**CACIE Tool #26** – **12070 STOMP Input File Generator Tool**

**xprt\_12070\_input\_gen.f**

**Version** **1.0**

**QA**: **QA**

# Description and Purpose

The 12070 STOMP Input File Generator Tool generates the 2018 (or RTD year if the model has RTD) - 12070 STOMP transport input file. This code reads and modifies the 1943-2018 STOMP input file created by the 2018 STOMP Input File Generator Tool. If the model has RTD, additional input is taken from the RTD initial conditions (IC) file created by the RTD IC Tool.

The STOMP input file generated by this tool is ***input\_XPRT-#\_12070***, where ***#*** is 1 or 2 (corresponding to the group of radionuclides modeled).

# Functional Requirements

The following are the functional requirements (FRs) of the 12070 STOMP Input File Generator Tool:

FR-1: Accept user input at the command line as arguments including: 1943-2018 STOMP input file location/name, simulation start year, and optionally the source zone RTD IC file path/name (included only if the model has RTD [start year > 2018]).

FR-2: Based on the name of the 1943-2018 STOMP input file, determine whether the simulation is for rads1 or rads2.

FR-3: Copy lines from the 1943-2018 STOMP input file except as noted in the following functional requirements FR-4 to FR-7. 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 (if no RTD)
* Boundary Conditions Card
* Output Control Card (Partial)
* Surface Flux Card
* Source Card

FR-4: In the Simulation Title Card, replace the second Simulation Note Line (“*Rad# Transport Simulation (1943-2018),*”) with:

* “*Rad# Transport Simulation (2018 - 12070),*” where # is the radionuclide group as determined in FR-2, if the model does not have RTD (simulation start year = 2018).
* “*Rad# Transport Simulation (YYYY [RTD Year] - 12070),*” where # is the radionuclide group as determined in FR-2 and YYYY is the RTD year, if the model has RTD (simulation start year > 2018).

FR-5: Replace the Solution Control Card as follows:

* Set the restart path depending on whether the simulation is for rads1 or rads2, and whether the model has RTD:  
   “*../xprt-1/restart*” for rads1, no RTD  
   “*../xprt-1-rtd/restart*” for rads1, with RTD  
   “*../xprt-2/restart*” for rads2, no RTD  
   “*../xprt-2-rtd/restart*” for rads2, with RTD
* Replace the rest of the Solution Control Card with:

Water w/ Patankar Vadose Transport Courant,1.0,

2,

YYYY,year,2070,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6,

2070,year,12070,year,1.0E-08,year,10.0,year,1.25,16,1.0E-6,

1000000,

0,

where YYYY is the RTD year if the model has RTD, or 2018 is the model does not have RTD.

FR-6: If the model does not have RTD, initial conditions are set to 0 lines. If the model has RTD:

* Read the RTD file and determine the number of initial conditions.
* Write the total number of RTD initial conditions, followed by the RTD initial conditions.

FR-7: Revise the Output Control Card:

* The number of plot times will use the number reported in the Output Control Card of the 1943-2018 STOMP input file. The exception to this is if the Output Control Card does not include the simulation start year, in which case the number of plot times is increased by one from that of the 1943-2018 STOMP input file. 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 12070 STOMP input file.
* Write the plot times using the Output Control Card in the 1943-2018 STOMP input file and adhere to the following logic:
  + If the simulation start year is included in the Output Control Card of the 1943-2018 STOMP input file, replace the plot time corresponding with the simulation start year with the simulation start year plus 0.00000001.
  + Else, insert the simulation start year plus 0.00000001 in the proper time sequence (regarding the other plot times).
* Copy the number of plot file variables and the plot file variable list from the 1943-2018 STOMP input file, replacing the last line (“Final Restart, ,”) with “No Restart, ,”.

FR-8: Save the output file (i.e., the complete STOMP 12070 transport input file, which includes all the required cards).

FR-9: Verify that the output file is written in STOMP format

# Software Requirements Specifications

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

Compiler Options: -o OutputFileName

Special Considerations: None

# Software Design Description

Flow:

The 12070 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. Determine whether the simulation is for rads1 or rads2.
4. Open the output file.
5. Open the 1943-2018 STOMP input file created by the 2018 STOMP Input File Generator Tool – Portions of this file will be copied to the output file generated by the 12070 STOMP Input File Generator Tool (see list in FR-3).
6. Write Simulation Title Card – All lines except the last line are from the 1943-2018 STOMP input file created by the 2018 STOMP Input File Generator Tool; the last line identifies the simulation (radionuclide group and model years).
7. Write Solution Control Card – Determine the appropriate restart path and write the Solution Control Card. See FR-5 for details.
8. Write the following cards, which are copied from the 1943-2018 STOMP input file created by the 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
9. Write Initial Conditions Card – If the model does not have RTD, initial conditions are set to 0. If the model has RTD:
   1. Read the RTD file and determine the number of initial conditions in that file.
   2. Write:  
      ~Initial Conditions Card  
      #------------------------------------------------------------------  
      Gas Pressure, Aqueous Pressure,
   3. Write the total number of initial conditions.
   4. Copy the source zone initial conditions from the RTD file.
10. Write the Boundary Conditions Card, which is copied from the 1943-2018 STOMP input file created by the 2018 STOMP Input File Generator Tool.
11. Determine if the simulation start year is included in the Output Control plot times for the 1943-2018 STOMP input file. If the simulation start year 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 the simulation start year 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.
12. If the simulation start year is included in the Output Control plot times for the 1943-2018 STOMP input file, add 0.00000001 to that plot time year so that STOMP will output a plot for that year.
13. 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 plot times using the Output Control Card in the 1943-2018 STOMP input file and adhere to the following logic:
       1. If the simulation start year is included in the Output Control Card of the 1943-2018 STOMP input file, replace the plot time corresponding with the simulation start year with the simulation start year plus 0.00000001.
       2. Else, insert the simulation start year plus 0.00000001 in the proper time sequence (regarding the other plot times).
    3. Copy the number of plot file variables and the plot file variable list from the 1943-2018 STOMP input file, replacing the last line (“Final Restart, ,”) with “No Restart, ,”.
14. Write the Surface Flux Card and Source Card, which are copied from the 1943-2018 STOMP input file created by the 2018 STOMP Input File Generator Tool.

Arguments:

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

Simulation start year – Either 2018 if the model does not have RTD, or RTD year if the model has RTD.

(optional) RTD IC input file – Path to the source zone RTD IC input file created by the RTD IC Tool (included only if the model has RTD [simulation start year > 2018]).

Input Files:

* 1943-2018 STOMP input file (path read as Command Line Argument 1) – 1943-2018 STOMP input file created by the 2018 STOMP Input File Generator Tool.
* RTD IC input file (path read as Command Line Argument 3) – Source zone RTD IC input file created by the RTD IC Tool (included only if the model has RTD [simulation start year > 2018]).

Output Files:

The output file generated by this tool is a STOMP input for transport modeling for 2018 (or RTD year if the model has RTD) through 12070. There are two possible output file names depending on radionuclide group:

input\_XPRT-1\_12070 – Radionuclide Group = 1

input\_XPRT-2\_12070 – Radionuclide Group = 2

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\ca-modinput\linux\xprt\_12070\_input\_gen\_linux-intel-64.exe “$INPUT1 $INPUT2 [$INPUT3]

Each of the shell script variables (denoted by the “$”) will be set in the shell script with the corresponding variable input:

* $INPUT1 – 1943-2018 STOMP input file
* $INPUT2 – Simulation start year
* $INPUT3 – (optional) RTD IC file

Code Review:

A code review was performed by Jacob Fullerton on 5/6/2020. No impacts to other repository tools or library dependencies were identified for the 12070 STOMP Input File Generator tool.

# Requirements Traceability Matrix

The requirements traceability matrix for the 12070 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\_12070\_input\_gen-IT-1 | Installation Test |
| FR-1 | CACIE-xprt\_12070\_input\_gen-AT-1 CACIE-xprt\_12070\_input\_gen-AT-2 | Check the screen output from this tool to see that the 1943-2018 STOMP input file location/name, simulation start year and the RTD IC input file (if the model has RTD) location/name were read correctly from the command line input. |
| FR-2 | CACIE-xprt\_12070\_input\_gen-AT-1 CACIE-xprt\_12070\_input\_gen-AT-2 | Check the output file name to determine if the correct radionuclide group (“XPRT-1” for rads1 or “XPRT-2” for rads2) was selected. |
| FR-3 | CACIE-xprt\_12070\_input\_gen-AT-1 CACIE-xprt\_12070\_input\_gen-AT-2 | ~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, ~Boundary Conditions Card, ~Surface Flux Card, ~Source Card:  Check that these Cards are identical to those in the 1943-2018 STOMP input file. |
| FR-4 | CACIE-xprt\_12070\_input\_gen-AT-1 CACIE-xprt\_12070\_input\_gen-AT-2 | ~Simulation Title Card:   * Check that all lines except the last are identical to those in the 1943-2018 STOMP input file. * If the simulation start year is 2018, check that the last line is “Rad# Transport Simulation (2018-12070),”, where # is 1 or 2 depending on the radionuclide group selected. * If the simulation start year is after 2018, check that the last line is “Rad# Transport Simulation (YYYY [RTD Year] - 12070),”, where # is 1 or 2 depending on the radionuclide group selected and YYYY is the RTD year. |
| FR-5 | CACIE-xprt\_12070\_input\_gen-AT-1 CACIE-xprt\_12070\_input\_gen-AT-2 CACIE-xprt\_12070\_input\_gen-AT-3 CACIE-xprt\_12070\_input\_gen-AT-4 | ~Solution Control Card:   * Check that the restart path is correct. * Check that the Solution Control Card matches the format described in Functional Requirement FR-5. |
| FR-6 | CACIE-xprt\_12070\_input\_gen-AT-1 CACIE-xprt\_12070\_input\_gen-AT-2 | ~Initial Conditions Card:   * If the simulation start year is 2018, check that the Initial Conditions Card is identical to the Initial Conditions Card in the 1943-2018 STOMP input file. * If the simulation start year is after 2018, check that the Initial Conditions Card includes the initial conditions in the RTD IC input file. * Check that the number of initial conditions in the Initial Conditions Card is correct. |
| FR-7 | CACIE-xprt\_12070\_input\_gen-AT-1 CACIE-xprt\_12070\_input\_gen-AT-2 | ~Output Control Card:   * Check that the plot times include a value equal to the simulation start year+0.00000001. * Check that the number of plot times is correct. * Check that the last line of the Output Control Card is “No Restart, ,”. * Check that all other lines in the Output Control Card are identical to those in the 1943-2018 STOMP input file. |
| FR-8 | CACIE-xprt\_12070\_input\_gen-AT-1 | Check that the following cards are included in the generated STOMP mass balance transport input file:   * Simulation Title Card * Solution Control Card * 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 * Surface Flux Card * Source Card |
| FR-9 | CACIE-xprt\_12070\_input\_gen-AT-4 | 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 12070 STOMP Input File Generator is presented in Table 2 and the acceptance test plan cases for 12070 STOMP Input File Generator are presented in Table 3, Table 4, Table 5, and Table 6.

| Table 2  **12070 STOMP Input File Generator Installation Test Plan** | | | |
| --- | --- | --- | --- |
| **12070 STOMP Input File Generator Installation Testing**  **CACIE-12070 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 execute the tool using ***runner\_run\_IT-1\_Final-Input-Gen.sh*** as follows: Open a Linux terminal and after navigating to the appropriate directory indicated type *./runner\_run\_IT-1\_Final-Input-Gen.sh* | | |
| 2 | A new directory called “IT-1” should have been created. Navigate into ***./IT-1*** and open  ***runlog\_IT-1\_Final-Input-Gen.log***. In this file there should be the following line (second line of the file): “not-a-file”.  In line 10 of the file there should be the following error as a result of not providing a valid input file to the tool: “forrtl: No such file or directory” | If the 2nd line has “not-a-file” in it and line 10 has the error specified, this validates the tool installation. |  |

| Table 3  **12070 STOMP Input File Generator Acceptance Test Plan Case 1** | | | |
| --- | --- | --- | --- |
| **12070 STOMP Input File Generator Acceptance Testing**  **CACIE-12070 STOMP Input File Generator – AT-1** | | **Date:** | |
| **Tool Runner File Location for this test:**  [**\\olive\backups\CAVE\CA-CIE-ToolsEnv\final\_input\_gen\AT-1**](file:///\\olive\backups\CAVE\CA-CIE-ToolsEnv\final_input_gen\AT-1) | | **Test Performed By:** | |
| **Testing Directory:** [**\\olive\backups\CAVE\CA-CIE-ToolsEnv\final\_input\_gen**](file:///\\olive\backups\CAVE\CA-CIE-ToolsEnv\final_input_gen) | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| 1 | Navigate to the testing directory | | |
| 2 | Invoke the ***runner\_run\_AT-1\_Final-Input-Gen.sh*** by doing the following:  Open a Linux terminal, navigate to the testing directory and type: *./runner\_run\_AT-1\_Final-Input-Gen.sh* | | |
| 3 | A new directory should have been created called ***./AT-1***. Navigate to that directory and open a file called ***12070\_Input\_Gen\_screen.log*** in a text editor. Verify that lines 2, 7 and 9 have the following strings of text (in order):   * ../xprt-2/input\_XPRT-2 * Simulation Start Year = 2018 * No RTD for this model   Extra spaces before or after the specified strings are negligible.  These 3 lines of text correspond with the shell script variables: $INPUT1, $INPUT2, and $INPUT3 in the ***runner\_run\_AT-1\_Final-Input-Gen.sh*** program executed in step 2 of this test. | If the text is present as described, this partially satisfies the following FR:  FR-1  A subsequent test will finish validating this requirement |  |
| 4 | With ***./AT-1/12070\_Input\_Gen\_screen.log*** open in a text editor, verify that line 6 has the following phrase (ignoring extra whitespace):  Radionuclide Group 2 | If the text is present as specified, this partially satisfies the following FR:  FR-2  A subsequent test will finish validating this requirement |  |
| 5 | Using a diff merge or file comparison utility, open and compare the following files:   * ***./xprt-2/input\_XPRT-2*** * ***./input\_XPRT-2\_12070***   Verify in the comparison that there are no differences in the following cards, ignoring extra whitespaces (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 * Source * Surface Flux   Verify that there are differences between the two files for the following cards (expected differences will be enumerated in subsequent steps):   * Simulation Title * Solution Control * Output Control   Extra white space characters are negligible | Card differences between the input and output files should only be found in the cards indicated. This partially satisfies the following FR:  FR-3  A subsequent test will validate the case where RTD is specified for a model (changes the Initial Conditions card). |  |
| 6 | In a text editor, open the ***./AT-1/input\_XPRT-2\_12070*** file. Navigate to the “Simulation Title Card”. The final line of the card should state the following (extra white space characters are negligible):  “Rad2 Transport Simulation (2018 – 12070),” | If the specified text is present in the “Simulation Title Card” as specified, this partially satisfies the following FR:  FR-4 |  |
| 7 | In a text editor, open the ***./AT-1/input\_XPRT-2\_12070*** file. Navigate to the “Solution Control Card” and verify that the following text is present:   * Restart File, ../xprt-2/restart, * Water w/ Patankar Vadose Transport Courant, 1.0, * 2, * 2018,year,2070,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * 2070,year,12070,year,1.0E-08,year,10.0,year,1.25,16,1.0E-6, * 1000000, * 0, | If the text is present in the card as indicated, this partially satisfies the following FR:  FR-5  Subsequent tests will validate other aspects of this FR. |  |
| 8 | In a text editor, open the ***./AT-1/input\_XPRT-2\_12070*** file. Note that this model does not have RTD. Navigate to the “Initial Conditions Card”. Verify that the “Initial Conditions Card” contains the following lines:   * Gas Pressure, Aqueous Pressure, * 0, | If the text specified is present in the “Initial Conditions Card”, this partially satisfies the following FR:  FR-6  A subsequent test will validate the remaining aspect of this FR. |  |
| 9 | In either a text editor or file comparison utility, open the script output, ***./AT-1/input\_XPRT-2­\_12070*** and ***./xprt-2/input\_XPRT-2***. In both files, navigate to the “Output Control Card” and verify that:   * 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 should differ by “1” where the ***input\_XPRT-2\_12070*** should have the same number of plot times as ***input\_XPRT-2*** plus one (e.g. if ***input\_XPRT-2*** has 10 plot times, then ***input\_XPRT-2\_12070*** will have 11 plot times) * All plot times will be written verbatim (extra white spaces are negligible) except that there will be one more plot time in the ***input\_XPRT-2\_12070*** file. This extra plot time will be “2018.00000001” * The remainder of the “Output Control Card” should match between the two files (white spaces are negligible) until the file restart * The final line of the “Output Control Card” will have a “No Restart, ,” specified in the ***input\_XPRT-2\_12070*** | If the text is present as described, this partially satisfies the following FR:  FR-7  This partially satisfies the FR, a subsequent test will address the remaining portions of this FR. |  |
| 10 | In addition to the previous steps verified the content of the ***./AT-1/input\_XPRT-2\_12070*** file. If all previous steps passed, then the tool output being saved to a file is also validated. | If all previous steps have passed, this also verifies the following FR:  FR-8 |  |

| Table 4  **12070 STOMP Input File Generator Acceptance Test Plan Case 2** | | | |
| --- | --- | --- | --- |
| **12070 STOMP Input File Generator Acceptance Testing**  **CACIE-12070 STOMP Input File Generator – AT-2** | | **Date:** | |
| **Tool Runner File Location for this test:** | | **Test Performed By:** | |
| **Testing Directory:** [**\\olive\backups\CAVE\CA-CIE-ToolsEnv\final\_input\_gen**](file:///\\olive\backups\CAVE\CA-CIE-ToolsEnv\final_input_gen) | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| 1 | Navigate to the testing directory | | |
| 2 | Invoke the ***runner\_run\_AT-2\_Final-Input-Gen.sh*** by doing the following:  Open a Linux terminal, navigate to the testing directory and type: *./runner\_run\_AT-2\_Final-Input-Gen.sh* | | |
| 3 | A new directory should have been created called ***./AT-2***. Navigate to that directory and open a file called ***12070\_Input\_Gen\_screen.log*** in a text editor. Verify that lines 2, 7 and 10 have the following strings of text (in order):   * ../xprt-1/input\_XPRT-1 * Simulation Start Year = 2030 * ./../xprt-1/rads1-rtd-ic.txt   Extra spaces before or after the specified strings are negligible.  These 3 lines of text correspond with the shell script variables: $INPUT1, $INPUT2, and $INPUT3 in the ***runner\_run\_AT-2\_Final-Input-Gen.sh*** program executed in step 2 of this test. | If the text is present as described, this satisfies the following FR:  FR-1 |  |
| 4 | With ***./AT-2/12070\_Input\_Gen\_screen.log*** open in a text editor, verify that line 6 has the following phrase (ignoring extra whitespace):  Radionuclide Group 1 | If the text is present as specified, this satisfies the following FR:  FR-2 |  |
| 5 | Using a diff merge or file comparison utility, open and compare the following files:   * ***./xprt-1/input\_XPRT-1*** * ***./input\_XPRT-1\_12070***   Verify in the comparison that there are no differences in the following cards, ignoring extra whitspaces (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 * Boundary Conditions * Source * Surface Flux   Verify that there are differences between the two files for the following cards (expected differences will be enumerated in subsequent steps):   * Simulation Title * Solution Control * Output Control * Initial Conditions   Extra white space characters are negligible | Card differences between the input and output files should only be found in the cards indicated. This satisfies the following FR:  FR-3 |  |
| 6 | In a text editor, open the ***./AT-2/input\_XPRT-1\_12070*** file. Navigate to the “Simulation Title Card”. The final line of the card should state the following (extra white space characters are negligible):  “Rad1 Transport Simulation (2030 [RTD Year] – 12070),” | If the specified text is present in the “Simulation Title Card” as specified, this satisfies the following FR:  FR-4 |  |
| 7 | In a text editor, open the ***./AT-2/input\_XPRT-1\_12070*** file. Navigate to the “Solution Control Card” and verify that the following text is present:   * Restart File, ../xprt-1-rtd/restart, * Water w/ Patankar Vadose Transport Courant,1.0, * 2, * 2030,year,2070,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * 2070,year,12070,year,1.0E-08,year,10.0,year,1.25,16,1.0E-6, * 1000000, * 0, | If the text is present in the card as indicated, this partially satisfies the following FR:  FR-5  Subsequent tests will validate other aspects of this FR. |  |
| 8 | Using a diff merge or file comparison utility, open and compare the following files:   * ***./xprt-1/rads1-rtd-ic.txt*** * ***./AT-2/input\_XPRT-1\_12070***   In the ***./AT-2/input\_XPRT-1\_12070*** file, navigate to the “Initial Conditions Card”. Verify that the “Initial Conditions Card” contains the following lines:   * Gas Pressure, Aqueous Pressure, * 24,   The ***./AT-2/input\_XPRT-1\_12070*** file, lines 216 through 243, should match verbatim with the ***./xprt-1/rads1-rtd-ic.txt*** file. | If the text specified is present in the “Initial Conditions Card” and matches with the ***rads1-rtd-ic.txt*** as indicated, this satisfies the following FR:  FR-6 |  |
| 9 | In either a text editor or file comparison utility, open the script output, ***./AT-2/input\_XPRT-1\_12070*** and ***./xprt-1/input\_XPRT-1***. In both files, navigate to the “Output Control Card” and verify that:   * 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 should be equal between ***input\_XPRT-1\_12070*** and ***input\_XPRT-1*** * All plot times will be written verbatim (extra white spaces are negligible) except that there will be a modification to the “2030” plot time in the ***input\_XPRT-1\_12070*** file when compared against the ***input\_XPRT-1***. This extra plot time will be “2030.00000001” * The remainder of the “Output Control Card” should match between the two files (white spaces are negligible) until the file restart * The final line of the “Output Control Card” will have a “No Restart, ,” specified in the ***input\_XPRT-1\_12070*** | If the text is written as indicated for the “Output Control Card”, this satisfies the following FR:  FR-7 |  |

| Table 5  **12070 STOMP Input File Generator Acceptance Test Plan Case 3** | | | |
| --- | --- | --- | --- |
| **12070 STOMP Input File Generator Acceptance Testing**  **CACIE-12070 STOMP Input File Generator – AT-3** | | **Date:** | |
| **Tool Runner File Location for this test:** | | **Test Performed By:** | |
| **Testing Directory:** [**\\olive\backups\CAVE\CA-CIE-ToolsEnv\final\_input\_gen**](file:///\\olive\backups\CAVE\CA-CIE-ToolsEnv\final_input_gen) | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| 1 | Navigate to the testing directory | | |
| 2 | Invoke the ***runner\_run\_AT-3\_Final-Input-Gen.sh*** by doing the following:  Open a Linux terminal, navigate to the testing directory and type: *./runner\_run\_AT-3\_Final-Input-Gen.sh* | | |
| 3 | In a text editor, open the ***./AT-3/input\_XPRT-2\_12070*** file. Navigate to the “Solution Control Card” and verify that the following text is present:   * Restart File, ../xprt-2-rtd/restart, * Water w/ Patankar Vadose Transport Courant,1.0, * 2, * 2030,year,2070,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * 2070,year,12070,year,1.0E-08,year,10.0,year,1.25,16,1.0E-6, * 1000000, * 0, | If the text is present in the card as indicated, this partially satisfies the following FR:  FR-5  A subsequent test will validate remaining aspect of this FR. |  |

| Table 6  **12070 STOMP Input File Generator Acceptance Test Plan Case 4** | | | |
| --- | --- | --- | --- |
| **12070 STOMP Input File Generator Acceptance Testing**  **CACIE-12070 STOMP Input File Generator – AT-4** | | **Date:** | |
| **Tool Runner File Location for this test:** | | **Test Performed By:** | |
| **Testing Directory:** [**\\olive\backups\CAVE\CA-CIE-ToolsEnv\final\_input\_gen**](file:///\\olive\backups\CAVE\CA-CIE-ToolsEnv\final_input_gen) | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| 1 | Navigate to the testing directory | | |
| 2 | Invoke the ***runner\_run\_AT-4\_Final-Input-Gen.sh*** by doing the following:  Open a Linux terminal, navigate to the testing directory and type: *./runner\_run\_AT-4\_Final-Input-Gen.sh* | | |
| 3 | In a text editor, open the ***./AT-4/input\_XPRT-1\_12070*** file. Navigate to the “Solution Control Card” and verify that the following text is present:   * Restart File, ../xprt-1/restart, * Water w/ Patankar Vadose Transport Courant,1.0, * 2, * 2018,year,2070,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * 2070,year,12070,year,1.0E-08,year,10.0,year,1.25,16,1.0E-6, * 1000000, * 0, | If the text is present in the card as indicated, this partially satisfies the following FR:  FR-5 |  |
| 4 | In a text editor, open the ***./AT-4/screenout*** file and navigate through the file and verify that there are no error messages (Search for the keyword “error” as a case-insensitive search). Verify that the following text is present in the ***screenout*** file:  113 2026685 2.01800E+03 8.00000E-09 [ 0/ 0/ 0/ 0/ 0/ 0/ 0/ 0/ 0] 1.0000000E+00 1.3233889E+10 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 3.1687181E-01 6.0744326E-02 -8.7102863E+04 1.9301252E+02 -4.0241227E-01 5.3871908E-02 -6.0014580E+00 | If there are no errors present in the file and the text is present as indicated, this satisfies the following FR:  FR-9 |  |

# Acceptance Test Report

To complete the Acceptance Testing use Appendix A. The 4 test cases are described as follows:

* Acceptance Test 1 is in Table A-1 of Appendix A. This test executes the tool and the inputs are compared against the outputs to validate the functional requirements.
* Acceptance Test 2 is in Table A-2 of Appendix A. This test executes the tool and the inputs are compared against the outputs to validate the functional requirements.
* Acceptance Test 3 is in Table A-3 of Appendix A. This test executes the tool and the inputs are compared against the outputs to validate the functional requirements.
* Acceptance Test 4 is in Table A-4 of Appendix A. This test executes the tool and the inputs are compared against the outputs to validate the functional requirements. After the outputs are verified, the 12070 STOMP input file is copied and the time steps are limited down to a single time step. This new file is then given as input to an eSTOMP executable and the eSTOMP output is verified.

Details of these tests, when they were conducted, by whom, and if they Passed or Failed are in each table of Appendix A.

# User Guide

To run this tool a STOMP input file needs to be provided along with a user-specified start year (and associated RTD initial conditions overwrite file produced by the RTD IC tool, as applicable). Refer to the software design and input description for additional information about the input file to be modified by the tool. Using a Linux terminal execute the following command:

$ ./<path/to/repository>/tools/ca-modinput/linux/xprt\_12070\_input\_gen\_linux-intel-64.exe <path/to/STOMP/input/file>/input\_file <YYYY> [<path/to/RTD/initial/conditions/overwrite/file>]

The “YYYY” is the start year to be supplied by the user. The 3rd argument is optional and should be included if “YYYY” is different from 2018 and corresponds with a model where RTD action(s) takes place in the model.

# Tool Versions

This section details changes incorporated into each version of the 12070 STOMP Input File Generator tool.

* 1.0 – Tool was developed.

# Appendix A

**Completed Acceptance Test Cases**

**Tool Runner Log**

Test directory verified

###Executing 12070 Input Generator###

INFO--05/06/2020 08:11:54 AM--Starting CA-CIE Tool Runner. Logging to ".././AT-1/runner\_run\_AT-1\_12070-Input-Gen.log"

INFO--05/06/2020 08:11:54 AM--Code Version: b12d5e8ccca9e84952cba844ef6c0e12b2789d30 v2.13: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--05/06/2020 08:11:54 AM--Code Version: bf149c67c14084c4f4e6cb0b990c64dc6f25d6f0 Local repo SHA-1 has does not correspond to a remote repo release version: /home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/final\_input\_gen/tools/ca-modinput/linux/xprt\_12070\_input\_gen\_linux-intel-64.exe<--a14832f5960b2a0e0562aa800fdaacd1b804a1fd

INFO--05/06/2020 08:11:54 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--05/06/2020 08:11:54 AM--QA Status: TEST : /home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/final\_input\_gen/tools/ca-modinput/linux/xprt\_12070\_input\_gen\_linux-intel-64.exe

INFO--05/06/2020 08:11:54 AM--Invoking Command:"/home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/final\_input\_gen/tools/ca-modinput/linux/xprt\_12070\_input\_gen\_linux-intel-64.exe" with Arguments:"../xprt-2/input\_XPRT-2 2018 "

INFO--05/06/2020 08:11:54 AM--Username:cfarrow 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 A-1  **12070 STOMP Input File Generator Acceptance Test Plan Case 1** | | | |
| --- | --- | --- | --- |
| **12070 STOMP Input File Generator Acceptance Testing**  **CACIE-12070 STOMP Input File Generator – AT-1** | | **Date: 06 May, 2020** | |
| **Tool Runner File Location for this test:**  [**\\olive\backups\CAVE\CA-CIE-ToolsEnv\final\_input\_gen\AT-1**](file:///\\olive\backups\CAVE\CA-CIE-ToolsEnv\final_input_gen\AT-1) | | **Test Performed By: Christopher Farrow** | |
| **Testing Directory:** [**\\olive\backups\CAVE\CA-CIE-ToolsEnv\final\_input\_gen**](file:///\\olive\backups\CAVE\CA-CIE-ToolsEnv\final_input_gen) | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| 1 | Navigate to the testing directory | | |
| 2 | Invoke the ***runner\_run\_AT-1\_Final-Input-Gen.sh*** by doing the following:  Open a Linux terminal, navigate to the testing directory and type: *./runner\_run\_AT-1\_Final-Input-Gen.sh* | | |
| 3 | A new directory should have been created called ***./AT-1***. Navigate to that directory and open a file called ***12070\_Input\_Gen\_screen.log*** in a text editor. Verify that lines 2, 7 and 9 have the following strings of text (in order):   * ../xprt-2/input\_XPRT-2 * Simulation Start Year = 2018 * No RTD for this model   Extra spaces before or after the specified strings are negligible.  These 3 lines of text correspond with the shell script variables: $INPUT1, $INPUT2, and $INPUT3 in the ***runner\_run\_AT-1\_Final-Input-Gen.sh*** program executed in step 2 of this test. | If the text is present as described, this partially satisfies the following FR:  FR-1  A subsequent test will finish validating this requirement | PASS |
| 4 | With ***./AT-1/12070\_Input\_Gen\_screen.log*** open in a text editor, verify that line 6 has the following phrase (ignoring extra whitespace):  Radionuclide Group 2 | If the text is present as specified, this partially satisfies the following FR:  FR-2  A subsequent test will finish validating this requirement | PASS |
| 5 | Using a diff merge or file comparison utility, open and compare the following files:   * ***./xprt-2/input\_XPRT-2*** * ***./input\_XPRT-2\_12070***   Verify in the comparison that there are no differences in the following cards, ignoring extra whitespaces (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 * Source * Surface Flux   Verify that there are differences between the two files for the following cards (expected differences will be enumerated in subsequent steps):   * Simulation Title * Solution Control * Output Control   Extra white space characters are negligible | Card differences between the input and output files should only be found in the cards indicated. This partially satisfies the following FR:  FR-3  A subsequent test will validate the case where RTD is specified for a model (changes the Initial Conditions card). | PASS |
| 6 | In a text editor, open the ***./AT-1/input\_XPRT-2\_12070*** file. Navigate to the “Simulation Title Card”. The final line of the card should state the following (extra white space characters are negligible):  “Rad2 Transport Simulation (2018 – 12070),” | If the specified text is present in the “Simulation Title Card” as specified, this partially satisfies the following FR:  FR-4 | PASS |
| 7 | In a text editor, open the ***./AT-1/input\_XPRT-2\_12070*** file. Navigate to the “Solution Control Card” and verify that the following text is present:   * Restart File, ../xprt-2/restart, * Water w/ Patankar Vadose Transport Courant, 1.0, * 2, * 2018,year,2070,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * 2070,year,12070,year,1.0E-08,year,10.0,year,1.25,16,1.0E-6, * 1000000, * 0, | If the text is present in the card as indicated, this partially satisfies the following FR:  FR-5  Subsequent tests will validate other aspects of this FR. | PASS |
| 8 | In a text editor, open the ***./AT-1/input\_XPRT-2\_12070*** file. Note that this model does not have RTD. Navigate to the “Initial Conditions Card”. Verify that the “Initial Conditions Card” contains the following lines:   * Gas Pressure, Aqueous Pressure, * 0, | If the text specified is present in the “Initial Conditions Card”, this partially satisfies the following FR:  FR-6  A subsequent test will validate the remaining aspect of this FR. | PASS |
| 9 | In either a text editor or file comparison utility, open the script output, ***./AT-1/input\_XPRT-2­\_12070*** and ***./xprt-2/input\_XPRT-2***. In both files, navigate to the “Output Control Card” and verify that:   * 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 should differ by “1” where the ***input\_XPRT-2\_12070*** should have the same number of plot times as ***input\_XPRT-2*** plus one (e.g. if ***input\_XPRT-2*** has 10 plot times, then ***input\_XPRT-2\_12070*** will have 11 plot times) * All plot times will be written verbatim (extra white spaces are negligible) except that there will be one more plot time in the ***input\_XPRT-2\_12070*** file. This extra plot time will be “2018.00000001” * The remainder of the “Output Control Card” should match between the two files (white spaces are negligible) until the file restart * The final line of the “Output Control Card” will have a “No Restart, ,” specified in the ***input\_XPRT-2\_12070*** | If the text is present as described, this partially satisfies the following FR:  FR-7  This partially satisfies the FR, a subsequent test will address the remaining portions of this FR. | PASS |
| 10 | In addition to the previous steps verified the content of the ***./AT-1/input\_XPRT-2\_12070*** file. If all previous steps passed, then the tool output being saved to a file is also validated. | If all previous steps have passed, this also verifies the following FR:  FR-8 | PASS |

**Tool Runner Log**

Test directory verified

###Executing 12070 Input Generator###

INFO--05/06/2020 08:26:02 AM--Starting CA-CIE Tool Runner. Logging to ".././AT-2/runner\_run\_AT-2\_12070-Input-Gen.log"

INFO--05/06/2020 08:26:02 AM--Code Version: b12d5e8ccca9e84952cba844ef6c0e12b2789d30 v2.13: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--05/06/2020 08:26:03 AM--Code Version: bf149c67c14084c4f4e6cb0b990c64dc6f25d6f0 Local repo SHA-1 has does not correspond to a remote repo release version: /home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/final\_input\_gen/tools/ca-modinput/linux/xprt\_12070\_input\_gen\_linux-intel-64.exe<--a14832f5960b2a0e0562aa800fdaacd1b804a1fd

INFO--05/06/2020 08:26:03 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--05/06/2020 08:26:03 AM--QA Status: TEST : /home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/final\_input\_gen/tools/ca-modinput/linux/xprt\_12070\_input\_gen\_linux-intel-64.exe

INFO--05/06/2020 08:26:03 AM--Invoking Command:"/home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/final\_input\_gen/tools/ca-modinput/linux/xprt\_12070\_input\_gen\_linux-intel-64.exe" with Arguments:"../xprt-1/input\_XPRT-1 2030 ./../xprt-1/rads1-rtd-ic.txt"

INFO--05/06/2020 08:26:03 AM--Username:cfarrow 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 A-2  **12070 STOMP Input File Generator Acceptance Test Plan Case 2** | | | |
| --- | --- | --- | --- |
| **12070 STOMP Input File Generator Acceptance Testing**  **CACIE-12070 STOMP Input File Generator – AT-2** | | **Date: 06 May, 2020** | |
| **Tool Runner File Location for this test:**  [**\\olive\backups\CAVE\CA-CIE-ToolsEnv\final\_input\_gen\AT-2**](file:///\\olive\backups\CAVE\CA-CIE-ToolsEnv\final_input_gen\AT-2) | | **Test Performed By: Christopher Farrow** | |
| **Testing Directory:** [**\\olive\backups\CAVE\CA-CIE-ToolsEnv\final\_input\_gen**](file:///\\olive\backups\CAVE\CA-CIE-ToolsEnv\final_input_gen) | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| 1 | Navigate to the testing directory | | |
| 2 | Invoke the ***runner\_run\_AT-2\_Final-Input-Gen.sh*** by doing the following:  Open a Linux terminal, navigate to the testing directory and type: *./runner\_run\_AT-2\_Final-Input-Gen.sh* | | |
| 3 | A new directory should have been created called ***./AT-2***. Navigate to that directory and open a file called ***12070\_Input\_Gen\_screen.log*** in a text editor. Verify that lines 2, 7 and 10 have the following strings of text (in order):   * ../xprt-1/input\_XPRT-1 * Simulation Start Year = 2030 * ./../xprt-1/rads1-rtd-ic.txt   Extra spaces before or after the specified strings are negligible.  These 3 lines of text correspond with the shell script variables: $INPUT1, $INPUT2, and $INPUT3 in the ***runner\_run\_AT-2\_Final-Input-Gen.sh*** program executed in step 2 of this test. | If the text is present as described, this satisfies the following FR:  FR-1 | PASS |
| 4 | With ***./AT-2/12070\_Input\_Gen\_screen.log*** open in a text editor, verify that line 6 has the following phrase (ignoring extra whitespace):  Radionuclide Group 1 | If the text is present as specified, this satisfies the following FR:  FR-2 | PASS |
| 5 | Using a diff merge or file comparison utility, open and compare the following files:   * ***./xprt-1/input\_XPRT-1*** * ***./input\_XPRT-1\_12070***   Verify in the comparison that there are no differences 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 * Boundary Conditions * Source * Surface Flux   Verify that there are differences between the two files for the following cards (expected differences will be enumerated in subsequent steps):   * Simulation Title * Solution Control * Output Control * Initial Conditions   Extra white space characters are negligible | Card differences between the input and output files should only be found in the cards indicated. This satisfies the following FR:  FR-3 | PASS |
| 6 | In a text editor, open the ***./AT-2/input\_XPRT-1\_12070*** file. Navigate to the “Simulation Title Card”. The final line of the card should state the following (extra white space characters are negligible):  “Rad1 Transport Simulation (2030 [RTD Year] – 12070),” | If the specified text is present in the “Simulation Title Card” as specified, this satisfies the following FR:  FR-4 | PASS |
| 7 | In a text editor, open the ***./AT-2/input\_XPRT-1\_12070*** file. Navigate to the “Solution Control Card” and verify that the following text is present:   * Restart File, ../xprt-1-rtd/restart, * Water w/ Patankar Vadose Transport Courant,1.0, * 2, * 2030,year,2070,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * 2070,year,12070,year,1.0E-08,year,10.0,year,1.25,16,1.0E-6, * 1000000, * 0, | If the text is present in the card as indicated, this partially satisfies the following FR:  FR-5  Subsequent tests will validate other aspects of this FR. | PASS |
| 8 | Using a diff merge or file comparison utility, open and compare the following files:   * ***./xprt-1/rads1-rtd-ic.txt*** * ***./AT-2/input\_XPRT-1\_12070***   In the ***./AT-2/input\_XPRT-1\_12070*** file, navigate to the “Initial Conditions Card”. Verify that the “Initial Conditions Card” contains the following lines:   * Gas Pressure, Aqueous Pressure, * 24,   The ***./AT-2/input\_XPRT-1\_12070*** file, lines 216 through 243, should match verbatim with the ***./xprt-1/rads1-rtd-ic.txt*** file. | If the text specified is present in the “Initial Conditions Card” and matches with the ***rads1-rtd-ic.txt*** as indicated, this satisfies the following FR:  FR-6 | PASS |
| 9 | In either a text editor or file comparison utility, open the script output, ***./AT-2/input\_XPRT-1\_12070*** and ***./xprt-1/input\_XPRT-1***. In both files, navigate to the “Output Control Card” and verify that:   * 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 should be equal between ***input\_XPRT-1\_12070*** and ***input\_XPRT-1*** * All plot times will be written verbatim (extra white spaces are negligible) except that there will be a modification to the “2030” plot time in the ***input\_XPRT-1\_12070*** file when compared against the ***input\_XPRT-1***. This extra plot time will be “2030.00000001” * The remainder of the “Output Control Card” should match between the two files (white spaces are negligible) until the file restart * The final line of the “Output Control Card” will have a “No Restart, ,” specified in the ***input\_XPRT-1\_12070*** | If the text is written as indicated for the “Output Control Card”, this satisfies the following FR:  FR-7 | PASS |

**Tool Runner Log**

Test directory verified

###Executing 12070 Input Generator###

INFO--05/06/2020 09:16:43 AM--Starting CA-CIE Tool Runner. Logging to ".././AT-3/runner\_run\_AT-3\_12070-Input-Gen.log"

INFO--05/06/2020 09:16:43 AM--Code Version: b12d5e8ccca9e84952cba844ef6c0e12b2789d30 v2.13: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--05/06/2020 09:16:44 AM--Code Version: bf149c67c14084c4f4e6cb0b990c64dc6f25d6f0 Local repo SHA-1 has does not correspond to a remote repo release version: /home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/final\_input\_gen/tools/ca-modinput/linux/xprt\_12070\_input\_gen\_linux-intel-64.exe<--a14832f5960b2a0e0562aa800fdaacd1b804a1fd

INFO--05/06/2020 09:16:44 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--05/06/2020 09:16:44 AM--QA Status: TEST : /home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/final\_input\_gen/tools/ca-modinput/linux/xprt\_12070\_input\_gen\_linux-intel-64.exe

INFO--05/06/2020 09:16:44 AM--Invoking Command:"/home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/final\_input\_gen/tools/ca-modinput/linux/xprt\_12070\_input\_gen\_linux-intel-64.exe" with Arguments:"../xprt-2/input\_XPRT-2 2030 ./../xprt-2/rads2-rtd-ic.txt"

INFO--05/06/2020 09:16:44 AM--Username:cfarrow 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 A-3  **12070 STOMP Input File Generator Acceptance Test Plan Case 3** | | | |
| --- | --- | --- | --- |
| **12070 STOMP Input File Generator Acceptance Testing**  **CACIE-12070 STOMP Input File Generator – AT-3** | | **Date: 06 May, 2020** | |
| **Tool Runner File Location for this test:**  [**\\olive\backups\CAVE\CA-CIE-ToolsEnv\final\_input\_gen\AT-3**](file:///\\olive\backups\CAVE\CA-CIE-ToolsEnv\final_input_gen\AT-3) | | **Test Performed By: Christopher Farrow** | |
| **Testing Directory:** [**\\olive\backups\CAVE\CA-CIE-ToolsEnv\final\_input\_gen**](file:///\\olive\backups\CAVE\CA-CIE-ToolsEnv\final_input_gen) | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| 1 | Navigate to the testing directory | | |
| 2 | Invoke the ***runner\_run\_AT-3\_Final-Input-Gen.sh*** by doing the following:  Open a Linux terminal, navigate to the testing directory and type: *./runner\_run\_AT-3\_Final-Input-Gen.sh* | | |
| 3 | In a text editor, open the ***./AT-3/input\_XPRT-2\_12070*** file. Navigate to the “Solution Control Card” and verify that the following text is present:   * Restart File, ../xprt-2-rtd/restart, * Water w/ Patankar Vadose Transport Courant,1.0, * 2, * 2030,year,2070,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * 2070,year,12070,year,1.0E-08,year,10.0,year,1.25,16,1.0E-6, * 1000000, * 0, | If the text is present in the card as indicated, this partially satisfies the following FR:  FR-5  A subsequent test will validate remaining aspect of this FR. | PASS |

**Tool Runner Log**

Test directory verified

###Executing 12070 Input Generator###

INFO--05/06/2020 09:21:26 AM--Starting CA-CIE Tool Runner. Logging to ".././AT-4/runner\_run\_AT-4\_12070-Input-Gen.log"

INFO--05/06/2020 09:21:26 AM--Code Version: b12d5e8ccca9e84952cba844ef6c0e12b2789d30 v2.13: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--05/06/2020 09:21:26 AM--Code Version: bf149c67c14084c4f4e6cb0b990c64dc6f25d6f0 Local repo SHA-1 has does not correspond to a remote repo release version: /home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/final\_input\_gen/tools/ca-modinput/linux/xprt\_12070\_input\_gen\_linux-intel-64.exe<--a14832f5960b2a0e0562aa800fdaacd1b804a1fd

INFO--05/06/2020 09:21:26 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--05/06/2020 09:21:26 AM--QA Status: TEST : /home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/final\_input\_gen/tools/ca-modinput/linux/xprt\_12070\_input\_gen\_linux-intel-64.exe

INFO--05/06/2020 09:21:26 AM--Invoking Command:"/home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/final\_input\_gen/tools/ca-modinput/linux/xprt\_12070\_input\_gen\_linux-intel-64.exe" with Arguments:"../xprt-1/input\_XPRT-1 2018 "

INFO--05/06/2020 09:21:26 AM--Username:cfarrow 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###

###Copy 12070 input file to 'input'

###Modify the number of time steps to be '1'###

###Copy the input.zone and input.bot from ../xprt-1 into the test directory###

Copied ./../xprt-1/input.zone to: ./AT-4

Copied ./../xprt-1/input.bot to: ./AT-4

###Make the surface file directory###

Created the new directory 'srf' in the testing directory

###Finished all necessary preparations to execute the 12070 STOMP input file###

###Execute the STOMP program using the 12070 STOMP input file as input###

###STOMP execution complete###

| Table A-4  **12070 STOMP Input File Generator Acceptance Test Plan Case 4** | | | |
| --- | --- | --- | --- |
| **12070 STOMP Input File Generator Acceptance Testing**  **CACIE-12070 STOMP Input File Generator – AT-4** | | **Date: 06 May, 2020** | |
| **Tool Runner File Location for this test:**  [**\\olive\backups\CAVE\CA-CIE-ToolsEnv\final\_input\_gen\AT-4**](file:///\\olive\backups\CAVE\CA-CIE-ToolsEnv\final_input_gen\AT-4) | | **Test Performed By: Christopher Farrow** | |
| **Testing Directory:** [**\\olive\backups\CAVE\CA-CIE-ToolsEnv\final\_input\_gen**](file:///\\olive\backups\CAVE\CA-CIE-ToolsEnv\final_input_gen) | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| 1 | Navigate to the testing directory | | |
| 2 | Invoke the ***runner\_run\_AT-4\_Final-Input-Gen.sh*** by doing the following:  Open a Linux terminal, navigate to the testing directory and type: *./runner\_run\_AT-4\_Final-Input-Gen.sh* | | |
| 3 | In a text editor, open the ***./AT-4/input\_XPRT-1\_12070*** file. Navigate to the “Solution Control Card” and verify that the following text is present:   * Restart File, ../xprt-1/restart, * Water w/ Patankar Vadose Transport Courant,1.0, * 2, * 2018,year,2070,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * 2070,year,12070,year,1.0E-08,year,10.0,year,1.25,16,1.0E-6, * 1000000, * 0, | If the text is present in the card as indicated, this partially satisfies the following FR:  FR-5 | PASS |
| 4 | In a text editor, open the ***./AT-4/screenout*** file and navigate through the file and verify that there are no error messages (Search for the keyword “error” as a case-insensitive search). Verify that the following text is present in the ***screenout*** file:  113 2026685 2.01800E+03 8.00000E-09 [ 0/ 0/ 0/ 0/ 0/ 0/ 0/ 0/ 0] 1.0000000E+00 1.3233889E+10 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 3.1687181E-01 6.0744326E-02 -8.7102863E+04 1.9301252E+02 -4.0241227E-01 5.3871908E-02 -6.0014580E+00 | If there are no errors present in the file and the text is present as indicated, this satisfies the following FR:  FR-9 | PASS |

# Appendix B

# Completed Installation Test

**Tool Runner Log**

Test directory verified

###Executing 12070 Input Generator###

INFO--05/07/2020 08:33:41 AM--Starting CA-CIE Tool Runner. Logging to ".././IT-1/runner\_run\_IT-1\_12070-Input-Gen.log"

INFO--05/07/2020 08:33:41 AM--Code Version: 6a972494db2300f4ada263b11ffd42e5490c9bf1 v2.14: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--05/07/2020 08:33:41 AM--Code Version: 6a972494db2300f4ada263b11ffd42e5490c9bf1 v2.14: /opt/tools/tools/ca-modinput/linux/xprt\_12070\_input\_gen\_linux-intel-64.exe<--a14832f5960b2a0e0562aa800fdaacd1b804a1fd

INFO--05/07/2020 08:33:41 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--05/07/2020 08:33:41 AM--QA Status: QUALIFIED : /opt/tools/tools/ca-modinput/linux/xprt\_12070\_input\_gen\_linux-intel-64.exe

INFO--05/07/2020 08:33:41 AM--Invoking Command:"/opt/tools/tools/ca-modinput/linux/xprt\_12070\_input\_gen\_linux-intel-64.exe" with Arguments:"not-a-file 2018 "

INFO--05/07/2020 08:33:41 AM--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  **12070 STOMP Input File Generator Installation Test Plan** | | | |
| --- | --- | --- | --- |
| **12070 STOMP Input File Generator Installation Testing**  **CACIE-12070 STOMP Input File Generator – IT-1** | | **Date: 05/07/2020** | |
| **Tool Runner File Location for this test:**  **\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\CA-CIE-Tools\_v2.X\_install\_tests\xprt\_12070\_input\_gen\IT-1** | | **Test Performed By: Sara Lindberg** | |
| **Testing Directory: \\olive\backups\CAVE\CA-CIE-Tools-TestEnv\CA-CIE-Tools\_v2.X\_install\_tests\xprt\_12070\_input\_gen** | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| Tools Code Repository Directory: /opt/tools | | | |
| Navigate to the testing directory | | | |
| 1 | Invoke Tool Runner and execute the tool using ***runner\_run\_IT-1\_Final-Input-Gen.sh*** as follows: Open a Linux terminal and after navigating to the appropriate directory indicated type *./runner\_run\_IT-1\_Final-Input-Gen.sh* | | |
| 2 | A new directory called “IT-1” should have been created. Navigate into ***./IT-1*** and open  ***runlog\_IT-1\_Final-Input-Gen.log***. In this file there should be the following line (second line of the file): “not-a-file”.  In line 10 of the file there should be the following error as a result of not providing a valid input file to the tool: “forrtl: No such file or directory” | If the 2nd line has “not-a-file” in it and line 10 has the error specified, this validates the tool installation. | Pass |

**Appendix C**

**QA Checklist**

