



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

**DEC 22 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

ACCEPTANCE OF AMENDED RESPONSE AND CLOSURE OF CORRECTIVE ACTION  
REQUEST (CAR) YM-94-045 RESULTING FROM YUCCA MOUNTAIN QUALITY  
ASSURANCE DIVISION'S (YMQAD) AUDIT YMP-94-06 OF U.S. GEOLOGICAL  
SURVEY (USGS) (SCPB: N/A)

The YMQAD staff has reviewed the amended response to  
CAR YM-94-045 and determined the results to be satisfactory.  
Based on the results of the Software Advisory Group meeting,  
your amended response and the acceptance of the USGS  
interpretation of what constitutes scientific and engineering  
software, the results of the verification of corrective action  
documented on October 21, 1994, is now considered acceptable.  
No further verification is necessary. As a result, the CAR is  
considered closed.

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

*Robert B. Constable*

YMQAD:RBC-1124

Richard E. Spence, Director  
Yucca Mountain Quality Assurance Division

Enclosure:  
CAR YM-94-045

cc w/encl:

~~J. G. Spradl~~ 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, USGS/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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OFFICE OF CIVILIAN  
RADIOACTIVE WASTE MANAGEMENT  
U.S. DEPARTMENT OF ENERGY  
WASHINGTON, D.C.

8 CAR NO.: YM-94-045  
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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 ___ No <u>X</u> If Yes, Circle One: A B C D E		10 Does a stop work condition exist? Yes ___ No <u>X</u> ; If Yes - Attach copy of SWO If Yes, Circle One: A B C	
		3 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> for Date 7-4-94	
15 Response Accepted QAR <i>Maudlin</i> Date 07/14/94		16 Response Accepted QADD <i>Richard Maudlin</i> Date 9/21/94	
17 Amended Response Accepted QAR <i>Maudlin</i> Date 11/20/94		18 Amended Response Accepted QADD <i>RBC</i> for Date 12-21-94	
19 Corrective Actions Verified QAR <i>Maudlin</i> Date 11/20/94		20 Closure Approved by: QADD <i>RBC</i> for Date 12-21-94	

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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.

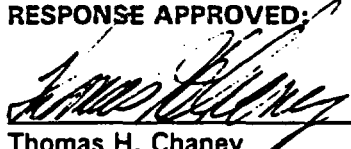
2. For each action above, identify the name of the individual assigned responsibility for completion of the action and the anticipated (or actual, if complete) completion date.

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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**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

8/31/94  
Date

  
Larry R. Hayes  
Chief, Yucca Mountain Project Branch

8/31/94  
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

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WASHINGTON, D.C.

CAR NO. YM-94-045  
DATE: \_\_\_\_\_  
SHEET: 1 OF \_\_\_\_\_

**CORRECTIVE ACTION REQUEST**  
(continuation sheet)

**SUPPLEMENTAL RESPONSE:** { As outlined in the original corrective action response dated 08/01/94. }

**1. CORRECTIVE ACTION FOR DEFICIENT CONDITION CAR No. YM-94-045**

- A. **Remedial Action:** As previously reported, a detailed investigation was completed to determine the applicability of YMP-USGS-QMP-3.03, R4 to MAIN130. This investigation concluded that MAIN130 is not Scientific and Engineering Software (SES) as defined by YMP-USGS-QMP-3.03. A Software Identification Form was completed in accordance with QMP-3.03 to document the withdrawal of the software from further software configuration management. No further remedial actions were required.

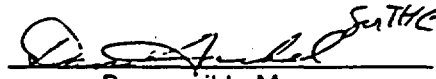
A verification activity was performed by YMQAD to determine if completion of the above-described actions were adequate to warrant closure of this CAR. This verification produced uncertainty regarding the adequacy of the SES definition provided in QMP-3.03. The YMP Software Advisory Group (SAG), which was originally responsible for defining SES, was consulted during its November meeting. The SAG found the USGS interpretations and definitions regarding SES to be adequate. No further remedial actions are required.


- B. **Investigative Action:** Not Applicable.  
C. **Root Cause Determination:** Not Applicable.  
D. **Corrective Action to Prevent 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. Mark A. Wallendorf, USGS YMP Branch SCM Coordinator. 11/23/94

**3. RESPONSE APPROVED:**

  
Responsible Manager  
Date 11/22/94

  
Responsible Manager  
Date 11/22/94

11/22/94 LTR. HAYES TO SPENCE