**CACIE Tool #17.0a –** **Average Aqueous Rate *(******aq\_mod\_avg.exe)***

***CACIE Tool #17.0b – Adjust Node Locations (******aq\_mod\_avg\_10-18-18.exe)***

***CACIE Tool #17.0c – Average Tritium Rate (******h-3\_mod\_avg.exe)***

***CACIE Tool #17.0d – Output Source Areas (src\_plot\_area.exe)***

**Version** **1.0**

**QA**: **TEST** or **NA** or **QA**

1. **Description and Purpose**

One or two paragraphs describing the tool’s function and purpose.

Four executables:

1. aq\_mod\_avg.exe: read src card input from Mark's script and average aqueous rate for selected source nodes (input file - "src\_node\_aq\_avg.dat")
2. aq\_mod\_avg\_10-18-18.exe: read src card input from Mark's script and adjust locations of selected source nodes (input file - "src\_node\_changes.dat")
3. h-3\_mod\_avg.exe: read src card input from Mark's script and average H-3 rate for selected source nodes (input file - "src\_node\_h-3\_avg.dat")
4. src\_plot\_area.exe: read src card input from Mark's script and output source areas
5. **Functional Requirements**

The functional requirements of the tool will be documented in this section. Each requirement will have an ID, such as: FR-N, where N starts at 1 and increments for each Functional Requirement. Each of the Functional Requirement IDs will have a corresponding test ID listed in the RTM.

The functional requirements for the Average Aqueous Rate tool are as follows:

FR-1a: open src\_node\_aq\_avg.dat

FR-2a: open src\_node\_aq\_avg.dat and get source node changes

FR-3a: verify that there are no more than 25 changes

FR-4a: read in modin file

FR-5a: read in card file(s)

FR-6a: verify there are no more than 200 yearly rates

FR-7a: verify that years match

FR-8a: verify that rates match (difference is not greater than 1E-10)

FR-9a: verify that the input year range is within the list of years.

FR-10a: sum aqueous rates

FR-11a: calculate average aqueous rates

FR-12a: Determine minimum and maximum years

The functional requirements for the Adjust Node Locations tool are as follows:

FR-1b: code in ***aq\_mod\_avg\_10-18-18.exe*** is all but identical to ***aq\_mod\_avg\_.exe***

…

FR-Xb:

The functional requirements for the Average Tritium Rate tool are as follows:

FR-1c:  ***h-3\_mod\_avg.exe*** is all but identical to ***aq\_mod\_avg\_.exe***

FR-2c:

FR-3c:

FR-4c:

FR-5c:

The functional requirements for the Output Source Areas tool are as follows:

FR-1d: Open infile (src card input from Mark’s script?)

FR-2d: Verify list list is less than 200 (?)

FR-3d: Extract site area, clip area and grid area for each site

FR-4d: Some type of check with respect to “-Part“

FR-5d:

FR-6d: Write information to output file “site\_area.dat”

1. **Software Requirements Specifications**

The software requirements specification of the tool will be documented in this section.

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1. **Software Design Description**

The software design description of the tool will be documented in this section. The results of a Code Walkthrough with an independent third party will be summarized in this section.

09a – Average Aqueous Rate —  
Arguments:  
input file [arg(1)]

Input:  
arg(1) file  
src\_node\_aq\_avg.dat

Output:  
arg(1)\_srcavg.card  
arg(1)\_srcavg\_last.card

09b – Adjust Node Locations —  
Arguments:  
input file [arg(1)]  
input file

Output:  
arg(1)\_srcavg.card

09c – Average Tritium Rate —  
Arguments:  
input file [arg(1)]

Input:  
arg(1) file  
src\_node\_h-3\_avg.dat

Output:  
arg(1)\_srcavg\_H-3.card  
arg(1)\_srcavg\_H-3\_last.card

09d – Output Source Areas —  
Arguments:  
input file [arg(1)]

Input:  
arg(1) file

Output:  
site\_area.dat

1. **Requirements Traceability Matrix**

A requirements traceability matrix for the tool will be documented in this section. At a minimum, the matrix will include IDs of: Functional Requirements and the corresponding Acceptance Test, along with an indication of the test result (Pass/Fail).

Table 1 presents the requirements traceability matrix for the Average Aqueous Rate tool.

| **Table 1. Average Aqueous Rate Tool Requirements Traceability Matrix** | | |
| --- | --- | --- |
| **Functional Requirement** | **Acceptance Test** | **Test Result (Pass/Fail)** |
| FR-1a |  |  |
| FR-2a |  |  |
| FR-3a |  |  |
| FR-4a |  |  |
| FR-5a |  |  |
| FR-6a |  |  |
| FR-7a |  |  |
| FR-8a |  |  |
| FR-9a |  |  |
| FR-10a |  |  |
| FR-11a |  |  |
| FR-12a |  |  |

Table 2 presents the requirements traceability matrix for the Adjust Node Locations tool.

| **Table 2. Adjust Node Locations Tool Requirements Traceability Matrix** | | |
| --- | --- | --- |
| **Functional Requirement** | **Acceptance Test** | **Test Result (Pass/Fail)** |
| FR-1b |  |  |
| … |  |  |
| FR-Xb |  |  |

Table 3 presents the requirements traceability matrix for the Average Tritium Rate tool.

| **Table 3. Average Tritium Rate Tool Requirements Traceability Matrix** | | |
| --- | --- | --- |
| **Functional Requirement** | **Acceptance Test** | **Test Result (Pass/Fail)** |
| FR-1c |  |  |
| FR-2c |  |  |
| FR-3c |  |  |
| FR-4c |  |  |
| FR-5c |  |  |
| FR-6c |  |  |
| FR-7c |  |  |
| FR-8c |  |  |
| FR-9c |  |  |
| FR-10c |  |  |
| FR-11c |  |  |
| FR-12c |  |  |

Table 4 presents the requirements traceability matrix for the Output Source Areas tool.

| **Table 4. Output Source Areas Tool Requirements Traceability Matrix** | | |
| --- | --- | --- |
| **Functional Requirement** | **Acceptance Test** | **Test Result (Pass/Fail)** |
| FR-1d |  |  |
| FR-2d |  |  |
| FR-3d |  |  |
| FR-4d |  |  |
| FR-5d |  |  |
| FR-6d |  |  |

1. **Test Plan and Cases**

The test plan for the tool will be documented in this section. Each test will have a unique ID and criteria for determining if the test result is pass or fail. The TEST ID will be referenced in the RTM and ATR. An installation test, labeled **IT-1**, will be used by the Tool Runner to confirm the version of the tool being used is running correctly before launching it with the user’s parameters.

The Unit Testing done on the tool will be documented here, also.

The test plan for the Average Aqueous Rate tool is as follows.

| **Table 5. Average Aqueous Rate Tool Test Plan** | | |
| --- | --- | --- |
| **TEST ID** | **Test Case** | **Test Result (Pass/Fail)** |
| IT-1 | Installation Test |  |
| ATC-X |  |  |
| ATC-X |  |  |

The test plan for the Adjust Node Locations tool is as follows.

| **Table 6. Adjust Node Locations Tool Test Plan** | | |
| --- | --- | --- |
| **TEST ID** | **Test Case** | **Test Result (Pass/Fail)** |
| IT-1 | Installation Test |  |
| ATC-X |  |  |
| ATC-X |  |  |

The test plan for the Average Tritium Rate tool is as follows.

| **Table 7. Average Tritium Rate Tool Test Plan** | | |
| --- | --- | --- |
| **TEST ID** | **Test Case** | **Test Result (Pass/Fail)** |
| IT-1 | Installation Test |  |
| ATC-X |  |  |
| ATC-X |  |  |

The test plan for the Output Source Areas tool is as follows.

| **Table 8. Output Source Areas Tool Test Plan** | | |
| --- | --- | --- |
| **TEST ID** | **Test Case** | **Test Result (Pass/Fail)** |
| IT-1 | Installation Test |  |
| ATC-X |  |  |
| ATC-X |  |  |

1. **Acceptance Test Report**

The test report will state whether the tool is qualified for use, summarize test case results, and report all resolved incidents and resolution of unresolved incidents.

1. **User Guide**

A guide for using the tool will be documented in this section.