



## Department of Energy

Washington, DC 20585

QA: QA

FEB 07 2002

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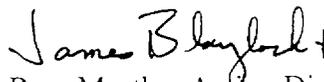
### ISSUANCE OF DEFICIENCY REPORT (DR) BSC-02-D-070 RESULTING FROM AN OBSERVATION BY NOEL SIMPSON

Enclosed is DR BSC-02-D-070 generated as a result of an observation.

Please provide a response to this deficiency that meets the applicable requirements of Administrative Procedure (AP) 16.1Q, *Management of Conditions Adverse to Quality*. Send the original of your response to Deborah G. Opielowski, NQS, P.O. Box 364629, Mail Stop 455, North Las Vegas, Nevada 89036-8629. Initial response to the DR is due ten working days from the date of this letter. Any extensions to this due date must be requested in accordance with AP-16.1Q.

The Responsible Individual for this Condition Adverse to Quality (CAQ) should sign below and return to Ms. Opielowski within five working days.

If you have any questions, please contact either James Blaylock at (702) 794-1420 or Samuel E. Archuleta at (702) 794-1476.

  
Ram Murthy, Acting Director  
Office of Quality Assurance

OQA:JB-0633

Enclosure:  
DR BSC-02-D-070



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NM5507  
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NMSS

Acknowledgement of Understanding of the CAQ (DR BSC-02-D-070) by the Responsible Individual:

---

Responsible Individual

Date

cc w/encl:

N. K. Stablein, NRC, Rockville, MD  
Robert Latta, NRC, Las Vegas, NV  
S. W. Lynch, State of Nevada, Carson City, NV  
Engelbrecht von Tiesenhausen, Clark County, Las Vegas, NV  
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R. N. Wells, DOE/YMSCO (RW-60), Las Vegas, NV

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

8.  DEFICIENCY REPORT  
 CORRECTIVE ACTION REPORT

NO. **BSC-02-D-070**

PAGE 1 OF  
QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT

1. Controlling Document:  
AP-SI.1Q, Rev 2/ICN 4, Software Management; AP-17.1Q, Rev 1/ICN 2,  
Record Source Responsibilities for Inclusionary Records

2. Related Report No.:  
OCRWM Concern 01-206

3. Responsible Organization:  
Bechtel SAIC Co., LLC

4. Discussed With:  
Jean Younker, Tom Doering, Mike Jaeger

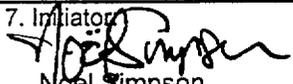
5. Requirement:

- AP-SI.1Q, Subsection 5.8.3.2a) states in part: "Users shall control and document the use of software so that comparable results can be obtained with any differences explained, through independent replication of the activity or process **within the defined boundaries to which the software was originally qualified.**" (Emphasis added).
- Section 5.7.3a) of AP-SI.1Q contains review criteria for the Independent Technical Reviewer (ITR). Section 5.7.3.a)6) specifically states that the ITR is to verify the software documentation for the following: "The VTR is complete, accurate, and consistent with the approved ITP and approved VTP and Step 5.6.1.4 of this procedure."
- Section 5.4 of AP-17.1Q specifies the controls for changing or correcting a record. Specifically, Section 5.4a)1) states: "Draw a single line through the incorrect information, and insert the correct information in close proximity. Date and initial, stamp, or sign the correction."

6. Description of Condition:

- Contrary to requirement 1, above, NUFT V3.0s was baselined for Operating System Solaris 5.5.1, however AMR-ANL-EBS-MD-000026, Rev 0/ICN 2 states in Section 3, that Sun OS 5.6 was used.
- Contrary to requirement 2, above, reviews of the software qualification documents failed to detect discrepancies. Among the problems noted in the Validation Test Plan (VTP) and the Validation Test Report (VTR) are:
  - The inability to verify that codes developed for TIP NUFT-01 are on the CM Baseline
  - Inconsistencies between actual test dates and documented test dates and approval dates in the VTR
  - Disparity in the number of test cases run for validation (27 vs. 30)
  - Inconsistencies in documenting use of Version 2.0s vs. 2.0.1s
  - The use of the codes in ICN 00, ICN 01, and ICN 02 is not clear
 These discrepancies/inconsistencies are noted in the attached draft report of Concern Related Findings

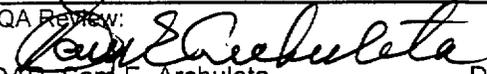
Contrary to requirement 3, above, the dates on the VTR have been written over without having applied the controls for the correction of records (i.e., single line mark through, initials, stamp, or signature and date).

7. Initiator:  
  
Noel Simpson

Date: 01/29/2002

9. Does a stop work condition exist? (Not required for a DR)  
 Yes  No  
If Yes, Check One:  A  B  C  D

10. Recommended Actions:  
**SEE CONTINUATION PAGE**

11. QA Review:  
  
QAR Sam E. Archuleta

Date: 2-6-02

12. Response Due Date:  
10 Working Days From Issuance

13. DOQA Issuance Approval:

Printed Name: Ram Murthy      Signature:       Date: 2/7/02

22. Corrective Actions Verified:

QAR	Date

23. Closure Approved by:

DOQA	Date

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

8.  DR/CAR  
 Stop Work Order

NO BSC-02-D-070

PAGE 2 OF  
QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

The following recommendations are submitted for consideration as elements of corrective actions for identified deficiencies:

1. Take immediate action to re-verify the code qualification documents package to determine impact of documentation deficiencies. If impact is deemed to be significant, re-qualification of the code may be required. Ensure that only appropriately qualified individuals conduct the re-verification and impact analysis. Further, strongly recommend that assistance from BSC/CIO Information Compliance be employed in the re-verification.
2. Revise qualification documents, as required, to assure defensibility of the code.
3. Perform an impact analysis on the AMR. If a revision of the operating system is necessary, (i.e., if only OS 5.6 will do the job) the code will have to be re-qualified with the new operating environment. If revision of the OS is not necessary, editorial revision of the AMR, at the very least, will be necessary.
4. Perform a thorough analysis of the qualification documents to determine, if possible, why and by whom document dates were altered, why disparities in the technical elements of the documents exist, and how they were allowed to pass through reviews. (For example: disparity in test dates, disparity in numbers of test cases, disparities in version control, and disparities in documented operating systems). Determine if a systemic failure is indicated.
5. Because of the potential impact on TSPA-SR, an immediate, workable corrective action plan should be developed, specifically to remediate the effects on the TSPA-SR, if any.
6. Ensure that the Extent of Condition Investigation includes a sample of other code qualification documents, and other technical products developed, reviewed, and/or approved by the individuals identified in the attached Concerns Related Findings Report. The sample population should also include samples of qualification packages and technical products from the same location, but by different individuals, again to ascertain if systemic problems exist..

  
Sam E. Archuleta  
QA Representative

2-6-02  
Date

*Jean Tommer*  
on 12/18/01

**DRAFT 12-18-01**  
**Concern No. 01-206**  
**Concern Related Findings**  
**Concerns Program Analyst (CPA): Gary W. Smith**

During the investigation of Concern No. 01-206, the CPA reviewed the NUFT version 3.0s Validation Test Plan (VTP) and Validation Test Report (VTR). This review resulted in the identification of several inconsistencies and discrepancies between the documentation in the NUFT 3.0s VTP/VTR and the test cases documented on a CD-ROM attached to the VTP. The following is a description of the findings from the review of NUFT VTP/VTR and inconsistencies or discrepancies identified:

**NUFT Baseline Information (12-7-01)**

Baseline Code	STN	Operating System	Baseline Date
NUFT v2.0s	10095 2.0s 00	Solaris 5.5.1	8-27-99
NUFT v2.0.1s	10017 2.0.1s 00	Solaris	10-22-99
NUFT v3.0s	10088 3.0s 00	Solaris 5.5.1	8-9-00

**AMRANL-EBS-MD-000026 Rev 0 ICN 2 (MOL.20010406.0012), In-Drift Thermal-Hydrological-Chemical Model (E0065)**

NUFT V3.0s software was used in analysis for AMRANL-EBS-MD-000026 Rev 0 ICN 2 (MOL.20010406.0012), In-Drift Thermal-Hydrological-Chemical Model (E0065), effective date 3-23-01. Section 3, Computer Software and Model Usage states:

“The analysis is performed using the multiphase flow module usnt (fully coupled unsaturated multiple phases, multiple component model with isothermal and non-isothermal options) of NUFT, developed at Lawrence Livermore National Laboratory (LLNL, 1999a and LLNL, 1999b). The NUFT V3.0s (NUFT) software is classified as qualified software program, as per AP-SI.1Q, Software Management, and was obtained from Configuration Management (CM) (STN: 10088-3.0s-00). NUFT was run on a Sun Ultra 10 Workstation with SunOS 5.6 operating system, was appropriate for the application, and was used only within the range of validation as per AP-SI.1Q. Version 3.0s has been installed on a Sun workstation with CPU Property Tag Number 6524874.”

**Finding:** NUFT v3.0s is baselined for Operating System Solaris 5.5.1. However, the AMR (E0065) Section 3 states that SunOS 5.6 was used.

**NUFT V3.0s Validation Test Plan (VTP) MOL.20000920.0090**

The Prediction of Thermohydrologic Behavior – NUFT 3.0s  
Document Number : 10088-VTP-3.0s-00, May 2000

Prepared by: Ronald Shaffer	Date: 5-11-00
Approved by: Responsible Manager, Barbara Campbell	Date: 6-5-00
Reviewed by: Independent Reviewer, Gary L. Johnson	Date: 5-12-00

Section 1.1. OVERVIEW

"This test plan for NUFT Version 3.0s is for operation on SUN SPARC Workstations running the SUNOS 5.5.1 operating system."

"According to the plan, a set of baseline test cases will be used during an automated integrated build/test/release process, which is detailed in TIP NUFT-01, a Build and Test Management System hereafter referred to as the "BTMS Developer Manual." (MOL.20010315.0314) This automated build/test/release process constructs an installable NUFT 3.0s package if the quantitative criteria during testing (Table 1) is met."

**Finding:** The CPA was unable to verify that the codes developed for TIP NUFT-01 are on the CM software baseline.

Appendix: Integration Test Case Suite with Completion Tables, Kenrick Lee states:

"The code is tested by benchmarking against NUFT 2.0.1s or by comparison with analytical solutions.

**NUFT v3.0s Validation Test Report (MOL.20000920.0091)**

The Prediction of Thermohydrologic Behavior – NUFT 3.0s  
Document Number : 10088-VTR-3.0s-00, June 2000

Prepared by: Ronald Shaffer	Date: 6-23-00
Approved by: Responsible Manager, Barbara Campbell	Date: 7-7-00
Reviewed by: Independent Reviewer, Charles Carrigan	Date: 6-23-00
ITSMA Review, Dianne P. Spence	Date: 7-26-00

Section 1.1 Report Overview

"The ITP was executed on June 6, 2000 and a through testing of NUFT 3.0s, which meets or exceeds all the requirements of the VTP, was executed on June 23, 2000."

Validation Test Plan execution Signature sign off Sheet

Ronald Shafer / Test Executor	Date: 6-26-00
Barbara A. Campbell / Responsible Manager	Date: 7-7-00
John J. Nitao / Code Developer / Witness	Date 6-27-00

Page 4-5. Qualitative Test Procedure

All cases are signed off by Ronald Shaffer Date 6-23-00

Appendix. Integration Test Case Suite With Completion Tables. Kenrich Lee

“ The Integration Test Case Suite consists of twenty-seven test cases.”

“The code is tested by benchmarking against NUFT 2.0.1s or by comparison with analytical solution.”

Test Cases Page 2-31 (30 test cases)

All test cases are signed off by Ronald Shaffer Date: 6-23-00

CD Attached to NUFT v 3.0s VTR

All NUFT v3.0s files examined were run on 6-26-00

All NUFT v2.0s files observed were run between 8-21-98 and 8-23-98

NUFT version 2.0.1s-cvs-9-21-98c files observed were run on 5-9-00

The following files were examined:

VSAM_30S.OUT	Run Date: 6-26-00 15:22:47 Date last modified: 6-26-00 2:35 PM Sun OS S139.es.lini.gov 5.5.1 Sun Sparc sunw ultra-2
VSAM.th	Run Date: 8-23-98 01:51:33 Date last modified: 6-26-00 1:15 PM NUFT V2.0s (Sun/Solaris)
BMRK001_3.0s	Run Date: 6-26-00 14:17:53
BMRK001.th	Run Date: 8-21-98 11:35:47 NUFT v2.0s
BMRK001_3.0s.ex BMRK001.in	Run Date: 6-26-00 1.2 1/27/98 NUFT input.file
BMRK001.th	Run Date: 8-21-98 11:51:51 NUFT version 2.0s (Sun /Solaris)
BMRK005.th	Run Date: 8-21-98 NUFT version 2.0s (Sun / Solaris)
BMRK005_3.0s.ex	Run Date: 6-26-00 14:19:28

NUFT v3.0s (SUN/SOLARIS)

MMRK003.th Run Date: 8-21-98  
NUFT version 2.0s (Sun /Solaris)

VERIF01.th Run Date: 8-22-98  
NUFT version 2.0s (Sun /Solaris)

VERIF06\_1m.th Run Date: 5-9-00  
NUFT version 2.0.1s-cvs-9-21-98c (SUN/SOLARIS)

VERIF06\_of.th Run Date: 5-9-00  
NUFT version 2.0.1s-cvs-9-21-98c (SUN/SOLARIS)

VERIF03.th Run Date 10-29-98  
NUFT version 7-29-97 (SUN SOLARIS)

VSAM2.th Run Date: 8-22-98 15:51:36  
NUFT version 2.0s (SUN/SOLARIS)

VSAM3.th Run Date: 8-22-98 15:59:31  
NUFT version 2.0s (SUN/SOLARIS)

VSAM6.th Run Date: 8-23-98 01:51:33  
NUFT version 2.0s (SUN/SOLARIS)

**Finding:** The test cases for the VTR NUFT 3.0s runs on the NUFT 3.0s CD were dated 6-26-00 and the thirty (30) VTR test cases were signed off and dated on 6-23-00. The sign off date is not consistent with the run date for the NUFT 3.0s test cases.

**Finding:** Contrary to the VTR statement that 27 cases were run, 30 cases were documented.

**Finding:** Many Validation cases on the CD are annotated as NUFT v2.0s not NUFT v 2.0.1s as documented in the VTP and VTR.

**Finding:** The NUFT v2.0s cases on the CD were run (8-21-98) prior to NUFT v2.0s being baselined on 8-27-99.

**Finding:** Some cases were observed to use NUFT v 2.0.1s run date of 5-9-00. However, the case annotation: NUFT version 2.0.1s-cvs-9-21-98c (SUN/SOLARIS). NUFT v 2.0.1s was based lined on 10-22-99. The CPA concludes that it is indeterminate if a baselined version of NUFT v2.0.1s was used to generate the test cases in the VTR.

AML-EBS-MS-000026, Rev. 0, ICN 02 - NUFT 3.0s was used on a platform running SUNOS 5.6. The code was not qualified for this OS. This item requires corrective action. Possible actions include revising the AMR and rerunning the code in a SUNOS 5.5.1; writing a 5.10 SAP and qualifying NUFT 3.0s in a SUNOS 5.6 environment.

The AMR (Rev 0, ICN 02) was signed in September 2000. From the documentation on-hand, it is not clear if the code was run for this revision of the AMR - after an SUR was used to obtain the code in August 2000, or if the code was run when earlier versions of the AMR (ICN 01 effective date July 2000, or the earlier ICN 00 version) were issued. This discrepancy should be further investigated.

The VTP (Page 5, Section 5.2) refers to SUNOS 5.5 rather than 5.5.1 or 5.6. This could be a typo, but verification is required.

Benchmark testing using version 2.0s vs 2.0.1s. This too could be a typo but verification is required.

Generally, the dates of review and approval do not work with the dates testing was performed (See concerns document).

There is confusion about the number of test cases involved in validation. Text says 27 tests, file counts say 30 tests.

The dates on the VTR cover sheet appear altered.