Software Release Notice
Developed or Modified Software

1. Software Name: xFlo Version: 1.0beta

2. Software Function: Thermal Hydrological Simulation.

3. Summary of Actions:
☒ New Software ☐ Update to Existing Software ☐ Software Retirement

4. Software Development

4a. Software Requirements Description (SRD) Date Approved: 5/13/2003
4b. Software Development Plan (SDP) Date Approved: _____
4c. Software Change Report (SCR) Nos: _____
4d. User's Guide Date Date Approved To be transmitted to NRC on 7-13-2006.
4e. Enclosed: ☒ Copy of Program Title Block ☒ Sample Source Code Header Block

Developer: Scott Painter Date: 7-11-2006

Remarks:

5. Software Installation

5a. Computer Platform(s): Texas/Gorgon
5b. Operating System(s): Solaris/Window XP
5c. Programming Language(s): Fortran 95

5d. Installation Testing: ☒ Passed Testing Performed on: 7-11-2006
Description of Testing Performed: Installed from CD and ran Acceptance Test 1. SP 7-12-06

5e. Archive Copy: ☒ Enclosed ☐ Not Available, Why:

Installation Performed by:: Scott Painter Date: 7-11-2006

Remarks:

6. Software Assessment

6a. Acceptance Testing:
☐ Enclosed ☒ Documented in Scientific Notebook No. SN608E
☐ Documented in SCRs (see above)_____

6b. Validation Status:
☐ Full Validation ☐ Limited Validation Date of Validation:_____
☒ Not Validated, Explain: Beta-test version. Will be validated in future.

Software Developer: Scott Painter Date: 7-11-2006

Remarks:

7. Approval

Manager: [illegible] Date 7/11/06

Remarks:

7. QA Verification

SRN Number: 394

Software Custodian [illegible] Date: 7/13/2006

Remarks:

Program title block

```
! Program Name:        xFlo
! File/Program Name:   xFlo.f
! Release Date:        July 2006
! Release Version:     1.0beta
! Client Name:         USNRC
! Client Office:       Division of High Level Waste Repository Safety
! Client Contact:      J. Pohle (301-415-6703)
! Contract Number:     NRC 02-02-012
! CNWRA Contact:       Scott Painter (210-522-3348)
!                      Center for Nuclear Waste Regulatory Analyses
!                      San Antonio, Texas 78238-5166
```


```
! DISCLAIMER/NOTICE

! This computer code/material was developed as an account of work
! performed by the Center for Nuclear Waste Regulatory Analyses (CNWRA)
! for the Division of Waste Management of the Nuclear Regulatory
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! EVEN IF YOU HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES,
! OR FOR ANY CLAIM BY ANY OTHER PARTY.
```


```
program xflo
```

Example Source Block

```
! Program Name:        xFlo
! File/Program Name:   thermalhydrology.f95
! Release Date:        July 2006
! Release Version:     1.0beta
! Client Name:         USNRC
! Client Office:       Division of High Level Waste Repository Safety
! Client Contact:      J. Pohle (301-415-6703)
! Contract Number:     NRC 02-02-012
! CNWRA Contact:       Scott Painter (210-522-3348)
!                      Center for Nuclear Waste Regulatory Analyses
!                      San Antonio, Texas 78238-5166

! this module contains all physics models for thermal hydrology
!  no public variables . Instead, module updates variables in the gsd class
!  several routines are made public to the generic physics module

 module thermalhydrology
```

File Listing

```
AcceptanceTests        pckr_class.f95        thermalhydrology.f95
Makefile               physics.f95           vangenuchten_class.f95
bc_class.f95           ppcxflo.f95           vgaf_class.f95
data                   precision.f95         watsolv_class.f95
grid.f95               pvt2.f95              xflo.f95
gsd_class.f95          src_class.f95
interpolation_class.f95  stepper.f95

./AcceptanceTests:
Accept.s  Solaris1  Solaris2

./AcceptanceTests/Solaris1:
bcon.dat          mass5          results4          seconda2
control.dat       mass6          results5          seconda3
fort.10           mass7          results6          seconda4
geometry.dat      mass8          results7          seconda5
initial.dat       mass9          results8          seconda6
mass1             physics.dat    results9          seconda7
mass10            results1       seconda-frac.tcp  seconda8
mass11            results10      seconda-mat.tcp   seconda9
mass12            results11      seconda1          solver.dat
mass13            results12      seconda10         solverdetails.out
mass14            results13      seconda11         source.dat
mass2             results14      seconda12         test1d.flo
mass3             results2       seconda13         test1d.out
mass4             results3       seconda14

./AcceptanceTests/Solaris2:
bcon.dat          mass6          results5          seconda3
control.dat       mass7          results6          seconda4
geometry.dat      mass8          results7          seconda5
initial.dat       mass9          results8          seconda6
mass1             physics.dat    results9          seconda7
mass10            results1       seconda-frac.tcp  seconda8
mass11            results10      seconda-mat.tcp   seconda9
mass12            results11      seconda1          solver.dat
mass2             results12      seconda10         source.dat
mass3             results2       seconda11         test2d.flo
mass4             results3       seconda12         test2d.out
mass5             results4       seconda2

./data:
psat.dat      pt_gasien2.dat  pt_liqden.dat   pt_liqvis3.dat
pt_gasden.dat  pt_gasvis2.dat  pt_liqien.dat
```