

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

YUCCA MOUNTAIN QUALITY ASSURANCE DIVISION

QUALITY ASSURANCE SURVEILLANCE REPORT OF

MANAGEMENT AND OPERATING CONTRACTOR

COMPUTER SOFTWARE

SURVEILLANCE YMP-SR-93-039

CONDUCTED AT LAS VEGAS, NEVADA

AUGUST 23 THROUGH 25, 1993

ACTIVITIES SURVEILLED:

THE DEVELOPMENT, ACQUISITION, CONTROL, AND USE OF
COMPUTER SOFTWARE, QUALITY ASSURANCE PROGRAM ELEMENT 19.0
BY THE MANAGEMENT AND OPERATING CONTRACTOR (LAS VEGAS)

Prepared by: John R Matras Date: 9/7/93
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Surveillance Team Leader
Yucca Mountain Quality Assurance Division

Approved by: Donald G. Horton Date: 9/8/93
Donald G. Horton
Director
Office of Quality Assurance

1.0 EXECUTIVE SUMMARY

This surveillance, performed by a team consisting of one member from Yucca Mountain Quality Assurance Division (YMQAD) and one member from Headquarters Quality Assurance Division (HQQAD), evaluated the Management and Operating Contractor (M&O) Quality Assurance (QA) Program Element 19.0 to determine compliance to implementing procedures and evaluate the effectiveness of controls for computer software. This surveillance was conducted to meet a commitment that this QA program element would be evaluated during fiscal year 1993. This surveillance will be followed by a surveillance in fiscal year 1994 of the M&O in Vienna after implementation of the Quality Assurance Requirements and Description document (QARD) DOE/RW-0333P. With the exception of one condition adverse to quality identified on Corrective Action Request (CAR) YM-93-089, compliance to implementing procedures was found to be satisfactory and QA Program Element 19.0 is effectively implemented. A description of CAR YM-93-089 is included in Paragraph 5.1 of this report and an information copy of the CAR is contained in Attachment 1.

2.0 PURPOSE AND SCOPE

A surveillance of the M&O (Las Vegas) computer software was conducted in Las Vegas, Nevada on August 23 through 25, 1993 to evaluate compliance to implementing procedures and evaluate effectiveness of controls for computer software.

3.0 SURVEILLANCE TEAM

J. R. Matras, Surveillance Team Leader, YMQAD
Mike Donovan, Surveillance Team Member, HQQAD
Robert Brient, Observer, U.S. Nuclear Regulatory Commission

4.0 PERSONNEL CONTACTED DURING THE SURVEILLANCE

N. W. Hodgson, Configuration Management, M&O Las Vegas
George Vaslos, Quality Assurance, M&O Las Vegas
J. C. Becerra, Structural Engineer, M&O Las Vegas
Saeed Bonabian, Geotechnical Specialist, M&O Las Vegas
R. H. Bahney III, Waste Package Design Engineer, M&O Las Vegas
T. W. Doering, Waste Package Design Manager, M&O Las Vegas

5.0 SURVEILLANCE RESULTS

During the surveillance, three software products (FLAC 3.22, ANSYS 5.0, and STAAD III/ISDS 16.0) were selected for evaluation. These three products are acquired software that have completed verification and validation (V&V), and were released for application in quality-affecting activities. With the exception of CAR YM-93-089, the results of the evaluation indicated that the M&O is effectively implementing QA Program Element 19.0. CAR YM-93-089 was issued because, in one instance, the M&O did not have procedures for controlling the application of software. A description of CAR YM-93-089 is included in Paragraph 5.1. The primary activity associated with acquired software is the V&V of the code and supporting documentation. The adequacy of test cases, which included the comparison of expected test case results with hand calculations (STAAD III/ISDS), test book equations and results (ANSYS), and alternate calculations (FLAC), was evaluated. A selection of test cases was run and compared to expected results. The documentation supporting the verification and validation of these software products was satisfactory. The objective evidence selected for evaluation is listed in Paragraph 5.2.

5.1 CAR YM-93-089

The M&O Computer Software Quality Assurance Plan (CSQAP), Section 11 requires that "Affected office managers shall establish the appropriate procedures for controlling the application of software to technical calculations generating primary data." Contrary to the above requirement FLAC Version 3.22 was being used to generate primary data that was being used in technical calculation :B00000000-01717-0200-000028-00, "TS North Ramp Stability Analysis (Package 2A)" without procedures for controlling the application of the software.

5.2 Objective Evidence Reviewed

Software V&V Package for ANSYS Software
ANSYS Users Manual
ANSYS Verification and Validation Manual
Software V&V Package for FLAC Software
FLAC Users Manual
FLAC Verification and Validation Manual
Software V&V Package for STAAD III/ISDS Software
STAAD III/ISDS Users Manual

6.0 RECOMMENDATIONS

1. A technical evaluation should be performed on technical calculations using software to assure that the correct model was used in the technical calculations.
2. Implementing procedures should be revised to eliminate the confusion between acquired, existing, and commercial-off-the-shelf software. There was considerable confusion between the CSQAP, Quality Assurance Procedure (QAP)-19.1, Revision 1, "Computer Software Verification and Validation," and QAP-19.2, Revision 2, "Software Configuration Management" with the use of the terms acquired, existing, and commercial-off-the-shelf software. Also, requirements for the above three types of software were intermingled with developed software requirements making it difficult to determine the allocation of requirements.
3. A procedure should be developed that clearly describes the design/acquisition process and the interrelationship of this process with configuration management, verification and validation. QAP-19.1 and QAP-19.2 are integral processes to the design/acquisition processes and should not exist alone.
4. Users of procedures should be involved in the development of the procedures. Interviews with users of QAP-19.1 revealed concerns with existing procedures but these users have not seen the new procedures implementing the QARD DOE/RW-0333P. These new procedures are scheduled to be effective August 30, 1993.

7.0 ATTACHMENTS

Attachment 1: Information Copy of CAR YM-93-089

ATTACHMENT 1

INFORMATION COPY
OF
CORRECTIVE ACTION REQUEST

THIS IS A COPY

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT U.S. DEPARTMENT OF ENERGY WASHINGTON, D.C.	8 CAR NO.: <u>YM-93-089</u> DATE: <u>8/27/93</u> SHEET: <u>1</u> OF <u>1</u> QA
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CORRECTIVE ACTION REQUEST

1 Controlling Document Computer Software Quality Assurance Plan	2 Related Report No. Surveillance YMP-93-39	
3 Responsible Organization MEO, (Las Vegas, Vienna, and Charlotte)	4 Discussed With Nathaniel Hodgeson	
5 Requirement: Section 11 "Control of software Applications" Affected office manager shall establish the appropriate procedures for controlling the application of software to technical calculations generating primary data.		
6 Adverse Condition: Contrary to the above requirement, software was used in the technical calculation no.: B00000000-01717-0200-000028-00, IS North Ramp Stability Analysis (Package 2A) without procedures for controlling the application of the software package FLAC Version 3.22		
9 Does a significant condition adverse to quality exist? Yes ___ No <u>X</u> If Yes, Circle One: A B C	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 D	11 Response Due Date: 20 working days from issuance
12 Required Actions: <input checked="" type="checkbox"/> Remedial <input checked="" type="checkbox"/> Extent of Deficiency <input checked="" type="checkbox"/> Preclude Recurrence <input type="checkbox"/> Root Cause Determination		
13 Recommended Actions: Evaluate all design packages completed by the MEO/TRW (Las Vegas, Vienna, and Charlotte) for the use of software, and that the software was used in accordance with the requirements of Section 11 of the Computer Software Quality Assurance Plan, and perform remedial action.		
7 Initiator J. Matras <i>J. Matras</i> Date <u>8/27/93</u>	14 Issuance Approved by: QADD <i>AC Vance</i> Date <u>9/1/93</u>	
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	