**CACIE Tool #40** – **CIE RTD STOMP Input File Generator Tool**

**xprt\_RTD\_input\_gen\_cie.f**

**Version** **1.0**

**QA**: **QA**

# Description and Purpose

The CIE RTD STOMP Input File Generator Tool generates the 2018 – RTD year STOMP transport input file. This code reads and modifies the 1943-2018 STOMP input file created by the CIE 2018 STOMP Input File Generator Tool. The STOMP input file generated by this tool is ***input\_XPRT\_RTD***.

# Functional Requirements

The following are the functional requirements (FR) of the CIE RTD STOMP Input File Generator Tool:

FR-1: Parse the following command line arguments: 1943-2018 STOMP input file location/name and simulation RTD year.

FR-2: Copy lines from the 1943-2018 STOMP input file except as noted in the following functional requirements FR-3 to FR-5. Input taken directly from the 1943-2018 STOMP input file includes the following STOMP cards:

* Simulation Title Card (Partial)
* Grid Card
* Inactive Nodes Card
* Rock Soil Zonation Card
* Mechanical Properties Card
* Hydraulic Properties Card
* Saturation Function Card
* X-Aqueous Relative Permeability Card
* Y-Aqueous Relative Permeability Card
* Z-Aqueous Relative Permeability Card
* Solute/Fluid Interaction Card
* Solute/Porous Media Interaction Card
* Initial Conditions Card
* Boundary Conditions Card
* Output Control Card (Partial)
* Surface Flux Card
* Source Card

FR-3: In the Simulation Title Card, replace the second Simulation Note Line (“*CIE Transport Simulation (1943-2018),*”) with “*CIE Transport Simulation (2018-YYYY [RTD Year]),*” where YYYY is the RTD year.

FR-4: Replace the Solution Control Card as follows:

* Set the restart path to *../xprt-2018/restart,*”.
* Replace the rest of the Solution Control Card with:

Water w/ Patankar Vadose Transport Courant,1.0,

1,

2018,year,YYYY,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6,

1000000,

0,

Where YYYY is the RTD year.

FR-5: Revise the Output Control Card:

* Copy the Output Control Card lines from the 1943-2018 STOMP input file down to the number of plot times.
* Write the number of plot times for the RTD STOMP input file. If 2018 is included in the 1943-2018 STOMP input file plot times, this value will be equal to the number of plot times in the 1943-2018 STOMP input file. If 2018 is not included in the 1943-2018 STOMP input file plot times, this value will be one more than the number of plot times in the 1943-2018 STOMP input file.
* Write the plot times, including a new value of 2018.00000001. If 2018 is included in the 1943-2018 STOMP input file plot times, remove it. All other plot times will be identical to those in the 1943-2018 STOMP input file.
* Copy the number of plot file variables and the plot file variable list from the 1943-2018 STOMP input file.

FR-6: Save the output file (i.e., the complete STOMP RTD transport input file, which includes all the required cards).

FR-7: The STOMP RTD transport input file produced by the tool should be formatted for STOMP execution.

# Software Requirements Specifications

FORTRAN, Linux Intel(R) Fortran Intel(R) 64 Compiler

Compiler Options: -o OutputFileName

Special Considerations: None

# Software Design Description

Flow:

The RTD STOMP Input File Generator Tool performs the following steps:

1. Declare variables – Character and array variables are declared.
2. Read command line arguments – See the list defined below.
3. Open the output file.
4. Open the 1943-2018 STOMP input file created by the CIE 2018 STOMP Input File Generator Tool – Portions of this file will be copied to the output file generated by the CIE RTD STOMP Input File Generator Tool (see list in FR-2).
5. Write Simulation Title Card – All lines except the last line are from the 1943-2018 STOMP input file created by the CIE 2018 STOMP Input File Generator Tool; the last line identifies the simulation: ”CIE Transport Simulation (2018-YYYY [RTD Year]),”, where YYYY is the RTD year.
6. Write Solution Control Card – See FR-4 for details.
7. Write the following cards, which are copied from the 1943-2018 STOMP input file created by the CIE 2018 STOMP Input File Generator Tool:
   1. Grid Card
   2. Inactive Nodes Card
   3. Rock/Soil Zonation Card
   4. Mechanical Properties Card
   5. Hydraulic Properties Card
   6. Saturation Function Card
   7. X-Aqueous Relative Permeability Card
   8. Y-Aqueous Relative Permeability Card
   9. Z-Aqueous Relative Permeability Card
   10. Solute/Fluid Interaction Card
   11. Solute/Porous Media Interaction Card
   12. Initial Conditions Card
   13. Boundary Conditions Card
8. Determine if the simulation start year, 2018, is included in the Output Control plot times for the 1943-2018 STOMP input file. If 2018 is included in the Output Control plot times for the 1943-2018 STOMP input file, the number of plot times will be unchanged from the 1943-2018 STOMP input file. If 2018 is not included in the Output Control plot times for the 1943-2018 STOMP input file, the number of plot times will be one more than the 1943-2018 STOMP input file.
9. If the simulation start year, 2018, is included in the Output Control plot times for the 1943-2018 STOMP input file, replace 2018 with 2018.00000001 so that STOMP will output a plot for that year. Otherwise, add a plot time of 2018.00000001.
10. Write Output Control Card:
    1. Copy the Output Control Card lines from the 1943-2018 STOMP input file down to the number of plot times.
    2. Write the number of plot times for the RTD STOMP input file.
    3. Write the plot times (including 2018.00000001).
    4. Copy the number of plot file variables and the plot file variable list from the 1943-2018 STOMP input file.
11. Write the Surface Flux Card and Source Card, which are copied from the 1943-2018 STOMP input file created by the CIE 2018 STOMP Input File Generator Tool.

Arguments:

1943-2018 STOMP input file – Path to the 1943-2018 STOMP input file created by the CIE 2018 STOMP Input File Generator Tool.

RTD year –RTD year for the model.

Input Files:

1943-2018 STOMP input file (path/name read as Command Line Argument 1) – 1943-2018 STOMP input file created by the CIE 2018 STOMP Input File Generator Tool.

Output Files:

The output file generated by this tool is a STOMP input for transport modeling for 2018 through RTD year:

input\_XPRT\_RTD

Execution:

The following is the shell script configuration that will be passed as an argument to the Tool Runner for qualified runs:

{directory path to repository}\tools\cie-modinput\linux\xprt\_RTD\_input\_gen\_cie\_linux-intel-64.exe “$INPUT1 $INPUT2”

Each of the shell script variables (denoted by the “$”) will be set in the shell script with the corresponding variable input (“$INPUT1” for the 1943-2018 STOMP input file path/name and “$INPUT2” for the RTD year to apply).

Code Review:

A code review was performed by Sara Lindberg on 9/10/2020. No impacts to other repository tools or library dependencies were identified for the CIE RTD STOMP Input File Generator Tool.

# Requirements Traceability Matrix

The requirements traceability matrix for the CIE RTD STOMP Input File Generator tool is presented in Table 1.

| Table 1  Requirements Traceability Matrix | | |
| --- | --- | --- |
| **Functional Requirement ID** | **Acceptance Test ID** | **Test Case** |
| QA Level | CACIE-xprt\_RTD\_input\_gen\_cie-IT-1 | Installation Test |
| FR-1 | CACIE-xprt\_RTD\_input\_gen\_cie-AT-1 | Check the screen output from this tool to see that the 1943-2018 STOMP input file location/name and RTD year were read correctly from the command line input. |
| FR-6 | CACIE-xprt\_RTD\_input\_gen\_cie-AT-1 | The CIE RTD STOMP Input file was generated in the correct directory with all the necessary cards. |
| FR-2 | CACIE-xprt\_RTD\_input\_gen\_cie-AT-1 | Check that the following cards are identical to those in the 1943-2018 STOMP input file:   * ~Grid Card * ~Inactive Nodes Card * ~Rock/Soil Zonation Card * ~Mechanical Properties Card * ~Hydraulic Properties Card * ~Saturation Function Card * ~X-Aqueous Relative Permeability Card * ~Y-Aqueous Relative Permeability Card * ~Z-Aqueous Relative Permeability Card * ~Solute/Fluid Interaction Card * ~Solute/Porous Media Interaction Card * ~Initial Conditions Card * ~Boundary Conditions Card * ~Surface Flux Card * ~Source Card |
| FR-3 | CACIE-xprt\_RTD\_input\_gen\_cie – AT-1 | ~Simulation Title Card:   * Check that all lines except the last are identical to those in the 1943-2018 STOMP input file. * Check that the last line is *CIE Transport Simulation (2018 – YYYY [RTD Year]),* where YYYY is the RTD year. |
| FR-4 | CACIE-xprt\_RTD\_input\_gen\_cie – AT-1 | ~Solution Control Card:  Check that the Solution Control Card matches the format described in Functional Requirement FR-4. |
| FR-5 | CACIE-xprt\_RTD\_input\_gen\_cie – AT-1 | ~Output Control Card:   * Check that the plot times include *2018.00000001*. * Check that the plot time 2018 is not included. * Check that the number of plot times is correct. * Check that all other lines in the Output Control Card are identical to those in the 1943-2018 STOMP input file. |
| FR-7 | CACIE-xprt\_RTD\_input\_gen\_cie – AT-1 | Copy and Paste the generated input file as ***input*** in the same directory. Modify the Simulation Title Card in the ***input*** file to run STOMP for only one-time step. This test ensures the ***input*** file will pass the STOMP syntax check. |

# Installation Test Plan and Acceptance Test Plan Cases

The installation test plan for CIE RTD STOMP Input File Generator is presented in Table 2 and the acceptance test plan case for CIE RTD STOMP Input File Generator is presented in Table 3.

| Table 2  **CIE RTD STOMP Input File Generator Installation Test Plan** | | | |
| --- | --- | --- | --- |
| **CIE RTD STOMP Input File Generator Installation Testing**  **CACIE-CIE RTD STOMP Input File Generator – IT-1** | | **Date:** | |
| **Tool Runner File Location for this test:** | | **Test Performed By: [FIRST & LAST NAME]** | |
| **Testing Directory:** | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| Tools Code Repository Directory: | | | |
| Navigate to the testing directory | | | |
| 1 | Invoke Tool runner and test installation of the tool as follows::  Open a Linux terminal, navigate to the testing directory and type *./runner\_run\_IT-1\_RTD-Input-Gen\_cie.sh* | | |
| 2 | Verify Tool Runner is invoked and executed. | Verify that the following file has been created and has the appropriate output corresponding with a “Tool Runner” execution:  ***./IT-1/runner\_run\_IT-1\_RTD-Input-Gen\_cie.log*** |  |
| 3 | Verify tool is invoked and executed. | A new file should have been created: ***./IT-1/RTD\_Input\_Gen\_cie\_screen.log.log***  The following program error should be found: “forrtl: severe (29): file not found” |  |

| Table 3  **CIE RTD STOMP Input File Generator Acceptance Test Plan Case 1** | | | |
| --- | --- | --- | --- |
| **CIE RTD STOMP Input File Generator Acceptance Testing**  **CACIE-CIE RTD STOMP Input File Generator – AT-1** | | **Date:** | |
| **Tool Runner File Location for this test:** //olive/backups/CAVE/v4-4Test/afarms\_xprt\_rtd\_at1/xprt-rtd/ | | **Test Performed By:** | |
| **Testing Directory:** //olive/backups/CAVE/v4-4Test/afarms\_xprt\_rtd\_at1/ | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| 1 | Ensure the following files are in the testing directory, as they are needed for the execution of the CIE RTD STOMP Input File Generator tool:   * input\_cie\_SS in the /ss/ directory * cie\_tr\_boundary\_card.dat in the /ret/ directory * cie\_Output\_Control.dat in the /trOCcards/ directory * cie\_surface\_flux.txt in the /trsurfcards/ directory * cie-src.card in the /sources/ directory * buffer-aq-src.card in the /sources/ directory * ***input\_XPRT\_2018*** in the /xprt-2018/ directory   Other files to complete the Acceptance Test:   * The ***input.bot***, ***input.zone***, and ***estomp-run.sh*** files are present in the /xprt-rtd/ directory. | The expected files are present in the listed directories. |  |
| 2 | Execute, using a Linux terminal, the shell script ***run\_input\_xprt\_rtd.sh*** located in /xprt-rtd/ subdirectory of the testing directory. | Script executes. |  |
| 3 | Open the ***rtd\_afarms\_screen.log*** file in the testing directory. Verify on line 3 the referenced file is the ***input\_XPRT\_2018*** file in the /xprt-2018/ directory. | The ***input\_XPRT\_2018*** file was utilized. |  |
| 4 | Using a diff merge or file comparison utility, open and compare the following files:   * ***input\_XPRT\_2018*** in the /xprt-2018/ directory * ***input\_XPRT\_RTD*** in the /xprt-rtd/ directory   Verify in the comparison that there are no differences (additional white space at the end of lines is negligible) in the following cards (look for the tilde “~” indicator for each card):   * Grid * Inactive Nodes * Rock/Soil Zonation * Mechanical Properties * Hydraulic Properties * Saturation Function * X-Aqueous Relative Permeability * Y-Aqueous Relative Permeability * Z-Aqueous Relative Permeability * Solute/Fluid Interaction * Solute/Porous Media Interaction * Initial Conditions * Boundary Conditions * Surface Flux * Source | There will be no differences between the two input files for the listed cards. |  |
| 5 | For the steps that follow open and use the ***input\_XPRT\_2018*** file in a preferred text editor. | | |
| 5.1 | Verify the Simulation Title Card final line (the second Simulation Note Line) states the year start is 2018 and the end year is 2027 [RTD year].  Verify that all other lines in the Simulation Title Card are identical to those in the ***input\_XPRT\_2018*** file. | The last line of the Simulation Title Card states the simulation years are 2018 to 2027.  All other lines of the Simulation Title Card are identical to those in the ***input\_XPRT\_2018*** file. |  |
| 5.2 | Navigate to the Solution Control Card. Verify that the first line in the Solution Control Card reads:   * *Restart File, ../xprt-2018/restart,*   Then verify that the remaining lines of the Solution Control Card have the following text (extra white spaces are negligible):   * *Water w/ Patankar Vadose Transport Courant, 1.0,* * *1,* * *2018,year,2027,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6,* * *1000000,* * *0,* | The changes to the Solution Control Card are present in the ***input\_XPRT\_RTD*** file. |  |
| 6 | Using a diff merge or file comparison utility, open and compare the following files:   * ***input\_XPRT\_2018*** in the /xprt-2018/ directory * ***input\_XPRT\_RTD*** in the /xprt-rtd/ directory   Navigate to the Output Control Card. Verify:   * The two output control cards should be identical in their structure (white spaces are negligible) until the number of plot times is reported * The number of plot times will be increased by “1” in the ***input\_XPRT\_RTD*** file * All plot times will be written verbatim (extra white spaces are negligible) except that there will be one more plot time written in the ***input\_XPRT\_RTD***. This extra plot time will be *2018.00000001, year,* * The remainder of the “Output Control Card” should match between the two files (white spaces are negligible) | If the Output Control Card modifications are made as detailed. |  |
| 7 | If all the Test Steps above pass, proceed to the next steps.  Navigate to the //olive/backups/CAVE/v4-4Test/afarms\_xprt\_rtd\_at1/xprt-rtd/ directory, make a copy of the ***input\_XPRT\_RTD*** file. Paste it into the same directory, and rename it ***input***. | | |
| 7.1 | Open the ***input*** file in the //olive/backups/CAVE/ v4-4Test/afarms\_xprt\_rtd\_at1/xprt-rtd/ directory and change the line in the Solution Control Card that reads *1000000*, to *1,*. Save the file.  This modifies the time step of the input file so it will only run for one time step. | The ***input*** file was modified successfully to run for a single time step. |  |
| 7.2 | In a Linux terminal navigate to the //olive/backups/CAVE/v4-4Test/afarms\_xprt\_rtd\_at1/xprt-rtd/ directory and type *sh estomp-run.sh* to run the ***input*** file.  Once the model simulation has completed, open the generated ***output*** file, scroll to the bottom, and verify the last line indicates the simulation completed. | The eSTOMP run executed successfully with the ***input*** file. The ***output*** file indicates the simulation stopped. |  |

# Acceptance Test Report

To complete the Acceptance Testing use Appendix A. This test case is described as follows:

* Acceptance Test 1 is in Table A-1 of Appendix A. It is the A Farms Area Model and is checking the ***input\_XPRT\_RTD*** file. This input file is built with a buffer, aqueous and radionuclide sources, and the RTD date is 2027.

Details of this test, when it was conducted, by whom, and if it Passed or Failed are in table A-1 of Appendix A.

# User Guide

To run this tool, a STOMP input file needs to be provided (to be modified by the tool). Refer to the software design and input description for additional information about the input file to be modified by the tool. Then, in a Linux terminal execute the following command:

$ ./<path/to/repository>/tools/cie-modinput/linux/xprt\_RTD\_input\_gen\_cie\_linux-intel-64.exe <path/to/STOMP/input/file>/input.file <YYYY>

The “YYYY” represents a year supplied by the user.

# Tool Versions

This section details changes incorporated into each version of the CIE RTD STOMP Input File Generator tool.

* 1.0 – Tool was developed.

# 

# Appendix A

**Completed Acceptance Test Cases**

**Tool Runner Log**

###Executing XPRT RTD Input Generator###

###Executing Fingerprint Tool###

INFO--09/14/2020 06:00:03 AM--Starting CA-CIE Tool Runner. Logging to "./xprt-rtd\_afarms.log"

INFO--09/14/2020 06:00:03 AM--Code Version: 0a1106ab56e79ae27221b486af36bff51cf307ab v5.6: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--09/14/2020 06:00:03 AM--Code Version: 0a1106ab56e79ae27221b486af36bff51cf307ab v5.6: /opt/tools/pylib/fingerprint/fingerprint.py<--e9692a4faec2ee264fe50417b6b6a516ba82b2f6

INFO--09/14/2020 06:00:03 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--09/14/2020 06:00:03 AM--QA Status: QUALIFIED : /opt/tools/pylib/fingerprint/fingerprint.py

INFO--09/14/2020 06:00:03 AM--Invoking Command:"python3.6" with Arguments:"/opt/tools/pylib/fingerprint/fingerprint.py /home/pallena/CAVE/v4-4Test/afarms\_xprt\_rtd\_at1/xprt-2018/input\_XPRT\_2018 --output ./xprt-rtd\_afarms.log --outputmode a"

INFO--09/14/2020 06:00:03 AM--Username:pallena Computer:olive Platform:Linux 4.4.0-38-generic #57~14.04.1-Ubuntu SMP Tue Sep 6 17:20:43 UTC 2016

Fingerprint generated at 2020-09-14 06:00:03.439157

/home/pallena/CAVE/v4-4Test/afarms\_xprt\_rtd\_at1/xprt-2018/input\_XPRT\_2018 0c2b963fbcb333f81cb137a3a3ab25bc97f96524d342925298f7dc5ba84716cf

###Finished Process###

###Executing XPRT RTD Input Generator for: /home/pallena/CAVE/v4-4Test/afarms\_xprt\_rtd\_at1/xprt-2018/input\_XPRT\_2018 ###

INFO--09/14/2020 06:00:03 AM--Starting CA-CIE Tool Runner. Logging to "./xprt-rtd\_afarms.log"

INFO--09/14/2020 06:00:03 AM--Code Version: 0a1106ab56e79ae27221b486af36bff51cf307ab v5.6: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--09/14/2020 06:00:03 AM--Code Version: fa91935e0c8c95bae576d61f0f7789781d05ba75 Local repo SHA-1 has does not correspond to a remote repo release version: ../../../CA-CIE-Tools-TestRepos/repo\_xprt\_RTD\_input\_gen\_cie.f/tools/cie-modinput/linux/xprt\_RTD\_input\_gen\_cie\_linux-intel-64.exe<--07e9f017cd6dd9a04c45aa9540bf50f7d039633e

INFO--09/14/2020 06:00:03 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--09/14/2020 06:00:03 AM--QA Status: TEST : ../../../CA-CIE-Tools-TestRepos/repo\_xprt\_RTD\_input\_gen\_cie.f/tools/cie-modinput/linux/xprt\_RTD\_input\_gen\_cie\_linux-intel-64.exe

INFO--09/14/2020 06:00:03 AM--Invoking Command:"../../../CA-CIE-Tools-TestRepos/repo\_xprt\_RTD\_input\_gen\_cie.f/tools/cie-modinput/linux/xprt\_RTD\_input\_gen\_cie\_linux-intel-64.exe" with Arguments:"/home/pallena/CAVE/v4-4Test/afarms\_xprt\_rtd\_at1/xprt-2018/input\_XPRT\_2018 2027 "

INFO--09/14/2020 06:00:03 AM--Username:pallena Computer:olive Platform:Linux 4.4.0-38-generic #57~14.04.1-Ubuntu SMP Tue Sep 6 17:20:43 UTC 2016

###Finished Process###

###Executing Fingerprint Tool###

INFO--09/14/2020 06:00:03 AM--Starting CA-CIE Tool Runner. Logging to "./xprt-rtd\_afarms.log"

INFO--09/14/2020 06:00:03 AM--Code Version: 0a1106ab56e79ae27221b486af36bff51cf307ab v5.6: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--09/14/2020 06:00:03 AM--Code Version: 0a1106ab56e79ae27221b486af36bff51cf307ab v5.6: /opt/tools/pylib/fingerprint/fingerprint.py<--e9692a4faec2ee264fe50417b6b6a516ba82b2f6

INFO--09/14/2020 06:00:03 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--09/14/2020 06:00:04 AM--QA Status: QUALIFIED : /opt/tools/pylib/fingerprint/fingerprint.py

INFO--09/14/2020 06:00:04 AM--Invoking Command:"python3.6" with Arguments:"/opt/tools/pylib/fingerprint/fingerprint.py /home/pallena/CAVE/v4-4Test/afarms\_xprt\_rtd\_at1/xprt-rtd/input\_XPRT\_RTD --output ./xprt-rtd\_afarms.log --outputmode a"

INFO--09/14/2020 06:00:04 AM--Username:pallena Computer:olive Platform:Linux 4.4.0-38-generic #57~14.04.1-Ubuntu SMP Tue Sep 6 17:20:43 UTC 2016

Fingerprint generated at 2020-09-14 06:00:04.077335

/home/pallena/CAVE/v4-4Test/afarms\_xprt\_rtd\_at1/xprt-rtd/input\_XPRT\_RTD 30a064e3d39967c373ca067ee6f16d7c6db8c33aaa1299a5300c1a255a0e72ea

###Finished Process###

| Table A-1  **CIE RTD STOMP Input File Generator Acceptance Test Plan Case 1** | | | |
| --- | --- | --- | --- |
| **CIE RTD STOMP Input File Generator Acceptance Testing**  **CACIE-CIE RTD STOMP Input File Generator – AT-1** | | **Date: 09-14-2020** | |
| **Tool Runner File Location for this test:** //olive/backups/CAVE/v4-4Test/afarms\_xprt\_rtd\_at1/xprt-rtd/ | | **Test Performed By: Praveena Allena** | |
| **Testing Directory:** //olive/backups/CAVE/v4-4Test/afarms\_xprt\_rtd\_at1/ | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| 1 | Ensure the following files are in the testing directory, as they are needed for the execution of the CIE RTD STOMP Input File Generator tool:   * input\_cie\_SS in the /ss/ directory * cie\_tr\_boundary\_card.dat in the /ret/ directory * cie\_Output\_Control.dat in the /trOCcards/ directory * cie\_surface\_flux.txt in the /trsurfcards/ directory * cie-src.card in the /sources/ directory * buffer-aq-src.card in the /sources/ directory * ***input\_XPRT\_2018*** in the /xprt-2018/ directory   Other files to complete the Acceptance Test:   * The ***input.bot***, ***input.zone***, and ***estomp-run.sh*** files are present in the /xprt-rtd/ directory. | The expected files are present in the listed directories. | Pass |
| 2 | Execute, using a Linux terminal, the shell script ***run\_input\_xprt\_rtd.sh*** located in /xprt-rtd/ subdirectory of the testing directory. | Script executes. | Pass |
| 3 | Open the ***rtd\_afarms\_screen.log*** file in the testing directory. Verify on line 3 the referenced file is the ***input\_XPRT\_2018*** file in the /xprt-2018/ directory. | The ***input\_XPRT\_2018*** file was utilized. | Pass |
| 4 | Using a diff merge or file comparison utility, open and compare the following files:   * ***input\_XPRT\_2018*** in the /xprt-2018/ directory * ***input\_XPRT\_RTD*** in the /xprt-rtd/ directory   Verify in the comparison that there are no differences (additional white space at the end of lines is negligible) in the following cards (look for the tilde “~” indicator for each card):   * Grid * Inactive Nodes * Rock/Soil Zonation * Mechanical Properties * Hydraulic Properties * Saturation Function * X-Aqueous Relative Permeability * Y-Aqueous Relative Permeability * Z-Aqueous Relative Permeability * Solute/Fluid Interaction * Solute/Porous Media Interaction * Initial Conditions * Boundary Conditions * Surface Flux * Source | There will be no differences between the two input files for the listed cards. | Pass |
| 5 | For the steps that follow open and use the ***input\_XPRT\_2018*** file in a preferred text editor. | | |
| 5.1 | Verify the Simulation Title Card final line (the second Simulation Note Line) states the year start is 2018 and the end year is 2027 [RTD year].  Verify that all other lines in the Simulation Title Card are identical to those in the ***input\_XPRT\_2018*** file. | The last line of the Simulation Title Card states the simulation years are 2018 to 2027.  All other lines of the Simulation Title Card are identical to those in the ***input\_XPRT\_2018*** file. | Pass |
| 5.2 | Navigate to the Solution Control Card. Verify that the first line in the Solution Control Card reads:   * *Restart File, ../xprt-2018/restart,*   Then verify that the remaining lines of the Solution Control Card have the following text (extra white spaces are negligible):   * *Water w/ Patankar Vadose Transport Courant, 1.0,* * *1,* * *2018,year,2027,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6,* * *1000000,* * *0,* | The changes to the Solution Control Card are present in the ***input\_XPRT\_RTD*** file. | Pass |
| 6 | Using a diff merge or file comparison utility, open and compare the following files:   * ***input\_XPRT\_2018*** in the /xprt-2018/ directory * ***input\_XPRT\_RTD*** in the /xprt-rtd/ directory   Navigate to the Output Control Card. Verify:   * The two output control cards should be identical in their structure (white spaces are negligible) until the number of plot times is reported * The number of plot times will be increased by “1” in the ***input\_XPRT\_RTD*** file * All plot times will be written verbatim (extra white spaces are negligible) except that there will be one more plot time written in the ***input\_XPRT\_RTD***. This extra plot time will be *2018.00000001, year,* * The remainder of the “Output Control Card” should match between the two files (white spaces are negligible) | If the Output Control Card modifications are made as detailed. | Pass |
| 7 | If all the Test Steps above pass, proceed to the next steps.  Navigate to the //olive/backups/CAVE/v4-4Test/afarms\_xprt\_rtd\_at1/xprt-rtd/ directory, make a copy of the ***input\_XPRT\_RTD*** file. Paste it into the same directory, and rename it ***input***. | | |
| 7.1 | Open the ***input*** file in the //olive/backups/CAVE/ v4-4Test/afarms\_xprt\_rtd\_at1/xprt-rtd/ directory and change the line in the Solution Control Card that reads *1000000*, to *1,*. Save the file.  This modifies the time step of the input file so it will only run for one time step. | The ***input*** file was modified successfully to run for a single time step. | Pass |
| 7.2 | In a Linux terminal navigate to the //olive/backups/CAVE/v4-4Test/afarms\_xprt\_rtd\_at1/xprt-rtd/ directory and type *sh estomp-run.sh* to run the ***input*** file.  Once the model simulation has completed, open the generated ***output*** file, scroll to the bottom, and verify the last line indicates the simulation completed. | The eSTOMP run executed successfully with the ***input*** file. The ***output*** file indicates the simulation stopped. | Pass |

# Appendix B

# Completed Installation Test

**Tool Runner Log**

Test directory verified

###Executing RTD Input Generator for: IT-1/not\_a\_file ###

INFO--09/15/2020 01:02:40 PM--Starting CA-CIE Tool Runner. Logging to ".././IT-1/runner\_run\_IT-1\_RTD-Input-Gen\_cie.log"

INFO--09/15/2020 01:02:40 PM--Code Version: be2c1c014b9e27a164558af032bb83afe6fa1172 v5.7a: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--09/15/2020 01:02:40 PM--Code Version: be2c1c014b9e27a164558af032bb83afe6fa1172 v5.7a: /opt/tools/tools/cie-modinput/linux/xprt\_RTD\_input\_gen\_cie\_linux-intel-64.exe<--07e9f017cd6dd9a04c45aa9540bf50f7d039633e

INFO--09/15/2020 01:02:40 PM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--09/15/2020 01:02:40 PM--QA Status: QUALIFIED : /opt/tools/tools/cie-modinput/linux/xprt\_RTD\_input\_gen\_cie\_linux-intel-64.exe

INFO--09/15/2020 01:02:40 PM--Invoking Command:"/opt/tools/tools/cie-modinput/linux/xprt\_RTD\_input\_gen\_cie\_linux-intel-64.exe" with Arguments:"not\_a\_file 2030"

INFO--09/15/2020 01:02:40 PM--Username:slindberg Computer:olive Platform:Linux 4.4.0-38-generic #57~14.04.1-Ubuntu SMP Tue Sep 6 17:20:43 UTC 2016

###Finished Process###

| Table B-1  **CIE RTD STOMP Input File Generator Installation Test Plan** | | | |
| --- | --- | --- | --- |
| **CIE RTD STOMP Input File Generator Installation Testing**  **CACIE-CIE RTD STOMP Input File Generator – IT-1** | | **Date: 9/15/2020** | |
| **Tool Runner File Location for this test:**  **OLIVE\backups\CAVE\CA-CIE-Tools-TestEnv\CA-CIE-Tools\_cie\_v5.X\_install\_tests\xprt\_RTD\_input\_gen\_cie\IT-1** | | **Test Performed By: Sara Lindberg** | |
| **Testing Directory: OLIVE\backups\CAVE\CA-CIE-Tools-TestEnv\CA-CIE-Tools\_cie\_v5.X\_install\_tests\xprt\_RTD\_input\_gen\_cie** | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| Tools Code Repository Directory: | | | |
| Navigate to the testing directory | | | |
| 1 | Invoke Tool runner and test installation of the tool as follows:  Open a Linux terminal, navigate to the testing directory and type *./runner\_run\_IT-1\_RTD-Input-Gen\_cie.sh* | | |
| 2 | Verify Tool Runner is invoked and executed. | Verify that the following file has been created and has the appropriate output corresponding with a “Tool Runner” execution:  ***./IT-1/runner\_run\_IT-1\_RTD-Input-Gen\_cie.log*** | PASS |
| 3 | Verify tool is invoked and executed. | A new file should have been created: ***./IT-1/RTD\_Input\_Gen\_screen\_cie.log.log***  The following program error should be found: “forrtl: severe (29): file not found” | PASS |

**Appendix C**

**QA Checklist**

