox"/> Remedial <input type="checkbox"/> Extent of Deficiency <input type="checkbox"/> Preclude Recurrence <input type="checkbox"/> Root Cause Determination			
12 Recommended Actions: Either generate or obtain user documentation that addresses the information specified in QMP-3.03, Revision 4 for main 130/1.			
7 Initiator Richard L. Maudlin <i>C.C. Wanner for</i> 6-30-94		14 Issuance Approved by: QADD <i>RBC</i> <i>for</i> Date <i>7-4-94</i>	
15 Response Accepted QAR <i>[Signature]</i> Date <i>07/14/94</i>		16 Response Accepted QADD <i>[Signature]</i> Date <i>9/21/94</i>	
17 Amended Response Accepted QAR Date		18 Amended Response Accepted QADD Date	
19 Corrective Actions Verified QAR Date		20 Closure Approved by: QADD Date	

ENCLOSURE

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

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CORRECTIVE ACTION REQUEST (Continuation Page)

1. CORRECTIVE ACTION RESPONSE FOR CAR No. YM-94-045

A. **REMEDIAL ACTION:** Prior to the performance of the recommended remedial actions for the cited software, MAIN130, a detailed investigation is necessary to confirm the applicability of YMP-USGS-QMP-3.03, R4 to MAIN130 (i.e. Is MAIN130 Scientific and Engineering Software (SES)?). This investigation, which involves USGS YMP Branch, YMP-USGS QA Office, and YMP-USGS Geologic Studies Program personnel in Denver and in Menlo Park, California, is currently underway. It will be concluded with the completion of a supplemental response to this CAR to be provided by August 31, 1994, which will provide the results of this investigation and will outline remaining remedial actions. Should MAIN130 be confirmed to be SES, a plan and schedule will be provided to put adequate user documentation in place for MAIN130. Otherwise, the software will be withdrawn from YMP-USGS Software Configuration Management.

B. **EXTENT OF THE DEFICIENCY:** Not Applicable.

C. **ROOT CAUSE DETERMINATION:** Not Applicable.

D. **CORRECTIVE ACTION TO PRECLUDE RECURRENCE:** Not Applicable.


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. SES Investigation and Supplemental Response:

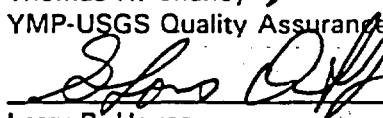
M.A. Wallendorf, YMP-USGS SCM Coordinator

08/31/94

3. RESPONSE APPROVED:


Thomas H. Chaney
YMP-USGS Quality Assurance Manager

8/11/94
Date


Larry R. Hayes
Chief, Yucca Mountain Project Branch

8/11/94
Date

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RADIOACTIVE WASTE MANAGEMENT
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CORRECTIVE ACTION REQUEST (Continuation Page)

SUPPLEMENTAL RESPONSE: (As outlined in the original corrective action response dated 08/01/94.)

1. CORRECTIVE ACTION RESPONSE FOR CAR No. YM-94-045

A. **REMEDIAL ACTION:** A detailed investigation has been completed to determine the applicability of YMP-USGS-QMP-3.03, R4 to MAIN130. This investigation, which involved USGS YMP Branch Office and YMP-USGS Geologic Studies Program personnel, has concluded that MAIN130 is not Scientific and Engineering Software as defined by YMP-USGS-QMP-3.03. A Software Identification Form has been completed in accordance with QMP-3.03 to document the results of the investigation and the withdrawal of the software from further software configuration management. No additional remedial actions are required.

B. **EXTENT OF THE DEFICIENCY:** Not Applicable.

C. **ROOT CAUSE DETERMINATION:** Not Applicable.

D. **CORRECTIVE ACTION TO PRECLUDE RECURRENCE:** Not Applicable.

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. M.A. Wallendorf, YMP-USGS SCM Coordinator

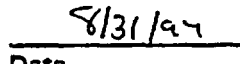
08/23/94

3. RESPONSE APPROVED:


Thomas H. Chaney
YMP-USGS Quality Assurance Manager


Date


Larry R. Hayes
Chief, Yucca Mountain Project Branch


Date

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CORRECTIVE ACTION REQUEST (CONTINUATION PAGE)

Verification of Corrective Action to CAR YM-94-45

A review of the Software Requirements Specification (SRS), GSP0028.01/B01.00, and Code for Main 130/1 was performed on September 29, 1994 based on the response provided on 08/31/94.

The results of the evaluation of the above do not acceptably resolve the noted condition. The QARD defines Scientific and Engineering Software as software that uses numerical methods for complex scientific, engineering, and mathematical calculations. After evaluation of MAIN 130 and the above documentation, it was determined that a numerical method (See Section B of the SRS for MAIN 130) was used by MAIN 130 to calculate the distance between two geodetic monuments using the following inputs:

- o Course range,
- o Range,
- o offset,
- o and meteorological data.

The above calculation is an engineering calculation that uses the mathematical functions of cube, square, square root, and arctan to meet an expected precision of better than 10^{-7} . This calculation is considered to be very complex. Based on this analysis, it appears that the algorithms in MAIN 130 meet the requirements for Scientific and Engineering Software as defined by the QARD.

Since there appears to be confusion regarding the interpretation of the QARD definition of Scientific and Engineering Software, there will be an attempt to further define what the criteria is for this type of software at the next schedule SAG meeting.

Since USGS is represented at the SAG meeting, a response to this unacceptable verification is requested based on the results of that meeting.


R.L. Maudlin

10/21/94
Date