Department of Energy
Nevada Operations Office
P. O. Box 98518
Las Vegas, NV 89193-8518

WBS 1.2.9.3
QA

FEB 07 1990

Richard J. Herbst
Technical Project Officer for Yucca Mountain Project
Los Alamos National Laboratory
University of California
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Los Alamos, NM 87545

VERIFICATION OF COMMITTED CORRECTIVE ACTION FOR STANDARD DEFICIENCY REPORT (SDR) 222, REVISION 0, RESULTING FROM YUCCA MOUNTAIN PROJECT OFFICE (PROJECT OFFICE) QUALITY ASSURANCE AUDIT 88-08 OF LOS ALAMOS NATIONAL LABORATORY (LOS ALAMOS)(NN1-1990-1130)

Reference: Letter, Herbst to Horton, dtd. 1/11/90

The reference letter proposes that the Project Office void or close SDR 222 because of Stop Work Order-LA01 issued by Los Alamos. The proposal is unacceptable to the Project Office because it would no longer have effective control over the adverse condition. SDR 222 will remain in effect until Los Alamos produces a Software Quality Assurance Plan that is approved by the Project Office.

Be advised that the effective date for the completion of the committed corrective action to SDR 222, Revision 0, has passed with the corrective action remaining incomplete. This renders the verification as unsatisfactory, and is hereby rejected. Please provide a new completion date within 10 working days from the date of this letter. Send a copy of your response to Nita J. Brogan, Science Applications International Corporation (SAIC), Las Vegas, Nevada, 89109.

Verification of completion of your corrective action will be performed after the new effective date to be provided. Any subsequent failure to comply with the due date provided will result in elevation of the matter to the appropriate management for action. A copy of the SDR is enclosed for your information.

9002120165 900207
PDR WASTE
WM-11 PDC

FULL TEXT ASCII SCAN
ADD: J Kennedy

102.7
WM-11
NH03

WMPO STANDARD DEFICIENCY REPORT

N-QA-038
3/87

2/8/90

Completed by Originating QA Organization

1 Date 10/6/88

2 Severity Level ☒ 1 ☐ 2 ☐ 3 Page 1 of 6

3 Discovered During Audit 88-08

3a Identified By K. Schwartztrauber

3b Branch Chief Concurrence Date

4 SDR No. 222 Rev. 0

5 Organization LANL

6 Person(s) Contacted M. McGowan/K. Eggert

7 Response Due Date is 20 Working Days from Date of Transmittal

8 Requirement (Audit Checklist Reference, if Applicable)
LANL QAPP, R2 Sections 5.1 and 3.3.1 state that activities and software used to support a license application are documented and controlled according to LANL implementing procedures.

9 Deficiency
Contrary to the above requirement, the quality of software development documentation activities prior to the implementation of LANL procedure TWS-QAS-QP-3.1, RO, dated 21-Sept-88 cannot be assured. The following

10 Recommended Action(s): ☒ Remedial ☒ Investigative ☒ Corrective

1. Modify LANL procedure TWS-MSTQA-QP-14 or TWS-QAS-QP-3.1 to include criteria

Aprvl.

11 QAE/Lead Auditor Date William H. Camp 11/4/88

12 Branch Manager Date H A Caldwell 4 Mar 88

13 Project Quality Mgr. Date James Blayford 11/15/88

Completed by Organization in Block 5

14 Remedial/Investigative Action(s)

15 Effective Date 2/28/89

Refer to Page 5 of 6

16 Cause of the Condition & Corrective Action to Prevent Recurrence

17 Effective Date 3/31/89

Refer to Page 6 of 6

18 Signature/Date H. Nunes 12/21/88

Comp. by Orig. QA Org.

19 Response	☐ Accept ☒ Amended Response ☐ Reject	QAE/Lead Auditor/Date W.H. Camp 3-9-89	Branch Manager/Date WBM 03/10/89 H A Caldwell 9 Mar 89
20 Amended Response	☒ Accept ☐ Reject	QAE/Lead Auditor/Date William H. Camp 4-21-89	Branch Manager/Date WBM 4/21/89 H A Caldwell 21 Apr 89
21 Verification	☐ Satisfactory ☐ Unsatisfactory	QAE/Lead Auditor/Date	Branch Manager/Date

22 Remarks
1. TELECON: N.D. COX TO H. NUNES, EXTENSION REQUEST TO BE PREPARED JAN 2-12, 1990. DATE: 12/22/89
2. TELECON: N.D. COX TO H. NUNES, JAN. 18, 1990, REPORTED EXTENSION REQUEST DATED 11 JAN. 90, LETTER NO. TWS-13 01 9096, HERBST TO HORTON.

23 QA CLOSURE	QAE/Lead Auditor/Date	Branch Manager/Date	PQM/Date

8 Requirement (continued)

The LANL NNWSI QAPP, R2, Sections 5.1 and 5.2 require that activities affecting quality be performed in accordance with documented procedures(i.e., QP's or DPs). Section 3.3.1 of the QAPP also states that computer software used to support a license application is documented and controlled according to LANL implementing procedures. Section 3.1.6 of the LANL NNWSI QAPP, R2 also requires that LANL establish procedures for review, approval and release of documents transmitting (software) information or items across scientific investigation interfaces.

LANL NNWSI QAPP, R2 states that, LANL will institute a software configuration management program through implementing procedures and will provide documentation of this program to the Records Management System (RMS).

9 Deficiency (continued)

objective evidence was examined to support this finding:

- LANL procedures do not specify appropriate quantitative or qualitative criteria for determining satisfactory work performance and compliance with QA requirements for scientific notebook documentation of software development activities.

- CAR 045 does not specify that a determination be made of the impact on quality resulting from the software development work performed prior to the date LANL procedural guidance was in effect.

- CAR 045 does not specify the action necessary to preclude the issuance of LANL reports and or publications containing data/results generated from computer codes which are not baselined, controlled and fully verified and validated as defined by NUREG-0856.

- LANL procedure TWS-QAS-QP-3.1, RO and LANL NNWSI QAPP, R2 does not state that computer programs developed and/or modified for the YMP shall be documented and controlled in accordance with the applicable elements of NUREG-0856.

- LANL procedure TWS-QAS-QP-3.2, RO does not state that the minimum requirements for software configuration mangement include a chronology of versions and description of changes made between versions.

- LANL procedure TWS-QAS-QP-3.1, RO does not specify how software verification, test and validation interface controls are coordinated among project participants. However, LANL is participating in Computer Code Verification Efforts (called COVE) with SNL, USGS, LLNL, LBL and PNL under Subtask D, titled "Computer Code Benchmarking Activities", of LANL

9 Deficiency (continued)

SIP 87/4.1.7, RO (WBS 2.3.4.1.7/A) without interface procedural control. Software interface controls are not addressed in LANL CAR 045.

DISCUSSION

LANL is developing Quality Assurance Level I scientific and engineering software and has been involved in this activity for several years to support the Yucca Mountain/NNWSI Project. LANL failed to issue procedural guidance to control software development documentation and to institute a software configuration management program as required by Section 3.3 of the LANL QAPP. LANL has recognized this deficiency in CAR 045, "Software Control", dated 19-Sept-88. On 21-Sept-88 LANL issued procedure TWS-QAS-QP-3.1, RO. The audit team did not have the benefit of reviewing this procedure prior to the audit, however, this procedure contained programmatic deficiencies, as described above, which were discovered during the conduct of the audit.

10 Recommended Actions (continued)

for satisfactory compliance with QA requirements for scientific notebook documentation of software development activities; include model development, mathematical methods, numerical techniques, source code listing references and changes.

2. Determine the impact on quality of software development work performed prior to the effective date of TWS-QAS-QP-3.1, RO. Investigate whether or not all LANL YMP software development documentation is being consistently prepared, reviewed, verified and validated

3. Document by Nonconformance Report all publications and reports containing data/results generated from computer codes which were not baselined, controlled, and fully verified and validated according to LANL procedures. Determine the impact on quality of publication of results based on the use of unqualified data and unverified and unvalidated computer codes. Develop measures to assure the LANL reports and publications are not released which contain data generated by uncontrolled computer codes unless appropriate disclaimers are included.

4. Modify LANL procedure TWS-QAS-QP-3.1 so that a commitment to the documentation requirements of NRUEG-0856 is stated.

5. Modify LANL procedures TWS-QAS-QP-3.1 so that the minimum requirements for configuration management are included.

10 Recommended Actions (continued)

6. Modify LANL PROCEDURE TWS-QAS-WP-3.1 or other appropriate procedures to ensure that software interfaces are controlled, coordinated and documented. Document by Nonconformance Report all COVE and other interface information generated from computer codes without appropriate disclaimers stating that the data/results are not based on controlled and fully verified and validated computer codes. Determine the impact on quality of potential use of results based on the use of unqualified data and unverified and unvalidated computer codes. Develop measures to assure that future COVE benchmarking activities are conducted in accordance with LANL interface control procedures.

14. Remedial/Investigative Action(s)

Revisions to Procedures TWS-QAS-QP-03.1, R0 (LANL Computer Software Control) and QP-14 (Research and Development Experimental Procedure) (to be issued as TWS-QAS-QP-03.5, R0) are now in progress, with issuance scheduled for January 1989. These and other procedures, as well as actions already initiated, will address the noted deficiencies as detailed below.

- Criteria for determining satisfactory work performance will be in the revised QP-03.1. QA requirements for notebooks will be in QP-03.5.

- As part of obtaining a fully qualified QA program, Project personnel have been directed to identify computer codes used after June 1984 to generate data used in LANL reports. This information will be used to assess any effects on quality of codes developed before implementation of QP-03.1. At present, it is LANL's intention to use no computer-generated data developed before implementation of the qualified QA plan in pursuing its scope of work.

- QP-03.1 and revisions to that procedure specify that reports using codes that have not been verified must include a disclaimer to that effect. Criteria for reviewing reports, as contained in the technical review procedure (TWS-QAS-QP-03.2), will address this requirement.

- The methods described in QP-03.1 are consistent with, or go beyond, NUREG-0856. LANL procedures reference only the LANL QAPP. The QAPP, in turn, references external source documents. The LANL QAPP, Rev. 4, now in preparation, is expected to cite NUREG-0856 as one of the external reference documents for guidance of software QA control.

- The requirements for a chronology of codes and description of changes between versions occurs in the LANL QAPP, Rev. 2. The software control procedure requires development of that information. The chronology of code version is documented on the Software Summary Form. The procedure requires reissuance of the summary form and all supporting documentation to document changes between versions of a code.

- An interface control procedure (TWS-QAS-QP-01.2) will govern all organizational interface activities, including software related activities.

16. Cause of Condition and Corrective Action to Prevent Recurrence

Cause: Inadequate procedural direction. NUREG-0856 was referenced in the YMP QA Plan as a document for guidance, not as a specific implementing requirement.

Corrective Action: As noted in Section 14. All corrective actions and required training will be completed by 3/31/89.

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

THIS IS A YMP
ACTION ITEM
NO. 89-0466

December 22, 1988

TWS-N5-12-88-061

Mr. James Blaylock
Project Quality Manager
Yucca Mountain Project Office
U.S. Department of Energy
Nevada Operations Office
P.O. Box 98518
Las Vegas, NV 89193-8518

Dear Mr. Blaylock:

SUBJECT: YUCCA MOUNTAIN PROJECT OFFICE (PROJECT OFFICE) QUALITY ASSURANCE (QA) STANDARD DEFICIENCY REPORTS (SDR) FROM AUDIT 88-08 OF LOS ALAMOS NATIONAL LABORATORY (LOS ALAMOS) SUPPORT OF THE YUCCA MOUNTAIN PROJECT

Reference: Letter Blaylock to Oakley, dated November 22, 1988 (NN1-1989-0466).

Enclosed are Los Alamos responses to 18 SDRs, 204-214 and 216-222. For each SDR, we have completed Items 14 through 18. These SDRs were generated during the course of the Project Office QA Audit 88-08 of the Los Alamos Yucca Mountain Project Program Plan and technical activities.

If you have any questions regarding these responses, please contact Henry Nunes (the Los Alamos Quality Assurance Project Leader) at FTS 843-8039.

Sincerely,

D. T. Oakley

DTO:rmj

Attachments: a/s

Cy: P. Guthals, QA, w/o enc., MS A120
R. J. Herbst, N-5, MS J521
T. Hirons, N-DO, w/o enc., MS E561
L. Maassen, ESS-1, MS D462
W. Mansel, DOE, Las Vegas, NV
H. P. Nunes, N-5, MS J521
E. Springer, HSE-12, MS J495
K. W. Thomas, INC-7, MS J514
C. Watson, ESS-5, MS F665
K. A. West, N-5, MS J521
M. L. Wheeler, LATA, MS M321
(continued on next page)

Cy: (continued)
J. Whetten, ADET, w/o enc., MS A107
W. Camp, SAIC, Las Vegas, NV
D. Eppler, SAIC, Las Vegas, NV
Audit 88-08 file, LATA, MS M321
TWS-N5 file, MS M321
RPC file (2), MS J521
CRM-4 (2), w/o enc., MS A150

14. Remedial/Investigative Action(s)

Revisions to Procedures TWS-QAS-QP-03.1, R0 (LANL Computer Software Control) and QP-14 (Research and Development Experimental Procedure) (to be issued as TWS-QAS-QP-03.5, R0) are now in progress, with issuance scheduled for January 1989. These and other procedures, as well as actions already initiated, will address the noted deficiencies as detailed below.

1. Criteria for determining satisfactory work performance will be in the revised QP-03.1. QA requirements for notebooks will be in QP-03.5.

2. The QAPP, R4.3, requires that any computer software and computer-generated data used for licensing must be documented in compliance with methods described in the LANL software quality administrative procedures. This documentation is currently described in QP-03.1. Codes developed before implementation of QP-03.1 will be documented as necessary, consistent with QP-03.1, before they are used for generating licensing information. Data generated by computer software that has not been documented and verified in accordance with the QA methods described in QP-03.1 are unacceptable for use in the licensing process.

   As part of developing a fully qualified QA program, Project personnel at LANL have been directed to identify computer codes used after June 1984 to generate data appearing in LANL reports. Any of these data that may be required for licensing will be regenerated after the code and associated documentation have been shown to be in compliance with QP-03.1 or subsequent implementing procedures for software QA. The regeneration of these data will ensure that there is no effect on quality resulting from software developed before implementation of QP-03.1.

   Control of computer software and computer-generated data is achieved through the application of the procedure governing the technical review of technical information products (reports), QP-03.2. The procedure stipulates that a quality assurance review be performed of all computer software described in or used to generate data appearing in the report. A disclaimer is

to be inserted in the report identifying any software that is not in full compliance with QA requirements.

Surveys and audits will be used to verify that LANL software is being developed and documented in accordance with QA requirements. All LANL groups currently using or developing computer software will be audited against the applicable software QA requirements.

3. QP-03.1 and revisions to that procedure specify that reports using codes that have not been verified must include a disclaimer to that effect. Criteria for reviewing reports, as contained in the technical review procedure (TWS-QAS-QP-03.2), will address this requirement.

4. The methods described in QP-03.1 are consistent with NUREG-0856. LANL procedures reference only the LANL QAPP. The QAPP, in turn, references external source documents. The LANL QAPP, Rev. 4.3, issued 3/30/89, cites NUREG-0856 as one of the external reference documents for guidance of software QA documentation.

5. The requirements for a chronology of codes and description of changes between versions occurs in the LANL QAPP, Rev. 4.3. The software control procedure explains the development of that information. The chronology of code version is documented on the Software Summary Form. The procedure requires reissuance of the summary form and all supporting documentation to document changes between versions of a code.

6. An interface control procedure (TWS-QAS-QP-01.2) will govern all organizational interface activities, including software related activities.

16. Cause of Condition and Corrective Action to Prevent Recurrence

Cause: Inadequate procedural direction. NUREG-0856 was referenced in the YMP QA Plan as a document for guidance, not as a specific implementing requirement.

Corrective Action: As noted in Section 14. All corrective actions and required training will be completed by 4/30/89.

If you have any questions, please contact Robert B. Constable of my staff at (702) 794-7945 or FTS 544-7945, or Neil D. Cox of SAIC at (702) 794-7236 or FTS 544-7236.

James Blaylock for

Donald G. Horton, Director
Quality Assurance Division
Yucca Mountain Project Office

YMP:RBC-1916

Enclosure:
SDR 222

cc w/encl:
Ralph Stein, HQ (RW-30) FORS
D. E. Shelor, HQ (RW-3) FORS
H. P. Nunes, LANL, Los Alamos, NM
N. D. Cox, SAIC, Las Vegas, NV, 517/T-06
S. R. Dana, SAIC, Las Vegas, NV, 517/T-06
J. H. Nelson, SAIC, Las Vegas, NV, 517/T-04
S. W. Zimmerman, NWPO, Carson City, NV
J. E. Kennedy, NRC, Washington, DC

cc w/o encl:
N. J. Brogan, SAIC, Las Vegas, NV, 517/T-22
Cynthia Robertson, SAIC, Las Vegas, NV, 517/T-22
J. W. Gilray, NRC, Las Vegas, NV
H. E. Valencia, LAAO
J. W. Hines, NWQA, AL
A. R. Chernoff, MSD, AL