**CACIE Tool #23** – **Mass Balance STOMP Input File Generator Tool**

**xprt\_mb\_input\_gen.f**

**Version** **1.0**

**QA**: **QA**

# Description and Purpose

The Mass Balance STOMP Input File Generator Tool generates the mass balance STOMP transport input file. This code reads and modifies the STOMP input file created by the 2018 STOMP Input File Generator Tool. Additional input is taken from the mass balance output control file created by the Transient Output Card Generator Tool.

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

# Functional Requirements

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

FR-1: Parse the following command line arguments: 1943-2018 STOMP input file location/name and the mass balance output control file location/name.

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

FR-3: Copy lines from the 1943-2018 STOMP input file except as noted in the following functional requirements FR-4 to FR-8. Input taken directly from the 1943-2018 STOMP input file includes the following STOMP cards:

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

FR-4: In the Simulation Title Card, replace the second Simulation Note Line (“*Rad# Transport Simulation (1943-2018),*”) with “*Rad# Mass Balance Simulation (1943-12070),*” where # is the radionuclide group as determined in FR-2.

FR-5: Replace lines defining the execution time periods in the Solution Control Card as follows:

* Determine the number of execution time periods from the 1943-2018 STOMP input file.
* If the number of execution time periods from the 1943-2018 STOMP input file is one, the execution time periods will be:

2,

1943,year,,2070,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6,

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

* If the number of execution time periods from the 1943-2018 STOMP input file is two, read the first source year (XXXX) from the 1943-2018 STOMP input file. The execution time periods will be:

4,

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,

2018,year,2070,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6,

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

* If the number of execution time periods from the 1943-2018 STOMP input file is three, read the first source year (XXXX) and the last aqueous source year (YYYY) from the 1943-2018 STOMP input file. The execution time periods will be:

4,

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

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

FR-6: Revise the Solute/Fluid Interaction Card from the 1943-2018 STOMP input file, replacing the radionuclide half-life values with “1.000E+20”. All other input for the Solute/Fluid Interaction Card will remain the same as the 1943-2018 STOMP input file.

FR-7: Replace the Output Control Card with the mass balance output control file.

FR-8: Reset the Total Number of Surface Flux Inputs to “9” and remove the Surface Flux Card outputs for the P2R Bottom Flux surfaces. This will leave only the nine surfaces that cover the entire model domain.

FR-9: Save the output file (i.e., the complete STOMP mass balance transport input file, which includes all the required cards).

FR-10: The STOMP mass balance transport input file produced by the tool should be formatted for STOMP execution.

# Software Requirements Specifications

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

Compiler Options: -o OutputFileName

Special Considerations: None

# Software Design Description

Flow:

The Mass Balance STOMP Input File Generator Tool performs the following steps:

1. Declare variables – Character and array variables are declared.
2. Read command line arguments – See the list defined below.
3. Determine whether the simulation is for rads1 or rads2.
4. Open the output file.
5. Open the 1943-2018 STOMP input file created by the 2018 STOMP Input File Generator Tool – Portions of this file will be copied to the output file generated by the mass balance STOMP Input File Generator Tool (see list in FR-3).
6. Write Simulation Title Card – All lines except the last line are from the 1943-2018 STOMP input file created by the 2018 STOMP Input File Generator Tool; the last line identifies the simulation (radionuclide group, mass balance and model years).
7. Write Solution Control Card – Determine the number of execution time periods based on the number of execution time periods in the 1943-2018 STOMP input file and write the Solution Control Card. See FR-5 for details.
8. Write the following cards, which are copied from the 1943-2018 STOMP input file created by the 2018 STOMP Input File Generator Tool:
   1. Grid Card
   2. Inactive Nodes Card
   3. Rock/Soil Zonation Card
   4. Mechanical Properties Card
   5. Hydraulic Properties Card
   6. Saturation Function Card
   7. X-Aqueous Relative Permeability Card
   8. Y-Aqueous Relative Permeability Card
   9. Z-Aqueous Relative Permeability Card
9. Write Solute/Fluid Interaction Card – Revise the Solute/Fluid Interaction Card from the 1943-2018 STOMP input file, replacing the radionuclide half-life values with “1.000E+20”. All other input for the Solute/Fluid Interaction Card will remain the same as the 1943-2018 STOMP input file.
10. Write the following cards, which are copied from the 1943-2018 STOMP input file created by the 2018 STOMP Input File Generator Tool:
    1. Solute/Porous Media Interaction Card
    2. Initial Conditions Card
    3. Boundary Conditions Card
11. Open the mass balance output control file.
12. Replace the Output Control Card with the mass balance output control file.
13. Reset the Total Number of Surface Flux Inputs to “9”.
14. Remove the Surface Flux Card outputs for the P2R Bottom Flux surfaces.
15. Write the Source Card, which is copied from the 1943-2018 STOMP input file created by the 2018 STOMP Input File Generator Tool.

Arguments:

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

Mass balance output control file – Path to the mass balance output control file created by the Transient Output Card Generator Tool.

Input Files:

* 1943-2018 STOMP input file (path read as Command Line Argument 1) – 1943-2018 STOMP input file created by the 2018 STOMP Input File Generator Tool.
* Mass balance output control file (path read as Command Line Argument 2) – Mass balance output control file created by the Transient Output Card Generator Tool.

Output Files:

The output file generated by this tool is a STOMP input for mass balance transport modeling for 1943 through 12070. There are 2 possible output file names depending on radionuclide group:

input\_XPRT-MB1 – Radionuclide Group = 1

input\_XPRT-MB2 – Radionuclide Group = 2

Execution:

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

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

Each of the shell script variables (denoted by the “$”) will be set in the shell script with the corresponding variable input (“$INPUT1” for the input card and “$INPUT2” for the output control card).

Code Review:

A code review was performed by Jacob Fullerton on April 22, 2020. No impacts to other repository tools or library dependencies were identified for the Mass Balance STOMP Input File Generator tool.

# Requirements Traceability Matrix

The requirements traceability matrix for the Mass Balance 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\_mb\_input\_gen-IT-1 | Installation Test |
| FR-1 | CACIE-xprt\_mb\_input\_gen-AT-1 | Check the log to see that the STOMP input file location/name and the mass balance output control file location/name were read correctly from the command line input. |
| FR-2 | CACIE-xprt\_mb\_input\_gen-AT-1 and CACIE-xprt\_mb\_input\_gen-AT-2 | Check the output file name to determine if the correct radionuclide group (“MB1” for rads1 or “MB2” for rads2). |
| FR-3 | CACIE-xprt\_mb\_input\_gen-AT-1 | ~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/Porous Media Interaction Card, ~Initial Conditions Card, ~Boundary Conditions Card, ~Source Card:  Check that these Cards are identical to those in the STOMP input file. |
| FR-4 | CACIE-xprt\_mb\_input\_gen-AT-1 and CACIE-xprt\_mb\_input\_gen-AT-2 | ~Simulation Title Card:   * Check that all lines except the last are identical to those in the STOMP input file. * Check that the last line is “Rad# Mass Balance Simulation (1943-12070),”, where # is 1 or 2 depending on the radionuclide group selected. |
| FR-5 | CACIE-xprt\_mb\_input\_gen-AT-1; CACIE-xprt\_mb\_input\_gen-AT-2; CACIE-xprt\_mb\_input\_gen-AT-3 | ~Solution Control Card:   * Check that the Solution Control Card matches the format described in Functional Requirement FR-5. * Check that the first source year and end of aqueous source input date are correct for the test model. |
| FR-6 | CACIE-xprt\_mb\_input\_gen-AT-1 | ~ Solute/Fluid Interaction Card:   * Check that the half-life values in the Solute/Fluid Interaction Card are set at 1.000E+20 years. * Check that all other parameters in the Solute/Fluid Interaction Card are identical to those in the STOMP input file. |
| FR-7 | CACIE-xprt\_mb\_input\_gen-AT-1 | ~Output Control Card:  Check that the Output Control Card is identical to rad1\_Mass\_Balance\_Output\_Control.dat or rad2\_Mass\_Balance\_Output\_Control.dat (depending on radionuclide group). |
| FR-8 | CACIE-xprt\_mb\_input\_gen-AT-1 | ~Surface Flux Card:   * Check that the Total Number of Surface Flux Inputs is “9”. * Check that the nine surface fluxes (aqueous and the eight radionuclides) for the entire model domain at the base of the model are identical to the first nine surface fluxes in the the STOMP input file. |
| FR-9 | CACIE-xprt\_mb\_input\_gen-AT-1 | Check that the following cards are included in the generated STOMP mass balance transport input file:   * Simulation Title Card * Solution Control Card * Grid Card * Inactive Nodes Card * Rock Soil Zonation Card * Mechanical Properties Card * Hydraulic Properties Card * Saturation Function Card * X-Aqueous Relative Permeability Card * Y-Aqueous Relative Permeability Card * Z-Aqueous Relative Permeability Card * Solute/Fluid Interaction Card * Solute/Porous Media Interaction Card * Initial Conditions Card * Boundary Conditions Card * Output Control Card * Surface Flux Card * Source Card |
| FR-10 | CACIE-xprt\_mb\_input\_gen-AT-4 | Validate that the output file from the tool is a valid, STOMP-formatted file by running it with the STOMP executable. |

# Installation Test Plan and Acceptance Test Plan Cases

The installation test plan for Mass Balance STOMP Input File Generator is presented in Table 2 and the acceptance test plan cases for Mass Balance STOMP Input File Generator are presented in Table 3 through Table 5.

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

| Table 3  **Mass Balance STOMP Input File Generator Acceptance Test Plan Case 1** | | | |
| --- | --- | --- | --- |
| **Mass Balance STOMP Input File Generator Acceptance Testing**  **CACIE-Mass Balance STOMP Input File Generator – AT-1** | | **Date:** | |
| **Tool Runner File Location for this test:**  [**\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt\_mb\_input\_gen\AT-1**](file:///\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt_mb_input_gen\AT-1) | | **Test Performed By:** | |
| **Testing Directory:** [**\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt\_mb\_input\_gen**](file:///\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt_mb_input_gen) | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| 1 | Navigate to the testing directory | | |
| 2 | Invoke the ***runner\_run\_AT-1\_MB-Input-Gen.sh*** by doing the following:  Open a Linux terminal, navigate to the testing directory and type: *./runner\_run\_AT-1\_MB-Input-Gen.sh* | | |
| 3 | A new directory should have been created called “AT-1”. Navigate to that directory and open a file called ***mass\_balance\_model\_screen.log*** in a text editor. Verify that in line 2 of the file you see “input\_XPRT-1” and in line 7 you should see “rad1\_Mass\_Balance\_Output\_Control.dat”  These 2 lines of text correspond with the two inputs specified in the shell script (feel free to verify the file names in $INPUT1 and $INPUT2 of the shell script invoked in step 2 of this acceptance test). | If the text is present as described, this satisfies the following FR:  FR-1 |  |
| 4 | The input file used in its file name “XPRT-1” which is parsed by the code to recognize whether the input file corresponds with “Radionuclide Group 1” or “Radionuclide Group 2”. This input file has the number “1” in its name, which indicates to the script that this file corresponds with “Radionuclide Group 1”.  Open the ***mass\_balance\_model\_screen.log*** in a text editor. Read in line 11 and verify that “Radionuclide Group 1” is written. | Verify that line 11 of ***mass\_balance\_model\_screen.log*** has “Radionuclide Group 1” in the line. This partially satisfies the following FR:  FR-2  The other aspect of this test will be vetted in another test. |  |
| 5 | Using a diff merge or file comparison utility, open and compare the following files:   * ***input\_XPRT-1*** * ***input\_XPRT-MB1***   Verify in the comparison that there are no differences in the following cards (look for the tilde “~” indicator for each card):   * Grid * Inactive Nodes * Rock/Soil Zonation * Mechanical Properties * Hydraulic Properties * Saturation Function * X-Aqueous Relative Permeability * Y-Aqueous Relative Permeability * Z-Aqueous Relative Permeability * Solute/Porous Media Interaction * Initial Conditions * Boundary Conditions * Source Card   Verify that there are differences between the two files for the following cards (expected differences will be enumerated in subsequent steps):   * Simulation Title * Solution Control * Solute/Fluid Interaction * Output Control Card * Surface Flux | Card differences between the input and output files should only be found in the cards indicated. This satisfies the following FR’s:  FR-3, FR-9 |  |
| 6 | Open the ***input\_XPRT-MB1*** file in a preferred text editor. Verify that the “Simulation Title Card” has the following line of text: “Rad1 Mass Balance Simulation (1943-12070),” | If the text is present in the card indicated, this partially satisfies the following FR:  FR-4  A subsequent test will verify the remaining aspect of this FR. |  |
| 7 | Open the ***./AT-1/input\_XPRT-1*** and navigate to the “Solution Control Card”. This card should specify a total of 3 execution periods (line 23). You’ll see execution periods as follows:   * 1943, 1956 * 1956, 1968 * 1968, 2018   Open the script output, ***./AT-1/input\_XPRT-MB1***. Verify that the tool output adopts the first 2 periods verbatim from ***input\_XPRT-1***, modifies the 3rd to extend it to 2070, and adds a final period from 2070 to 12070. The expected number of execution periods in ***input\_XPRT-MB1*** should be 4 (line 23) with execution periods as follows:   * 1943, 1956 * 1956, 1968 * 1968, 2070 * 2070, 12070   Verify that the 4 following lines of text are present (verbatim, ignoring additional white space characters):   * 1943,year,1956,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * 1956,year,1968,year,1.0E-08,year,0.01,year,1.25,16,1.0E-6, * 1968,year,2070,year,1.0E-08,year,0.1,year,1.25,16,16,1.0E-6, * 2070,year,12070,year,1.0E-08,year,10.0,year,1.25,16,1.0E-6 | If the execution periods are written out in the ***input\_XPRT-MB1*** as specified, this partially satisfies the following FR:  FR-5  Subsequent tests will verify the other parts of FR-5 |  |
| 8 | Open the script output, ***./AT-1/input\_XPRT-MB1***, and navigate to the “Solute/Fluid Interaction Card”. Verify that the 6th column (the 6th value for each line, delimiting by the commas) is set to 1.000E+20. This represents the half-life of the associated “solute” or constituent. | If all the solutes specified in the “Solute/Fluid Interaction Card” have a half-life of 1.000E+20, this satisfies the following FR:  FR-6 |  |
| 9 | Using a diff merge or file comparison utility, open and compare the following files:   * ***input\_XPRT-MB1*** * ***rad1\_Mass\_Balance\_Output\_Control.dat***   The only portion that should match verbatim is the “Output Control Card” portion of the ***input\_XPRT-MB1*** when compared with the ***rad1\_Mass\_Balance\_Output\_Control.dat***. Extra whitespaces at the end of the lines are acceptable. | If the comparison holds true, this satisfies the following FR:  FR-7 |  |
| 10 | Open the following files in a text editor (option to compare them using a utility):   * ***input\_XPRT-MB1*** * ***input\_XPRT-1***   Navigate to the portion comparing the “Surface Flux Card” and verify that the ***input\_XPRT-MB1*** file only has 9 surfaces specified. There should be an exact match with the first 9 surfaces specified between the two files. No other surfaces should be identified in the ***input\_XPRT-MB1***. | If the surfaces specified are written as indicated this satisfies the following FR:  FR-8 |  |

| Table 4  **Mass Balance STOMP Input File Generator Acceptance Test Plan Case 2** | | | |
| --- | --- | --- | --- |
| **Mass Balance STOMP Input File Generator Acceptance Testing**  **CACIE-Mass Balance STOMP Input File Generator – AT-2** | | **Date:** | |
| **Tool Runner File Location for this test:**  [**\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt\_mb\_input\_gen\AT-2**](file:///\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt_mb_input_gen\AT-2) | | **Test Performed By:** | |
| **Testing Directory:** [**\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt\_mb\_input\_gen**](file:///\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt_mb_input_gen) | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| 1 | Navigate to the testing directory | | |
| 2 | Invoke the ***runner\_run\_AT-2\_MB-Input-Gen.sh*** by doing the following:  Open a Linux terminal, navigate to the testing directory and type: *./runner\_run\_AT-2\_MB-Input-Gen.sh* | | |
| 3 | A new directory should have been created called “AT-2”. | | |
| 4 | The input file used has in its file name the phrase “XPRT-2” which is parsed by the code to recognize whether the input file corresponds with “Radionuclide Group 1” or “Radionuclide Group 2”. This input file has the number “2” in its name, which indicates to the script that this file corresponds with “Radionuclide Group 2”.  Open the ***mass\_balance\_model\_screen.log*** in a text editor. Read in line 11 and verify that “Radionuclide Group 2” is written. | Verify that line 11 of ***mass\_balance\_model\_screen.log*** has “Radionuclide Group 1” in the line. This test finishes verifying the following FR:  FR-2 |  |
| 5 | Open the ***input\_XPRT-MB2*** file in a preferred text editor. Verify that the “Simulation Title Card” has the following line of text: “Rad2 Mass Balance Simulation (1943-12070),” | If the text is present in the card indicated, this satisfies the following FR:  FR-4 |  |
| 6 | Open the ***./AT-2/input\_XPRT-2*** file and navigate “Solution Control Card” should specify a total of 2 execution periods (line 22). You’ll see execution periods as follows:   * 1943, 1953 * 1953, 2018   Open the script output, ***./AT-2/input\_XPRT-MB2***. Verify that the tool output adopts the first period verbatim from ***input\_XPRT-2***, modifies the 2nd to extend it to 2070, and adds a final period from 2070 to 12070. The expected number of execution periods in ***input\_XPRT-MB2*** should be 4 (line 23) with execution periods as follows:   * 1943, 1953 * 1953, 2018 * 2018, 2070 * 2070, 12070   Verify that the 4 following lines of text are present (verbatim, ignoring additional white space characters):   * 1943,year,1953,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * 1953,year,2018,year,1.0E-08,year,0.01,year,1.25,16,1.0E-6, * 2018,year,2070,year,1.0E-08,year,0.1,year,1.25,16,16,1.0E-6, * 2070,year,12070,year,1.0E-08,year,10.0,year,1.25,16,1.0E-6 | If the execution periods are written out in the ***input\_XPRT-MB2*** as specified, this partially satisfies the following FR:  FR-5  A subsequent test will verify the other parts of FR-5 |  |

| Table 5  **Mass Balance STOMP Input File Generator Acceptance Test Plan Case 3** | | | |
| --- | --- | --- | --- |
| **Mass Balance STOMP Input File Generator Acceptance Testing**  **CACIE-Mass Balance STOMP Input File Generator – AT-3** | | **Date:** | |
| **Tool Runner File Location for this test:**  [**\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt\_mb\_input\_gen\AT-3**](file:///\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt_mb_input_gen\AT-3) | | **Test Performed By:** | |
| **Testing Directory:** [**\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt\_mb\_input\_gen**](file:///\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt_mb_input_gen) | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| 1 | Navigate to the testing directory | | |
| 2 | Invoke the ***runner\_run\_AT-3\_MB-Input-Gen.sh*** by doing the following:  Open a Linux terminal, navigate to the testing directory and type: *./runner\_run\_AT-3\_MB-Input-Gen.sh* | | |
| 3 | A new directory should have been created called “AT-3”. | | |
| 4 | Open the ***./AT-3/input\_XPRT-2*** “Solution Control Card” should specify a total of 1 execution periods (line 22). You’ll see execution periods as follows:   * 1943, 2018   Open the script output ***./AT-3/input\_XPRT-MB2***. Verify that the tool output modifies the execution period to extend it to 2070 and adds a final period from 2070 to 12070. The expected number of execution periods in ***input\_XPRT-MB2*** should be 2 (line 23) with execution periods as follows:   * 1943, 2070 * 2070, 12070   Verify that the 2 following lines of text are present (verbatim, ignoring additional white space characters):   * 1943,year,2070,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * 2070,year,12070,year,1.0E-08,year,10,year,1.25,16,1.0E-6, | If the execution periods are written out in the ***input\_XPRT-MB2*** as specified, this satisfies the following FR:  FR-5 |  |

| Table 6  **Mass Balance STOMP Input File Generator Acceptance Test Plan Case 4** | | | |
| --- | --- | --- | --- |
| **Mass Balance STOMP Input File Generator Acceptance Testing**  **CACIE-Mass Balance STOMP Input File Generator – AT-4** | | **Date:** | |
| **Tool Runner File Location for this test:**  [**\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt\_mb\_input\_gen\AT-4**](file:///\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt_mb_input_gen\AT-4) | | **Test Performed By:** | |
| **Testing Directory:** [**\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt\_mb\_input\_gen**](file:///\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt_mb_input_gen) | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| 1 | Navigate to the testing directory | | |
| 2 | Invoke the ***runner\_run\_AT-4\_MB-Input-Gen.sh*** by doing the following:  Open a Linux terminal, navigate to the testing directory and type: *./runner\_run\_AT-4\_MB-Input-Gen.sh* | | |
| 3 | A new directory should have been created called “AT-4”. | | |
| 4 | Navigate to the ***./AT-4/srf*** directory. Verify that the following files were created:   * Ra-226-mass-balance.srf * Th-230-mass-balance.srf * U-232-mass-balance.srf * U-233-mass-balance.srf * U-234-mass-balance.srf * U-235-mass-balance.srf * U-236-mass-balance.srf * U-238-mass-balance.srf * Water-mass-balance.srf | If the files listed are present in the directory indicated, this satisfies the following FR:  FR-10 |  |

# Acceptance Test Report

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

* Acceptance Test 1 is in Table A-1. The test executes the Mass Balance STOMP Input File Generator tool and the output files are opened and compared against the tool’s input files. It is successful and qualified to use.
* Acceptance Test 2 is in Table A-2. The test executes the Mass Balance STOMP Input File Generator tool and the output files are opened and compared against the tool’s input files. It is successful and qualified to use.
* Acceptance Test 3 is in Table A-3. The test executes the Mass Balance STOMP Input File Generator tool and the output files are opened and compared against the tool’s input files. It is successful and qualified to use.
* Acceptance Test 4 is in Table A-4. The test executes the Mass Balance STOMP Input File Generator tool and the output files are opened and compared against the tool’s input files. The input file is then modified to execute for only one time step and linking the needed files to the appropriate locations like the restart file, input.zone, input.bot, etc. The modified input file is then read into the eSTOMP program and the outputs from the eSTOMP program are verified. The test is successful and the tool is qualified to use.

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 you will need to execute the program in a Linux environment. The command to put into the terminal should be like the following:

$ <path/to/repository>/tools/ca-modinput/linux/xprt\_mb\_input\_gen\_linux-intel-64.exe <path/to/STOMP/input/file>/input.file <path/to/output/control/card>/oc\_card.file

# Tool Versions

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

* 1.0 – Tool was developed.

# Appendix A

**Completed Acceptance Test Cases**

**Tool Runner Log**

Test directory verified

###Copy files to output directory###

###Executing Mass Balance Input Generator for: AT-1/input\_XPRT-1 ###

INFO--04/23/2020 10:17:28 AM--Starting CA-CIE Tool Runner. Logging to ".././AT-1/runner\_run\_AT-1\_MB-Input-Gen.log"

INFO--04/23/2020 10:17:28 AM--Code Version: abf2036978b773627ccbaca9dd6b216fb2bda2fb v2.9: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--04/23/2020 10:17:28 AM--Code Version: 9f80ec5d09cfd62c19f4b87a7bdc4bde784fceda Local repo SHA-1 has does not correspond to a remote repo release version: /home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/repo\_xprt\_mb\_input\_gen.f/tools/ca-modinput/linux/xprt\_mb\_input\_gen\_linux-intel-64.exe<--094cea9d0f6ce5c10aade225966e4c9ba236d162

INFO--04/23/2020 10:17:28 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--04/23/2020 10:17:28 AM--QA Status: TEST : /home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/repo\_xprt\_mb\_input\_gen.f/tools/ca-modinput/linux/xprt\_mb\_input\_gen\_linux-intel-64.exe

INFO--04/23/2020 10:17:28 AM--Invoking Command:"/home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/repo\_xprt\_mb\_input\_gen.f/tools/ca-modinput/linux/xprt\_mb\_input\_gen\_linux-intel-64.exe" with Arguments:"input\_XPRT-1 rad1\_Mass\_Balance\_Output\_Control.dat"

INFO--04/23/2020 10:17:28 AM--Username:cfarrow Computer:olive Platform:Linux 4.4.0-38-generic #57~14.04.1-Ubuntu SMP Tue Sep 6 17:20:43 UTC 2016

###Finished Process###

| Table A-1  **Mass Balance STOMP Input File Generator Acceptance Test Plan Case 1** | | | |
| --- | --- | --- | --- |
| **Mass Balance STOMP Input File Generator Acceptance Testing**  **CACIE-Mass Balance STOMP Input File Generator – AT-1** | | **Date: 23 April, 2020** | |
| **Tool Runner File Location for this test:**  [**\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt\_mb\_input\_gen\AT-1**](file:///\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt_mb_input_gen\AT-1) | | **Test Performed By: Christopher Farrow** | |
| **Testing Directory:** [**\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt\_mb\_input\_gen**](file:///\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt_mb_input_gen) | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| 1 | Navigate to the testing directory | | |
| 2 | Invoke the ***runner\_run\_AT-1\_MB-Input-Gen.sh*** by doing the following:  Open a Linux terminal, navigate to the testing directory and type: *./runner\_run\_AT-1\_MB-Input-Gen.sh* | | |
| 3 | A new directory should have been created called “AT-1”. Navigate to that directory and open a file called ***mass\_balance\_model\_screen.log*** in a text editor. Verify that in line 2 of the file you see “input\_XPRT-1” and in line 7 you should see “rad1\_Mass\_Balance\_Output\_Control.dat”  These 2 lines of text correspond with the two inputs specified in the shell script (feel free to verify the file names in $INPUT1 and $INPUT2 of the shell script invoked in step 2 of this acceptance test). | If the text is present as described, this satisfies the following FR:  FR-1 | PASS |
| 4 | The input file used in its file name “XPRT-1” which is parsed by the code to recognize whether the input file corresponds with “Radionuclide Group 1” or “Radionuclide Group 2”. This input file has the number “1” in its name, which indicates to the script that this file corresponds with “Radionuclide Group 1”.  Open the ***mass\_balance\_model\_screen.log*** in a text editor. Read in line 11 and verify that “Radionuclide Group 1” is written. | Verify that line 11 of ***mass\_balance\_model\_screen.log*** has “Radionuclide Group 1” in the line. This partially satisfies the following FR:  FR-2  The other aspect of this test will be vetted in another test. | PASS |
| 5 | Using a diff merge or file comparison utility, open and compare the following files:   * ***input\_XPRT-1*** * ***input\_XPRT-MB1***   Verify in the comparison that there are no differences in the following cards (look for the tilde “~” indicator for each card):   * Grid * Inactive Nodes * Rock/Soil Zonation * Mechanical Properties * Hydraulic Properties * Saturation Function * X-Aqueous Relative Permeability * Y-Aqueous Relative Permeability * Z-Aqueous Relative Permeability * Solute/Porous Media Interaction * Initial Conditions * Boundary Conditions * Source Card   Verify that there are differences between the two files for the following cards (expected differences will be enumerated in subsequent steps):   * Simulation Title * Solution Control * Solute/Fluid Interaction * Output Control Card * Surface Flux | Card differences between the input and output files should only be found in the cards indicated. This satisfies the following FR’s:  FR-3, FR-9 | PASS |
| 6 | Open the ***input\_XPRT-MB1*** file in a preferred text editor. Verify that the “Simulation Title Card” has the following line of text: “Rad1 Mass Balance Simulation (1943-12070),” | If the text is present in the card indicated, this partially satisfies the following FR:  FR-4  A subsequent test will verify the remaining aspect of this FR. | PASS |
| 7 | Open the ***./AT-1/input\_XPRT-1*** and navigate to the “Solution Control Card”. This card should specify a total of 3 execution periods (line 23). You’ll see execution periods as follows:   * 1943, 1956 * 1956, 1968 * 1968, 2018   Open the script output, ***./AT-1/input\_XPRT-MB1***. Verify that the tool output adopts the first 2 periods verbatim from ***input\_XPRT-1***, modifies the 3rd to extend it to 2070, and adds a final period from 2070 to 12070. The expected number of execution periods in ***input\_XPRT-MB1*** should be 4 (line 23) with execution periods as follows:   * 1943, 1956 * 1956, 1968 * 1968, 2070 * 2070, 12070   Verify that the 4 following lines of text are present (verbatim, ignoring additional white space characters):   * 1943,year,1956,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * 1956,year,1968,year,1.0E-08,year,0.01,year,1.25,16,1.0E-6, * 1968,year,2070,year,1.0E-08,year,0.1,year,1.25,16,16,1.0E-6, * 2070,year,12070,year,1.0E-08,year,10.0,year,1.25,16,1.0E-6 | If the text is written out in the ***input\_XPRT-MB1*** as specified, this partially satisfies the following FR:  FR-5  Subsequent tests will verify the other aspects of FR-5 | PASS |
| 8 | Open the script output, ***./AT-1/input\_XPRT-MB1***, and navigate to the “Solute/Fluid Interaction Card”. Verify that the 6th column (the 6th value for each line, delimiting by the commas) is set to 1.000E+20. This represents the half-life of the associated “solute” or constituent. | If all the solutes specified in the “Solute/Fluid Interaction Card” have a half-life of 1.000E+20, this satisfies the following FR:  FR-6 | PASS |
| 9 | Using a diff merge or file comparison utility, open and compare the following files:   * ***input\_XPRT-MB1*** * ***rad1\_Mass\_Balance\_Output\_Control.dat***   The only portion that should match verbatim is the “Output Control Card” portion of the ***input\_XPRT-MB1*** when compared with the ***rad1\_Mass\_Balance\_Output\_Control.dat***. Extra whitespaces at the end of the lines are acceptable. | If the comparison holds true, this satisfies the following FR:  FR-7 | PASS |
| 10 | Open the following files in a text editor (option to compare them using a utility):   * ***input\_XPRT-MB1*** * ***input\_XPRT-1***   Navigate to the portion comparing the “Surface Flux Card” and verify that the ***input\_XPRT-MB1*** file only has 9 surfaces specified. There should be an exact match with the first 9 surfaces specified between the two files. No other surfaces should be identified in the ***input\_XPRT-MB1***. | If the surfaces specified are written as indicated this satisfies the following FR:  FR-8 | PASS |

**Tool Runner Log**

Test directory verified

###Copy files to output directory###

###Executing Mass Balance Input Generator for: AT-2/input\_XPRT-2 ###

INFO--04/23/2020 11:10:37 AM--Starting CA-CIE Tool Runner. Logging to ".././AT-2/runner\_run\_AT-2\_MB-Input-Gen.log"

INFO--04/23/2020 11:10:37 AM--Code Version: abf2036978b773627ccbaca9dd6b216fb2bda2fb v2.9: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--04/23/2020 11:10:37 AM--Code Version: 9f80ec5d09cfd62c19f4b87a7bdc4bde784fceda Local repo SHA-1 has does not correspond to a remote repo release version: /home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/repo\_xprt\_mb\_input\_gen.f/tools/ca-modinput/linux/xprt\_mb\_input\_gen\_linux-intel-64.exe<--094cea9d0f6ce5c10aade225966e4c9ba236d162

INFO--04/23/2020 11:10:37 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--04/23/2020 11:10:37 AM--QA Status: TEST : /home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/repo\_xprt\_mb\_input\_gen.f/tools/ca-modinput/linux/xprt\_mb\_input\_gen\_linux-intel-64.exe

INFO--04/23/2020 11:10:37 AM--Invoking Command:"/home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/repo\_xprt\_mb\_input\_gen.f/tools/ca-modinput/linux/xprt\_mb\_input\_gen\_linux-intel-64.exe" with Arguments:"input\_XPRT-2 rad2\_Mass\_Balance\_Output\_Control.dat"

INFO--04/23/2020 11:10:37 AM--Username:cfarrow Computer:olive Platform:Linux 4.4.0-38-generic #57~14.04.1-Ubuntu SMP Tue Sep 6 17:20:43 UTC 2016

###Finished Process###

| Table A-2  **Mass Balance STOMP Input File Generator Acceptance Test Plan Case 2** | | | |
| --- | --- | --- | --- |
| **Mass Balance STOMP Input File Generator Acceptance Testing**  **CACIE-Mass Balance STOMP Input File Generator – AT-2** | | **Date: 23 April, 2020** | |
| **Tool Runner File Location for this test:**  [**\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt\_mb\_input\_gen\AT-2**](file:///\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt_mb_input_gen\AT-2) | | **Test Performed By: Chris Farrow** | |
| **Testing Directory:** [**\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt\_mb\_input\_gen**](file:///\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt_mb_input_gen) | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| 1 | Navigate to the testing directory | | |
| 2 | Invoke the ***runner\_run\_AT-2\_MB-Input-Gen.sh*** by doing the following:  Open a Linux terminal, navigate to the testing directory and type: *./runner\_run\_AT-2\_MB-Input-Gen.sh* | | |
| 3 | A new directory should have been created called “AT-2”. | | |
| 4 | The input file used has in its file name the phrase “XPRT-2” which is parsed by the code to recognize whether the input file corresponds with “Radionuclide Group 1” or “Radionuclide Group 2”. This input file has the number “2” in its name, which indicates to the script that this file corresponds with “Radionuclide Group 2”.  Open the ***mass\_balance\_model\_screen.log*** in a text editor. Read in line 11 and verify that “Radionuclide Group 2” is written. | Verify that line 11 of ***mass\_balance\_model\_screen.log*** has “Radionuclide Group 1” in the line. This test finishes verifying the following FR:  FR-2 | PASS |
| 5 | Open the ***input\_XPRT-MB2*** file in a preferred text editor. Verify that the “Simulation Title Card” has the following line of text: “Rad2 Mass Balance Simulation (1943-12070),” | If the text is present in the card indicated, this satisfies the following FR:  FR-4 | PASS |
| 6 | Open the ***./AT-2/input\_XPRT-2*** file and navigate “Solution Control Card” should specify a total of 2 execution periods (line 22). You’ll see execution periods as follows:   * 1943, 1953 * 1953, 2018   Open the script output, ***./AT-2/input\_XPRT-MB2***. Verify that the tool output adopts the first period verbatim from ***input\_XPRT-2***, modifies the 2nd to extend it to 2070, and adds a final period from 2070 to 12070. The expected number of execution periods in ***input\_XPRT-MB2*** should be 4 (line 23) with execution periods as follows:   * 1943, 1953 * 1953, 2018 * 2018, 2070 * 2070, 12070   Verify that the 4 following lines of text are present (verbatim, ignoring additional white space characters):   * 1943,year,1953,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * 1953,year,2018,year,1.0E-08,year,0.01,year,1.25,16,1.0E-6, * 2018,year,2070,year,1.0E-08,year,0.1,year,1.25,16,16,1.0E-6, * 2070,year,12070,year,1.0E-08,year,10.0,year,1.25,16,1.0E-6 | If the execution periods are written out in the ***input\_XPRT-MB2*** as specified, this partially satisfies the following FR:  FR-5  A subsequent test will verify the other parts of FR-5 | PASS |

**Tool Runner Log**

Test directory verified

###Copy files to output directory###

###Executing Mass Balance Input Generator for: AT-3/input\_XPRT-2 ###

INFO--04/23/2020 11:28:18 AM--Starting CA-CIE Tool Runner. Logging to ".././AT-3/runner\_run\_AT-3\_MB-Input-Gen.log"

INFO--04/23/2020 11:28:18 AM--Code Version: abf2036978b773627ccbaca9dd6b216fb2bda2fb v2.9: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--04/23/2020 11:28:18 AM--Code Version: 9f80ec5d09cfd62c19f4b87a7bdc4bde784fceda Local repo SHA-1 has does not correspond to a remote repo release version: /home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/repo\_xprt\_mb\_input\_gen.f/tools/ca-modinput/linux/xprt\_mb\_input\_gen\_linux-intel-64.exe<--094cea9d0f6ce5c10aade225966e4c9ba236d162

INFO--04/23/2020 11:28:18 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--04/23/2020 11:28:18 AM--QA Status: TEST : /home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/repo\_xprt\_mb\_input\_gen.f/tools/ca-modinput/linux/xprt\_mb\_input\_gen\_linux-intel-64.exe

INFO--04/23/2020 11:28:18 AM--Invoking Command:"/home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/repo\_xprt\_mb\_input\_gen.f/tools/ca-modinput/linux/xprt\_mb\_input\_gen\_linux-intel-64.exe" with Arguments:"input\_XPRT-2 rad2\_Mass\_Balance\_Output\_Control.dat"

INFO--04/23/2020 11:28:18 AM--Username:cfarrow Computer:olive Platform:Linux 4.4.0-38-generic #57~14.04.1-Ubuntu SMP Tue Sep 6 17:20:43 UTC 2016

###Finished Process###

| Table A-3  **Mass Balance STOMP Input File Generator Acceptance Test Plan Case 3** | | | |
| --- | --- | --- | --- |
| **Mass Balance STOMP Input File Generator Acceptance Testing**  **CACIE-Mass Balance STOMP Input File Generator – AT-3** | | **Date: 23 April, 2020** | |
| **Tool Runner File Location for this test:**  [**\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt\_mb\_input\_gen\AT-3**](file:///\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt_mb_input_gen\AT-3) | | **Test Performed By: Chris Farrow** | |
| **Testing Directory:** [**\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt\_mb\_input\_gen**](file:///\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt_mb_input_gen) | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| 1 | Navigate to the testing directory | | |
| 2 | Invoke the ***runner\_run\_AT-3\_MB-Input-Gen.sh*** by doing the following:  Open a Linux terminal, navigate to the testing directory and type: *./runner\_run\_AT-3\_MB-Input-Gen.sh* | | |
| 3 | A new directory should have been created called “AT-3”. | | |
| 4 | Open the ***./AT-3/input\_XPRT-2*** “Solution Control Card” should specify a total of 1 execution periods (line 22). You’ll see execution periods as follows:   * 1943, 2018   Open the script output ***./AT-3/input\_XPRT-MB2***. Verify that the tool output modifies the execution period to extend it to 2070 and adds a final period from 2070 to 12070. The expected number of execution periods in ***input\_XPRT-MB2*** should be 2 (line 23) with execution periods as follows:   * 1943, 2070 * 2070, 12070   Verify that the 2 following lines of text are present (verbatim, ignoring additional white space characters):   * 1943,year,2070,year,1.0E-08,year,0.1,year,1.25,16,1.0E-6, * 2070,year,12070,year,1.0E-08,year,10,year,1.25,16,1.0E-6, | If the execution periods are written out in the ***input\_XPRT-MB2*** as specified, this satisfies the following FR:  FR-5 | PASS |

**Tool Runner Log**

Test directory verified

###Copy files to output directory###

Copied: input\_XPRT-2\_FR-10 to: AT-4/input\_XPRT-2

Copied: rad2\_Mass\_Balance\_Output\_Control.dat to: AT-4

Copied: restart to: AT-4

Copied: input.bot to : AT-4

Copied: input.zone to : AT-4

###Executing Mass Balance Input Generator for: AT-4/input\_XPRT-2 ###

INFO--04/23/2020 11:35:34 AM--Starting CA-CIE Tool Runner. Logging to ".././AT-4/runner\_run\_AT-4\_MB-Input-Gen.log"

INFO--04/23/2020 11:35:34 AM--Code Version: abf2036978b773627ccbaca9dd6b216fb2bda2fb v2.9: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--04/23/2020 11:35:34 AM--Code Version: 9f80ec5d09cfd62c19f4b87a7bdc4bde784fceda Local repo SHA-1 has does not correspond to a remote repo release version: /home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/repo\_xprt\_mb\_input\_gen.f/tools/ca-modinput/linux/xprt\_mb\_input\_gen\_linux-intel-64.exe<--094cea9d0f6ce5c10aade225966e4c9ba236d162

INFO--04/23/2020 11:35:34 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--04/23/2020 11:35:34 AM--QA Status: TEST : /home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/repo\_xprt\_mb\_input\_gen.f/tools/ca-modinput/linux/xprt\_mb\_input\_gen\_linux-intel-64.exe

INFO--04/23/2020 11:35:34 AM--Invoking Command:"/home/cfarrow/CAVE/CA-CIE-Tools-TestRepos/repo\_xprt\_mb\_input\_gen.f/tools/ca-modinput/linux/xprt\_mb\_input\_gen\_linux-intel-64.exe" with Arguments:"input\_XPRT-2 rad2\_Mass\_Balance\_Output\_Control.dat"

INFO--04/23/2020 11:35:34 AM--Username:cfarrow Computer:olive Platform:Linux 4.4.0-38-generic #57~14.04.1-Ubuntu SMP Tue Sep 6 17:20:43 UTC 2016

###Finished Process###

###Copy mass balance input file to 'input'

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

Modify the location of the restart file to be the one copied to the directory

###Finished all necessary modifications to the mass balance STOMP input file###

###Execute the STOMP program using the mass balance input file as input###

| Table A-4  **Mass Balance STOMP Input File Generator Acceptance Test Plan Case 4** | | | |
| --- | --- | --- | --- |
| **Mass Balance STOMP Input File Generator Acceptance Testing**  **CACIE-Mass Balance STOMP Input File Generator – AT-4** | | **Date: 23 April, 2020** | |
| **Tool Runner File Location for this test:**  [**\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt\_mb\_input\_gen\AT-4**](file:///\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt_mb_input_gen\AT-4) | | **Test Performed By: Chris Farrow** | |
| **Testing Directory:** [**\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt\_mb\_input\_gen**](file:///\\olive\backups\CAVE\CA-CIE-Tools-TestEnv\xprt_mb_input_gen) | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| 1 | Navigate to the testing directory | | |
| 2 | Invoke the ***runner\_run\_AT-4\_MB-Input-Gen.sh*** by doing the following:  Open a Linux terminal, navigate to the testing directory and type: *./runner\_run\_AT-4\_MB-Input-Gen.sh* | | |
| 3 | A new directory should have been created called “AT-4”. | | |
| 4 | Navigate to the ***./AT-4/srf*** directory. Verify that the following files were created:   * Ra-226-mass-balance.srf * Th-230-mass-balance.srf * U-232-mass-balance.srf * U-233-mass-balance.srf * U-234-mass-balance.srf * U-235-mass-balance.srf * U-236-mass-balance.srf * U-238-mass-balance.srf * Water-mass-balance.srf | If the files listed are present in the directory indicated, this satisfies the following FR:  FR-10 | PASS |

# Appendix B

# Completed Installation Test

**Tool Runner Log**

###Executing Mass Balance Input Generator for: IT-1/not\_an\_input\_file ###

INFO--04/27/2020 08:52:28 AM--Starting CA-CIE Tool Runner. Logging to ".././IT-1/runner\_run\_IT-1\_MB-Input-Gen.log"

INFO--04/27/2020 08:52:28 AM--Code Version: 8c2f04ebbb2bba5650c21ba0bd59bc8684b76d4b v2.11: /opt/tools/pylib/runner/runner.py<--1bcfd6779e9cbdb82673405873a8e5e81514ae27

INFO--04/27/2020 08:52:28 AM--Code Version: 8c2f04ebbb2bba5650c21ba0bd59bc8684b76d4b v2.11: /opt/tools/tools/ca-modinput/linux/xprt\_mb\_input\_gen\_linux-intel-64.exe<--094cea9d0f6ce5c10aade225966e4c9ba236d162

INFO--04/27/2020 08:52:28 AM--QA Status: QUALIFIED : /opt/tools/pylib/runner/runner.py

INFO--04/27/2020 08:52:28 AM--QA Status: QUALIFIED : /opt/tools/tools/ca-modinput/linux/xprt\_mb\_input\_gen\_linux-intel-64.exe

INFO--04/27/2020 08:52:28 AM--Invoking Command:"/opt/tools/tools/ca-modinput/linux/xprt\_mb\_input\_gen\_linux-intel-64.exe" with Arguments:"not\_an\_input\_file not\_an\_oc\_file"

INFO--04/27/2020 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

###Finished Process###

| Table B-1.  **Mass Balance STOMP Input File Generator Installation Test Plan** | | | |
| --- | --- | --- | --- |
| **Mass Balance STOMP Input File Generator Installation Testing**  **CACIE-Mass Balance STOMP Input File Generator – IT-1** | | **Date: 04/27/2020** | |
| **Tool Runner File Location for this test:  \\olive\backups\CAVE\CA-CIE-Tools-TestEnv\CA-CIE-Tools\_v2.X\_install\_tests\xprt\_mb\_input\_gen\IT-1** | | **Test Performed By: Sara Lindberg** | |
| **Testing Directory: \\olive\backups\CAVE\CA-CIE-Tools-TestEnv\CA-CIE-Tools\_v2.X\_install\_tests\xprt\_mb\_input\_gen** | | | |
| **Test Step** | **Test Instruction** | **Expected Result** | **Test Result  (Pass/Fail)** |
| Tools Code Repository Directory: /opt/tools | | | |
| Navigate to the testing directory | | | |
| 1 | Invoke Tool runner and test installation of the tool ***runner\_run\_IT-1\_MB-Input-Gen.sh***:  Open a Linux terminal, navigate to the testing directory and type *./runner\_run\_IT-1\_MB-Input-Gen.sh* | | |
| 2 | Verify Tool Runner is invoked and executed. | Verify that the following file has been created and has the appropriate output corresponding with a “Tool Runner” execution:  ***./IT/runner\_run\_IT-1\_MB-Input-Gen.log*** | Pass |
| 3 | Verify tool is invoked and executed. | A new file should have been created: ***./IT/mass\_balance\_model\_screen.log***  The following program error should be found: “forrtl: severe (29): file not found” | Pass |

**Appendix C**

**QA Checklist**

