**CACIE Tool #16** – **2018 STOMP Input File Generator Tool**

**xprt\_2018\_input\_gen.f**

**Version** **1.0**

**QA**: **QA**

# Description and Purpose

The 2018 STOMP Input File Generator Tool generates the 1943-2018 STOMP transport input file. A STOMP input file contains several cards, each providing specific information on components needed to execute a flow and transport simulation. For instance, the Initial Conditions Card provides initial primary variable and solute concentration values for each grid cell, and the Boundary Conditions Card provides these values at the boundaries of the computational domain. Typically, the data sets used to build the individual cards included in the generated STOMP transport input file are extracted from different source files. The 2018 STOMP Input File Generator Tool accesses information from the following files:

* input\_SS in the /ss/ directory
* ca\_tr\_boundary\_card.dat in the /ret/ directory
* rad#\_Output\_Control.dat (where # is 1 or 2) in the /trOCcards/ directory
* rad#\_ surface\_flux.txt (where # is 1 or 2) in the /trsurfcards/ directory
* rads#-src.card (where # is 1 or 2) in the /sources/ directory
* buffer-aq-src.card in the /sources/ directory (if the model has a buffer zone)
* Material properties for the 200 West Area
* Material properties for the 200 East Area
* Solute properties for Radionuclide Group 1
* Solute properties for Radionuclide Group 2

The STOMP input file generated by this tool is ***input\_XPRT-#\_2018\_XX\_buffer***, where ***#*** is 1 or 2 (corresponding to the group of radionuclides modelled) and ***XX*** is “with” if the model has a buffer zone or “no” is the model does not have a buffer zone.

# Functional Requirements

The following are the functional requirements (FR) of the 2018 STOMP Input File Generator Tool:

FR-1: Parse the following command line arguments: the radionuclide group (rad1 or rad2), model area (200E or 200W), buffer zone switch (buffer if the model has a buffer zone, nobuffer if not) and material and solute transport property file locations/names.

FR-2: Parse the text corresponding to the Simulation Title Card from the ***input\_SS*** file (generated by the CAST tool and located in the /ss/ directory), replacing the second Simulation Note Line (“Steady-state simulation”) with Rad# Transport Simulation (1943-2018), where Rad# is consistent with the radionuclide group command line argument, and write text to the output file.

FR-3: Generate the Solution Control Card as follows:

* Determine the first source year (XXXX) and the end source year (YYYY) of aqueous source input for the model from /sources/rads1-src.card or /sources/rads2-src.card (depending on the radionuclide group command line argument) and /sources/buffer-aq-src.card (if the model has a buffer zone).
* If the end source year is prior to 2018 (YYYY < 2018), write the following text to the Solution Control Card in the output file:

Restart File, ../ss/restart,

Water w/ Patankar Vadose Transport Courant,1.0,

3,

1943,year,XXXX,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6,

XXXX,year,YYYY,year,1.0E-08,year,0.01,year,1.25,16,1.0E-6,

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

1000000,

0,

* If the end source year is 2018 or later (YYYY ≥ 2018), write the following text to the Solution Control Card in the output file:

Restart File, ../ss/restart,

Water w/ Patankar Vadose Transport Courant,1.0,

2,

1943,year,XXXX,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6,

XXXX,year,2018,year,1.0E-08,year,0.01,year,1.25,16,1.0E-6,

1000000,

0,

* If there are no aqueous source inputs between 1943 and 2018, write the following text to the Solution Control Card in the output file:

Restart File, ../ss/restart,

Water w/ Patankar Vadose Transport Courant,1.0,

1,

1943,year,2018,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6,

1000000,

0,

FR-4: Parse the text corresponding to the following cards from the ***input\_SS*** file (generated by the CAST tool and located in the /ss/ directory) and write the text to the output file:

* Grid Card
* Inactive Nodes Card
* Rock Soil Zonation Card
* Mechanical Properties Card
* Hydraulic Properties Card
* Saturation Function Card
* X-Aqueous Relative Permeability Card
* Y-Aqueous Relative Permeability Card
* Z-Aqueous Relative Permeability Card

FR-5: Generate the Solute/Fluid Interaction Card using data from the solute transport properties file corresponding to the radionuclide group command line argument. The location and name of this file are read as a command line argument.

FR-6: Generate the Solute/Porous Media Interaction Card using data from two files:

* The material transport properties file for the 200 East area if the model is in 200 East or the 200 West area if the model is in 200 West
* The solute transport properties file for Radionuclide Group 1 or Radionuclide Group 2 (depending on radionuclide group read as command line input)
* The locations and names of these files are read as command line arguments.
* There are two equations to calculate gravel corrections, based on solute Kd values.
  + Equation 1 is used for solutes with Kd values greater than or equal to 10 mL/g:

*Kd*(gc) = (1-f) *Kd*(<2 mm) + (*f*) 0.23 *Kd*(<2 mm)

Equation 1

* + Equation 2 is used for solutes with Kd values less than 10 mL/g:

*Kd*(gc) = (1-*f*) *Kd*(<2 mm)

Equation 2

* + where *Kd*(gc) is the gravel-corrected *Kd* value, *f* is the weight fraction of gravel, and *Kd*(<2 mm) is the *Kd* value determined using <2 mm material.

FR-7: Generate the Initial Conditions Card with zero initial conditions.

FR-8: Generate the Boundary Conditions Card from the /ret/ca\_tr\_boundary\_card.dat file. The Boundary Conditions Card will be identical to ca\_tr\_boundary\_card.dat except for increasing the number of boundary conditions by one and adding the following lines at the end of the Boundary Conditions Card:

file, input.bot, Dirichlet Aqueous, outflow, outflow, outflow, outflow, outflow, outflow, outflow, outflow,

1,

1943,year,101325,Pa,,,,,,,,,,,,,,,,,

FR-9: Insert Output Control Card from /trOCcards/rad1\_Output\_Control.dat or /trOCcards/rad2\_Output\_Control.dat (depending on radionuclide group read as command line input), replacing No Restart with Final Restart.

FR-10: Generate the Surface Flux Card as follows:

* Insert /trsurfcards/rad1\_surface\_flux.txtor/trsurfcards/rad2\_surface\_flux.txt (depending on radionuclide group read as command line input).

FR-11: Generate Source Card as follows:

* Read number of source domains in /sources/rads1-src.card or /sources/rads2-src.card (depending on radionuclide group read as command line input).
* Read number of source domains in /sources/buffer-aq-src.card (if the model has a buffer zone).
* Insert /sources/rads1-src.card or /sources/rads2-src.card (depending on radionuclide group read as command line input), replacing the number of source domains with the sum of source domains in the source and buffer (if included) zones.
* Insert /sources/buffer-aq-src.card (if the model has a buffer zone).

FR-12. Save the output file (i.e., the complete STOMP transport input file, which includes all the required cards).

# Software Requirements Specifications

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

Compiler Options: -o OutputFileName

Special Considerations: None

# Software Design Description

Flow:

The 2018 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. Assign input files – Based on the first three command line arguments, assign the input files needed for code execution.
4. Open the output file.
5. Read material properties – Read material properties for either the 200 East or 200 West HSUs (based on the Area Command Line Argument).
6. Read solute properties – Read solute properties for either Radionuclide Group 1 or Radionuclide Group 2 (based on the RadGroup Command Line Argument).
7. Determine times – Find first and last years for sources (both aqueous and solute), first for the model source domain, followed by the model buffer, if the model has a buffer.
8. Open the input\_SS file generated by CAST – Portions of this file will be copied to the output file generated by the 2018 STOMP Input File Generator Tool (see list in FR-2).
9. Write Simulation Title Card – All lines except the last line are from input\_SS; the last line identifies the simulation (radionuclide group and model years).
10. Write Solution Control Card – Determine the number of execution time periods based on first and last years for aqueous source inputs and write the Solution Control Card.
11. Write the following cards, which are copied from input\_ss:
    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
12. Write Solute/Fluid Interaction Card – Generate Solute/Fluid Interaction Card lines using solute properties read in Step 6.
13. Write Solute/Porous Media Interaction Card – Calculate gravel-corrected Kd values and generate Solute/Porous Media Interaction Card lines using material properties read in Step 5 and solute properties read in Step 6.
14. Write Initial Conditions Card – Zero initial conditions.
15. Write Boundary Conditions Card – Copy lines from the ca\_tr\_boundary\_card.dat file, increasing the number of boundary conditions by one. Then add the boundary condition for the base of the model.
16. Write Output Control Card – Copy lines from the rad1\_Output\_Control.dat or rad2\_Output\_Control.dat (depending on radionuclide group), replacing the last line with Final Restart, ,
17. Write Surface Flux Card – Copy lines from the rad1\_surface\_flux.txtorrad2\_surface\_flux.txt (depending on radionuclide group).
18. Determine number of source domains – Read number of source domains from rads1-src.card or rads2-src.card (depending on radionuclide group). If the model has a buffer area, read the number of source domains from buffer-aq-src.card and add to the number of source domains from the source area.
19. Write Source Card – Copy lines from rads1-src.card or rads2-src.card (depending on radionuclide group), replacing the number of source domains with the total value calculated in Step 18. If the model has a buffer area, copy lines from buffer-aq-src.card.

Arguments:

RadGroup – Radionuclide group selected (rad1 or rad2).

* Radionuclide group 1 includes: C-14, Cl-36, H-3, I-129, Np-237, Re-187, Sr-90 and Tc-99
* Radionuclide group 2 includes: U
* 232, U233, U234, U235, U236, U238, Th-230 and Ra-226.

Area – Area identifier (200E or 200W). Specifies whether the model is in 200 East or 200 West.

BufferSwitch – If there is an aqueous-only buffer for the model, enter the keyword buffer; otherwise enter the keyword nobuffer.

WMATTR – Path to the file that contains transport properties for 200 West hydrostratigraphic units.

EMATTR – Path to the file that contains transport properties for 200 East hydrostratigraphic units.

R1SOLTR – Path to the file that contains transport properties for Radionuclide Group 1.

R2SOLTR – Path to the file that contains transport properties for Radionuclide Group 2.

Input Files:

* input\_SS (/ss/ directory) – Steady state STOMP input file generated by the CAST tool.
* ca\_tr\_boundary\_card.dat (/ret/ directory) – RET transient boundary conditions.
* rad1\_Output\_Control.dat or rad2\_Output\_Control.dat (depending on radionuclide group); (/trOCcards/ directory) – Output Control Card for the transport simulations.
* rad1\_surface\_flux.txtorrad2\_surface\_flux.txt (depending on radionuclide group); (/trsurfcards/ directory) – Surface Flux Card for the transport simulations.
* rads1-src.card or rads2-src.card (depending on radionuclide group); (/sources/ directory) – Source Card lines for the model source zone.
* buffer-aq-src.card (/sources/ directory) – Source Card lines for the model buffer zone (applicable only if the model has a buffer zone).
* Material properties for the 200 West Area (path read as Command Line Argument 4) – Transport properties for 200W hydrostratigraphic units.
* Material properties for the 200 East Area (path read as Command Line Argument 5) – Transport properties for 200E hydrostratigraphic units.
* Solute properties for Radionuclide Group 1 *(*path read as Command Line Argument 6) – Transport properties for each radionuclide in rad1 group.
* Solute properties for Radionuclide Group 2 (path read as Command Line Argument 7) – Transport properties for each radionuclide in rad2 group.

Output Files:

The output file generated by this tool is a STOMP input for transport modeling for 1943 through 2018. There are four possible output file names depending on radionuclide group and whether a model has a buffer zone:

input\_XPRT-1\_2018\_with\_buffer – Radionuclide Group = 1, Model includes a buffer zone

input\_XPRT-1\_2018\_no\_buffer – Radionuclide Group = 1, No buffer zone

input\_XPRT-2\_2018\_with\_buffer – Radionuclide Group = 2, Model includes a buffer zone

input\_XPRT-2\_2018\_no\_buffer – Radionuclide Group = 2, No buffer zone

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\_2018\_input\_gen\_linux-intel-64.exe RadGroup Area BufferSwitch WMATTR EMATTR R1SOLTR R2SOLTR

Where:

RadGroup = rad1 or rad2  
Area = 200E or 200W  
BufferSwitch = buffer or nobuffer  
WMATTR – Path and filename for transport properties for 200 West hydrostratigraphic units  
EMATTR – Path and filename for transport properties for 200 East hydrostratigraphic units.  
R1SOLTR – Path and filename for transport properties for Radionuclide Group 1.  
R2SOLTR – Path and filename for transport properties for Radionuclide Group 2.

Code Review:

A code review was performed by Sara Lindberg on 3/25/2020. No impacts to other repository tools or library dependencies were identified for the Transient Output Card Generator tool.

# Requirements Traceability Matrix

The requirements traceability matrix for the 2018 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\_2018\_input\_gen-IT-1 | Installation Test |
| All | CACIE-xprt\_2018\_input\_gen-AT-1 through AT-4 | Check input formats for all STOMP Cards against the STOMP User Guide. |
| All | CACIE-xprt\_2018\_input\_gen-AT-1 through 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. |
| FR-1 | CACIE-xprt\_2018\_input\_gen-AT-1 through AT-4 | Check the screen output from this tool to see that the radionuclide group, model area and the buffer zone switch were read correctly from the command line input. |
| FR-2 | CACIE-xprt\_2018\_input\_gen-AT-1 through AT-4 | ~Simulation Title Card:   * Check that all lines except the last are identical to those in /ss/input\_SS. * Check that the last line is Rad# Transport Simulation (1943-2018), where # is 1 or 2 depending on the radionuclide group selected. |
| FR-3 | CACIE-xprt\_2018\_input\_gen-AT-1 through AT-4 | ~Solution Control Card:   * Check that the Solution Control Card matches the format described in Functional Requirement FR-3. * Check that the first source year and end of aqueous source input date are correct for the test model. |
| FR-4 | CACIE-xprt\_2018\_input\_gen-AT-1 through AT-4 | ~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:   * Check that these Cards are identical to those in /ss/input\_SS. |
| FR-1  FR-5  FR-6 | CACIE-xprt\_2018\_input\_gen-AT-1 through AT-4 | ~Solute/Fluid Interaction Card, ~Solute/Porous Media Interaction Card:   * Check these Cards were populated correctly |
| FR-7 | CACIE-xprt\_2018\_input\_gen-AT-1 through AT-4 | ~Initial Conditions Card:   * Check that the number of initial conditions is zero. |
| FR-8 | CACIE-xprt\_2018\_input\_gen-AT-1 through AT-4 | ~Boundary Conditions Card:   * Check that these Cards are identical to those in /ret/ca\_tr\_boundary\_card.datexcept for number of boundary conditions and addition of a bottom pressure boundary. * Check that the number of boundary conditions is equal to the number of boundary conditions in /ret/ca\_tr\_boundary\_card.dat plus one. * Check that the bottom pressure boundary condition (as shown in Functional Requirement FR-8) is included. |
| FR-9 | CACIE-xprt\_2018\_input\_gen-AT-1 through AT-4 | ~Output Control Card:   * Check that the Output Control Card is identical to rad1\_Output\_Control.dat or rad2\_Output\_Control.dat (depending on radionuclide group), except Final Restart instead of No Restart on the last line. |
| FR-10 | CACIE-xprt\_2018\_input\_gen-AT-1 through AT-4 | ~Surface Flux Card:   * Check the Surface Flux Card (either rad1\_surface\_flux.txt or rad2\_surface\_flux.txt files) was inserted. |
| FR-11 | CACIE-xprt\_2018\_input\_gen-AT-1 through AT-4 | ~Source Card:   * Check that the number of source domains is equal to the number of the source domains in the source zone if the model does not have a buffer zone, or equal to the number of source domains in the source zone plus the number of source domains in the buffer zone if the model has a buffer zone. * Check that the Source Card includes the lines from rads1-src.cardorrads2-src.card(depending on radionuclide group), except for number of source domains. * Check that the Source Card includes the lines from buffer-aq-src.card, except for number of source domains, if the model includes a buffer zone. |
| FR-12 | CACIE-xprt\_2018\_input\_gen-AT-1 through AT-4 | Check that the following cards are included in the generated STOMP 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 |

# Installation Test Plan and Acceptance Test Plan Cases

The installation test plan for 2018 STOMP Input File Generator is presented in Table 2 and the acceptance test plan cases for 2018 STOMP Input File Generator are presented in Table 3, Table 4, Table 5, and Table 6.

| Table 2  **2018 STOMP Input File Generator Installation Test Plan** | | | |
| --- | --- | --- | --- |
| **2018 STOMP Input File Generator Installation Testing**  **CACIE-2018 STOMP Input File Generator – IT-1** | | **Date:** | |
| **Tool Runner File Location for this test:**  **[PUT LINK TO THE DIRECTORY HERE]** | | **Test Performed By: [FIRST & LAST NAME]** | |
| **Testing Directory: [PROVIDE LINK TO TESTING DIRECTORY]** | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| Tools Code Repository Directory: | | | |
| Navigate to the testing directory | | | |
| 1 | Invoke Tool runner and test installation of the tool:  *./CACIE\_xprt\_2018\_input\_gen\_IT-1.sh* | | |
| 2 | Verify Tool Runner is invoked and executed. | Tool runner log file is generated (***xprt\_2018\_input\_install\_test.log***) |  |
| 3 | Verify tool is invoked and executed. | ***input\_XPRT-1\_2018\_with\_buffer*** file is generated   Note: this file will be empty for install test |  |

| Table 3  **2018 STOMP Input File Generator Acceptance Test Plan Case 1** | | | |
| --- | --- | --- | --- |
| **2018 STOMP Input File Generator Acceptance Testing**  **CACIE-2018 STOMP Input File Generator – AT-1** | | **Date:** | |
| **Tool Runner File Location for this test:**  //olive/backups/CAVE/v4-2Test/mpondIF\_AT1/xprt-1 | | **Test Performed By:** | |
| **Testing Directory:** //olive/backups/CAVE/v4-2Test/mpondIF\_AT1 | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| 1 | Ensure the following files are in testing directory, as they are needed for the execution of the ***xprt\_2018\_input\_gen.f*** tool:   * input\_SS in the /ss/ directory * ca\_tr\_boundary\_card.dat in the /ret/ directory * rad1\_Output\_Control.dat in the /trOCcards/ directory * rad1\_ surface\_flux.txt in the /trsurfcards/ directory * rads1-src.card in the /sources/ directory * buffer-aq-src.card in the /sources/ directory * Both rad1 (***CA\_rad1\_solute\_transport\_props.prn***) and rad2 (***CA\_rad2\_solute\_transport\_props.prn***) solute property files are present in //olive/backups/CAVE/v4-2Test/matprops/ * Both 200W (***CA\_200W\_material\_transport\_props.prn***) and 200E (***CA\_200E\_material\_transport\_props.prn***) material property files are present in //olive/backups/CAVE/v4-2Test/matprops/   Other files to complete the Acceptance Test:   * The ***input.bot***, ***input.zone*** and ***estomp-run.sh*** files are present in the /xprt-1/ directory | The expected files are present in the listed directories. |  |
| 2 | Execute, using a Linux terminal, the shell script ***create\_rad\_2018\_input\_xprt1.sh*** located in /xprt-1/ subdirectory of the testing directory. | Script executes. |  |
| 3 | Confirm the following file was generated by ***create\_rad\_2018\_input\_xprt1.sh*** in the same directory:   * ***input\_XPRT-1\_2018\_with\_buffer***   Other files generated in the same directories that are not a functional requirement are as follows:   * ***xprt-1\_mpondIF\_AT1.log*** – M Pond Log File | The files were generated in the corresponding directories. |  |
| 4 | Using an application, such as DiffMerge, compare the provided ***input\_SS*** file with ***input\_XPRT-1\_2018\_with\_buffer*** to determine the following: | | |
| 4.1 | Simulation Title Card:   * All lines except the last must be identical in both files * The last line of ***input\_XPRT-1\_2018\_with\_buffer*** must read Rad1 Transport Simulation (1943-2018), | All but the last line of the Simulation Title Card in both files will be identical. The last line of ***input\_XPRT-1\_2018\_with\_buffer*** reads Rad1 Transport Simulation (1943-2018), |  |
| 4.2 | The following cards will be identical in both files:   * 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 | All listed cards are identical in both the ***input\_SS*** file and the ***input\_XPRT-1\_2018\_with\_buffer*** file. |  |
| 5 | Navigate to the Solution Control Card in the ***input\_XPRT-1\_2018*** file. | | |
| 5.1 | Ensure the first two lines of the Solution Control Card read as follows:   * Restart File, ../ss/restart, * Water w/ Patankar Vadose Transport Courant,1.0, | The first two lines of the Solution Control Card of the ***input\_XPRT-1\_2018\_with\_buffer*** file match these lines. |  |
| 5.2 | Navigate to /sources/ to open ***rads1-src.card*** and ***buffer-aq-src.card*** (if the model has a buffer zone) files in a preferred text editor. For each file, under each # Site = line, record:   * The earliest reported year of aqueous source release * The final year of aqueous source release (solid source release will not influence time stepping)   Take the earliest year (from either file) and the final year (from either file). Use these two years in the next step. | | |
| 5.3 | Back to the ***input\_XPRT-1\_2018\_with\_buffer*** file from /xprt-1/.  If the last year of aqueous source release is prior to 2018, ensure the fourth through sixth lines of the Solution Control Card looks as follows:   * 1943,year,XXXX,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6 * XXXX,year,YYYY,year,1.0E-08,year,0.01,year,1.25,16,1.0E-6, * YYYY,year,2018,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6,   Where XXXX is the earliest year of release and YYYY is the final year of release.  If the last year of aqueous source release is after 2018, ensure the fourth and fifth lines of the Solution Control Card looks as follows:   * 1943,year,XXXX,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * XXXX,year,2018,year,1.0E-08,year,0.01,year,1.25,16,1.0E-6,   Where XXXX is the earliest year of release.  If there are no aqueous source releases between 1943 and 2018, ensure the fourth line of the Solution Control Card looks as follows:   * 1943,year,2018,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, | Depending on the first and final aqueous source release years will determine how the identified line(s) of the Solution Control Card will look. The Solution Control Card should look as shown with the correct year or years for release. |  |
| 5.4 | Ensure the last two lines of the Solution Control Card read as follows:   * 1000000,   0, | |  |
| 6 | Ensure the Solute/Fluid Interaction Card in the ***input\_XPRT-1\_2018\_with\_buffer*** file, located in /xprt-1/, matches as follows:   * 8, * C-14, Conventional, 2.50E-9, m^2/s, continuous, 5.700E+03, yr, 1.0E-12, Ci/m^3, * Cl-36, Conventional, 2.50E-9, m^2/s, continuous, 3.010E+05, yr, 1.0E-12, Ci/m^3, * H-3, Conventional, 2.50E-9, m^2/s, continuous, 1.232E+01, yr, 1.0E-12, Ci/m^3, * I-129, Conventional, 2.50E-9, m^2/s, continuous, 1.570E+07, yr, 1.0E-12, Ci/m^3, * Np-237, Conventional, 2.50E-9, m^2/s, continuous, 2.144E+06, yr, 1.0E-12, Ci/m^3, * Re-187, Conventional, 2.50E-9, m^2/s, continuous, 4.120E+10, yr, 1.0E-12, Ci/m^3, * Sr-90, Conventional, 2.50E-9, m^2/s, continuous, 2.879E+01, yr, 1.0E-12, Ci/m^3, * Tc-99, Conventional, 2.50E-9, m^2/s, continuous, 2.111E+05, yr, 1.0E-12, Ci/m^3, * 0, | The Solute/Fluid Interaction Card does match the text from this Test Instruction. |  |
| 7 | Ensure that in the Solute/Porous Media Interaction Card in the ***input\_XPRT-1\_2018\_with\_buffer*** file each HSU from the Rock/Soil Zonation Card is present with two numerical values and two associated units. An example is:   * Backfill, 0.1, m, 0.01, m,   Next, ensure in the Solute/Porous Media Interaction Card that beneath each HSU the following eight radionuclides are present with a numerical value, the associated unit, and the correct number of commas. Each HSU will have different Kd values:   * C-14, #.#E±##, mL/g,, * Cl-36, #.#E±##, mL/g,, * H-3, #.#E±##, mL/g,, * I-129, #.#E±##, mL/g,, * Np-237, #.#E±##, mL/g,, * Re-187, #.#E±##, mL/g,, * Sr-90, #.#E±##, mL/g,, * Tc-99, #.#E±##, mL/g,, | Each HSU in the ***input\_XPRT-1\_2018\_with\_buffer*** file matches the provided list. |  |
| 8 | Ensure the Initial Conditions Card is as follows:  Gas Pressure, Aqueous Pressure,  0, | The Initial Conditions Card matches this information. |  |
| 9 | Boundary Conditions Card section | | |
| 9.1 | Navigate to /ret/ directory and count the number of ***group\_#####.dat*** files.    In the upper section of the Boundary Conditions Card of the ***input\_XPRT-1\_2018\_with\_buffer*** file, below the line #Number of COCs, ensure the value present equals the number of ***group\_#####.dat*** files PLUS one. | The reported value below the #Number of COCs line in the Boundary Conditions Card equals the number of ***group\_#####.dat*** files plus one. |  |
| 9.2 | Navigate to the bottom of the Boundary Conditions Card of the ***input\_XPRT-1\_2018\_with\_buffer*** file. Ensure the last three lines of the Boundary Conditions Card is as follows:   * file, input.bot, Dirichlet Aqueous, outflow, outflow, outflow, outflow, outflow, outflow, outflow, outflow, * 1, * 1943,year,101325,Pa,,,,,,,,,,,,,,,,, | The Boundary Conditions Card of the ***input\_XPRT-1\_2018\_with\_buffer*** file matches. |  |
| 10 | Navigate to /trOCcards/ and open ***rad1\_Output\_Control.dat*** file in a preferred text editor.  Ensure the ***rad1\_Output\_Control.dat*** and the Output Control Card of the ***input\_XPRT-1\_2018\_with\_buffer*** file are identical except the final line in the ***input\_XPRT-1\_2018\_with\_buffer*** file, which reads Final Restart, , | The Output Control Card of the ***input\_XPRT-1\_2018\_with\_buffer*** file and the ***rad1\_Output\_Control.dat*** file are identical. |  |
| 11 | Ensure the Surface Flux Card in the ***input\_XPRT-1\_2018\_with\_buffer*** file matches the ***rad1\_surface\_flux.txt*** file in the /trsurfcards/ directory. | The Surface Flux Card in the ***input\_XPRT-1\_2018\_with\_buffer*** file matches the ***rad1\_surface\_flux.txt*** file in the /trsurfcards/ directory. |  |
| 12 | Verify the contents of the Source Card. | | |
| 12.1 | * Navigate to /sources/ * Open ***rads1-src.card*** in a preferred text editor. Record the number of source domains (line 8). * If a buffer exists, open ***buffer-aq-src.card*** in a preferred text editor. Record the number of source domains (line 8). * Sum these values. | | |
| 12.2 | Ensure in the ***input\_XPRT-1\_2018\_with\_buffer*** file the number of source domains reported in the Source Card is equal to that summed value from 12.1 | The summed value from 12.1 equals the number of source domains reported in the Source Card of the ***input\_XPRT-1\_2018\_with\_buffer*** file. |  |
| 12.3 | Ensure the ***rads1-src.card*** was inserted into the ***input\_XPRT-1\_2018\_with\_buffer*** file.  If a buffer is present for the model, ensure the ***buffer-aq-src.card*** file was inserted into the ***input\_XPRT-1\_2018\_with\_buffer*** file. | The appropriate file(s) were inserted into the input file. |  |
| 13 | Ensure in the ***input\_XPRT-1\_2018\_with\_buffer*** file all the following cards are inserted:   * 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 | All listed cards are present in the ***input\_XPRT-1\_2018\_with\_buffer*** file. |  |
| 14 | If all the Test Steps above pass, proceed to the next steps.  Navigate to the //olive/backups/CAVE/v4-2Test/mpondIF\_AT1/xprt-1/ directory, make a copy of the ***input\_XPRT-1\_2018\_with\_buffer*** file. Paste it into the same directory, and rename it ***input*** | | |
| 14.1 | Open the ***input*** file in the //olive/backups/CAVE/v4-2Test/mpondIF\_AT1/xprt-1/ directory and change the line in the Solution Control Card that reads 1000000, to 1,  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. |  |
| 14.2 | In a Linux terminal navigate to the //olive/backups/CAVE/v4-2Test/mpondIF\_AT1/xprt-1/ directory and type sh stomp-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  **2018 STOMP Input File Generator Acceptance Test Plan Case 2** | | | |
| --- | --- | --- | --- |
| **2018 STOMP Input File Generator Acceptance Testing**  **CACIE-2018 STOMP Input File Generator – AT-2** | | **Date:** | |
| **Tool Runner File Location for this test:**  //olive/backups/CAVE/v4-2Test/mpondIF\_AT2/xprt-2 | | **Test Performed By:** | |
| **Testing Directory:** //olive/backups/CAVE/v4-2Test/mpondIF\_AT2 | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| 1 | Ensure the following files are in testing directory, as they are needed for the execution of the ***xprt\_2018\_input\_gen.f*** tool:   * input\_SS in the /ss/ directory * ca\_tr\_boundary\_card.dat in the /ret/ directory * rad2\_Output\_Control.dat in the /trOCcards/ directory * rad2\_ surface\_flux.txt in the /trsurfcards/ directory * rads2-src.card in the /sources/ directory * buffer-aq-src.card in the /sources/ directory * Both rad1 (***CA\_rad1\_solute\_transport\_props.prn***) and rad2 (***CA\_rad2\_solute\_transport\_props.prn***) solute property files are present in //olive/backups/CAVE/v4-2Test/matprops/ * Both 200W (***CA\_200W\_material\_transport\_props.prn***) and 200E (***CA\_200E\_material\_transport\_props.prn***) material property files are present in //olive/backups/CAVE/v4-2Test/matprops/   Other files to complete the Acceptance Test:   * The ***input.bot***, ***input.zone*** and ***estomp-run.sh*** files are present in the /xprt-2/ directory | The expected files are present in the listed directories. |  |
| 2 | Execute, using a Linux terminal, the shell script ***create\_rad\_2018\_input\_xprt2.sh*** located in /xprt-2/ subdirectory of the testing directory. | Script executes. |  |
| 3 | Confirm the following file was generated by ***create\_rad\_2018\_input\_xprt2.sh*** in the same directory:   * ***input\_XPRT-2\_2018\_with\_buffer***   Other files generated in the same directories that are not a functional requirement are as follows:   * ***xprt-2\_mpondIF\_AT2.log*** – M Pond Log File | The files were generated in the corresponding directories. |  |
| 4 | Using an application, such as DiffMerge, compare the provided ***input\_SS*** file with ***input\_XPRT-2\_2018\_with\_buffer*** to determine the following: | | |
| 4.1 | Simulation Title Card:   * All lines except the last must be identical in both files * The last line of ***input\_XPRT-2\_2018\_with\_buffer*** must read Rad2 Transport Simulation (1943-2018), | All but the last line of the Simulation Title Card in both files will be identical. The last line of ***input\_XPRT-2\_2018\_with\_buffer*** reads Rad2 Transport Simulation (1943-2018), |  |
| 4.2 | The following cards will be identical in both files:   * 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 | All listed cards are identical in both the ***input\_SS*** file and the ***input\_XPRT-2\_2018\_with\_buffer*** file. |  |
| 5 | Navigate to the Solution Control Card in the ***input\_XPRT-2\_2018\_with\_buffer*** file. | | |
| 5.1 | Ensure the first two lines of the Solution Control Card read as follows:   * Restart File, ../ss/restart, * Water w/ Patankar Vadose Transport Courant,1.0, | The first two lines of the Solution Control Card of the ***input\_XPRT-2\_2018\_with\_buffer*** file match these lines. |  |
| 5.2 | Navigate to /sources/ to open ***rads2-src.card*** and ***buffer-aq-src.card*** (if the model has a buffer zone) files in a preferred text editor. For each file, under each # Site = line, record:   * The earliest reported year of aqueous source release * The final year of aqueous source release (solid source release will not influence time stepping)   Take the earliest aqueous source release year (from either file) and the final aqueous source release year (from either file). Use these two years in the next step. | | |
| 5.3 | Back to the ***input\_XPRT-2\_2018\_with\_buffer*** file from /xprt-2/.  If the last year of aqueous source release is prior to 2018, ensure the fourth through sixth lines of the Solution Control Card looks as follows:   * 1943,year,XXXX,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6 * XXXX,year,YYYY,year,1.0E-08,year,0.01,year,1.25,16,1.0E-6, * YYYY,year,2018,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6,   Where XXXX is the earliest year of aqueous source release and YYYY is the final year of aqueous source release.  If the last year of aqueous source release is after 2018, ensure the fourth and fifth lines of the Solution Control Card looks as follows:   * 1943,year,XXXX,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * XXXX,year,2018,year,1.0E-08,year,0.01,year,1.25,16,1.0E-6,   Where XXXX is the earliest year of aqueous source release.  If there are no source releases between 1943 and 2018, ensure the fourth line of the Solution Control Card looks as follows:   * 1943,year,2018,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, | Depending on the first and final aqueous source release years will determine how the identified line(s) of the Solution Control Card will look. The Solution Control Card should look as shown with the correct year or years for release. |  |
| 5.4 | Ensure the last two lines of the Solution Control Card read as follows:   * 1000000,   0, | |  |
| 6 | Ensure the Solute/Fluid Interaction Card in the ***input\_XPRT-2\_2018\_with\_buffer*** file, located in /xprt-2/, matches as follows:   * 8, * U-232, Conventional, 2.50E-9, m^2/s, continuous, 6.890E+01, yr, 1.0E-12, Ci/m^3, * U-233, Conventional, 2.50E-9, m^2/s, continuous, 1.592E+05, yr, 1.0E-12, Ci/m^3, * U-234, Conventional, 2.50E-9, m^2/s, continuous, 2.455E+05, yr, 1.0E-12, Ci/m^3, * U-235, Conventional, 2.50E-9, m^2/s, continuous, 7.040E+08, yr, 1.0E-12, Ci/m^3, * U-236, Conventional, 2.50E-9, m^2/s, continuous, 2.342E+07, yr, 1.0E-12, Ci/m^3, * U-238, Conventional, 2.50E-9, m^2/s, continuous, 4.468E+09, yr, 1.0E-12, Ci/m^3, * Th-230, Conventional, 2.50E-9, m^2/s, continuous, 7.538E+04, yr, 1.0E-12, Ci/m^3, * Ra-226, Conventional, 2.50E-9, m^2/s, continuous, 1.600E+03, yr, 1.0E-12, Ci/m^3, * 2, * U-234, Th-230, 1.00, * Th-230, Ra-226, 1.00, | The Solute/Fluid Interaction Card does match the text from this Test Instruction. |  |
| 7 | Ensure that in the Solute/Porous Media Interaction Card in the ***input\_XPRT-2\_2018\_with\_buffer*** file each HSU from the Rock/Soil Zonation Card is present with two numerical values and two associated units. An example is:   * Backfill, 0.1, m, 0.01, m,   Next, ensure in the Solute/Porous Media Interaction Card that beneath each HSU the following eight radionuclides are present with a numerical value, the associated unit, and the correct number of commas. Each HSU will have different Kd values:   * U-232, #.#E±##, mL/g,, * U-233, #.#E±##, mL/g,, * U-234, #.#E±##, mL/g,, * U-235, #.#E±##, mL/g,, * U-236, #.#E±##, mL/g,, * U-237, #.#E±##, mL/g,, * U-238, #.#E±##, mL/g,, * Ra-226, #.#E±##, mL/g,, | Each HSU in the ***input\_XPRT-2\_2018\_with\_buffer*** file matches the provided list. |  |
| 8 | Ensure the Initial Conditions Card is as follows:  Gas Pressure, Aqueous Pressure,  0, | The Initial Conditions Card matches this information. |  |
| 9 | Boundary Conditions Card section | | |
| 9.1 | Navigate to /ret/ directory and count the number of ***group\_#####.dat*** files.    In the upper section of the Boundary Conditions Card of the ***input*** file, below the line #Number of COCs, ensure the value present equals the number of ***group\_#####.dat*** files PLUS one. | The reported value below the #Number of COCs line in the Boundary Conditions Card equals the number of ***group\_#####.dat*** files plus one. |  |
| 9.2 | Navigate to the bottom of the Boundary Conditions Card of the ***input\_XPRT-2\_2018\_with\_buffer*** file. Ensure the last three lines of the Boundary Conditions Card is as follows:   * file, input.bot, Dirichlet Aqueous, outflow, outflow, outflow, outflow, outflow, outflow, outflow, outflow, * 1, * 1943,year,101325,Pa,,,,,,,,,,,,,,,,, | The Boundary Conditions Card of the ***input\_XPRT-2\_2018\_with\_buffer*** file matches. |  |
| 10 | Navigate to /trOCcards/ and open ***rad2\_Output\_Control.dat*** file in a preferred text editor.  Ensure the ***rad2\_Output\_Control.dat*** and the Output Control Card of the ***input\_XPRT-2\_2018\_with\_buffer*** file are identical except the final line in the ***input\_XPRT-2\_2018\_with\_buffer*** file, which reads Final Restart, , | The Output Control Card of the ***input\_XPRT-2\_2018\_with\_buffer*** file and the ***rad2\_Output\_Control.dat*** file are identical. |  |
| 11 | Ensure the Surface Flux Card in the ***input\_XPRT-2\_2018\_with\_buffer*** file matches the ***rad2\_surface\_flux.txt*** file in the /trsurfcards/ directory. | The Surface Flux Card in the ***input\_XPRT-2\_2018\_with\_buffer*** file matches the ***rad2\_surface\_flux.txt*** file in the /trsurfcards/ directory. |  |
| 12 | Verify the contents of the Source Card. | | |
| 12.1 | * Navigate to /sources/ * Open ***rads2-src.card*** in a preferred text editor. Record the number of source domains (line 8). * If a buffer exists, open ***buffer-aq-src.card*** in a preferred text editor. Record the number of source domains (line 8). * Sum these values. | | |
| 12.2 | Ensure in the ***input\_XPRT-2\_2018\_with\_buffer*** file the number of source domains reported in the Source Card is equal to that summed value from 12.1 | The summed value from 12.1 equals the number of source domains reported in the Source Card of the ***input\_XPRT-2\_2018\_with\_buffer*** file. |  |
| 12.3 | Ensure the ***rads2-src.card*** was inserted into the ***input\_XPRT-2\_2018\_with\_buffer*** file.  If a buffer is present for the model, ensure the ***buffer-aq-src.card*** file was inserted into the ***input\_XPRT-2\_2018\_with\_buffer*** file. | The appropriate file(s) were inserted into the input file. |  |
| 13 | Ensure in the ***input\_XPRT-2\_2018\_with\_buffer*** file all the following cards are inserted in the following order:   * 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 | All listed cards are present in the ***input\_XPRT-2\_2018\_with\_buffer*** file. |  |
| 14 | If all the Test Steps above pass, proceed to the next steps.  Navigate to the //olive/backups/CAVE/v4-2Test/mpondIF\_AT2/xprt-2/ directory, make a copy of the ***input\_XPRT-2\_2018\_with\_buffer*** file. Paste it into the same directory, and rename it ***input*** | | |
| 14.1 | Open the ***input*** file in the //olive/backups/CAVE/v4-2Test/mpondIF\_AT2/xprt-2/ directory and change the line in the Solution Control Card that reads 1000000, to 1,  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. |  |
| 14.2 | In a Linux terminal navigate to the //olive/backups/CAVE/v4-2Test/mpondIF\_AT2/xprt-2/ directory and type sh stomp-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  **2018 STOMP Input File Generator Acceptance Test Plan Case 3** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **2018 STOMP Input File Generator Acceptance Testing**  **CACIE-2018 STOMP Input File Generator – AT-3** | | **Date:** | | | |
| **Tool Runner File Location for this test:**  //olive/backups/CAVE/v4-2Test/mpondIF\_AT3/xprt-1 | | **Test Performed By:** | | | |
| **Testing Directory:** //olive/backups/CAVE/v4-2Test/mpondIF\_AT3 | | | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | | | **Test Result  (Pass/Fail)** |
| 1 | Ensure the following files are in testing directory, as they are needed for the execution of the ***xprt\_2018\_input\_gen.f*** tool:   * input\_SS in the /ss/ directory * ca\_tr\_boundary\_card.dat in the /ret/ directory * rad1\_Output\_Control.dat in the /trOCcards/ directory * rad1\_ surface\_flux.txt in the /trsurfcards/ directory * rads1-src.card in the /sources/ directory * Both rad1 (***CA\_rad1\_solute\_transport\_props.prn***) and rad2 (***CA\_rad2\_solute\_transport\_props.prn***) solute property files are present in //olive/backups/CAVE/v4-2Test/matprops/ * Both 200W (***CA\_200W\_material\_transport\_props.prn***) and 200E (***CA\_200E\_material\_transport\_props.prn***) material property files are present in //olive/backups/CAVE/v4-2Test/matprops/   Other files to complete the Acceptance Test:   * The ***input.bot***, ***input.zone*** and ***estomp-run.sh*** files are present in the /xprt-1/ directory | The expected files are present in the listed directories. | | |  |
| 2 | Execute, using a Linux terminal, the shell script ***create\_rad\_2018\_input\_xprt1.sh*** located in /xprt-1/ subdirectory of the testing directory. | Script executes. | | |  |
| 3 | Confirm the following file was generated by ***create\_rad\_2018\_input\_xprt1.sh*** in the same directory:   * ***input\_XPRT-1\_2018\_no\_buffer***   Other files generated in the same directories that are not a functional requirement are as follows:   * ***xprt-1\_mpondIF\_AT3.log*** | The files were generated in the corresponding directories. | | |  |
| 4 | Using an application, such as DiffMerge, compare the provided ***input\_XPRT-1\_2018\_with\_buffer*** file located at //olive/backups/CAVE/v4-2Test/mpondIF\_AT1/xprt-1/ with the ***input\_XPRT-1\_2018\_no\_buffer*** file at //olive/backups/CAVE/v4-2Test/mpondIF\_AT3/xprt-1/ to determine the following: | | | | |
| 4.1 | Ensure the list of cards below is the same:   * Simulation Title 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 | | The listed cards are identical. |  | |
| 5 | Open the ***input\_XPRT-1\_2018\_no\_buffer*** file in the //olive/backups/CAVE/v4-2Test/mpondIF\_AT3/xprt-1/ directory and use it for the following steps | | | | |
| 6 | Ensure the Solution Control Card reads, line-by-line:   * Restart File, ../ss/restart, * Water w/ Patankar Vadose Transport Courant,1.0, * 1, * 1943,year,2018,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * 1000000, * 0, | | The Solution Control card reads identical as listed. |  | |
| 7 | Navigate to the Source Card in the ***input\_XPRT-1\_2018\_no\_buffer*** file in the //olive/backups/CAVE/v4-2Test/mpondIF\_AT3/xprt-1/ directory. Compare the contents of the Source Card with the original file the tool pulled from, ***rads1-src.card*** in the /sources/ subdirectory of the Testing Directory. Ensure the data of the Source card from ***input\_XPRT-1\_2018\_no\_buffer*** and the file ***rads1-src.card*** match. | | The Source Card of ***input\_XPRT-1\_2018\_no\_buffer*** and the ***rads1-src.card*** are identical. |  | |
| 8 | If all the Test Steps above pass, proceed to the next steps.  Navigate to the //olive/backups/CAVE/v4-2Test/mpondIF\_AT3/xprt-1/ directory, make a copy of the ***input\_XPRT-1\_2018\_no\_buffer*** file. Paste it into the same directory, and rename it ***input*** | | | | |
| 8.1 | Open the ***input*** file in the //olive/backups/CAVE/v4-2Test/mpondIF\_AT3/xprt-1/ directory and change the line in the Solution Control Card that reads 1000000, to 1,  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. |  | |
| 8.2 | In a Linux terminal navigate to the //olive/backups/CAVE/v4-2Test/mpondIF\_AT3/xprt-1/ directory and type sh stomp-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 6  **2018 STOMP Input File Generator Acceptance Test Plan Case 4** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **2018 STOMP Input File Generator Acceptance Testing**  **CACIE-2018 STOMP Input File Generator – AT-4** | | **Date:** | | | |
| **Tool Runner File Location for this test:**  //olive/backups/CAVE/v4-2Test/mpondIF\_AT4/xprt-1 | | **Test Performed By:** | | | |
| **Testing Directory:** //olive/backups/CAVE/v4-2Test/mpondIF\_AT4 | | | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | | | **Test Result  (Pass/Fail)** |
| 1 | Ensure the following files are in testing directory, as they are needed for the execution of the ***xprt\_2018\_input\_gen.f*** tool:   * input\_SS in the /ss/ directory * ca\_tr\_boundary\_card.dat in the /ret/ directory * rad1\_Output\_Control.dat in the /trOCcards/ directory * rad1\_ surface\_flux.txt in the /trsurfcards/ directory * rads1-src.card in the /sources/ directory * ***buffer-aq-src.card*** in the /sources/ directory * Both rad1 (***CA\_rad1\_solute\_transport\_props.prn***) and rad2 (***CA\_rad2\_solute\_transport\_props.prn***) solute property files are present in //olive/backups/CAVE/v4-2Test/matprops/ * Both 200W (***CA\_200W\_material\_transport\_props.prn***) and 200E (***CA\_200E\_material\_transport\_props.prn***) material property files are present in //olive/backups/CAVE/v4-2Test/matprops/   Other files to complete the Acceptance Test:   * The ***input.bot***, ***input.zone*** and ***estomp-run.sh*** files are present in the /xprt-1/ directory | The expected files are present in the listed directories. | | |  |
| 2 | Execute, using a Linux terminal, the shell script ***create\_rad\_2018\_input\_xprt1.sh*** located in /xprt-1/ subdirectory of the testing directory. | Script executes. | | |  |
| 3 | Confirm the following file was generated by ***create\_rad\_2018\_input\_xprt1.sh*** in the same directory:   * ***input\_XPRT-1\_2018\_with\_buffer***   Other files generated in the same directories that are not a functional requirement are as follows:   * ***xprt-1\_mpondIF\_AT4.log*** | The files were generated in the corresponding directories. | | |  |
| 4 | Using an application, such as DiffMerge, compare the provided ***input\_XPRT-1\_2018\_with\_buffer*** file located at //olive/backups/CAVE/v4-2Test/mpondIF\_AT1/xprt-1/ with the ***input\_XPRT-1\_2018\_with\_buffer*** file at //olive/backups/CAVE/v4-2Test/mpondIF\_AT4/xprt-1/ to determine the following: | | | | |
| 4.1 | Ensure the list of cards below is the same:   * Simulation Title 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 | | The listed cards are identical. |  | |
| 5 | Open the ***input\_XPRT-1\_2018\_with\_buffer*** file in the //olive/backups/CAVE/v4-2Test/mpondIF\_AT4/xprt-1/ directory and use it for the following steps | | | | |
| 6 | Ensure the Solution Control Card reads, line-by-line:   * Restart File, ../ss/restart, * Water w/ Patankar Vadose Transport Courant,1.0, * 3, * 1943,year,1953,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * 1953,year,1998,year,1.0E-08,year,0.01,year,1.25,16,1.0E-6, * 1998,year,2018,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * 1000000, * 0, | | The Solution Control card reads identical as listed. |  | |
| 7 | Navigate to the Source Card in the ***input\_XPRT-1\_2018\_with\_buffer*** file in the //olive/backups/CAVE/v4-2Test/mpondIF\_AT4/xprt-1/ directory. Compare the contents of the Source Card with the original file the tool pulled from, ***rads1-src.card*** in the /sources/ subdirectory of the Testing Directory. Ensure the data of the Source card from ***input\_XPRT-1\_2018\_with\_buffer*** and the file ***rads1-src.card*** match. | | The Source Card of ***input\_XPRT-1\_2018\_with\_buffer*** and the ***rads1-src.card*** are identical. |  | |
| 8 | If all the Test Steps above pass, proceed to the next steps.  Navigate to the //olive/backups/CAVE/v4-2Test/mpondIF\_AT4/xprt-1/ directory, make a copy of the ***input\_XPRT-1\_2018\_with\_buffer*** file. Paste it into the same directory, and rename it ***input*** | | | | |
| 8.1 | Open the ***input*** file in the //olive/backups/CAVE/v4-2Test/mpondIF\_AT4/xprt-1/ directory and change the line in the Solution Control Card that reads 1000000, to 1,  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. |  | |
| 8.2 | In a Linux terminal navigate to the //olive/backups/CAVE/v4-2Test/mpondIF\_AT4/xprt-1/ directory and type sh stomp-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. |  | |

# 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. It is the M Pond Area Model and is checking the rad1 ***input\_XPRT-1\_2018\_with\_buffer*** file. This input file is built with a buffer, aqueous and radionuclide sources, and the sources end after the 2018 end date.
* Acceptance Test 2 is in Table A-2 of Appendix A. It is the M Pond Area Model and is checking the rad2 ***input\_XPRT-2\_2018\_with\_buffer*** file. This input file is built with a buffer, aqueous and radionuclide sources, and the sources end after the 2018 end date.
* Acceptance Test 3 is in Table A-3 of Appendix A. It is the M Pond Area Model and is checking the rad1 ***input\_XPRT-1\_2018\_no\_buffer*** file. This input file is built without a buffer, has no aqueous sources, a single solid source, and because of no aqueous sources the Solution control card runs from 1943 to 2018 with a larger time step.
* Acceptance Test 4 is in Table A-4 of Appendix A. This test is the same as Acceptance Test 1 with the exception of Site = 2607-EQ in the Source Card. This site carried the aqueous sources beyond 2018, but without it the aqueous sources cease prior to 2018.

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 code:

1. You need to have the inputs in the appropriate directory structure, which are specified in Section 4 of this document, under Input Files.
2. From a Linux terminal in either the /xprt-1/ or /xprt-2/ subdirectory of the testing directory execute the tool as specified in Section 4 of this document, under Execution.
3. Check that either ***input\_XPRT-1\_2018*** or ***input\_XPRT-2\_2018*** file was generated.

# Tool Versions

This section details changes incorporated into each version of the 2018 STOMP Input File Generator tool.

* 1.0 – Tool was developed.

# 

# Appendix A

**Completed Acceptance Test Cases**

**Tool Runner Log**

###Executing input generator###

INFO--03/26/2020 05:41:47 AM--Starting CA-CIE Tool Runner. Logging to "./xprt-1\_mpondIF\_AT1.log"

INFO--03/26/2020 05:41:48 AM--Code Version: 19633fecf43ac8ef2c4424bfe19fd563fc966f1b v2.1: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--03/26/2020 05:41:48 AM--Code Version: d92f3469d77db78b1d08fac4390de91d0ad7e2bd Local repo SHA-1 has does not correspond to a remote repo release version: ../../../CA-CIE-Tools-TestRepos/repo\_xprt\_2018\_input\_gen.f/tools/ca-modinput/linux/xprt\_2018\_input\_gen\_linux-intel-64.exe<--dcf3dccedb15a3880555c3e255789b2712bb8fff

INFO--03/26/2020 05:41:48 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--03/26/2020 05:41:48 AM--QA Status: TEST : ../../../CA-CIE-Tools-TestRepos/repo\_xprt\_2018\_input\_gen.f/tools/ca-modinput/linux/xprt\_2018\_input\_gen\_linux-intel-64.exe

INFO--03/26/2020 05:41:48 AM--Invoking Command:"../../../CA-CIE-Tools-TestRepos/repo\_xprt\_2018\_input\_gen.f/tools/ca-modinput/linux/xprt\_2018\_input\_gen\_linux-intel-64.exe" with Arguments:"rad1 200E buffer /opt/ICF/Prod/2WMATTR/v1.0/data/CA\_200W\_material\_transport\_props.prn /opt/ICF/Prod/2EMATTR/v1.0/data/CA\_200E\_material\_transport\_props.prn /opt/ICF/Prod/R1SOLTR/v1.0/data/CA\_rad1\_solute\_transport\_props.prn /opt/ICF/Prod/R2SOLTR/v1.0/data/CA\_rad2\_solute\_transport\_props.prn"

INFO--03/26/2020 05:41:48 AM--Username:pallena Computer:olive Platform:Linux 4.4.0-38-generic #57~14.04.1-Ubuntu SMP Tue Sep 6 17:20:43 UTC 2016

###Finished Process###

###Executing Fingerprint Tool###

INFO--03/26/2020 05:41:48 AM--Starting CA-CIE Tool Runner. Logging to "./xprt-1\_mpondIF\_AT1.log"

INFO--03/26/2020 05:41:48 AM--Code Version: 19633fecf43ac8ef2c4424bfe19fd563fc966f1b v2.1: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--03/26/2020 05:41:48 AM--Code Version: 19633fecf43ac8ef2c4424bfe19fd563fc966f1b v2.1: /opt/tools/pylib/fingerprint/fingerprint.py<--13a885dc11cc15aea74c14b09c0d8584ec6cfd08

INFO--03/26/2020 05:41:48 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--03/26/2020 05:41:48 AM--QA Status: QUALIFIED : /opt/tools/pylib/fingerprint/fingerprint.py

INFO--03/26/2020 05:41:48 AM--Invoking Command:"python3.6" with Arguments:"/opt/tools/pylib/fingerprint/fingerprint.py /home/pallena/CAVE/v4-2Test/mpondIF\_AT1/xprt-1/input\_XPRT-1\_2018\_with\_buffer --output ./xprt-1\_mpondIF\_AT1.log --outputmode a"

INFO--03/26/2020 05:41:48 AM--Username:pallena Computer:olive Platform:Linux 4.4.0-38-generic #57~14.04.1-Ubuntu SMP Tue Sep 6 17:20:43 UTC 2016

Fingerprint generated at 2020-03-26 05:41:48.331368

/home/pallena/CAVE/v4-2Test/mpondIF\_AT1/xprt-1/input\_XPRT-1\_2018\_with\_buffer dd1725d6cac004c962288428056414a4959f0e994983be6e04c3183e106ac753

###Finished Process###

| Table A-1  **2018 STOMP Input File Generator Acceptance Test Plan Case 1** | | | |
| --- | --- | --- | --- |
| **2018 STOMP Input File Generator Acceptance Testing**  **CACIE-2018 STOMP Input File Generator – AT-1** | | **Date: 03-26-2020** | |
| **Tool Runner File Location for this test:**  //olive/backups/CAVE/v4-2Test/mpondIF\_AT1/xprt-1 | | **Test Performed By: Praveena Allena** | |
| **Testing Directory:** //olive/backups/CAVE/v4-2Test/mpondIF\_AT1 | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| 1 | Ensure the following files are in testing directory, as they are needed for the execution of the ***xprt\_2018\_input\_gen.f*** tool:   * input\_SS in the /ss/ directory * ca\_tr\_boundary\_card.dat in the /ret/ directory * rad1\_Output\_Control.dat in the /trOCcards/ directory * rad1\_ surface\_flux.txt in the /trsurfcards/ directory * rads1-src.card in the /sources/ directory * buffer-aq-src.card in the /sources/ directory * Both rad1 (***CA\_rad1\_solute\_transport\_props.prn***) and rad2 (***CA\_rad2\_solute\_transport\_props.prn***) solute property files are present in //olive/backups/CAVE/v4-2Test/matprops/ * Both 200W (***CA\_200W\_material\_transport\_props.prn***) and 200E (***CA\_200E\_material\_transport\_props.prn***) material property files are present in //olive/backups/CAVE/v4-2Test/matprops/   Other files to complete the Acceptance Test:   * The ***input.bot***, ***input.zone*** and ***estomp-run.sh*** files are present in the /xprt-1/ directory | The expected files are present in the listed directories. | Pass |
| 2 | Execute, using a Linux terminal, the shell script ***create\_rad\_2018\_input\_xprt1.sh*** located in /xprt-1/ subdirectory of the testing directory. | Script executes. | Pass |
| 3 | Confirm the following file was generated by ***create\_rad\_2018\_input\_xprt1.sh*** in the same directory:   * ***input\_XPRT-1\_2018\_with\_buffer***   Other files generated in the same directories that are not a functional requirement are as follows:   * ***xprt-1\_mpondIF\_AT1.log*** – M Pond Log File | The files were generated in the corresponding directories. | Pass |
| 4 | Using an application, such as DiffMerge, compare the provided ***input\_SS*** file with ***input\_XPRT-1\_2018\_with\_buffer*** to determine the following: | | |
| 4.1 | Simulation Title Card:   * All lines except the last must be identical in both files * The last line of ***input\_XPRT-1\_2018\_with\_buffer*** must read Rad1 Transport Simulation (1943-2018), | All but the last line of the Simulation Title Card in both files will be identical. The last line of ***input\_XPRT-1\_2018\_with\_buffer*** reads Rad1 Transport Simulation (1943-2018), | Pass |
| 4.2 | The following cards will be identical in both files:   * 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 | All listed cards are identical in both the ***input\_SS*** file and the ***input\_XPRT-1\_2018\_with\_buffer*** file. | Pass |
| 5 | Navigate to the Solution Control Card in the ***input\_XPRT-1\_2018*** file. | | |
| 5.1 | Ensure the first two lines of the Solution Control Card read as follows:   * Restart File, ../ss/restart, * Water w/ Patankar Vadose Transport Courant,1.0, | The first two lines of the Solution Control Card of the ***input\_XPRT-1\_2018\_with\_buffer*** file match these lines. | Pass |
| 5.2 | Navigate to /sources/ to open ***rads1-src.card*** and ***buffer-aq-src.card*** (if the model has a buffer zone) files in a preferred text editor. For each file, under each # Site = line, record:   * The earliest reported year of aqueous source release * The final year of aqueous source release (solid source release will not influence time stepping)   Take the earliest year (from either file) and the final year (from either file). Use these two years in the next step. | | |
| 5.3 | Back to the ***input\_XPRT-1\_2018\_with\_buffer*** file from /xprt-1/.  If the last year of aqueous source release is prior to 2018, ensure the fourth through sixth lines of the Solution Control Card looks as follows:   * 1943,year,XXXX,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6 * XXXX,year,YYYY,year,1.0E-08,year,0.01,year,1.25,16,1.0E-6, * YYYY,year,2018,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6,   Where XXXX is the earliest year of release and YYYY is the final year of release.  If the last year of aqueous source release is after 2018, ensure the fourth and fifth lines of the Solution Control Card looks as follows:   * 1943,year,XXXX,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * XXXX,year,2018,year,1.0E-08,year,0.01,year,1.25,16,1.0E-6,   Where XXXX is the earliest year of release.  If there are no aqueous source releases between 1943 and 2018, ensure the fourth line of the Solution Control Card looks as follows:   * 1943,year,2018,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, | Depending on the first and final aqueous source release years will determine how the identified line(s) of the Solution Control Card will look. The Solution Control Card should look as shown with the correct year or years for release. | Pass |
| 5.4 | Ensure the last two lines of the Solution Control Card read as follows:   * 1000000,   0, | | Pass |
| 6 | Ensure the Solute/Fluid Interaction Card in the ***input\_XPRT-1\_2018\_with\_buffer*** file, located in /xprt-1/, matches as follows:   * 8, * C-14, Conventional, 2.50E-9, m^2/s, continuous, 5.700E+03, yr, 1.0E-12, Ci/m^3, * Cl-36, Conventional, 2.50E-9, m^2/s, continuous, 3.010E+05, yr, 1.0E-12, Ci/m^3, * H-3, Conventional, 2.50E-9, m^2/s, continuous, 1.232E+01, yr, 1.0E-12, Ci/m^3, * I-129, Conventional, 2.50E-9, m^2/s, continuous, 1.570E+07, yr, 1.0E-12, Ci/m^3, * Np-237, Conventional, 2.50E-9, m^2/s, continuous, 2.144E+06, yr, 1.0E-12, Ci/m^3, * Re-187, Conventional, 2.50E-9, m^2/s, continuous, 4.120E+10, yr, 1.0E-12, Ci/m^3, * Sr-90, Conventional, 2.50E-9, m^2/s, continuous, 2.879E+01, yr, 1.0E-12, Ci/m^3, * Tc-99, Conventional, 2.50E-9, m^2/s, continuous, 2.111E+05, yr, 1.0E-12, Ci/m^3, * 0, | The Solute/Fluid Interaction Card does match the text from this Test Instruction. | Pass |
| 7 | Ensure that in the Solute/Porous Media Interaction Card in the ***input\_XPRT-1\_2018\_with\_buffer*** file each HSU from the Rock/Soil Zonation Card is present with two numerical values and two associated units. An example is:   * Backfill, 0.1, m, 0.01, m,   Next, ensure in the Solute/Porous Media Interaction Card that beneath each HSU the following eight radionuclides are present with a numerical value, the associated unit, and the correct number of commas. Each HSU will have different Kd values:   * C-14, #.#E±##, mL/g,, * Cl-36, #.#E±##, mL/g,, * H-3, #.#E±##, mL/g,, * I-129, #.#E±##, mL/g,, * Np-237, #.#E±##, mL/g,, * Re-187, #.#E±##, mL/g,, * Sr-90, #.#E±##, mL/g,, * Tc-99, #.#E±##, mL/g,, | Each HSU in the ***input\_XPRT-1\_2018\_with\_buffer*** file matches the provided list. | Pass |
| 8 | Ensure the Initial Conditions Card is as follows:  Gas Pressure, Aqueous Pressure,  0, | The Initial Conditions Card matches this information. | Pass |
| 9 | Boundary Conditions Card section | | |
| 9.1 | Navigate to /ret/ directory and count the number of ***group\_#####.dat*** files.    In the upper section of the Boundary Conditions Card of the ***input\_XPRT-1\_2018\_with\_buffer*** file, below the line #Number of COCs, ensure the value present equals the number of ***group\_#####.dat*** files PLUS one. | The reported value below the #Number of COCs line in the Boundary Conditions Card equals the number of ***group\_#####.dat*** files plus one. | Pass |
| 9.2 | Navigate to the bottom of the Boundary Conditions Card of the ***input\_XPRT-1\_2018\_with\_buffer*** file. Ensure the last three lines of the Boundary Conditions Card is as follows:   * file, input.bot, Dirichlet Aqueous, outflow, outflow, outflow, outflow, outflow, outflow, outflow, outflow, * 1, * 1943,year,101325,Pa,,,,,,,,,,,,,,,,, | The Boundary Conditions Card of the ***input\_XPRT-1\_2018\_with\_buffer*** file matches. | Pass |
| 10 | Navigate to /trOCcards/ and open ***rad1\_Output\_Control.dat*** file in a preferred text editor.  Ensure the ***rad1\_Output\_Control.dat*** and the Output Control Card of the ***input\_XPRT-1\_2018\_with\_buffer*** file are identical except the final line in the ***input\_XPRT-1\_2018\_with\_buffer*** file, which reads Final Restart, , | The Output Control Card of the ***input\_XPRT-1\_2018\_with\_buffer*** file and the ***rad1\_Output\_Control.dat*** file are identical. | Pass |
| 11 | Ensure the Surface Flux Card in the ***input\_XPRT-1\_2018\_with\_buffer*** file matches the ***rad1\_surface\_flux.txt*** file in the /trsurfcards/ directory. | The Surface Flux Card in the ***input\_XPRT-1\_2018\_with\_buffer*** file matches the ***rad1\_surface\_flux.txt*** file in the /trsurfcards/ directory. | Pass |
| 12 | Verify the contents of the Source Card. | | |
| 12.1 | * Navigate to /sources/ * Open ***rads1-src.card*** in a preferred text editor. Record the number of source domains (line 8). * If a buffer exists, open ***buffer-aq-src.card*** in a preferred text editor. Record the number of source domains (line 8). * Sum these values. | | |
| 12.2 | Ensure in the ***input\_XPRT-1\_2018\_with\_buffer*** file the number of source domains reported in the Source Card is equal to that summed value from 12.1 | The summed value from 12.1 equals the number of source domains reported in the Source Card of the ***input\_XPRT-1\_2018\_with\_buffer*** file. | Pass |
| 12.3 | Ensure the ***rads1-src.card*** was inserted into the ***input\_XPRT-1\_2018\_with\_buffer*** file.  If a buffer is present for the model, ensure the ***buffer-aq-src.card*** file was inserted into the ***input\_XPRT-1\_2018\_with\_buffer*** file. | The appropriate file(s) were inserted into the input file. | Pass |
| 13 | Ensure in the ***input\_XPRT-1\_2018\_with\_buffer*** file all the following cards are inserted:   * 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 | All listed cards are present in the ***input\_XPRT-1\_2018\_with\_buffer*** file. | Pass |
| 14 | If all the Test Steps above pass, proceed to the next steps.  Navigate to the //olive/backups/CAVE/v4-2Test/mpondIF\_AT1/xprt-1/ directory, make a copy of the ***input\_XPRT-1\_2018\_with\_buffer*** file. Paste it into the same directory, and rename it ***input*** | | |
| 14.1 | Open the ***input*** file in the //olive/backups/CAVE/v4-2Test/mpondIF\_AT1/xprt-1/ directory and change the line in the Solution Control Card that reads 1000000, to 1,  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 |
| 14.2 | In a Linux terminal navigate to the //olive/backups/CAVE/v4-2Test/mpondIF\_AT1/xprt-1/ directory and type sh stomp-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 input generator###

INFO--03/26/2020 06:40:26 AM--Starting CA-CIE Tool Runner. Logging to "./xprt-2\_mpondIF\_AT2.log"

INFO--03/26/2020 06:40:26 AM--Code Version: 19633fecf43ac8ef2c4424bfe19fd563fc966f1b v2.1: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--03/26/2020 06:40:26 AM--Code Version: d92f3469d77db78b1d08fac4390de91d0ad7e2bd Local repo SHA-1 has does not correspond to a remote repo release version: ../../../CA-CIE-Tools-TestRepos/repo\_xprt\_2018\_input\_gen.f/tools/ca-modinput/linux/xprt\_2018\_input\_gen\_linux-intel-64.exe<--dcf3dccedb15a3880555c3e255789b2712bb8fff

INFO--03/26/2020 06:40:26 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--03/26/2020 06:40:26 AM--QA Status: TEST : ../../../CA-CIE-Tools-TestRepos/repo\_xprt\_2018\_input\_gen.f/tools/ca-modinput/linux/xprt\_2018\_input\_gen\_linux-intel-64.exe

INFO--03/26/2020 06:40:26 AM--Invoking Command:"../../../CA-CIE-Tools-TestRepos/repo\_xprt\_2018\_input\_gen.f/tools/ca-modinput/linux/xprt\_2018\_input\_gen\_linux-intel-64.exe" with Arguments:"rad2 200E buffer /opt/ICF/Prod/2WMATTR/v1.0/data/CA\_200W\_material\_transport\_props.prn /opt/ICF/Prod/2EMATTR/v1.0/data/CA\_200E\_material\_transport\_props.prn /opt/ICF/Prod/R1SOLTR/v1.0/data/CA\_rad1\_solute\_transport\_props.prn /opt/ICF/Prod/R2SOLTR/v1.0/data/CA\_rad2\_solute\_transport\_props.prn"

INFO--03/26/2020 06:40:26 AM--Username:pallena Computer:olive Platform:Linux 4.4.0-38-generic #57~14.04.1-Ubuntu SMP Tue Sep 6 17:20:43 UTC 2016

###Finished Process###

###Executing Fingerprint Tool###

INFO--03/26/2020 06:40:26 AM--Starting CA-CIE Tool Runner. Logging to "./xprt-2\_mpondIF\_AT2.log"

INFO--03/26/2020 06:40:26 AM--Code Version: 19633fecf43ac8ef2c4424bfe19fd563fc966f1b v2.1: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--03/26/2020 06:40:26 AM--Code Version: 19633fecf43ac8ef2c4424bfe19fd563fc966f1b v2.1: /opt/tools/pylib/fingerprint/fingerprint.py<--13a885dc11cc15aea74c14b09c0d8584ec6cfd08

INFO--03/26/2020 06:40:26 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--03/26/2020 06:40:26 AM--QA Status: QUALIFIED : /opt/tools/pylib/fingerprint/fingerprint.py

INFO--03/26/2020 06:40:26 AM--Invoking Command:"python3.6" with Arguments:"/opt/tools/pylib/fingerprint/fingerprint.py /home/pallena/CAVE/v4-2Test/mpondIF\_AT2/xprt-2/input\_XPRT-2\_2018\_with\_buffer --output ./xprt-2\_mpondIF\_AT2.log --outputmode a"

INFO--03/26/2020 06:40:26 AM--Username:pallena Computer:olive Platform:Linux 4.4.0-38-generic #57~14.04.1-Ubuntu SMP Tue Sep 6 17:20:43 UTC 2016

Fingerprint generated at 2020-03-26 06:40:26.993696

/home/pallena/CAVE/v4-2Test/mpondIF\_AT2/xprt-2/input\_XPRT-2\_2018\_with\_buffer c35d986745583211465e57092367351be35f9e16defd91662e09d660fdfa055c

###Finished Process###

| Table A-2  **2018 STOMP Input File Generator Acceptance Test Plan Case 2** | | | |
| --- | --- | --- | --- |
| **2018 STOMP Input File Generator Acceptance Testing**  **CACIE-2018 STOMP Input File Generator – AT-2** | | **Date: 03-26-2020** | |
| **Tool Runner File Location for this test:**  //olive/backups/CAVE/v4-2Test/mpondIF\_AT2/xprt-2 | | **Test Performed By: Praveena Allena** | |
| **Testing Directory:** //olive/backups/CAVE/v4-2Test/mpondIF\_AT2 | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| 1 | Ensure the following files are in testing directory, as they are needed for the execution of the ***xprt\_2018\_input\_gen.f*** tool:   * input\_SS in the /ss/ directory * ca\_tr\_boundary\_card.dat in the /ret/ directory * rad2\_Output\_Control.dat in the /trOCcards/ directory * rad2\_ surface\_flux.txt in the /trsurfcards/ directory * rads2-src.card in the /sources/ directory * buffer-aq-src.card in the /sources/ directory * Both rad1 (***CA\_rad1\_solute\_transport\_props.prn***) and rad2 (***CA\_rad2\_solute\_transport\_props.prn***) solute property files are present in //olive/backups/CAVE/v4-2Test/matprops/ * Both 200W (***CA\_200W\_material\_transport\_props.prn***) and 200E (***CA\_200E\_material\_transport\_props.prn***) material property files are present in //olive/backups/CAVE/v4-2Test/matprops/   Other files to complete the Acceptance Test:   * The ***input.bot***, ***input.zone*** and ***estomp-run.sh*** files are present in the /xprt-2/ directory | The expected files are present in the listed directories. | Pass |
| 2 | Execute, using a Linux terminal, the shell script ***create\_rad\_2018\_input\_xprt2.sh*** located in /xprt-2/ subdirectory of the testing directory. | Script executes. | Pass |
| 3 | Confirm the following file was generated by ***create\_rad\_2018\_input\_xprt2.sh*** in the same directory:   * ***input\_XPRT-2\_2018\_with\_buffer***   Other files generated in the same directories that are not a functional requirement are as follows:   * ***xprt-2\_mpondIF\_AT2.log*** – M Pond Log File | The files were generated in the corresponding directories. | Pass |
| 4 | Using an application, such as DiffMerge, compare the provided ***input\_SS*** file with ***input\_XPRT-2\_2018\_with\_buffer*** to determine the following: | | |
| 4.1 | Simulation Title Card:   * All lines except the last must be identical in both files * The last line of ***input\_XPRT-2\_2018\_with\_buffer*** must read Rad2 Transport Simulation (1943-2018), | All but the last line of the Simulation Title Card in both files will be identical. The last line of ***input\_XPRT-2\_2018\_with\_buffer*** reads Rad2 Transport Simulation (1943-2018), | Pass |
| 4.2 | The following cards will be identical in both files:   * 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 | All listed cards are identical in both the ***input\_SS*** file and the ***input\_XPRT-2\_2018\_with\_buffer*** file. | Pass |
| 5 | Navigate to the Solution Control Card in the ***input\_XPRT-2\_2018\_with\_buffer*** file. | | |
| 5.1 | Ensure the first two lines of the Solution Control Card read as follows:   * Restart File, ../ss/restart, * Water w/ Patankar Vadose Transport Courant,1.0, | The first two lines of the Solution Control Card of the ***input\_XPRT-2\_2018\_with\_buffer*** file match these lines. | Pass |
| 5.2 | Navigate to /sources/ to open ***rads2-src.card*** and ***buffer-aq-src.card*** (if the model has a buffer zone) files in a preferred text editor. For each file, under each # Site = line, record:   * The earliest reported year of aqueous source release * The final year of aqueous source release (solid source release will not influence time stepping)   Take the earliest aqueous source release year (from either file) and the final aqueous source release year (from either file). Use these two years in the next step. | | |
| 5.3 | Back to the ***input\_XPRT-2\_2018\_with\_buffer*** file from /xprt-2/.  If the last year of aqueous source release is prior to 2018, ensure the fourth through sixth lines of the Solution Control Card looks as follows:   * 1943,year,XXXX,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6 * XXXX,year,YYYY,year,1.0E-08,year,0.01,year,1.25,16,1.0E-6, * YYYY,year,2018,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6,   Where XXXX is the earliest year of aqueous source release and YYYY is the final year of aqueous source release.  If the last year of aqueous source release is after 2018, ensure the fourth and fifth lines of the Solution Control Card looks as follows:   * 1943,year,XXXX,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * XXXX,year,2018,year,1.0E-08,year,0.01,year,1.25,16,1.0E-6,   Where XXXX is the earliest year of aqueous source release.  If there are no source releases between 1943 and 2018, ensure the fourth line of the Solution Control Card looks as follows:   * 1943,year,2018,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, | Depending on the first and final aqueous source release years will determine how the identified line(s) of the Solution Control Card will look. The Solution Control Card should look as shown with the correct year or years for release. | Pass |
| 5.4 | Ensure the last two lines of the Solution Control Card read as follows:   * 1000000,   0, | | Pass |
| 6 | Ensure the Solute/Fluid Interaction Card in the ***input\_XPRT-2\_2018\_with\_buffer*** file, located in /xprt-2/, matches as follows:   * 8, * U-232, Conventional, 2.50E-9, m^2/s, continuous, 6.890E+01, yr, 1.0E-12, Ci/m^3, * U-233, Conventional, 2.50E-9, m^2/s, continuous, 1.592E+05, yr, 1.0E-12, Ci/m^3, * U-234, Conventional, 2.50E-9, m^2/s, continuous, 2.455E+05, yr, 1.0E-12, Ci/m^3, * U-235, Conventional, 2.50E-9, m^2/s, continuous, 7.040E+08, yr, 1.0E-12, Ci/m^3, * U-236, Conventional, 2.50E-9, m^2/s, continuous, 2.342E+07, yr, 1.0E-12, Ci/m^3, * U-238, Conventional, 2.50E-9, m^2/s, continuous, 4.468E+09, yr, 1.0E-12, Ci/m^3, * Th-230, Conventional, 2.50E-9, m^2/s, continuous, 7.538E+04, yr, 1.0E-12, Ci/m^3, * Ra-226, Conventional, 2.50E-9, m^2/s, continuous, 1.600E+03, yr, 1.0E-12, Ci/m^3, * 2, * U-234, Th-230, 1.00, * Th-230, Ra-226, 1.00, | The Solute/Fluid Interaction Card does match the text from this Test Instruction. | Pass |
| 7 | Ensure that in the Solute/Porous Media Interaction Card in the ***input\_XPRT-2\_2018\_with\_buffer*** file each HSU from the Rock/Soil Zonation Card is present with two numerical values and two associated units. An example is:   * Backfill, 0.1, m, 0.01, m,   Next, ensure in the Solute/Porous Media Interaction Card that beneath each HSU the following eight radionuclides are present with a numerical value, the associated unit, and the correct number of commas. Each HSU will have different Kd values:   * U-232, #.#E±##, mL/g,, * U-233, #.#E±##, mL/g,, * U-234, #.#E±##, mL/g,, * U-235, #.#E±##, mL/g,, * U-236, #.#E±##, mL/g,, * U-237, #.#E±##, mL/g,, * U-238, #.#E±##, mL/g,, * Ra-226, #.#E±##, mL/g,, | Each HSU in the ***input\_XPRT-2\_2018\_with\_buffer*** file matches the provided list. | Pass |
| 8 | Ensure the Initial Conditions Card is as follows:  Gas Pressure, Aqueous Pressure,  0, | The Initial Conditions Card matches this information. | Pass |
| 9 | Boundary Conditions Card section | | |
| 9.1 | Navigate to /ret/ directory and count the number of ***group\_#####.dat*** files.    In the upper section of the Boundary Conditions Card of the ***input*** file, below the line #Number of COCs, ensure the value present equals the number of ***group\_#####.dat*** files PLUS one. | The reported value below the #Number of COCs line in the Boundary Conditions Card equals the number of ***group\_#####.dat*** files plus one. | Pass |
| 9.2 | Navigate to the bottom of the Boundary Conditions Card of the ***input\_XPRT-2\_2018\_with\_buffer*** file. Ensure the last three lines of the Boundary Conditions Card is as follows:   * file, input.bot, Dirichlet Aqueous, outflow, outflow, outflow, outflow, outflow, outflow, outflow, outflow, * 1, * 1943,year,101325,Pa,,,,,,,,,,,,,,,,, | The Boundary Conditions Card of the ***input\_XPRT-2\_2018\_with\_buffer*** file matches. | Pass |
| 10 | Navigate to /trOCcards/ and open ***rad2\_Output\_Control.dat*** file in a preferred text editor.  Ensure the ***rad2\_Output\_Control.dat*** and the Output Control Card of the ***input\_XPRT-2\_2018\_with\_buffer*** file are identical except the final line in the ***input\_XPRT-2\_2018\_with\_buffer*** file, which reads Final Restart, , | The Output Control Card of the ***input\_XPRT-2\_2018\_with\_buffer*** file and the ***rad2\_Output\_Control.dat*** file are identical. | Pass |
| 11 | Ensure the Surface Flux Card in the ***input\_XPRT-2\_2018\_with\_buffer*** file matches the ***rad2\_surface\_flux.txt*** file in the /trsurfcards/ directory. | The Surface Flux Card in the ***input\_XPRT-2\_2018\_with\_buffer*** file matches the ***rad2\_surface\_flux.txt*** file in the /trsurfcards/ directory. | Pass |
| 12 | Verify the contents of the Source Card. | | |
| 12.1 | * Navigate to /sources/ * Open ***rads2-src.card*** in a preferred text editor. Record the number of source domains (line 8). * If a buffer exists, open ***buffer-aq-src.card*** in a preferred text editor. Record the number of source domains (line 8). * Sum these values. | | |
| 12.2 | Ensure in the ***input\_XPRT-2\_2018\_with\_buffer*** file the number of source domains reported in the Source Card is equal to that summed value from 12.1 | The summed value from 12.1 equals the number of source domains reported in the Source Card of the ***input\_XPRT-2\_2018\_with\_buffer*** file. | Pass |
| 12.3 | Ensure the ***rads2-src.card*** was inserted into the ***input\_XPRT-2\_2018\_with\_buffer*** file.  If a buffer is present for the model, ensure the ***buffer-aq-src.card*** file was inserted into the ***input\_XPRT-2\_2018\_with\_buffer*** file. | The appropriate file(s) were inserted into the input file. | Pass |
| 13 | Ensure in the ***input\_XPRT-2\_2018\_with\_buffer*** file all the following cards are inserted in the following order:   * 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 | All listed cards are present in the ***input\_XPRT-2\_2018\_with\_buffer*** file. | Pass |
| 14 | If all the Test Steps above pass, proceed to the next steps.  Navigate to the //olive/backups/CAVE/v4-2Test/mpondIF\_AT2/xprt-2/ directory, make a copy of the ***input\_XPRT-2\_2018\_with\_buffer*** file. Paste it into the same directory, and rename it ***input*** | | |
| 14.1 | Open the ***input*** file in the //olive/backups/CAVE/v4-2Test/mpondIF\_AT2/xprt-2/ directory and change the line in the Solution Control Card that reads 1000000, to 1,  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 |
| 14.2 | In a Linux terminal navigate to the //olive/backups/CAVE/v4-2Test/mpondIF\_AT2/xprt-2/ directory and type sh stomp-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 input generator###

INFO--03/26/2020 07:59:45 AM--Starting CA-CIE Tool Runner. Logging to "./xprt-1\_mpondIF\_AT3.log"

INFO--03/26/2020 07:59:45 AM--Code Version: 19633fecf43ac8ef2c4424bfe19fd563fc966f1b v2.1: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--03/26/2020 07:59:45 AM--Code Version: d92f3469d77db78b1d08fac4390de91d0ad7e2bd Local repo SHA-1 has does not correspond to a remote repo release version: ../../../CA-CIE-Tools-TestRepos/repo\_xprt\_2018\_input\_gen.f/tools/ca-modinput/linux/xprt\_2018\_input\_gen\_linux-intel-64.exe<--dcf3dccedb15a3880555c3e255789b2712bb8fff

INFO--03/26/2020 07:59:45 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--03/26/2020 07:59:45 AM--QA Status: TEST : ../../../CA-CIE-Tools-TestRepos/repo\_xprt\_2018\_input\_gen.f/tools/ca-modinput/linux/xprt\_2018\_input\_gen\_linux-intel-64.exe

INFO--03/26/2020 07:59:45 AM--Invoking Command:"../../../CA-CIE-Tools-TestRepos/repo\_xprt\_2018\_input\_gen.f/tools/ca-modinput/linux/xprt\_2018\_input\_gen\_linux-intel-64.exe" with Arguments:"rad1 200E nobuffer /opt/ICF/Prod/2WMATTR/v1.0/data/CA\_200W\_material\_transport\_props.prn /opt/ICF/Prod/2EMATTR/v1.0/data/CA\_200E\_material\_transport\_props.prn /opt/ICF/Prod/R1SOLTR/v1.0/data/CA\_rad1\_solute\_transport\_props.prn /opt/ICF/Prod/R2SOLTR/v1.0/data/CA\_rad2\_solute\_transport\_props.prn"

INFO--03/26/2020 07:59:45 AM--Username:pallena Computer:olive Platform:Linux 4.4.0-38-generic #57~14.04.1-Ubuntu SMP Tue Sep 6 17:20:43 UTC 2016

###Finished Process###

###Executing Fingerprint Tool###

INFO--03/26/2020 07:59:45 AM--Starting CA-CIE Tool Runner. Logging to "./xprt-1\_mpondIF\_AT3.log"

INFO--03/26/2020 07:59:45 AM--Code Version: 19633fecf43ac8ef2c4424bfe19fd563fc966f1b v2.1: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--03/26/2020 07:59:45 AM--Code Version: 19633fecf43ac8ef2c4424bfe19fd563fc966f1b v2.1: /opt/tools/pylib/fingerprint/fingerprint.py<--13a885dc11cc15aea74c14b09c0d8584ec6cfd08

INFO--03/26/2020 07:59:45 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--03/26/2020 07:59:45 AM--QA Status: QUALIFIED : /opt/tools/pylib/fingerprint/fingerprint.py

INFO--03/26/2020 07:59:45 AM--Invoking Command:"python3.6" with Arguments:"/opt/tools/pylib/fingerprint/fingerprint.py /home/pallena/CAVE/v4-2Test/mpondIF\_AT3/xprt-1/input\_XPRT-1\_2018\_no\_buffer --output ./xprt-1\_mpondIF\_AT3.log --outputmode a"

INFO--03/26/2020 07:59:45 AM--Username:pallena Computer:olive Platform:Linux 4.4.0-38-generic #57~14.04.1-Ubuntu SMP Tue Sep 6 17:20:43 UTC 2016

Fingerprint generated at 2020-03-26 07:59:45.518732

/home/pallena/CAVE/v4-2Test/mpondIF\_AT3/xprt-1/input\_XPRT-1\_2018\_no\_buffer efc79ae2c448c5ce71ba03721f05029d4b9ff5da15f7d6cf16fdfc38976cadc3

###Finished Process###

| Table A-3  **2018 STOMP Input File Generator Acceptance Test Plan Case 3** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **2018 STOMP Input File Generator Acceptance Testing**  **CACIE-2018 STOMP Input File Generator – AT-3** | | **Date:03-26-2020** | | | |
| **Tool Runner File Location for this test:**  //olive/backups/CAVE/v4-2Test/mpondIF\_AT3/xprt-1 | | **Test Performed By: Praveena Allena** | | | |
| **Testing Directory:** //olive/backups/CAVE/v4-2Test/mpondIF\_AT3 | | | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | | **Test Result  (Pass/Fail)** | |
| 1 | Ensure the following files are in testing directory, as they are needed for the execution of the ***xprt\_2018\_input\_gen.f*** tool:   * input\_SS in the /ss/ directory * ca\_tr\_boundary\_card.dat in the /ret/ directory * rad1\_Output\_Control.dat in the /trOCcards/ directory * rad1\_ surface\_flux.txt in the /trsurfcards/ directory * rads1-src.card in the /sources/ directory * Both rad1 (***CA\_rad1\_solute\_transport\_props.prn***) and rad2 (***CA\_rad2\_solute\_transport\_props.prn***) solute property files are present in //olive/backups/CAVE/v4-2Test/matprops/ * Both 200W (***CA\_200W\_material\_transport\_props.prn***) and 200E (***CA\_200E\_material\_transport\_props.prn***) material property files are present in //olive/backups/CAVE/v4-2Test/matprops/   Other files to complete the Acceptance Test:   * The ***input.bot***, ***input.zone*** and ***estomp-run.sh*** files are present in the /xprt-1/ directory | The expected files are present in the listed directories. | | Pass | |
| 2 | Execute, using a Linux terminal, the shell script ***create\_rad\_2018\_input\_xprt1.sh*** located in /xprt-1/ subdirectory of the testing directory. | Script executes. | | Pass | |
| 3 | Confirm the following file was generated by ***create\_rad\_2018\_input\_xprt1.sh*** in the same directory:   * ***input\_XPRT-1\_2018\_no\_buffer***   Other files generated in the same directories that are not a functional requirement are as follows:   * ***xprt-1\_mpondIF\_AT3.log*** | The files were generated in the corresponding directories. | | Pass | |
| 4 | Using an application, such as DiffMerge, compare the provided ***input\_XPRT-1\_2018\_with\_buffer*** file located at //olive/backups/CAVE/v4-2Test/mpondIF\_AT1/xprt-1/ with the ***input\_XPRT-1\_2018\_no\_buffer*** file at //olive/backups/CAVE/v4-2Test/mpondIF\_AT3/xprt-1/ to determine the following: | | | | |
| 4.1 | Ensure the list of cards below is the same:   * Simulation Title 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 | | The listed cards are identical. | | Pass |
| 5 | Open the ***input\_XPRT-1\_2018\_no\_buffer*** file in the //olive/backups/CAVE/v4-2Test/mpondIF\_AT3/xprt-1/ directory and use it for the following steps | | | | |
| 6 | Ensure the Solution Control Card reads, line-by-line:   * Restart File, ../ss/restart, * Water w/ Patankar Vadose Transport Courant,1.0, * 1, * 1943,year,2018,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * 1000000, * 0, | | The Solution Control card reads identical as listed. | | Pass |
| 7 | Navigate to the Source Card in the ***input\_XPRT-1\_2018\_no\_buffer*** file in the //olive/backups/CAVE/v4-2Test/mpondIF\_AT3/xprt-1/ directory. Compare the contents of the Source Card with the original file the tool pulled from, ***rads1-src.card*** in the /sources/ subdirectory of the Testing Directory. Ensure the data of the Source card from ***input\_XPRT-1\_2018\_no\_buffer*** and the file ***rads1-src.card*** match. | | The Source Card of ***input\_XPRT-1\_2018\_no\_buffer*** and the ***rads1-src.card*** are identical. | | Pass |
| 8 | If all the Test Steps above pass, proceed to the next steps.  Navigate to the //olive/backups/CAVE/v4-2Test/mpondIF\_AT3/xprt-1/ directory, make a copy of the ***input\_XPRT-1\_2018\_no\_buffer*** file. Paste it into the same directory, and rename it ***input*** | | | | |
| 8.1 | Open the ***input*** file in the //olive/backups/CAVE/v4-2Test/mpondIF\_AT3/xprt-1/ directory and change the line in the Solution Control Card that reads 1000000, to 1,  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 |
| 8.2 | In a Linux terminal navigate to the //olive/backups/CAVE/v4-2Test/mpondIF\_AT3/xprt-1/ directory and type sh stomp-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 input generator###

INFO--03/26/2020 08:13:52 AM--Starting CA-CIE Tool Runner. Logging to "./xprt-1\_mpondIF\_AT4.log"

INFO--03/26/2020 08:13:52 AM--Code Version: 19633fecf43ac8ef2c4424bfe19fd563fc966f1b v2.1: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--03/26/2020 08:13:52 AM--Code Version: d92f3469d77db78b1d08fac4390de91d0ad7e2bd Local repo SHA-1 has does not correspond to a remote repo release version: ../../../CA-CIE-Tools-TestRepos/repo\_xprt\_2018\_input\_gen.f/tools/ca-modinput/linux/xprt\_2018\_input\_gen\_linux-intel-64.exe<--dcf3dccedb15a3880555c3e255789b2712bb8fff

INFO--03/26/2020 08:13:52 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--03/26/2020 08:13:52 AM--QA Status: TEST : ../../../CA-CIE-Tools-TestRepos/repo\_xprt\_2018\_input\_gen.f/tools/ca-modinput/linux/xprt\_2018\_input\_gen\_linux-intel-64.exe

INFO--03/26/2020 08:13:52 AM--Invoking Command:"../../../CA-CIE-Tools-TestRepos/repo\_xprt\_2018\_input\_gen.f/tools/ca-modinput/linux/xprt\_2018\_input\_gen\_linux-intel-64.exe" with Arguments:"rad1 200E buffer /opt/ICF/Prod/2WMATTR/v1.0/data/CA\_200W\_material\_transport\_props.prn /opt/ICF/Prod/2EMATTR/v1.0/data/CA\_200E\_material\_transport\_props.prn /opt/ICF/Prod/R1SOLTR/v1.0/data/CA\_rad1\_solute\_transport\_props.prn /opt/ICF/Prod/R2SOLTR/v1.0/data/CA\_rad2\_solute\_transport\_props.prn"

INFO--03/26/2020 08:13:52 AM--Username:pallena Computer:olive Platform:Linux 4.4.0-38-generic #57~14.04.1-Ubuntu SMP Tue Sep 6 17:20:43 UTC 2016

###Finished Process###

###Executing Fingerprint Tool###

INFO--03/26/2020 08:13:52 AM--Starting CA-CIE Tool Runner. Logging to "./xprt-1\_mpondIF\_AT4.log"

INFO--03/26/2020 08:13:52 AM--Code Version: 19633fecf43ac8ef2c4424bfe19fd563fc966f1b v2.1: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--03/26/2020 08:13:52 AM--Code Version: 19633fecf43ac8ef2c4424bfe19fd563fc966f1b v2.1: /opt/tools/pylib/fingerprint/fingerprint.py<--13a885dc11cc15aea74c14b09c0d8584ec6cfd08

INFO--03/26/2020 08:13:52 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--03/26/2020 08:13:52 AM--QA Status: QUALIFIED : /opt/tools/pylib/fingerprint/fingerprint.py

INFO--03/26/2020 08:13:52 AM--Invoking Command:"python3.6" with Arguments:"/opt/tools/pylib/fingerprint/fingerprint.py /home/pallena/CAVE/v4-2Test/mpondIF\_AT4/xprt-1/input\_XPRT-1\_2018\_with\_buffer --output ./xprt-1\_mpondIF\_AT4.log --outputmode a"

INFO--03/26/2020 08:13:52 AM--Username:pallena Computer:olive Platform:Linux 4.4.0-38-generic #57~14.04.1-Ubuntu SMP Tue Sep 6 17:20:43 UTC 2016

Fingerprint generated at 2020-03-26 08:13:52.655809

/home/pallena/CAVE/v4-2Test/mpondIF\_AT4/xprt-1/input\_XPRT-1\_2018\_with\_buffer e6a0014840245cb349c78de7526704e1d3a9f92540862febb5dac726efe23ca4

###Finished Process###

| Table A-4  **2018 STOMP Input File Generator Acceptance Test Plan Case 4** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **2018 STOMP Input File Generator Acceptance Testing**  **CACIE-2018 STOMP Input File Generator – AT-4** | | **Date: 03-26-2020** | | | |
| **Tool Runner File Location for this test:**  //olive/backups/CAVE/v4-2Test/mpondIF\_AT4/xprt-1 | | **Test Performed By: Praveena Allena** | | | |
| **Testing Directory:** //olive/backups/CAVE/v4-2Test/mpondIF\_AT4 | | | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | | | **Test Result  (Pass/Fail)** |
| 1 | Ensure the following files are in testing directory, as they are needed for the execution of the ***xprt\_2018\_input\_gen.f*** tool:   * input\_SS in the /ss/ directory * ca\_tr\_boundary\_card.dat in the /ret/ directory * rad1\_Output\_Control.dat in the /trOCcards/ directory * rad1\_ surface\_flux.txt in the /trsurfcards/ directory * rads1-src.card in the /sources/ directory * ***buffer-aq-src.card*** in the /sources/ directory * Both rad1 (***CA\_rad1\_solute\_transport\_props.prn***) and rad2 (***CA\_rad2\_solute\_transport\_props.prn***) solute property files are present in //olive/backups/CAVE/v4-2Test/matprops/ * Both 200W (***CA\_200W\_material\_transport\_props.prn***) and 200E (***CA\_200E\_material\_transport\_props.prn***) material property files are present in //olive/backups/CAVE/v4-2Test/matprops/   Other files to complete the Acceptance Test:   * The ***input.bot***, ***input.zone*** and ***estomp-run.sh*** files are present in the /xprt-1/ directory | The expected files are present in the listed directories. | | | Pass |
| 2 | Execute, using a Linux terminal, the shell script ***create\_rad\_2018\_input\_xprt1.sh*** located in /xprt-1/ subdirectory of the testing directory. | Script executes. | | | Pass |
| 3 | Confirm the following file was generated by ***create\_rad\_2018\_input\_xprt1.sh*** in the same directory:   * ***input\_XPRT-1\_2018\_with\_buffer***   Other files generated in the same directories that are not a functional requirement are as follows:   * ***xprt-1\_mpondIF\_AT4.log*** | The files were generated in the corresponding directories. | | | Pass |
| 4 | Using an application, such as DiffMerge, compare the provided ***input\_XPRT-1\_2018\_with\_buffer*** file located at //olive/backups/CAVE/v4-2Test/mpondIF\_AT1/xprt-1/ with the ***input\_XPRT-1\_2018\_with\_buffer*** file at //olive/backups/CAVE/v4-2Test/mpondIF\_AT4/xprt-1/ to determine the following: | | | | |
| 4.1 | Ensure the list of cards below is the same:   * Simulation Title 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 | | The listed cards are identical. | Pass | |
| 5 | Open the ***input\_XPRT-1\_2018\_with\_buffer*** file in the //olive/backups/CAVE/v4-2Test/mpondIF\_AT4/xprt-1/ directory and use it for the following steps | | | | |
| 6 | Ensure the Solution Control Card reads, line-by-line:   * Restart File, ../ss/restart, * Water w/ Patankar Vadose Transport Courant,1.0, * 3, * 1943,year,1953,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * 1953,year,1998,year,1.0E-08,year,0.01,year,1.25,16,1.0E-6, * 1998,year,2018,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * 1000000, * 0, | | The Solution Control card reads identical as listed. | Pass | |
| 7 | Navigate to the Source Card in the ***input\_XPRT-1\_2018\_with\_buffer*** file in the //olive/backups/CAVE/v4-2Test/mpondIF\_AT4/xprt-1/ directory. Compare the contents of the Source Card with the original file the tool pulled from, ***rads1-src.card*** in the /sources/ subdirectory of the Testing Directory. Ensure the data of the Source card from ***input\_XPRT-1\_2018\_with\_buffer*** and the file ***rads1-src.card*** match. | | The Source Card of ***input\_XPRT-1\_2018\_with\_buffer*** and the ***rads1-src.card*** are identical. | Pass | |
| 8 | If all the Test Steps above pass, proceed to the next steps.  Navigate to the //olive/backups/CAVE/v4-2Test/mpondIF\_AT4/xprt-1/ directory, make a copy of the ***input\_XPRT-1\_2018\_with\_buffer*** file. Paste it into the same directory, and rename it ***input*** | | | | |
| 8.1 | Open the ***input*** file in the //olive/backups/CAVE/v4-2Test/mpondIF\_AT4/xprt-1/ directory and change the line in the Solution Control Card that reads 1000000, to 1,  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 | |
| 8.2 | In a Linux terminal navigate to the //olive/backups/CAVE/v4-2Test/mpondIF\_AT4/xprt-1/ directory and type sh stomp-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 | |

# Appendix B

# Completed Installation Test

**Tool Runner Log**

INFO--03/27/2020 08:52:28 AM--Starting CA-CIE Tool Runner. Logging to "./xprt\_2018\_input\_install\_test.log"

INFO--03/27/2020 08:52:28 AM--Code Version: 0b4478192d987adbff818006239cda369278912a v2.2: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--03/27/2020 08:52:28 AM--Code Version: 0b4478192d987adbff818006239cda369278912a v2.2: /opt/tools/tools/ca-modinput/linux/xprt\_2018\_input\_gen\_linux-intel-64.exe<--dcf3dccedb15a3880555c3e255789b2712bb8fff

INFO--03/27/2020 08:52:28 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--03/27/2020 08:52:28 AM--QA Status: QUALIFIED : /opt/tools/tools/ca-modinput/linux/xprt\_2018\_input\_gen\_linux-intel-64.exe

INFO--03/27/2020 08:52:28 AM--Invoking Command:"/opt/tools/tools/ca-modinput/linux/xprt\_2018\_input\_gen\_linux-intel-64.exe" with Arguments:"rad1 200E buffer"

INFO--03/27/2020 08:52:28 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

| Table B-1  **2018 STOMP Input File Generator Installation Test Plan** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **2018 STOMP Input File Generator Installation Testing**  **CACIE-2018 STOMP Input File Generator – IT-1** | | | **Date: 03/27/2020** | | |
| **Tool Runner File Location for this test:**  **O:\CAVE\CA-CIE-Tools-TestEnv\CA-CIE-Tools\_v2.X\_install\_tests\xprt\_2018\_input\_gen\v1.0** | | | **Test Performed By: Sara Lindberg** | | |
| **Testing Directory:**  **O:\CAVE\CA-CIE-Tools-TestEnv\CA-CIE-Tools\_v2.X\_install\_tests\xprt\_2018\_input\_gen\v1.0** | | | | | |
| **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 test installation of the tool:  *./* *CACIE\_xprt\_2018\_input\_gen\_IT-1.sh* | | | | |
| 2 | Verify Tool Runner is invoked and executed. | Tool runner log file is generated (xprt\_2018\_input\_install\_test.log) | | | Pass |
| 3 | Verify tool is invoked and executed. | input\_XPRT-1\_2018\_with\_buffer file is generated   Note: this file will be empty for install test | | | Pass |

**Appendix C**

**QA Checklist**

