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CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES
NONCONFORMANCE REPORT

Project No. 20.01402.562

NCR No. 2000-10

PART 1: DESCRIPTION OF NONCONFORMANCE

MULTIFLO acceptance testing (i.e., benchmark method) of release 1.2 was performed as documented in multiple scientific notebooks over a period of approximately 2 years. Testing just prior to release was performed and witnessed by QA; however, no evidence (e.g., notes in scientific notebooks, annotations on Design Verification Report) was

Initiated by: Donald W. Dunavant

Date: 07/10/2000

Action Required by: Gordon Wittmeyer

PART 2: PROPOSED DISPOSITION AND CORRECTIVE ACTION Response by: 7/24/2000


Disposition: Accept MULTIFLO Version 1.2 as is. Re-work the Design Verification Report for the release fo MULTIFLO Version 1.2.

Basis of Disposition: The acceptance tests were conducted and the files for the acceptance test are recorded on the CD-ROM included with the MULTIFLO Version 1.2 QA record. Review of the test results indicate that the MULTIFLO Version 1.2 code functions properly. The Design Verification Report can be re-worked because the results of acceptance testing exist.

Action to Correct Nonconformance: References will be added to the Design Verification Report indicating the physical location of the acceptance test results. In addition, a "README" file and a memorandum will be prepared that describe the input and output files comprising the acceptance test. To prevent recurrence, the template used by the software custodian for design verification will be revised to require reference to the location of the acceptance test results.

SP

Target date for completion: 08/21/2000

Proposed by:  Gordon Wittmeyer

Date: 07/18/2000

PART 3: APPROVAL

Element Manager: 

Date: 7/18/2000

Director of QA: 

Date: 7/21/2000

Comments/Instructions:

PART 4: CLOSE OUT

Comments: DVR form has been changed to identify location of acceptance test results. "Readme" files and memorandum have been generated that describe input and output files.


Verified by:  Date: 8/11/2000

Distribution:

Original-CENTER QA DIRECTOR QA Records
ORIGINATOR
PRINCIPAL INVESTIGATORS
ELEMENT MANAGERS
B. Sagar, H. Garcia

* available to support successful test results or QA observations.

NOTE: Major revision to The Design Verification Report form was made following Audit 2000-01. The DVR form has been used several times since and it appears CNWRA FORM QAP 9-1 The revised form is superior in several ways to the earlier form.

 QA 2/9/2001.

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CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

CORRECTIVE ACTION REQUEST

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CAR No: 2000-04

Associated AR, SR, NCR No: Audit 2000-1

PART A: DESCRIPTION OF CONDITION ADVERSE TO QUALITY: Software Control

Not all requirements of TOP-018 are being complied with, such as: para 5.5.2, changes/modifications to MULTIFLO are not being updated to be compliant; para 5.5.5, the requirement for code review is not being determined by the Element Manager; para 5.6.2, acceptance testing for MULTIFLO/TPA has not been formally documented.

Initiated by: D.W. Dunavant

DWP

Date: 06/30/00

PART B: PROPOSED ACTION

Responsible Individual:

Response Due:

1) Extent of Condition:

UPON FURTHER INTERVIEWS WITH EM & PI IT WAS
 AGREED THAT THE FIRST TWO DEFICIENCIES CITED WERE
 BEING COMPLIED WITH. THIS CAR IS RESCINDED AND

2) Root Cause:

THE THIRD ITEM IS BEING DOCUMENTED ON CNWRA
 NCR 2000-10.

DW Dunavant
 Audit Team Leader

3) Remedial Action:

7/10/00

Proposed Completion Date:

4) Corrective Action to Preclude Recurrence:

Proposed Completion Date:

Element Manager:

Date:

PART C: APPROVAL
Comments/Instructions

Director of QA:

Date:

PART D: VERIFICATION OF CORRECTIVE ACTION IMPLEMENTATION

Distribution:
 Original-CNWRA/QA DIRECTOR QA Records
 ORIGINATOR
 PRINCIPAL INVESTIGATORS
 ELEMENT MANAGERS
 TECHNICAL DIRECTOR
 CNWRA PRESIDENT

Verified by:

Date:


CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

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MEMORANDUM

July 20, 2000

TO: Bruce Mabrito

FROM: Scott Painter 

SUBJECT: NCR 2000-10: Acceptance testing for MULTIFLO V1.2

This memo addresses the NCR 2000-10: Acceptance testing for Multiflo V1.2. Please note that

1. acceptance testing was performed at the time of release for both Versions 1.2 and 1.2.1,
2. input and output files for these tests were submitted to QA records with the source code,
3. the final acceptance testing was witnessed by QA personnel when the Design Verification Reports were completed,
4. and the simulation used for the acceptance test is described in scientific notebook 282, Vol 3 (Pg 13 in the entry dated 2.23.99).

The basis for the NCR is that the final acceptance testing was not noted in scientific notebook 282.

To address this NCR, I have made the following entry into scientific notebook 282, Vol 7, pg 6:

7.20.00 Acceptance Testing for V1.2. and V1.2.1

Final acceptance testing performed was performed at the time of release of Versions 1.2 and 1.2.1. The simulation is a one-dimensional version of the one described in Scientific Notebook 282 Vol 3, Pg 13, entry dated 2.23.99. This simulation is of a dual-permeability, non-isothermal, fully coupled, thermal-hydrological-chemical system. It tests all major new capabilities added in Version 1.2. Both Versions of the code ran this simulation to completion. The input and output files are in QA records with the source code in the directory "mflo1.2/runs/". To execute the test problem, one would type at the command line `multiflo VALd dcml` as described in the MULTIFLO User's Guide.

cc: W. Patrick
B. Sagar
E. Percy
G. Wittmeyer

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**CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES
DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE**

ACQUIRED CODE - NOT TO BE MODIFIED¹

Software Title/Name: _____

Version: _____

**Demonstration
workstation:** _____

Operating System: _____

Developer: _____

1. Output: TOP-018, Section 5.5.4

**Software designed so that individual runs are uniquely identified by Date, Time,
Name of software and version?**

Yes: ☐ No: ☐ N/A: ☐

Date and time of run: _____

Name and version: _____

Notes: Acquired code that is not to be modified is accepted as is.

2. Medium and Header Documentation: TOP-018, Section 5.5.6

**The physical labeling of software medium (tapes, disks, etc.) contain required
information?**

Yes: ☐ No: ☐ N/A: ☐

Program Name: _____

Module/Name/Title: _____

Module Revision: _____

File Type (ASCII, OBJ, EXE): _____

Recording Date: _____

Operating System of Supporting
Hardware: _____

Notes: Acquired code that is not to be modified may not have all above
elements.

¹ See TOP-018, Table 1 for criteria.

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**DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE
ACQUIRED CODE - NOT TO BE MODIFIED**

3. User's Manual: TOP-018, Section 5.5.5

- a) Is there a Users' Manual for the software?

Yes: ☐ No: ☐ N/A: ☐

User's Manual Version and Date: _____

Notes:

- b) Are there basic instructions for the use of the software?

Yes: ☐ No: ☐ N/A: ☐

Location of Instruction: _____

Notes:

4. Acceptance Testing: TOP-018, Section 5.6

- a) Has installation testing been conducted for each intended computer platform and operating system?

Yes: ☐ No: ☐ N/A: ☐

Platform(s): _____

Operating System(s): _____

Location of Test Results: _____

Notes:

5. Configuration Control: TOP-018, Section 5.7

- a) Is the Software Summary Form completed and signed?

Yes: ☐ No: ☐ N/A: ☐

Software Summary Form Approval Date: _____

Notes:

- b) Is a software technical description prepared, documenting the essential mathematical and numerical basis?

Yes: ☐ No: ☐ N/A: ☐

Location Technical Description: _____

Notes:

- c) Is the source code available (or, is the executable code available in the case of (acquired/commercial codes)?

Yes: ☐ No: ☐ N/A: ☐

Location of Source Code: _____

Notes:

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**DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE
ACQUIRED CODE - NOT TO BE MODIFIED**

6. Configuration Control, continued: TOP-018, Section 5.7

Have all the script/make files and executable files been submitted to the Software Custodian?

Yes: ☐ No: ☐ N/A: ☐

Location of Script/Make Files: _____

Notes:

7. Software Release: TOP-018, Section 5.9

Upon acceptance of the software as verified above, has a Software release Notice, Form TOP-6 been issued?

Yes: ☐ No: ☐ N/A: ☐

Version number on software (1.0 for 1st issue): _____

Version number on SRN: _____

Notes:

8. Software Validation: TOP-018, Section 5.10

- a) Has a Software Validation Test Plan (SVTP) been prepared for the range of application of the software?

Yes: ☐ No: ☐ N/A: ☐

Version/Date of SVTP: _____

Date reviewed and approved via QAP-002: _____

Notes:

- b) Has a Software Validation Test Report (SVTR) been prepared that documents the results of the validation cases, interpretation of the results, and determination if the software has been validated?

Yes: ☐ No: ☐ N/A: ☐

Version/Date of SVTR: _____

Date reviewed and approved via QAP-002: _____

Notes:

Additional Remarks:

CNWRA Software Developer/Date

CNWRA Software Custodian/Date

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**CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES
DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE**

DEVELOPED SOFTWARE¹

Software Title/Name: _____

Version: _____

**Demonstration
workstation:** _____

Operating System: _____

Developer: _____

1. Software Requirements Description: TOP-018, Section 5.3

Software Requirements Description (SRD) and any changes thereto reviewed in accordance with QAP-002 requirements?

Yes: ☐ No: ☐ N/A: ☐

SRD Version:

SRD Approval Date:

Notes:

2. Software Development Plan (SDP): TOP-018, Section 5.4

a) The Element Manager has approved the SDP and any changes?

Yes: ☐ No: ☐ N/A: ☐

b) The SDP addresses applicable section of TOP-018, Appendix B, Software Development Plan Template?

Yes: ☐ No: ☐ N/A: ☐

SDP Version:

SDP Approval Date:

Notes:

¹ See TOP-018, Table 1 for criteria.

**DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE
DEVELOPED SOFTWARE**

3. Design and Development: TOP-018, Section 5.5.1, 5.5.2

- a) Is development and module/subroutine-level testing documented either in scientific notebooks and/or in Software Change Reports (SCR)?

Yes: ☐ No: ☐ N/A: ☐

Scientific Notebook(s): _____

SCR Number(s): _____

Notes:

- b) Is development and module/subroutine-level testing sufficiently documented so that an informed reviewer can follow the testing procedures and logic?

Yes: ☐ No: ☐ N/A: ☐

Notes:

- c) Is development in accordance with the conventions described in the SDP/SCR, i.e. coding convention?

Yes: ☐ No: ☐ N/A: ☐

Notes:

4. Internal Documentation: TOP-018, Section 5.5.3

Software internally documented to allow a user to understand the function(s) being performed and to follow the flow of execution of individual routines?

Yes: ☐ No: ☐ N/A: ☐

Module(s) Reviewed: _____

Notes:

5. Output: TOP-018, Section 5.5.4

Software designed so that individual runs are uniquely identified by Date, Time, Name of software and version?

Yes: ☐ No: ☐ N/A: ☐

Date and time of run: _____

Name and version: _____

Notes:

**DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE
DEVELOPED SOFTWARE**

6. Code Reviews: TOP-018, Section 5.5.5

Are code reviews (if implemented) documented in a scientific notebook or in another format that allows others to understand the code review process and results?

Yes: ☐ No: ☐ N/A: ☐

Scientific Notebook: _____

Notes: Acquired code that is not to be modified is accepted as is. No code reviews required.

7. Medium and Header Documentation: TOP-018, Section 5.5.6

a) Program title block of main program contains required information?

Yes: ☐ No: ☐ N/A: ☐

Program Title: _____

Customer Name: _____

Customer Office/Division: _____

Customer Contact(s): _____

Customer Phone Number: _____

Associated Documentation: _____

Disclaimer Notice: _____

Notes:

b) Source code module header contains required information provides Program Name, Client Name, Contract Reference, Revision Number, and Revision History?

Yes: ☐ No: ☐ N/A: ☐

Module Reviewed: _____

Module Reviewed: _____

Module Reviewed: _____

Notes:

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**DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE
DEVELOPED SOFTWARE**

7. Medium and Header Documentation, continued: TOP-018, Section 5.5.6

- c) The physical labeling of software medium (tapes, disks, etc.) contain required information?

Yes: ☐ No: ☐ N/A: ☐

Program Name: _____

Module/Name/Title: _____

Module Revision: _____

File Type (ASCII, OBJ, EXE): _____

Recording Date: _____

Operating System of Supporting
Hardware: _____

Notes:

8. User's Manual: TOP-018, Section 5.5.5

- a) Is there a Users' Manual for the software?

Yes: ☐ No: ☐ N/A: ☐

User's Manual Version and Date: _____

Notes:

- b) Are there basic instructions for the use of the software?

Yes: ☐ No: ☐ N/A: ☐

Location of Instruction: _____

Notes:

9. Acceptance Testing: TOP-018, Section 5.6

- a) Does the acceptance testing demonstrate whether or not requirements in the SRD and/or SCR have been fulfilled?

Yes: ☐ No: ☐ N/A: ☐

Location of Test Results: _____

Notes:

**DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE
DEVELOPED SOFTWARE**

9. Acceptance Testing, continued: TOP-018, Section 5.6

- b) Has acceptance testing been conducted for each intended computer platform and operating system?

Yes: ☐ No: ☐ N/A: ☐

Platform(s): _____

Operating System(s): _____

Location of Test Results: _____

Notes:

- c) Has installation testing been conducted for each intended computer platform and operating system?

Yes: ☐ No: ☐ N/A: ☐

Platform(s): _____

Operating System(s): _____

Location of Test Results: _____

Notes:

10. Configuration Control: TOP-018, Section 5.7

- a) Is the Software Summary Form completed and signed?

Yes: ☐ No: ☐ N/A: ☐

Software Summary Form Approval Date: _____

Notes:

- b) Is a software technical description prepared, documenting the essential mathematical and numerical basis?

Yes: ☐ No: ☐ N/A: ☐

Location Technical Description: _____

Notes:

- c) Is the source code available (or, is the executable code available in the case of (acquired/commercial codes)?

Yes: ☐ No: ☐ N/A: ☐

Location of Source Code: _____

Notes:

**DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE
DEVELOPED SOFTWARE**

11. Configuration Control, continued: TOP-018, Section 5.7

- d) Have all the script/make files and executable files been submitted to the Software Custodian?

Yes: ☐ No: ☐ N/A: ☐

Location of Script/Make Files: _____

Notes:

12. Software Release: TOP-018, Section 5.9

Upon acceptance of the software as verified above, has a Software release Notice, Form TOP-6 been issued?

Yes: ☐ No: ☐ N/A: ☐

Version number on software (1.0 for 1st issue): _____

Version number on SRN: _____

Notes:

13. Software Validation: TOP-018, Section 5.10

- a) Has a Software Validation Test Plan (SVTP) been prepared for the range of application of the software?

Yes: ☐ No: ☐ N/A: ☐

Version/Date of SVTP: _____

Date reviewed and approved via QAP-002: _____

Notes:

- b) Has a Software Validation Test Report (SVTR) been prepared that documents the results of the validation cases, interpretation of the results, and determination if the software has been validated?

Yes: ☐ No: ☐ N/A: ☐

Version/Date of SVTR: _____

Date reviewed and approved via QAP-002: _____

Notes:

Additional Remarks:

CNWRA Software Developer/Date

CNWRA Software Custodian/Date

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**CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES
DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE**

ACQUIRED CODE - TO BE MODIFIED¹

Software Title/Name: _____

Version: _____

**Demonstration
workstation:** _____

Operating System: _____

Developer: _____

1. Software Requirements Description: TOP-018, Section 5.3

Software Requirements Description (SRD) and any changes thereto reviewed in accordance with QAP-002 requirements?

Yes: ☐ No: ☐ N/A: ☒

SRD Version: N/A

SRD Approval Date: N/A

Notes: Acquired code that is to be modified may use an SCR.

2. Software Development Plan (SDP): TOP-018, Section 5.4

a) The Element Manager has approved the SDP and any changes?

Yes: ☐ No: ☐ N/A: ☐

b) The SDP addresses applicable section of TOP-018, Appendix B, Software Development Plan Template?

Yes: ☐ No: ☐ N/A: ☐

SDP Version:

SDP Approval Date:

Notes: Acquired code that is to be modified may use an SCR.

¹ See TOP-018, Table 1 for criteria.

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**DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE
ACQUIRED CODE - TO BE MODIFIED**

3. Design and Development: TOP-018, Section 5.5.1, 5.5.2

- a) Is development and module/subroutine-level testing documented either in scientific notebooks and/or in Software Change Reports (SCR)?

Yes: ☐ No: ☐ N/A: ☐

Scientific Notebook(s): _____

SCR Number(s): _____

Notes:

- b) Is development and module/subroutine-level testing sufficiently documented so that an informed reviewer can follow the testing procedures and logic?

Yes: ☐ No: ☐ N/A: ☐

Notes:

- c) Is development in accordance with the conventions described in the SDP/SCR, i.e. coding convention?

Yes: ☐ No: ☐ N/A: ☐

Notes:

4. Internal Documentation: TOP-018, Section 5.5.3

Software internally documented to allow a user to understand the function(s) being performed and to follow the flow of execution of individual routines?

Yes: ☐ No: ☐ N/A: ☐

Module(s) Reviewed: _____

Notes:

5. Output: TOP-018, Section 5.5.4

Software designed so that individual runs are uniquely identified by Date, Time, Name of software and version?

Yes: ☐ No: ☐ N/A: ☐

Date and time of run: _____

Name and version: _____

Notes:

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**DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE
ACQUIRED CODE - TO BE MODIFIED**

6. Code Reviews: TOP-018, Section 5.5.5

Are code reviews (if implemented) documented in a scientific notebook or in another format that allows others to understand the code review process and results?

Yes: ☐ No: ☐ N/A: ☐

Scientific Notebook: _____

Notes: Acquired code that is not to be modified is accepted as is. No code reviews required.

7. Medium and Header Documentation: TOP-018, Section 5.5.6

a) Program title block of main program contains required information?

Yes: ☐ No: ☐ N/A: ☐

Program Title: _____

Customer Name: _____

Customer Office/Division: _____

Customer Contact(s): _____

Customer Phone Number: _____

Associated Documentation: _____

Disclaimer Notice: _____

Notes:

b) Source code module header contains required information provides Program Name, Client Name, Contract Reference, Revision Number, and Revision History?

Yes: ☐ No: ☐ N/A: ☐

Module Reviewed: _____

Module Reviewed: _____

Module Reviewed: _____

Notes:

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**DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE
ACQUIRED CODE - TO BE MODIFIED**

7. Medium and Header Documentation, continued: TOP-018, Section 5.5.6

- c) The physical labeling of software medium (tapes, disks, etc.) contain required information?

Yes: ☐ No: ☐ N/A: ☐

Program Name: _____

Module/Name/Title: _____

Module Revision: _____

File Type (ASCII, OBJ, EXE): _____

Recording Date: _____

Operating System of Supporting
Hardware: _____

Notes:

8. User's Manual: TOP-018, Section 5.5.5

- a) Is there a Users' Manual for the software?

Yes: ☐ No: ☐ N/A: ☐

User's Manual Version and Date: _____

Notes:

- b) Are there basic instructions for the use of the software?

Yes: ☐ No: ☐ N/A: ☐

Location of Instruction: _____

Notes:

9. Acceptance Testing: TOP-018, Section 5.6

- a) Does the acceptance testing demonstrate whether or not requirements in the SRD and/or SCR have been fulfilled?

Yes: ☐ No: ☐ N/A: ☐

Location of Test Results: _____

Notes:

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**DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE
ACQUIRED CODE - TO BE MODIFIED**

9. Acceptance Testing, continued: TOP-018, Section 5.6

- b) Has acceptance testing been conducted for each intended computer platform and operating system?

Yes: ☐ No: ☐ N/A: ☐

Platform(s): _____

Operating System(s): _____

Location of Test Results: _____

Notes:

- c) Has installation testing been conducted for each intended computer platform and operating system?

Yes: ☐ No: ☐ N/A: ☐

Platform(s): _____

Operating System(s): _____

Location of Test Results: _____

Notes:

10. Configuration Control: TOP-018, Section 5.7

- a) Is the Software Summary Form completed and signed?

Yes: ☐ No: ☐ N/A: ☐

Software Summary Form Approval Date: _____

Notes:

- b) Is a software technical description prepared, documenting the essential mathematical and numerical basis?

Yes: ☐ No: ☐ N/A: ☐

Location Technical Description: _____

Notes:

- c) Is the source code available (or, is the executable code available in the case of (acquired/commercial codes)?

Yes: ☐ No: ☐ N/A: ☐

Location of Source Code: _____

Notes:

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**DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE
ACQUIRED CODE - TO BE MODIFIED**

11. Configuration Control, continued: TOP-018, Section 5.7

- d) Have all the script/make files and executable files been submitted to the Software Custodian?

Yes: ☐ No: ☐ N/A: ☐

Location of Script/Make Files: _____

Notes:

12. Software Release: TOP-018, Section 5.9

Upon acceptance of the software as verified above, has a Software release Notice, Form TOP-6 been issued?

Yes: ☐ No: ☐ N/A: ☐

Version number on software (1.0 for 1st issue): _____

Version number on SRN: _____

Notes:

13. Software Validation: TOP-018, Section 5.10

- a) Has a Software Validation Test Plan (SVTP) been prepared for the range of application of the software?

Yes: ☐ No: ☐ N/A: ☐

Version/Date of SVTP: _____

Date reviewed and approved via QAP-002: _____

Notes:

- b) Has a Software Validation Test Report (SVTR) been prepared that documents the results of the validation cases, interpretation of the results, and determination if the software has been validated?

Yes: ☐ No: ☐ N/A: ☐

Version/Date of SVTR: _____

Date reviewed and approved via QAP-002: _____

Notes:

Additional Remarks:

CNWRA Software Developer/Date

CNWRA Software Custodian/Date