**CACIE Tool #41** – **CIE 3070 STOMP Input File Generator Tool**

**xprt\_3070\_input\_gen\_cie.f**

**Version** **1.1**

**QA**: **QA**

# Description and Purpose

The CIE 3070 STOMP Input File Generator Tool generates the 2018 (or RTD year if the model has RTD) - 3070 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. 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-3070***.

# Functional Requirements

The following are the functional requirements (FRs) of the CIE 3070 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: Copy lines from the 1943-2018 STOMP input file except as noted in the following functional requirements FR-3 to FR-6. 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-3: In the Simulation Title Card, replace the second Simulation Note Line (“*CIE Transport Simulation (1943-2018),*”) with:

* “*CIE Transport Simulation (2018 - 3070),*” if the model does not have RTD (simulation start year = 2018).
* “*CIE Transport Simulation (YYYY [RTD Year] - 3070),*” where YYYY is the RTD year, if the model has RTD (simulation start year > 2018).

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

* Set the restart path depending on whether the model has RTD:  
   “*../xprt-2018/restart*” for models with no RTD  
   “*../xprt-rtd/restart*” for models 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,3070,year,1.0E-08,year,1.0,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-5: If the model does not have RTD, initial conditions are set to 0 lines (same as 1943-2018 STOMP input file). 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-6: 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 3070 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-7: Save the output file (i.e., the complete STOMP 3070 transport input file, which includes all the required cards).

FR-8: 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 CIE 3070 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 3070 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” and model years).
6. Write Solution Control Card – Determine the appropriate restart path and write the 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
8. Write Initial Conditions Card – If the model does not have RTD, the number of initial conditions is 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.
9. Write the Boundary Conditions Card, which is copied from the 1943-2018 STOMP input file created by the CIE 2018 STOMP Input File Generator Tool.
10. 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.
11. 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.
12. 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, ,”.
13. 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.

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 CIE 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 3070:

input\_XPRT-3070

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\_3070\_input\_gen\_cie\_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 location/name
* $INPUT2 – Simulation start year
* $INPUT3 – (optional) RTD IC file location/name

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 3070 STOMP Input File Generator tool.

Updates to the code made for v1.1 were reviewed on 09/29/2020 by Sara Lindberg. The update is limited to change in the naming convention for the generated output file. No other functionality associated with the code is impacted by the change.

# Requirements Traceability Matrix

The requirements traceability matrix for the CIE 3070 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\_3070\_input\_gen\_cie-IT-1 | Installation Test |
| FR-1 | CACIE-xprt\_3070\_input\_gen\_cie-AT-1 and 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\_3070\_input\_gen\_cie-AT-1 and 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-3 | CACIE-xprt\_3070\_input\_gen\_cie-AT-1 and 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 *CIE Transport Simulation (2018-3070),*. * If the simulation start year is after 2018, check that the last line is *CIE Transport Simulation (YYYY [RTD Year] - 3070),* where YYYY is the RTD year. |
| FR-4 | CACIE-xprt\_3070\_input\_gen\_cie-AT-1 and AT-2 | ~Solution Control Card:   * Check that the restart path is correct. * Check that the Solution Control Card matches the format described in Functional Requirement FR-4. |
| FR-5 | CACIE-xprt\_3070\_input\_gen\_cie-AT-1 and 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-6 | CACIE-xprt\_3070\_input\_gen\_cie-AT-1 and 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-7 | CACIE-xprt\_3070\_input\_gen\_cie-AT-1 and AT-2 | 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-8 | CACIE-xprt\_3070\_input\_gen\_cie-AT-1 and AT-2 | Copy and Paste the generated input file as ***input*** in the same directory. Modify the Solution Control 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 3070 STOMP Input File Generator is presented in Table 2 and the acceptance test plan cases for CIE 3070 STOMP Input File Generator are presented in Table 3, Table 4, and Table 5.

| Table 2  **CIE 3070 STOMP Input File Generator Installation Test Plan** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **CIE 3070 STOMP Input File Generator Installation Testing**  **CACIE-CIE 3070 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)** |
| Navigate to the testing directory | | | | | |
| 1 | Invoke Tool Runner and execute the tool as follows: Open a Linux terminal and after navigating to the appropriate directory indicated type *./runner\_run\_IT-1\_3070-Gen\_cie.sh* | | | | |
| 2 | Verify tool runner and tool is invoked | Tool runner log includes:  QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py  And QA Status: QUALIFIED : /opt/tools/tools/cie-modinput/linux/xprt\_3070\_input\_gen\_cie\_linux-intel-64.exe | | |  |
| 2 | A new directory called “IT-1” should have been created. Navigate into ***./IT-1*** and open  ***runlog\_IT-1\_3070-Gen\_cie.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  **CIE 3070 STOMP Input File Generator Acceptance Test Plan Case 1** | | | |
| --- | --- | --- | --- |
| **CIE 3070 STOMP Input File Generator Acceptance Testing**  **CACIE-CIE 3070 STOMP Input File Generator – AT-1** | | **Date:** | |
| **Tool Runner File Location for this test:**  \\olive\backups\CAVE\v4-4Test\afarms\_xprt\_3070\_at1\xprt-3070\ | | **Test Performed By:** | |
| **Testing Directory:** \\olive\backups\CAVE\v4-4Test\afarms\_xprt\_3070\_at1\xprt-3070\ | | | |
| **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 3070 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\_with\_buffer*** in the /xprt-2018/ directory * ***cie-src-ic.txt*** in the /rtd-ic/ directory   Other files to complete the Acceptance Test:   * The ***input.bot***, ***input.zone***, and ***estomp-run.sh*** files are present in the /xprt-3070/ directory. | The expected files are present in the listed directories. |  |
| 2 | Execute, using a Linux terminal, the shell script ***run\_cie\_input\_xprt-3070.sh*** located in /xprt-3070/ subdirectory of the testing directory. | Script executes. |  |
| 3 | Verify in the Linux terminal the referenced file is the ***cie-src-ic.txt*** file in the /rtd\_ic/ directory. | The ***cie-src-ic.txt*** 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-3070*** in the /xprt-3070/ 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 * 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\_3070*** file in a preferred text editor. | | |
| 5.1 | Verify the Simulation Title Card final line (the Simulation Note Line) states the year start is *2027 [RTD Year]* and the end year is *3070*. | The second line of the Simulation Title Card states the simulation years are 2027 to 3070. |  |
| 5.2 | Navigate to the Solution Control Card. Verify that line 20 has the following text:   * *Restart File, ../xprt-rtd/restart,*   Then verify that lines 21 through 26 report the correct information detailed in FR-4 of Section 2 in this document. Note, AT-1 involves RTD. | The changes to the Solution Control Card are present in the ***input\_XPRT\_3070*** file. |  |
| 5.3 | Using a program, such as DiffMerge, verify the contents of the Initial Conditions Card in the ***input\_XPRT\_3070input\_XPRT-3070*** file match the ***cie-src-ic.txt*** file in the /rtd-ic/ directory. | The Initial Conditions Card and the ***cie-src-ic.txt*** file match. |  |
| 6 | Using a diff merge or file comparison utility, open and compare the following files:   * ***input\_XPRT\_2018\_with\_buffer*** in the /xprt-2018/ directory * ***input\_XPRT\_3070*** in the /xprt-3070/ 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\_3070*** 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\_3070***. This extra plot time will be *2027.00000001, year,* * The final line of the Output Control Card will read *No Restart, ,* * 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\_3070\_at1/xprt-3070/ directory, make a copy of the ***input\_XPRT\_3070*** 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\_3070\_at1/xprt-3070/ 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\_3070\_at1/xprt-3070/ 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 completed. |  |

| Table 4  **CIE 3070 STOMP Input File Generator Acceptance Test Plan Case 2** | | | |
| --- | --- | --- | --- |
| **CIE 3070 STOMP Input File Generator Acceptance Testing**  **CACIE-CIE 3070 STOMP Input File Generator – AT-2** | | **Date:** | |
| **Tool Runner File Location for this test:**  \\olive\backups\CAVE\v4-4Test\afarms\_xprt\_3070\_at2\xprt-3070\ | | **Test Performed By:** | |
| **Testing Directory:** \\olive\backups\CAVE\v4-4Test\afarms\_xprt\_3070\_at2\xprt-3070\ | | | |
| **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 3070 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 * ***input\_XPRT\_2018\_no\_buffer*** 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-3070/ directory. | The expected files are present in the listed directories. |  |
| 2 | Execute, using a Linux terminal, the shell script ***run\_cie\_input\_xprt-3070.sh*** located in /xprt-3070/ subdirectory of the testing directory. | Script executes. |  |
| 3 | Verify in the Linux terminal the referenced file is the ***cie-src-ic.txt*** file in the /rtd\_ic/ directory. | The ***cie-src-ic.txt*** 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\_3070*** in the /xprt-3070/ 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 * Boundary Conditions * Initial 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\_3070*** file in a preferred text editor. | | |
| 5.1 | Verify the Simulation Title Card final line (the Simulation Note Line) states the year start is *2018 [RTD Year]* and the end year is *3070*. | The second line of the Simulation Title Card states the simulation years are 2018 to 3070. |  |
| 5.2 | Navigate to the Solution Control Card. Verify that line 20 has the following text:   * *Restart File, ../xprt-2018/restart,*   Then verify that lines 21 through 26 report the correct information detailed in FR-4 of Section 2 in this document. Note, AT-2 had **NO** RTD. | The changes to the Solution Control Card are present in the ***input\_XPRT\_3070*** 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\_3070*** in the /xprt-3070/ 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\_3070input\_XPRT-3070*** 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\_3070***. This extra plot time will be *2018.00000001, year,* * The final line of the Output Control Card will read *No Restart, ,* * 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\_3070\_at2/xprt-3070/ directory, make a copy of the ***input\_XPRT\_3070*** 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\_3070\_at2/xprt-3070/ 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\_3070\_at2/xprt-3070/ 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 completed. |  |

| Table 5  **CIE 3070 STOMP Input File Generator Acceptance Test Plan Case 3** | | | |
| --- | --- | --- | --- |
| **CIE 3070 STOMP Input File Generator Acceptance Testing**  **CACIE-CIE 3070 STOMP Input File Generator – AT-3** | | **Date:** | |
| **Tool Runner File Location for this test:**  \\olive\backups\CAVE\v4-4Test\afarms\_xprt\_3070\_test\xprt-3070\ | | **Test Performed By:** | |
| **Testing Directory:** \\olive\backups\CAVE\v4-4Test\afarms\_xprt\_3070\_test\xprt-3070\ | | | |
| **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 3070 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 * ***input\_XPRT\_2018\_no\_buffer*** 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-3070/ directory. | The expected files are present in the listed directories. |  |
| 2 | Execute, using a Linux terminal, the shell script ***run\_cie\_input\_xprt-3070.sh*** located in /xprt-3070/ subdirectory of the testing directory. | Output file should be named ‘input\_XPRT-3070’ |  |

# Acceptance Test Report

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

* Acceptance Test 1 is in Table A-1 of Appendix A. This test is the A Farms Area Model that checks the input\_XPRT-3070 file. This input file is built with a buffer, aqueous, radionuclide, and chemical sources, and begins at the RTD year of 2027.
* Acceptance Test 2 is in Table A-2 of Appendix A. This test is the A Farms Area Model that checks the input\_XPRT-3070 file. This input file is built with no buffer, aqueous, radionuclide, and chemical sources, and has no RTD (start year of 2018).
* Acceptance Test 3 is in Table A-3 of Appendix A. This test verifies the output file name is “input\_XPRT-3070.”

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/cie-modinput/linux/xprt\_3070\_input\_gen\_cie\_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 CIE 3070 STOMP Input File Generator tool.

* 1.0 – Tool was developed.
* 1.1 – Tool was updated so that generated output filename is “input\_XPRT-3070.”

# Appendix A

**Completed Acceptance Test Cases**

**Tool Runner Log**

###Executing xprt 3070 input generator ###

###Executing Fingerprint Tool###

INFO--09/14/2020 12:00:47 PM--Starting CA-CIE Tool Runner. Logging to "./xprt-3070\_afarms.log"

INFO--09/14/2020 12:00:47 PM--Code Version: 0a1106ab56e79ae27221b486af36bff51cf307ab v5.6: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--09/14/2020 12:00:47 PM--Code Version: 0a1106ab56e79ae27221b486af36bff51cf307ab v5.6: /opt/tools/pylib/fingerprint/fingerprint.py<--e9692a4faec2ee264fe50417b6b6a516ba82b2f6

INFO--09/14/2020 12:00:47 PM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--09/14/2020 12:00:47 PM--QA Status: QUALIFIED : /opt/tools/pylib/fingerprint/fingerprint.py

INFO--09/14/2020 12:00:47 PM--Invoking Command:"python3.6" with Arguments:"/opt/tools/pylib/fingerprint/fingerprint.py /home/pallena/CAVE/v4-4Test/afarms\_xprt\_3070\_at1/xprt-2018/input\_XPRT\_2018 --output ./xprt-3070\_afarms.log --outputmode a"

INFO--09/14/2020 12:00:47 PM--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 12:00:47.330295

/home/pallena/CAVE/v4-4Test/afarms\_xprt\_3070\_at1/xprt-2018/input\_XPRT\_2018 0c2b963fbcb333f81cb137a3a3ab25bc97f96524d342925298f7dc5ba84716cf

###Finished Process###

###Executing xprt 3070 input generator without RTD IC ###

INFO--09/14/2020 12:00:47 PM--Starting CA-CIE Tool Runner. Logging to "./xprt-3070\_afarms.log"

INFO--09/14/2020 12:00:47 PM--Code Version: 0a1106ab56e79ae27221b486af36bff51cf307ab v5.6: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--09/14/2020 12:00:47 PM--Code Version: 0a1106ab56e79ae27221b486af36bff51cf307ab v5.6: /opt/tools/pylib/fingerprint/fingerprint.py<--e9692a4faec2ee264fe50417b6b6a516ba82b2f6

INFO--09/14/2020 12:00:47 PM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--09/14/2020 12:00:47 PM--QA Status: QUALIFIED : /opt/tools/pylib/fingerprint/fingerprint.py

INFO--09/14/2020 12:00:47 PM--Invoking Command:"python3.6" with Arguments:"/opt/tools/pylib/fingerprint/fingerprint.py /home/pallena/CAVE/v4-4Test/afarms\_xprt\_3070\_at1/rtd\_ic/cie-src-ic.txt --output ./xprt-3070\_afarms.log --outputmode a"

INFO--09/14/2020 12:00:47 PM--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 12:00:47.636293

/home/pallena/CAVE/v4-4Test/afarms\_xprt\_3070\_at1/rtd\_ic/cie-src-ic.txt 27ca21bc62411491431d0a7b810af2b2bc1d1f3e2dde3c4302ec18a181ca6fa6

###Finished Process###

###Executing xprt 3070 input generator with RTD IC ##

INFO--09/14/2020 12:00:47 PM--Starting CA-CIE Tool Runner. Logging to "./xprt-3070\_afarms.log"

INFO--09/14/2020 12:00:47 PM--Code Version: 0a1106ab56e79ae27221b486af36bff51cf307ab v5.6: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--09/14/2020 12:00:47 PM--Code Version: 9f79f64c6b2d55f31f30286fed40763abd2b836a Local repo SHA-1 has does not correspond to a remote repo release version: ../../../CA-CIE-Tools-TestRepos/repo\_xprt\_3070\_input\_gen\_cie.f/tools/cie-modinput/linux/xprt\_3070\_input\_gen\_cie\_linux-intel-64.exe<--c1f73ba7447e7f3ba6e4e3f635b78c9105cc5e89

INFO--09/14/2020 12:00:47 PM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--09/14/2020 12:00:47 PM--QA Status: TEST : ../../../CA-CIE-Tools-TestRepos/repo\_xprt\_3070\_input\_gen\_cie.f/tools/cie-modinput/linux/xprt\_3070\_input\_gen\_cie\_linux-intel-64.exe

INFO--09/14/2020 12:00:47 PM--Invoking Command:"../../../CA-CIE-Tools-TestRepos/repo\_xprt\_3070\_input\_gen\_cie.f/tools/cie-modinput/linux/xprt\_3070\_input\_gen\_cie\_linux-intel-64.exe" with Arguments:"/home/pallena/CAVE/v4-4Test/afarms\_xprt\_3070\_at1/xprt-2018/input\_XPRT\_2018 2027 /home/pallena/CAVE/v4-4Test/afarms\_xprt\_3070\_at1/rtd\_ic/cie-src-ic.txt"

INFO--09/14/2020 12:00:47 PM--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 12:00:48 PM--Starting CA-CIE Tool Runner. Logging to "./xprt-3070\_afarms.log"

INFO--09/14/2020 12:00:48 PM--Code Version: 0a1106ab56e79ae27221b486af36bff51cf307ab v5.6: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--09/14/2020 12:00:48 PM--Code Version: 0a1106ab56e79ae27221b486af36bff51cf307ab v5.6: /opt/tools/pylib/fingerprint/fingerprint.py<--e9692a4faec2ee264fe50417b6b6a516ba82b2f6

INFO--09/14/2020 12:00:48 PM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--09/14/2020 12:00:48 PM--QA Status: QUALIFIED : /opt/tools/pylib/fingerprint/fingerprint.py

INFO--09/14/2020 12:00:48 PM--Invoking Command:"python3.6" with Arguments:"/opt/tools/pylib/fingerprint/fingerprint.py /home/pallena/CAVE/v4-4Test/afarms\_xprt\_3070\_at1/xprt-3070/input\_XPRT\_3070 --output ./xprt-3070\_afarms.log --outputmode a"

INFO--09/14/2020 12:00:48 PM--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 12:00:48.428827

/home/pallena/CAVE/v4-4Test/afarms\_xprt\_3070\_at1/xprt-3070/input\_XPRT\_3070 896f7ec792f9a96bfc413b23b053777daff69a1aec3e0c88f3565055dedc383b

###Finished Process###

| Table A-1  **CIE 3070 STOMP Input File Generator Acceptance Test Plan Case 1** | | | |
| --- | --- | --- | --- |
| **CIE 3070 STOMP Input File Generator Acceptance Testing**  **CACIE-CIE 3070 STOMP Input File Generator – AT-1** | | **Date: 09-14-2020** | |
| **Tool Runner File Location for this test:**  \\olive\backups\CAVE\v4-4Test\afarms\_xprt\_3070\_at1\xprt-3070\ | | **Test Performed By: Praveena Allena** | |
| **Testing Directory:** \\olive\backups\CAVE\v4-4Test\afarms\_xprt\_3070\_at1\xprt-3070\ | | | |
| **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 3070 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\_with\_buffer*** in the /xprt-2018/ directory * ***cie-src-ic.txt*** in the /rtd-ic/ directory   Other files to complete the Acceptance Test:   * The ***input.bot***, ***input.zone***, and ***estomp-run.sh*** files are present in the /xprt-3070/ directory. | The expected files are present in the listed directories. | Pass |
| 2 | Execute, using a Linux terminal, the shell script ***run\_cie\_input\_xprt-3070.sh*** located in /xprt-3070/ subdirectory of the testing directory. | Script executes. | Pass |
| 3 | Verify in the Linux terminal the referenced file is the ***cie-src-ic.txt*** file in the /rtd\_ic/ directory. | The ***cie-src-ic.txt*** 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-3070*** in the /xprt-3070/ 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 * 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\_3070*** file in a preferred text editor. | | |
| 5.1 | Verify the Simulation Title Card final line (the Simulation Note Line) states the year start is *2027 [RTD Year]* and the end year is *3070*. | The second line of the Simulation Title Card states the simulation years are 2027 to 3070. | Pass |
| 5.2 | Navigate to the Solution Control Card. Verify that line 20 has the following text:   * *Restart File, ../xprt-rtd/restart,*   Then verify that lines 21 through 26 report the correct information detailed in FR-4 of Section 2 in this document. Note, AT-1 involves RTD. | The changes to the Solution Control Card are present in the ***input\_XPRT\_3070*** file. | Pass |
| 5.3 | Using a program, such as DiffMerge, verify the contents of the Initial Conditions Card in the ***input\_XPRT\_3070*** file match the ***cie-src-ic.txt*** file in the /rtd-ic/ directory. | The Initial Conditions Card and the ***cie-src-ic.txt*** file match. | 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\_3070*** in the /xprt-3070/ 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\_3070*** 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\_3070***. This extra plot time will be *2027.00000001, year,* * The final line of the Output Control Card will read *No Restart, ,* * 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\_3070\_at1/xprt-3070/ directory, make a copy of the ***input\_XPRT\_3070*** 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\_3070\_at1/xprt-3070/ 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\_3070\_at1/xprt-3070/ 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 completed. | Pass |

**Tool Runner Log**

###Executing xprt 3070 input generator ###

###Executing Fingerprint Tool###

INFO--09/14/2020 01:09:45 PM--Starting CA-CIE Tool Runner. Logging to "./xprt-3070\_afarms.log"

INFO--09/14/2020 01:09:45 PM--Code Version: 0a1106ab56e79ae27221b486af36bff51cf307ab v5.6: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--09/14/2020 01:09:45 PM--Code Version: 0a1106ab56e79ae27221b486af36bff51cf307ab v5.6: /opt/tools/pylib/fingerprint/fingerprint.py<--e9692a4faec2ee264fe50417b6b6a516ba82b2f6

INFO--09/14/2020 01:09:45 PM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--09/14/2020 01:09:45 PM--QA Status: QUALIFIED : /opt/tools/pylib/fingerprint/fingerprint.py

INFO--09/14/2020 01:09:45 PM--Invoking Command:"python3.6" with Arguments:"/opt/tools/pylib/fingerprint/fingerprint.py /home/pallena/CAVE/v4-4Test/afarms\_xprt\_3070\_at2/xprt-2018/input\_XPRT\_2018 --output ./xprt-3070\_afarms.log --outputmode a"

INFO--09/14/2020 01:09:45 PM--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 13:09:45.617433

/home/pallena/CAVE/v4-4Test/afarms\_xprt\_3070\_at2/xprt-2018/input\_XPRT\_2018 aa282ba09462aac633a0c774b1c3235b5114d571081e377aab7324a8ff8b919e

###Finished Process###

###No RTD##

###Executing xprt 3070##

INFO--09/14/2020 01:09:45 PM--Starting CA-CIE Tool Runner. Logging to "./xprt-3070\_afarms.log"

INFO--09/14/2020 01:09:45 PM--Code Version: 0a1106ab56e79ae27221b486af36bff51cf307ab v5.6: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--09/14/2020 01:09:45 PM--Code Version: 9f79f64c6b2d55f31f30286fed40763abd2b836a Local repo SHA-1 has does not correspond to a remote repo release version: ../../../CA-CIE-Tools-TestRepos/repo\_xprt\_3070\_input\_gen\_cie.f/tools/cie-modinput/linux/xprt\_3070\_input\_gen\_cie\_linux-intel-64.exe<--c1f73ba7447e7f3ba6e4e3f635b78c9105cc5e89

INFO--09/14/2020 01:09:45 PM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--09/14/2020 01:09:45 PM--QA Status: TEST : ../../../CA-CIE-Tools-TestRepos/repo\_xprt\_3070\_input\_gen\_cie.f/tools/cie-modinput/linux/xprt\_3070\_input\_gen\_cie\_linux-intel-64.exe

INFO--09/14/2020 01:09:45 PM--Invoking Command:"../../../CA-CIE-Tools-TestRepos/repo\_xprt\_3070\_input\_gen\_cie.f/tools/cie-modinput/linux/xprt\_3070\_input\_gen\_cie\_linux-intel-64.exe" with Arguments:"/home/pallena/CAVE/v4-4Test/afarms\_xprt\_3070\_at2/xprt-2018/input\_XPRT\_2018 2018"

INFO--09/14/2020 01:09:45 PM--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 01:09:46 PM--Starting CA-CIE Tool Runner. Logging to "./xprt-3070\_afarms.log"

INFO--09/14/2020 01:09:46 PM--Code Version: 0a1106ab56e79ae27221b486af36bff51cf307ab v5.6: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--09/14/2020 01:09:46 PM--Code Version: 0a1106ab56e79ae27221b486af36bff51cf307ab v5.6: /opt/tools/pylib/fingerprint/fingerprint.py<--e9692a4faec2ee264fe50417b6b6a516ba82b2f6

INFO--09/14/2020 01:09:46 PM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--09/14/2020 01:09:46 PM--QA Status: QUALIFIED : /opt/tools/pylib/fingerprint/fingerprint.py

INFO--09/14/2020 01:09:46 PM--Invoking Command:"python3.6" with Arguments:"/opt/tools/pylib/fingerprint/fingerprint.py /home/pallena/CAVE/v4-4Test/afarms\_xprt\_3070\_at2/xprt-3070/input\_XPRT\_3070 --output ./xprt-3070\_afarms.log --outputmode a"

INFO--09/14/2020 01:09:46 PM--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 13:09:46.216786

/home/pallena/CAVE/v4-4Test/afarms\_xprt\_3070\_at2/xprt-3070/input\_XPRT\_3070 ae8466e72a751c682e6c5c1a935e178e186444294d7d54e134846a33dcecc1a1

###Finished Process###

| Table A-2  **CIE 3070 STOMP Input File Generator Acceptance Test Plan Case 1** | | | |
| --- | --- | --- | --- |
| **CIE 3070 STOMP Input File Generator Acceptance Testing**  **CACIE-CIE 3070 STOMP Input File Generator – AT-2** | | **Date: 09-14-2020** | |
| **Tool Runner File Location for this test:**  \\olive\backups\CAVE\v4-4Test\afarms\_xprt\_3070\_at2\xprt-3070\ | | **Test Performed By: Praveena Allena** | |
| **Testing Directory:** \\olive\backups\CAVE\v4-4Test\afarms\_xprt\_3070\_at2\xprt-3070\ | | | |
| **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 3070 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 * ***input\_XPRT\_2018\_no\_buffer*** 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-3070/ directory. | The expected files are present in the listed directories. | Pass |
| 2 | Execute, using a Linux terminal, the shell script ***run\_cie\_input\_xprt-3070.sh*** located in /xprt-3070/ subdirectory of the testing directory. | Script executes. | Pass |
| 3 | Using a diff merge or file comparison utility, open and compare the following files:   * ***input\_XPRT\_2018*** in the /xprt-2018/ directory * ***input\_XPRT\_3070*** in the /xprt-3070/ 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 * Boundary Conditions * Initial Conditions * Surface Flux * Source | There will be no differences between the two input files for the listed cards. | Pass |
| 4 | For the steps that follow open and use the ***input\_XPRT\_3070*** file in a preferred text editor. | | |
| 4.1 | Verify the Simulation Title Card final line (the Simulation Note Line) states the year start is *2018*  and the end year is *3070*. | The second line of the Simulation Title Card states the simulation years are 2018 to 3070. | Pass |
| 4.2 | Navigate to the Solution Control Card. Verify that line 20 has the following text:   * *Restart File, ../xprt-2018/restart,*   Then verify that lines 21 through 26 report the correct information detailed in FR-4 of Section 2 in this document. Note, AT-2 had **NO** RTD. | The changes to the Solution Control Card are present in the ***input\_XPRT\_3070*** file. | Pass |
| 5 | Using a diff merge or file comparison utility, open and compare the following files:   * ***input\_XPRT\_2018*** in the /xprt-2018/ directory * ***input\_XPRT\_3070*** in the /xprt-3070/ 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\_3070*** 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\_3070***. This extra plot time will be *2018.00000001, year,* * The final line of the Output Control Card will read *No Restart, ,* * 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 |
| 6 | If all the Test Steps above pass, proceed to the next steps.  Navigate to the //olive/backups/CAVE/v4-4Test/afarms\_xprt\_3070\_at2/xprt-3070/ directory, make a copy of the ***input\_XPRT\_3070*** file. Paste it into the same directory, and rename it ***input***. | | |
| 6.1 | Open the ***input*** file in the //olive/backups/CAVE/ v4-4Test/afarms\_xprt\_3070\_at2/xprt-3070/ directory and change the line in the 2Solution 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 |
| 6.2 | In a Linux terminal navigate to the //olive/backups/CAVE/ v4-4Test/afarms\_xprt\_3070\_at2/xprt-3070/ 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 completed. | Pass |

**Tool Runner Log**

###Executing xprt 3070 input generator ###

###Executing Fingerprint Tool###

INFO--09/29/2020 01:39:44 PM--Starting CA-CIE Tool Runner. Logging to "./xprt-3070\_afarms.log"

INFO--09/29/2020 01:39:44 PM--Code Version: ae81462742b0e41afc9b54ac47ccee1d21e98683 v5.9: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--09/29/2020 01:39:44 PM--Code Version: ae81462742b0e41afc9b54ac47ccee1d21e98683 v5.9: /opt/tools/pylib/fingerprint/fingerprint.py<--e9692a4faec2ee264fe50417b6b6a516ba82b2f6

INFO--09/29/2020 01:39:44 PM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--09/29/2020 01:39:44 PM--QA Status: QUALIFIED : /opt/tools/pylib/fingerprint/fingerprint.py

INFO--09/29/2020 01:39:44 PM--Invoking Command:"python3.6" with Arguments:"/opt/tools/pylib/fingerprint/fingerprint.py /home/cfarrow/CAVE/v4-4Test/afarms\_xprt\_3070\_test/xprt-2018/input\_XPRT\_2018 --output ./xprt-3070\_afarms.log --outputmode a"

INFO--09/29/2020 01:39:44 PM--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

Fingerprint generated at 2020-09-29 13:39:44.227796

/home/cfarrow/CAVE/v4-4Test/afarms\_xprt\_3070\_test/xprt-2018/input\_XPRT\_2018 0c2b963fbcb333f81cb137a3a3ab25bc97f96524d342925298f7dc5ba84716cf

###Finished Process###

###Executing xprt 3070 input generator without RTD IC ###

INFO--09/29/2020 01:39:44 PM--Starting CA-CIE Tool Runner. Logging to "./xprt-3070\_afarms.log"

INFO--09/29/2020 01:39:44 PM--Code Version: ae81462742b0e41afc9b54ac47ccee1d21e98683 v5.9: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--09/29/2020 01:39:44 PM--Code Version: ae81462742b0e41afc9b54ac47ccee1d21e98683 v5.9: /opt/tools/pylib/fingerprint/fingerprint.py<--e9692a4faec2ee264fe50417b6b6a516ba82b2f6

INFO--09/29/2020 01:39:44 PM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--09/29/2020 01:39:44 PM--QA Status: QUALIFIED : /opt/tools/pylib/fingerprint/fingerprint.py

INFO--09/29/2020 01:39:44 PM--Invoking Command:"python3.6" with Arguments:"/opt/tools/pylib/fingerprint/fingerprint.py /home/cfarrow/CAVE/v4-4Test/afarms\_xprt\_3070\_test/rtd\_ic/cie-src-ic.txt --output ./xprt-3070\_afarms.log --outputmode a"

INFO--09/29/2020 01:39:44 PM--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

Fingerprint generated at 2020-09-29 13:39:44.484861

/home/cfarrow/CAVE/v4-4Test/afarms\_xprt\_3070\_test/rtd\_ic/cie-src-ic.txt 27ca21bc62411491431d0a7b810af2b2bc1d1f3e2dde3c4302ec18a181ca6fa6

###Finished Process###

###Executing xprt 3070 input generator with RTD IC ##

INFO--09/29/2020 01:39:44 PM--Starting CA-CIE Tool Runner. Logging to "./xprt-3070\_afarms.log"

INFO--09/29/2020 01:39:44 PM--Code Version: ae81462742b0e41afc9b54ac47ccee1d21e98683 v5.9: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--09/29/2020 01:39:44 PM--Code Version: 3a4057b70b526661f0aba1ad52cf2f01a30d5c56 Local repo SHA-1 has does not correspond to a remote repo release version: ../../../CA-CIE-Tools-TestRepos/repo\_xprt\_3070\_input\_gen\_cie.f/tools/cie-modinput/linux/xprt\_3070\_input\_gen\_cie\_linux-intel-64.exe<--d30aed3d79adca33ee8e0af043c8738cdd657f48

INFO--09/29/2020 01:39:44 PM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--09/29/2020 01:39:44 PM--QA Status: TEST : ../../../CA-CIE-Tools-TestRepos/repo\_xprt\_3070\_input\_gen\_cie.f/tools/cie-modinput/linux/xprt\_3070\_input\_gen\_cie\_linux-intel-64.exe

INFO--09/29/2020 01:39:44 PM--Invoking Command:"../../../CA-CIE-Tools-TestRepos/repo\_xprt\_3070\_input\_gen\_cie.f/tools/cie-modinput/linux/xprt\_3070\_input\_gen\_cie\_linux-intel-64.exe" with Arguments:"/home/cfarrow/CAVE/v4-4Test/afarms\_xprt\_3070\_test/xprt-2018/input\_XPRT\_2018 2027 /home/cfarrow/CAVE/v4-4Test/afarms\_xprt\_3070\_test/rtd\_ic/cie-src-ic.txt"

INFO--09/29/2020 01:39:44 PM--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###

###Executing Fingerprint Tool###

INFO--09/29/2020 01:39:44 PM--Starting CA-CIE Tool Runner. Logging to "./xprt-3070\_afarms.log"

INFO--09/29/2020 01:39:44 PM--Code Version: ae81462742b0e41afc9b54ac47ccee1d21e98683 v5.9: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--09/29/2020 01:39:45 PM--Code Version: ae81462742b0e41afc9b54ac47ccee1d21e98683 v5.9: /opt/tools/pylib/fingerprint/fingerprint.py<--e9692a4faec2ee264fe50417b6b6a516ba82b2f6

INFO--09/29/2020 01:39:45 PM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--09/29/2020 01:39:45 PM--QA Status: QUALIFIED : /opt/tools/pylib/fingerprint/fingerprint.py

INFO--09/29/2020 01:39:45 PM--Invoking Command:"python3.6" with Arguments:"/opt/tools/pylib/fingerprint/fingerprint.py /home/cfarrow/CAVE/v4-4Test/afarms\_xprt\_3070\_test/xprt-3070/input\_XPRT-3070 --output ./xprt-3070\_afarms.log --outputmode a"

INFO--09/29/2020 01:39:45 PM--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

Fingerprint generated at 2020-09-29 13:39:45.127181

/home/cfarrow/CAVE/v4-4Test/afarms\_xprt\_3070\_test/xprt-3070/input\_XPRT-3070 896f7ec792f9a96bfc413b23b053777daff69a1aec3e0c88f3565055dedc383b

###Finished Process###

| Table A-3  **CIE 3070 STOMP Input File Generator Acceptance Test Plan Case 3** | | | |
| --- | --- | --- | --- |
| **CIE 3070 STOMP Input File Generator Acceptance Testing**  **CACIE-CIE 3070 STOMP Input File Generator – AT-2** | | **Date: 29 Sep 2020** | |
| **Tool Runner File Location for this test:**  \\olive\backups\CAVE\v4-4Test\afarms\_xprt\_3070\_test\xprt-3070\ | | **Test Performed By: Chris Farrow** | |
| **Testing Directory:** \\olive\backups\CAVE\v4-4Test\afarms\_xprt\_3070\_test\xprt-3070\ | | | |
| **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 3070 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 * ***input\_XPRT\_2018\_no\_buffer*** 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-3070/ directory. | The expected files are present in the listed directories. | PASS |
| 2 | Execute, using a Linux terminal, the shell script ***run\_cie\_input\_xprt-3070.sh*** located in /xprt-3070/ subdirectory of the testing directory. | Output file should be named ‘input\_XPRT-3070’ | PASS |

# Appendix B

# Completed Installation Test

**Tool Runner Log**

Test directory verified

###Executing 3070 cie Input Generator###

INFO--09/30/2020 09:28:42 AM--Starting CA-CIE Tool Runner. Logging to ".././IT-1/runner\_run\_IT-1\_3070-Input-Gen\_cie.log"

INFO--09/30/2020 09:28:42 AM--Code Version: 795361d49db1993395ed858ed4e46a049426a598 v5.10: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--09/30/2020 09:28:42 AM--Code Version: 795361d49db1993395ed858ed4e46a049426a598 v5.10: /opt/tools/tools/cie-modinput/linux/xprt\_3070\_input\_gen\_cie\_linux-intel-64.exe<--d30aed3d79adca33ee8e0af043c8738cdd657f48

INFO--09/30/2020 09:28:42 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--09/30/2020 09:28:42 AM--QA Status: QUALIFIED : /opt/tools/tools/cie-modinput/linux/xprt\_3070\_input\_gen\_cie\_linux-intel-64.exe

INFO--09/30/2020 09:28:42 AM--Invoking Command:"/opt/tools/tools/cie-modinput/linux/xprt\_3070\_input\_gen\_cie\_linux-intel-64.exe" with Arguments:"not-a-file 2018 INPUT3"

INFO--09/30/2020 09:28:42 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  **CIE 3070 STOMP Input File Generator Installation Test Plan** | | | |
| --- | --- | --- | --- |
| **CIE 3070 STOMP Input File Generator Installation Testing**  **CACIE-CIE 3070 STOMP Input File Generator – IT-1** | | **Date: 09/30/2020** | |
| **Tool Runner File Location for this test:** **OLIVE\backups\CAVE\CA-CIE-Tools-TestEnv\CA-CIE-Tools\_cie\_v5.X\_install\_tests\xprt\_3070\_input\_gen\_cie\IT-1\_v1.1** | | **Test Performed By: Sara Lindberg** | |
| **Testing Directory: OLIVE\backups\CAVE\CA-CIE-Tools-TestEnv\CA-CIE-Tools\_cie\_v5.X\_install\_tests\xprt\_3070\_input\_gen\_cie** | | | |
| **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 as follows: Open a Linux terminal and after navigating to the appropriate directory indicated type *./runner\_run\_IT-1\_3070-Gen\_cie.sh* | | |
| 2 | Verify tool runner and tool is invoked | Tool runner log includes:  QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py  And QA Status: QUALIFIED : /opt/tools/tools/cie-modinput/linux/xprt\_3070\_input\_gen\_cie\_linux-intel-64.exe | PASS |
| 3 | A new directory called “IT-1” should have been created. Navigate into ***./IT-1*** and open  ***runlog\_IT-1\_3070-Gen\_cie.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**

