

January 4, 2016
LIC-16-0002

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Fort Calhoun Station, Unit No. 1
Renewed Facility Operating License No. DPR-40
NRC Docket No. 50-285

SUBJECT: Emergency Planning Implementing Procedure and Index

In accordance with 10 CFR 50.54(a), 10 CFR 50, Appendix E, Section V, and 10 CFR 50.4(b)(5), please find the procedure EPIP-EOF-6 Rev 49 enclosed for the Document Control Desk (holder of Copy 165) and the NRC Region IV Plant Support Branch 1 Secretary (holder of Copies 154 and 155). Individual index pages have been removed from plant procedures and are now part of the overall master index.

The document update instructions and summary of changes are included on the Confirmation of Transmittal form (Form EP-1) attached to each controlled copy change package. Please return the Confirmation of Transmittal forms by February 20, 2016.

The revised documents included in the enclosed package are:

<u>REMOVE SECTION</u>	<u>INSERT SECTION</u>
EPIP-EOF-6 Rev 49 issued 11/19/2015	EPIP-EOF-6 Rev 49 issued 12/22/2015

This change was reviewed and does not constitute a decrease in effectiveness.

No commitments are made in this letter.

If you have any questions regarding the enclosed changes, please contact Mr. Eric Plautz at 402-533-7308.

Sincerely,

Bradley H. Blome
Manager – Site Regulatory Assurance

BHB:mec

Enclosures

- c: NRC Region IV Plant Support Branch 1 Secretary (2 sets)
- C.F. Lyon, NRC Project Manager (w/o enclosures)
- S. M. Schneider, NRC Senior Resident Inspector (w/o enclosures)
- Emergency Planning Department (w/o enclosures)

AX45
NRR

EP-1
 Confirmation of Transmittal for
 Emergency Planning Documents/Information

Radiological Emergency Response Plan (RERP)
 Emergency Plan Implementing Procedures (EPIP)/(EP-FC-110 thru 115)
 Emergency Planning Forms (EPF)

Emergency Planning Department Manual (EPDM)
 Other Emergency Planning Document(s)/ Information

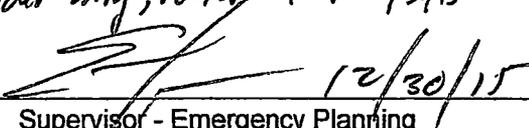
Date: _____

Transmitted to: _____

Name: Document Control Desk Copy No: 165 Date: _____
 Plant Support Branch Secretary Copy No: 154
 Plant Support Branch Secretary Copy No: 155

The following document(s) / information are forwarded for your manual:

REMOVE SECTION	INSERT SECTION
EPIP-EOF-6 Rev. 49 issued 11-19-15	EPIP-EOF-6 Rev. 49 issued 12-22-15

Summary of Changes: EPIP-EOF-6 Rev. 49 was reissued to correct the revision on pages 2 thru 47.
Editorial Header only; re-issue. 12/30/15

 Supervisor - Emergency Planning

I hereby acknowledge receipt of the above documents/information and have included them in my assigned manuals.

Signature: _____ **Date:** _____

Please sign above and return by: 2/20/2016

Tammy Collinson
 Fort Calhoun Station, FC-2-1
 Omaha Public Power District
 444 South 16th Street Mall
 Omaha, NE 68102-2247

NOTE: If the document(s)/information contained in this transmittal is no longer requested or needed by the recipient, or has been transferred to another individuals, please fill out the information below.

Document(s)/Information No Longer Requested/Needed
 Document(s)/Information Transferred to: _____

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Summary Analysis Report
EPIP-EOF-6, Revision 49

On 12-22-2015, Revision 49 of EPIP-EOF-6 was re-issued. The first time Revision 49 was issued, the front cover said Revision 49 and all of the other page headers said Revision 48 mistakenly. This re-issue of Revision 49 of EPIP-EPF-6 was only to correct the Revision numbers in the headers. This is editorial, not a reduction in effectiveness, and continues to comply with Regulations.

Distribution Authorized

This procedure does not contain any proprietary information, or such information has been censored. This issue may be released to the public document room. Proprietary information includes personnel names, company telephone numbers, and any information, which could impede emergency response.

EPIP-EOF-6

Offsite Dose Assessment using the Unified RASCAL Interface

Revision 49

Safety Classification:

Non-Safety

Usage Level:

Reference

Change No.:	EC 67069
Reason for Change:	Added reference to Procedure Overview, referencing Condenser Off Gas alignment to the stack per OI-CE-1 and post-accident sampling per CH-SMP-0005.
Preparer:	C. Worthing
Sponsor:	S. Gebers
Owner:	C. Worthing
Issued:	11-19-15 3:00 pm

Fort Calhoun Station

1.0 PURPOSE AND SCOPE

1.1 Purpose

1.1.1 This procedure provides the instructions for performing offsite dose assessment using the Unified RASCAL Interface (URI) by the On-Shift and ERO Dose Assessors.

1.1.2 This procedure provides the instructions for performing down river dose projects for Liquid Releases.

1.2 Scope

1.2.1 This procedure covers the operation of the URI dose assessment program and the EXCEL spread sheet for liquid dose projections.

2.0 DEFINITIONS

2.1 ATWS: Anticipated Transient Without SCRAM.

2.2 Committed Dose Equivalent (CDE): The internal dose equivalent to parts of the body (individual organs) that will be received from an intake of radioactive material by an individual over a 50-year period of time.

2.3 Committed Effective Dose Equivalent (CEDE): The internal dose equivalent to parts of the body (individual organs) that will be received from an intake of radioactive material by an individual over a 50-year period of time weighted for the relative radiosensitivity and risk associated with the individual organ and summed for the entire body.

2.4 Deep Dose Equivalent (DDE): The dose equivalent to the whole body that will be received from radiation external to the body.

2.5 Effective Dose Equivalent (EDE) is the sum of the products of the dose equivalent to the organ or tissue (H_T) and the weighting factors (W_T) applicable to each of the body organs or tissues that are irradiated ($H_E = \sum W_T H_T$).

2.6 Maximum Contaminant Level (MCL): Environmental Protection Agency limit for beta particle and Photon Radioactive for safety drinking water (4-mrem per year).

2.7 Protective Action Guidelines (PAGs): Radiation exposure guidelines which are used to determine when appropriate protective actions are to be taken on the part of emergency workers and the general public. These actions typically include sheltering and evacuation.

2.8 Protective Action Recommendations (PARs): A recommendation made by company personnel to the offsite authorities on the appropriate protective actions to be taken on the part of the general public. The PARs are based on plant conditions or dose projections using the PAGs for guidance.

2.9 Total Effective Dose Equivalent (TEDE): A method of converting exposure to radiation to the biological effects that it will cause to the human body. It combines the external and internal ionizing radiation exposure. The TEDE is the sum of Deep Dose Equivalent and Committed Effective Dose Equivalent.

3.0 RESPONSIBILITIES

3.1 The Manager-Emergency Planning, is responsible for:

- 3.1.1 Ensuring that, as part of initial and requalification training, individuals are provided with information on the purpose and use of the Interface software and appropriate precautions associated with its use.
- 3.1.2 If the transfer of dose assessment to the EOF is delayed, then the Control Room Dose Assessment Specialist shall relieve the on-shift Dose Assessor per their applicable checklists and perform required dose assessments.
- 3.1.3 The EOF shall relieve the On Shift or Control Room Dose Assessment Specialist of the responsibility for dose assessment per their applicable checklists and perform required dose assessments.

4.0 PROCEDURE

4.1 Overview

- 4.1.1 Unified RASCAL Interface (URI) shall be used only when an emergency has been declared or events require the calculation of radiological doses due to an actual or potential release of radioactive materials near or beyond the site boundary.
- 4.1.2 Emergency Liquid release projection spread sheet shall be used only when an emergency has been declared or events require the calculation of radiological doses due to an actual or potential release of radioactive materials into the Missouri river.
- 4.1.3 Attachments 3 – 9 provide instructions for utility modules and field team calculations.
- 4.1.4 URI can only calculate doses for a single release pathway at one time.
 - A. IF releases are occurring via multiple release pathways,
THEN
RUN individual dose assessments for each release and ADD together using the summation process.

- 4.1.5 URI contains many reports and operations that can be useful when running or evaluating dose assessment data. These functions may not be explicitly called within the body of this procedure. These may be attached to the end of the procedure.
- 4.1.6 **IF** the Condenser Off-Gas radiation monitor RM-057 is greater than 1E+07-cpm.
THEN request Operations to align Condenser Off-Gas to the Auxiliary Building stack per OI-CE-1.
- 4.1.7 **IF** Auxiliary Stack radiation monitors RM-062/RM-063 are out-of-service.
THEN RM-052 should be used to monitor effluent and implement CH-SMP-PA-0005 for accident range effluents.
- 4.1.8 **IF** both RM-052 and RM-062 are out-of-service.
THEN implement CH-SMP-PA-0005.
- 4.2 Start up
- 4.2.1 **START** the URI application
- 4.2.2 **IF** the program fails to start
OR an error occurs,
THEN
either **GO TO** another computer that has the program loaded **or** **SEE** Attachment 1 for further instructions.
- 4.2.3 **IF** dose assessments are being run during a drill or exercise,
THEN
CHECK the 'Print "This is a Drill" on all reports'.
- A. This will automatically indicate that the data is for a drill on all printed or viewed reports.
- 4.2.4 **SELECT** Rapid Assessment from the File menu or toolbar (Lightning Bolt icon) step 4.3 **or** **SELECT** Detailed Assessment from the File menu or toolbar (Cloud icon) step 4.4
- 4.2.5 **IF** assessment data is already available,
THEN
SELECT Sum Assessment from the file menu or toolbar (blue Sigma icon) step 4.5.

4.3 Rapid Dose Assessment

4.3.1 DETERMINE the Source Term as follows:

- A. **IF** the Fuel Clad barrier has been declared as a Loss or Potential Loss per the Emergency Action Levels,
THEN
SELECT Fuel Clad Damage as Yes.
- B. **IF** the Fuel Clad barrier remains intact per the Emergency Action Levels
THEN
SELECT Fuel Clad Damage as No.
- C. **IF** the Reactor Power Level has changed by $\geq 15\%$ / hour since the start of the event,
THEN
SELECT Conditions for Coolant Spiking as Yes,
OTHERWISE SELECT Conditions for Coolant Spiking as No.
- D. **IF** damage has occurred to spent fuel,
THEN
SELECT Damaged Spent Fuel Assembly

4.3.2 DETERMINE the Reactor Shutdown status as follows:

- A. For Non-ATWS events:
 - 1. **IF** the reactor is **NOT** shutdown,
THEN
ENSURE the Reactor Shutdown checkbox is unchecked.
 - 2. **IF** the reactor is shutdown,
THEN
CHECK the Reactor Shutdown checkbox.
 - 3. **ENTER** the Date and Time the reactor was shut down.
 - 4. **IF** a spent fuel event,
THEN
CHECK the Last Irradiated checkbox.
 - 5. **ENTER** the Date and Time core with the involved fuel assembly was shutdown.

B. For ATWS events

1. **IF** the reactor power is $\geq 2\%$,
THEN
ENSURE the Reactor Shutdown checkbox is unchecked.
2. **IF** the reactor power is $< 2\%$,
THEN
CHECK the Reactor Shutdown checkbox
3. **ENTER** the Date and Time the reactor power was reduced below 2%.

4.3.3 **SET** the meteorological data as follows:

- A. **SELECT** the applicable meteorological tower by checking the corresponding checkbox in the "Use" column of the Meteorological Data table.

i	NOTE	i
	Only ONE on-site tower may be selected for any single assessment. Currently URI only uses the FCS meteorological tower for input.	

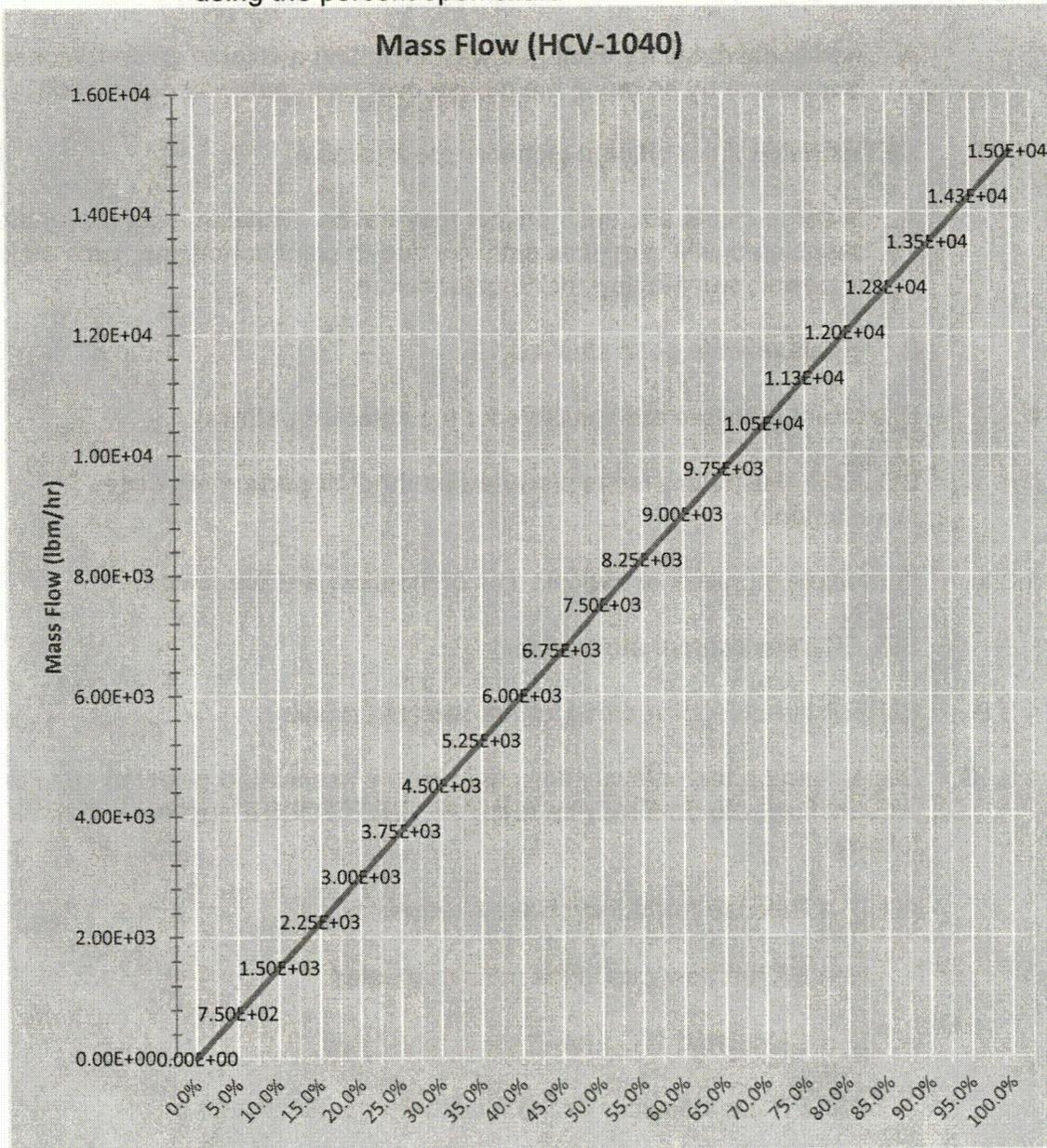
- B. **IF** multiple towers are present,
THEN
SELECT the tower that best represents the release point height.
- C. **IF** the meteorological data is available from the plant computer system,
THEN
ENTER the following:
- Wind Speed in the appropriate units
 - Wind Direction the wind is coming **FROM**
 - ΔT or the Stability Class directly
- D. **IF** the meteorological data is not available from the plant computer system,
THEN see Attachment 2 for further instructions for determining Wind Speed, Wind Direction and Stability Class.
- E. **SELECT** the precipitation status that best represents the current precipitation.
1. **IF** precipitation is unknown,
THEN
SELECT "None" from the dropdown list and use the following as guidance:
- None – No rain or snow (most conservative).
 - Light Rain – Drizzle, < 0.1 inches / hour.
 - Moderate Rain – Heavy Drizzle, 0.1 to 0.3 inches / hour.
 - Heavy Rain – > 0.3 inches / hour.
 - Light Snow – Visibility > 0.63 miles.
 - Moderate Snow – Visibility 0.31 to 0.63 miles.
 - Heavy Snow – Visibility < 0.31 miles.

4.3.4 **DETERMINE** the Release Duration

- A. **ENTER** the estimated Release Duration (4-hours is default).

- 4.3.5 **SELECT** the Release Point Pathway that **BEST** represents the release in progress.
- A. Additional detail for each pathway, including available effluent monitors, is available by hovering the mouse over each pathway description.
- 4.3.6 **DETERMINE** if the effluent monitors are available.
- A. In some cases effluent monitors may not be available even if they are associated with a release pathway due to plant conditions, such as loss of power, sample flow, or detector failure.
- B. **IF** unavailable go to step 4.3.12
- 4.3.7 **IF** effluent monitors are available for the selected pathway,
THEN
SELECT Yes as this is the preferred method for performing dose assessments.
- 4.3.8 **IF** multiple monitors or multiple lists of monitors are presented,
THEN
SELECT the appropriate monitor.
- 4.3.9 **ENTER** the monitor reading for the selected monitor.
- 4.3.10 Depending on the pathway selected and the associated selected monitor effluent flow rate data may be required. **DETERMINE** applicable flow as follows:
- A. **IF** a Release Point Flow Rate is requested,
THEN
ENTER the flow rate in the units requested.
- B. **IF** a Calculated S/G Flow Rate is requested,
THEN
ENTER the following for the faulted Steam Generator only:
- Pressure
 - Number of SRV's (Large Main Steam Safety Valves) or PORV's (Small Main Steam Safety Valves MS-291 or 292) open
 - Number of ADV's (HCV-1040) open
- C. **IF** a Calculated Steam Table Flow Rate is requested,
THEN
SELECT either Temperature or Pressure from the options **and** **ENTER** the corresponding system parameter value.

D. **ENTER** the Mass Flow rate. For ADV (HCV-1040) enter the mass flow using the percent open chart.



4.3.11 Go to step 4.3.15

4.3.12 **IF** effluent monitors are **NOT** available for the selected pathway,
THEN
SELECT No. Depending on the pathway selected the following options are available.

- 4.3.13 **IF** the Estimated RCS Leak Rate option is enabled,
THEN
ENTER the Reactor Coolant System leak rate in gpm
OR
SELECT the "I Don't Know" option. An assumed leak rate will be calculated.
- 4.3.14 **IF** the Containment Leakage option is enabled,
THEN
ENTER the High Range Area monitor reading
OR
SELECT the "No HRA Available or Applicable" option. Calculated damage assumptions will be used.
- 4.3.15 **IF** accident is spent fuel and monitors and containment leakage are not applicable
THEN
SELECT Unmonitored Damaged Spent Fuel Assembly.

i	NOTE	i
	If any errors are present there will be an exclamation point (!) on the Process Assessment button and the assessment will not continue until the errors are corrected.	

- 4.3.16 **PRESS** the "Process Assessment" button to run the dose assessment.
- 4.3.17 **SELECT** Print or Print Preview from the Menu or Toolbar to view or print the dose assessment results.
- 4.3.18 **PROVIDE** the dose assessment to the Shift Manager or Protective Measures for comparison to the Emergency Action Levels (EAL) and the Current Protective Action Recommendation (PAR).
- 4.3.19 No protective action recommendations are made by the dose assessment software. **USE** the protective action procedure (EPIP-EOF-7) to determine the appropriate response to the dose assessment results.
- 4.3.20 Repeat atmospheric dose assessment steps as appropriate steps 4.3 or 4.4.
- 4.4 **"DETAILED" Dose Assessment**
- 4.4.1 **SELECT** Detailed Assessment from the File menu or toolbar (Cloud icon).

4.4.2 **DETERMINE** the Source Term as follows:

- A. **CONTACT** technical support to determine the Source Term for the assessment based on the core conditions and/or type of accident that has occurred.
- B. **IF** the source term is from the Reactor Coolant System (RCS) **WITHOUT** core damage,
THEN
SELECT Normal Coolant.
- C. **IF** any of the following have occurred:
 - 1. The reactor has changed power level by $\geq 15\%$ / hour since the start of the event.
 - 2. A rapid depressurization of the RCS has occurred of sufficient magnitude to require safety injection.
 - 3. Chemistry has determined or reported that a RCS DEI spike has occurred.**THEN**
CHECK the Spiking checkbox.
- D. **IF** Spiking was selected,
THEN
DETERMINE the Spiking Factor:

i	NOTE	i
	A spiking factor cannot be less than 1 or greater than 1000. A spiking factor of 335 is the default and a spiking factor up to 1,000 is allowed by the software.	

- E. **IF** a post power change RCS DEI sample result is available,
THEN
CALCULATE the Spiking Factor as follows:
 - 1. **SELECT** Calculations Spiking Factors from the menu **and** **ENTER** the DEI concentration.
 - 2. **IF** the calculated Spiking Factor is < 335 ,
THEN
ENTER the calculated value.

3. **IF** the calculated Spiking Factor is ≥ 335 ,
THEN
ENTER the value up to 1,000.

- F. **IF** a post power change RCS DEI sample is **NOT** available,
THEN
ACCEPT the default Spiking Factor (335).

- 4.4.3 **IF** the source term is from the RCS **WITH** core damage,
THEN
SELECT Reactor Core Accident.

- 4.4.4 **SELECT** the Type of Damage as determined by technical support.

- 4.4.5 **IF** the information is not available,
THEN
SELECT Clad.

- 4.4.6 **IF** the source term is from damage to spent fuel,
THEN
SELECT Spent Fuel Accident.
 - A. **IF** the spent fuel release is unmonitored,
THEN
SELECT Un-Monitored Spent Fuel Accident with No other method available.

- 4.4.7 **IF** the source term is from a Waste Gas Decay Tank,
THEN
SELECT Waste Gas Decay Tank.

- 4.4.8 Enter the Site Meteorological Tower data as follows:
 - A. **SELECT** the applicable Site meteorological tower to be used in the assessment by checking the corresponding checkbox in the "Use" column of the Meteorological Data table.

 - B. **IF** multiple Site Towers are present,
THEN
SELECT the tower that best represents the release point height.

i	NOTE	i
	Only ONE on-site tower may be used at one time. Currently URI only uses the FCS meteorological tower for input.	

- C. **IF** the meteorological data is available from the plant computer system,
THEN
ENTER the Wind Speed in the appropriate units.
1. **ENTER** the Wind Direction the wind is coming **FROM**.
 2. **ENTER** the ΔT or the Stability Class directly.
- 4.4.9 **IF** the meteorological data is not available from the plant computer system,
THEN
SEE Attachment 2 for further instructions for determining Wind Speed, Wind Direction and Stability Class.
- 4.4.10 **SELECT** the precipitation status that best represents the current precipitation.
- A. **IF** precipitation is unknown,
THEN
SELECT "None" from the dropdown list. The following can be used as guidance:
- None – No rain or snow (most conservative).
 - Light Rain – Drizzle, < 0.1 inches / hour.
 - Moderate Rain – Heavy Drizzle, 0.1 to 0.3 inches / hour.
 - Heavy Rain – > 0.3 inches / hour.
 - Light Snow – Visibility > 0.63 miles.
 - Moderate Snow – Visibility 0.31 to 0.63 miles.
 - Heavy Snow – Visibility < 0.31 miles.
- 4.4.11 **ENTER** the optional Off-Site meteorological tower data as applicable.
- 4.4.12 **SELECT** the applicable tower(s).
- 4.4.13 **ENTER** the Wind Speed in the appropriate units.
- 4.4.14 **ENTER** the Wind Direction the wind is coming **FROM**.
- 4.4.15 **ENTER** the Stability Class Directly.

- 4.4.16 **IF** a stability class is not provided,
THEN
ENTER the same stability class that was used for the selected On-Site tower.
- 4.4.17 **SELECT** the precipitation status that best represents the current precipitation around the Off-Site tower site using the same criteria as described for the On-Site tower.
- 4.4.18 **DETERMINE** the Reactor Status as follows:
- A. **IF** the Source Term is Normal Coolant or Reactor Core Accident
AND for Non-ATWS events,
THEN
PERFORM the following:
1. **IF** the reactor is **NOT** shutdown,
THEN
ENSURE the Reactor Shutdown checkbox is unchecked.
 2. **IF** the reactor is shutdown,
THEN
PERFORM the following:
 - a. **CHECK** the Reactor Shutdown checkbox.
 - b. **ENTER** the Date and Time the reactor was shutdown.
- B. **IF** the Source Term is Normal Coolant or Reactor Core Accident
AND for ATWS events,
THEN
PERFORM the following:
1. **IF** the reactor power is $\geq 2\%$,
THEN
ENSURE the Reactor Shutdown checkbox is unchecked.
 2. **IF** the reactor power is $< 2\%$,
THEN
PERFORM the following:
 - a. **CHECK** the Reactor Shutdown checkbox.
 - b. **ENTER** the date and time the reactor power was reduced below 2%.

- 4.4.19 **IF** the Source Term is Spent Fuel Accident,
THEN
CHECK the Last Irradiated checkbox.
- 4.4.20 **IF** it can be determined when the fuel assemblies involved were last in the core,
THEN
ENTER the most recent date and time.
- 4.4.21 **IF** the date the fuel assembly was last in the reactor can not be determined,
THEN
PERFORM the following:
- A. **IF** the fuel involved in the accident was removed from the reactor within the last six months
OR it can not be determined,
THEN
SELECT New. The Reactor Status, Last Irradiated date will be set automatically.
 - B. **IF** the fuel involved in the accident was removed from the reactor more than six months ago,
THEN
SELECT Old. The Reactor Status, Last Irradiated date will be set automatically.
- 4.4.22 **IF** the source term is from a Waste Gas Decay Tank,
THEN
PERFORM the following:
- A. **IF** the Date and Time the tank was isolated can be determined,
THEN
CHECK the Reactor Status checkbox **and** **ENTER** the date and time the tank was isolated.
 - B. **IF** the Date and Time can not be determined,
THEN
ENSURE the Reactor Status checkbox is **NOT** checked.
- 4.4.23 **IF** any other source term was selected,
THEN
ENSURE the Reactor Status checkbox is **NOT** checked.
- 4.4.24 **DETERMINE** the Release Duration (default is 4-hours).
- A. **ENTER** the estimated Release Duration.

4.4.25 **OPEN** the Pathways form to determine the release point Pathway as follows:

A. **SELECT** the pathway that **BEST** represents the release in progress.

i	<u>NOTE</u>	i
	Additional detail for each pathway, including available effluent monitors and methodologies, is available by hovering the mouse over each pathway button to the right of the form.	

4.4.26 **DETERMINE** the correct process reduction settings and (if applicable) Spent Fuel Pool condition using the descriptions in Attachments 11 and 12.

i	NOTE	i
	Depending on the selected pathway, reduction processes will be enabled or disabled. If disabled, then they are not included in the pathway reduction factor calculation.	

4.4.27 **DETERMINE** the methodology to be used for the dose assessment.

- A. Monitored Release – Uses installed effluent monitors. Go to Step (4.4.28).
- B. Containment Leakage – Uses the coolant or core conditions including percent core damage or containment high radiation monitor readings. Go to Step (4.4.31).
- C. RCS Leakage – Uses a Reactor Coolant System leak rate. Go to Step (4.4.34).
- D. Release Point Sample – Uses actual effluent sample results in uCi/cc. Go to Step (4.4.35).
- E. Field Team – Back calculates based on field team survey and sample results. Go to Step (4.4.36).
- F. Unmonitored Spent Fuel – Tab is selected when the Un-Monitored Spent Fuel Accident with No other method available check box is selected. There are no user inputs on the Tab frame. The Unmonitored spent fuel method uses extent of core involved, pool condition, process reduction factor, fuel damage condition and release duration to determine a gross release rate that is not scaled to any plant measurement. Go to Step (4.4.38).

4.4.28 Monitored Release

- A. **SELECT** the effluent most appropriate monitor.
- B. **ENTER** the monitor reading for the selected monitor.

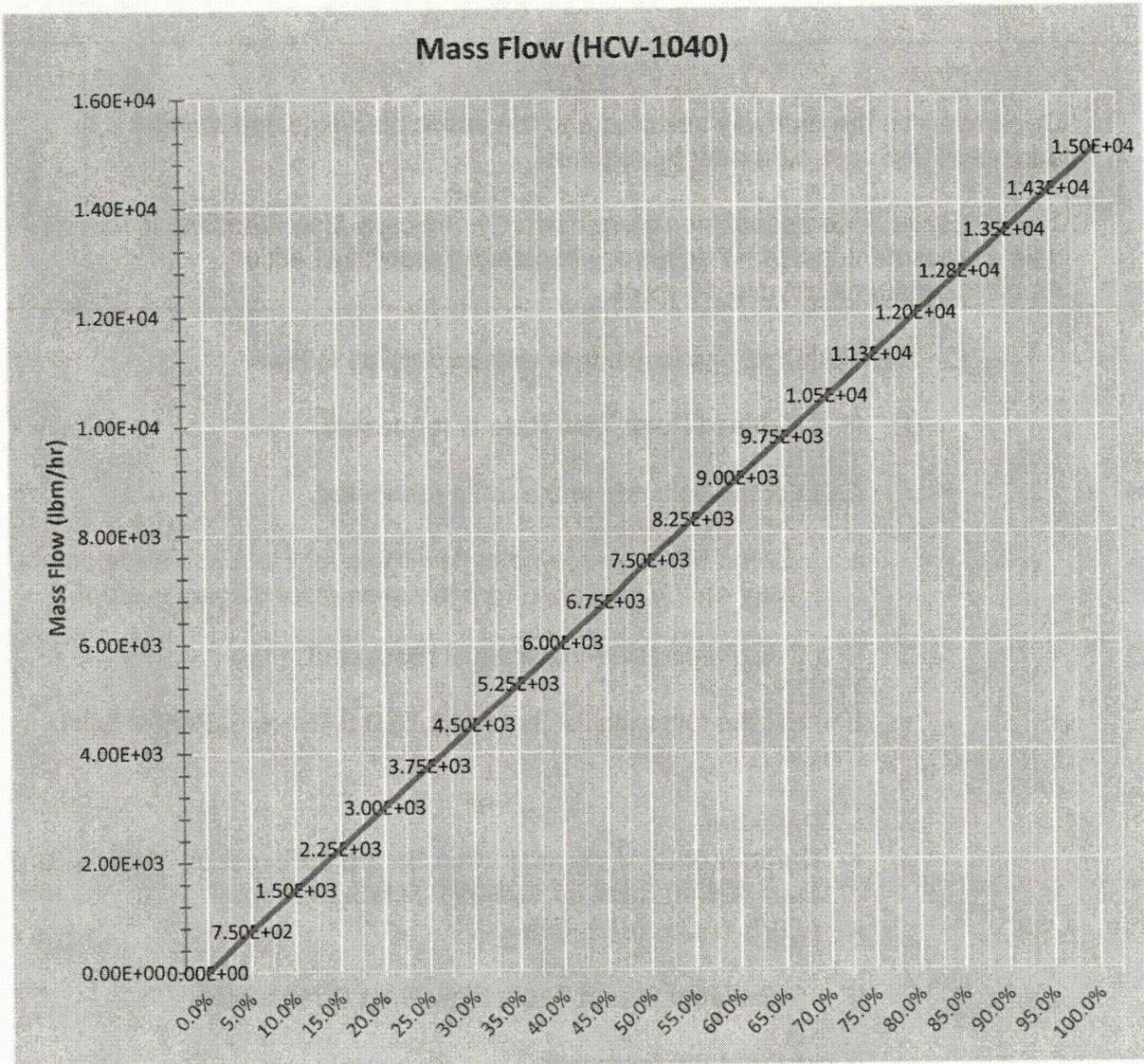
i	<u>NOTE</u>	i
	Depending on the pathway selected and the associated selected monitor additional flow rate data may be required.	
	Ten (10) mile dose assessments are normally selected. Use 50-miles, if 10-mile assessment indicated doses are exceeding protective action recommendations beyond 10-miles.	

C. **DETERMINE** applicable flow related data as follows:

1. **IF** a Release Point Flow Rate is requested,
THEN
ENTER the flow rate in the units requested.
 - a. Some sites release point flow rates for certain release points may not be available from the sites plant display system.

2. **IF** a Calculated S/G Flow Rate is requested,
THEN
ENTER the following for the **FAULTED STEAM GENERATOR ONLY**:
 - Pressure
 - Number of SRV's (Large Main Steam Safeties) or PORV's (Small Main Steam Safeties, MS-291 or MS-292) open
 - ADV's (HCV-1040) open

3. **IF** a Calculated Steam Table Flow Rate is requested,
THEN
PERFORM the following:
 - a. **SELECT** either Temperature or Pressure from the options **and** **ENTER** the corresponding system parameter.
 - b. **ENTER** the Mass Flow rate of the faulted generator only or ADV



- 4.4.29 **IF** all errors have been resolved,
THEN
PRESS the 10 Miles or 50 Miles button on the Process Assessment frame to run the dose assessment.

i	NOTE	i
	Use 50 miles if it is expected that the doses may exceed PARs at or beyond 10 miles. The 50 mile assessment does NOT provide doses within 10 miles. Use the 10 mile assessment for information within 10 miles.	

- 4.4.30 **GO TO** "Dose Assessment Results" below.
- 4.4.31 Containment Leakage
- A. **SELECT** the appropriate Method from any enabled options.
- B. **IF** % Fuel Damage is selected,
THEN
ENTER the percent damage that corresponds to the Source Term, Type of Damage (Clad or Melt).
- C. **IF** the Containment Radiation Monitor is selected,
THEN
ENTER the corresponding high range radiation monitor reading.
- D. **DETERMINE** the appropriate containment gas space volume Release Mode from the enabled options as follows:
1. **SELECT** "Leakage" when using the default percent primary containment leakage or a percent leakage determined through calculation.
 2. **ENTER** the leak rate as a percent. To determine the preset default leakage, hover the mouse over the textbox.
 3. **IF** the primary containment gaseous volume is leaking due to isolation failures, such as open valves or failed penetrations that do not meet the requirement of a Catastrophic Failure,
THEN
SELECT "Failure to Isolate".
 4. **IF** the primary containment has at least a 1-ft² hole providing a direct release path to the environment,
THEN
SELECT "Catastrophic Failure".

5. **SELECT** "Calc'd Cont. Leak Rate" when using a calculated leak rate and **ENTER** the leak rate in cfm. Default is 1.5-cfm (0.2%/24-hrs)

- 4.4.32 **IF** all errors have been resolved,
THEN
PRESS the 10 Miles or 50 Miles button on the Process Assessment frame to run the dose assessment.

i	NOTE	i
	Use 50 miles if it is expected that the doses may exceed PARs at or beyond 10 miles. The 50 mile assessment does NOT provide doses within 10 miles. Use the 10 mile assessment for information within 10 miles.	

- 4.4.33 **GO TO** "Dose Assessment Results" below.

- 4.4.34 RCS Leakage

- A. **SELECT** the appropriate Method from any enabled options.
- B. **IF** % Fuel Damage is selected,
THEN
ENTER the percent damage that corresponds to the Source Term, Type of Damage (Clad or Melt).
- C. **DETERMINE** the appropriate RCS liquid leakage Release Mode from the enabled options as follows:
1. **IF** the leak rate is unknown,
THEN
SELECT "Unknown Leak Rate".
 2. **IF** the leak rate is known,
THEN
SELECT "Calculated RCS Leak Rate" and **ENTER** the coolant leak rate in gpm.
- D. **IF** all errors have been resolved,
THEN
PRESS the 10 Miles or 50 Miles button on the Process Assessment frame to run the dose assessment

i	NOTE	i
	Use 50 miles if it is expected that the doses may exceed PARs at or beyond 10 miles. The 50 mile assessment does NOT provide doses within 10 miles. Use the 10 mile assessment for information within 10 miles.	

E. **GO TO** "Dose Assessment Results" below.

4.4.35 Release Point Sample

A. **ENTER** the release point flow rate in cfm.

B. **ENTER** the release concentrations in $\mu\text{Ci/cc}$ for each corresponding isotope.

i	NOTE	i
	Release point sample should be used only if noble gas, iodine and particulate data is available. Leaving a class of effluent blank will cause the dose assessment to be incomplete but if values are actually zero, that is acceptable for a complete dose assessment.	

C. **IF** all errors have been resolved,
THEN
PRESS the 10 Miles or 50 Miles button on the Process Assessment frame to run the dose assessment.

i	NOTE	i
	Use 50 miles if it is expected that the doses may exceed PARs at or beyond 10 miles. The 50 mile assessment does NOT provide doses within 10 miles. Use the 10 mile assessment for information within 10 miles.	

D. Go to "Dose Assessment Results" below.

4.4.36 Field Team results

A. **ENTER** the downwind distance in miles the sample was taken. The program assumes the sample was taken at or close to the plume centerline.

i	NOTE	i
	Distance may not exceed 10 miles and 50 mile assessments are not available in the Field Team method.	

B. **ENTER** the closed window exposure rate in mR/hr.

4.4.37 Field Team air sample results

- A. **IF** a field team air sample **IS** available,
THEN
PERFORM the following:
1. **USE** the air sample calculator tool in URI to calculate a field team sample result as described in Attachment 4.
 2. **IF** the concentration is < the calculated Lower Limit of Detection (LLD),
THEN
ENTER 0,
OTHERWISE
ENTER the I-131 concentration in $\mu\text{Ci/cc}$.
- B. The Air Sample Calculator provides a button to transfer the air sample result to the field team assessment form.
- C. **IF** a field team air sample result is **NOT** available,
THEN
BLANK the I-131 concentration value. Do **NOT** enter 0. Entering zero will cause the iodine and particulate source term to be set to zero.
- D. **ENTER** the time the field team survey data was taken.
- E. **IF** all errors have been resolved,
THEN
PRESS the 10 Miles button on the Process Assessment frame to run the dose assessment.
- F. **GO TO** "Dose Assessment Results" below.

4.4.38 Unmonitored Spent Fuel

- A. **IF** all errors have been resolved,
THEN
PRESS the 10 Miles or 50 Miles button on the Process Assessment frame to run the dose assessment.

i	<u>NOTE</u>	i
	Use 50 miles if it is expected that the doses may exceed PARs at or beyond 10 miles. The 50 mile assessment does NOT provide doses within 10 miles. Use the 10 mile assessment for information within 10 miles.	

B. **GO TO** "Dose Assessment Results" below.

4.4.39 Dose Assessment Results

A. To print or preview the dose assessment results, **SELECT** one of the options from the toolbar on the assessment method tab. The following reports are available.

1. Dose Assessment Report - This report contains assessment results and release information. It may be:
 - a. Previewed from the print preview toolbar button (page and magnifying glass icon).
 - b. Printed to the default printer from the print toolbar button (printer icon).
 - c. Printed to a Microsoft XPS document file from the print toolbar button (printer icon). The file can be attached to e-mail or WebEOC forms for distribution and viewed via Microsoft's Internet Explorer.
2. Receptor Point Report – This report contains calculated values for the predetermined receptor points. It may be:
 - a. Previewed from the print preview toolbar button.
 - b. Printed to the default printer from the print toolbar button.
 - c. Printed to a Microsoft XPS document file from the print toolbar button. The file can be attached to e-mail or WebEOC forms for distribution and viewed via Microsoft's Internet Explorer.
3. Evacuation Area Graphic – Provides a graphic of the sectors / areas that exceed the General Emergency Protective Action Guideline values for this dose assessment only (globe icon). This graphic is printed on the dose assessment report.

4. Results may be viewed or printed on a map. From the Detailed Assessment main menu or toolbar, **SELECT** View => View Receptor Point Locations or select the world icon at the upper left.
 - a. **SELECT** the 2, 5 or 10 mile map to view for 10 mile assessment. 50 mile map view is preset for 50 mile assessment.
 - b. **SELECT** the footprint results for either TEDE Dose or CDE Thyroid Dose.
 - c. **SELECT** a map Zoom Level.
 - d. **SELECT** the Display Options
 - 1) RASCAL Sector Results – Draws the 36 NRC sectors on the map which represents the close in doses to ~ 2.25 miles (10 mile assessment) or ~ 11 miles (50 mile assessment). RASCAL sectors are 10° each, split into 8 distance segments. Sector 1 starts at 5° and arcs in a clockwise direction.
 - 2) RASCAL Puff Results – Draws the 41 x 41 grids on the map which represents the doses beyond 2.25 miles (10 mile assessment) or 10 miles (50 mile assessment). Column 1 is on the left with row 1 on the bottom.
 - 3) Sectors – Displays the classic 16, 22.5° sectors.
 - 4) Mile Circles – Displays the 2, 5 and 10 mile distances for 10 mile assessment and 10, 25 and 50 mile distances for 50 mile assessment.
 - 5) Receptor Points – Displays the preset points of interest. Additional information can be obtained by double clicking each point as needed.
 - 6) Show Balloon – Displays an information balloon when the mouse is dragged across the map.
 - e. **SELECT** Print Current View to print the contents of the map displayed in the window to the default printer.
 - f. **SELECT** Print View to XPS to print the contents of the map displayed in the window to a Microsoft XPS document file. The file can be attached to e-mail or Web forms for distribution and viewed via Microsoft's Internet Explorer.

- 4.4.40 **PROVIDE** the dose projection to the Dose Assessment Coordinator or Protective Measures Manager for comparison to the Emergency Action Levels and the Current Protective Action Recommendation.
- 4.4.41 No protective action recommendations are made by the dose assessment software. **USE** the protective action procedure to determine the appropriate response to the dose assessment results.

4.5 Sum Assessment

4.5.1 **SELECT** Sum Assessment from the File menu or toolbar (blue Sigma icon).

4.5.2 **DETERMINE** the summation as follows:

A. **SELECT** the existing assessment results to sum.

i	NOTE	i
	Summed assessments should be concurrent – within minutes of each other or ongoing and overlapping.	

B. **ENTER** (type or drag-and-drop) the file names in the file name grid.

i	NOTE	i
	10 and 50 mile assessments will not sum. Up to five concurrent assessments may be summed.	

C. **ENABLE** or **DISABLE** entered files by selecting the Include checkbox on each line.

4.5.3 Dose Assessment Results

A. To print or preview the dose assessment results, **SELECT** one of the options from the toolbar on the assessment method tab. The following reports are available.

1. Dose Assessment Report - This report contains assessment results and release information. It may be:
 - a. Previewed from the print preview toolbar button (page and magnifying glass icon).
 - b. Printed to the default printer from the print toolbar button (printer icon).
 - c. Printed to a Microsoft XPS document file from the print toolbar button (printer icon). The file can be attached to e-mail or WebEOC forms for distribution and viewed via Microsoft's Internet Explorer.
 - d. Evacuation Area Graphic – Provides a graphic of the sectors/areas that exceed the General Emergency Protective Action Guideline values for this dose assessment only (globe icon). This graphic is printed on the dose assessment report.

- e. Results may be viewed or printed on a map. From the Detailed Assessment main menu or toolbar, **SELECT** View => View Receptor Point Locations or select the world icon at the upper left.
2. **SELECT** the 2, 5 or 10 mile map to view for 10 mile assessment. 50 mile map view is preset for 50 mile assessment.
3. **SELECT** the footprint results for either TEDE Dose or CDE Thyroid Dose.
4. **SELECT** a map Zoom Level.
5. **SELECT** the Display Options:
 - a. RASCAL Sector Results – Draws the 36 NRC sectors on the map which represents the close in doses to ~ 2.25 miles (10 mile assessment) or ~ 11 miles (50 mile assessment). RASCAL sectors are 10° each, split into 8 distance segments. Sector 1 starts at 5° and arcs in a clockwise direction.
 - b. RASCAL Puff Results – Draws the 41 x 41 grids on the map which represents the doses beyond 2.25 miles (10 mile assessment) or 10 miles (50 mile assessment). Column 1 is on the left with row 1 on the bottom.
 - c. Sectors – Displays the classic 16, 22.5° sectors.
 - d. Mile Circles – Displays the 2, 5 and 10 mile distances for 10 mile assessment and 10, 25 and 50 mile distances for 50 mile assessment.
 - e. Receptor Points – Displays the preset points of interest. Additional information can be obtained by double clicking each point as needed.
 - f. Show Balloon – Displays an information balloon when the mouse is dragged across the map.
6. **SELECT** Print Current View to print the contents of the map displayed in the window to the default printer.
7. **SELECT** Print View to XPS to print the contents of the map displayed in the window to a Microsoft XPS document file. The file can be attached to e-mail or WebEOC forms for distribution and viewed via Microsoft's Internet Explorer.

- 4.5.4 **PROVIDE** the dose projection to the Dose Assessment Coordinator or Protective Measures Manager for comparison to the Emergency Action Levels and the Current Protective Action Recommendation.
- 4.5.5 No protective action recommendations are made by the dose assessment software. **USE** the protective action procedure to determine the appropriate response to the dose assessment results.

4.6 Liquid Dose Projections

- 4.6.1 **START** the Liquid Dose Project spread sheet using EXCEL.
- 4.6.2 **DETERMINE** if the liquid effluent monitors are available.

i	<u>NOTE</u>	i
	The liquid release software assumes no dilution.	

- A. In some cases the effluent monitors may not be available even if they are associated with a liquid release pathway due to plant conditions, such as loss of power, sample flow or detector failure.

- 4.6.3 **IF** the effluent monitor is available for a liquid pathway
THEN
ENTER the monitor count rate for that pathway and calculated the concentration
- A. **ENTER** the calculated concentration for that pathway in the WATER SAMPLE cell of the spread sheet.
- 4.6.4 **IF** the water sample was analyzed from the effluent pathway
OR is from runoff that was analyzed
THEN enter the total concentration in the WATER SAMPLE cell of the spread sheet.
- 4.6.5 **ENTER** the release flow rate in the RELEASE FLOW RATE cell of the spread sheet

i	<u>NOTE</u>	i
	<p>Missouri river flow rate can be found on the National Weather Service web page "Advance Hydrological Prediction Services" for near Decatur. Click on chart to display river flows.</p> <p>http://water.weather.gov/ahps2/hydrograph_to_xml.php?gage=dctn1&output=tabular</p>	

4.6.6 **ENTER** the River flow rate in the RIVER FLOWRATE cell of the spread sheet.

A. **IF** the river flow rate is unknown
THEN use 28,369-ft³/s.

i	<u>NOTE</u>	i
	<p>The EPA has not proposed a specific drinking water Protective Action Guideline at this time. The current EPA standard under the Safe Drinking Water Act is 4-mrem per year.</p>	

4.6.7 **PROVIDE** the dose projection to the Shift Manager, Dose Assessment Coordinator or Protective Measures Manager for comparison to the Emergency Action Levels and the Current Protective Action Recommendation.

4.6.8 No protective action recommendations are made by the dose assessment software. **USE** the protective action procedure to determine the appropriate response to the dose assessment results.

5.0 **RETENTION/RECORDS**

None

6.0 **REFERENCES AND COMMITMENTS**

None

7.0 **ATTACHMENTS**

7.1 Attachment 1, URI Computer Program Loading Instructions

7.2 Attachment 2, Alternate Meteorology Methodologies

7.3 Attachment 3, Pre-Calculated Release Point Flow Rates

7.4 Attachment 4, Air Sample and Thyroid Dose Calculations

- 7.5 Attachment 5, Conversion Calculations
- 7.6 Attachment 6, Distance and Bearing
- 7.7 Attachment 7, Time to Threshold
- 7.8 Attachment 8, EDE to TEDE Ratios
- 7.9 Attachment 9, Detailed Source Term Data
- 7.10 Attachment 10, left intentionally blank
- 7.11 Attachment 11, Process Reduction Factor Determination for Pressurized Water Reactors
- 7.12 Attachment 12, Spent Fuel Pool Status Selection

Attachment 1 - URI Computer Program Loading Instructions

In the event the URI computer program does not run when initiated, the following instructions are provided to allow for the loading of the program. Loading of the program should be performed by IT personnel when they are available. If IT is not available the user should attempt to go to another computer that has the URI software loaded and attempt to run it from there before attempting to load the software on another computer.

1.0 INSTRUCTIONS FOR LOADING THE URI PROGRAM

- 1.1 **LOCATE** the URI program disks in the Control Room, TSC, or EOF.
- 1.2 **LOCATE** the site URI program on the disk.
- 1.3 **COPY** the contents of the applicable URI program folder to a corresponding folder on the target computer.
 - 1.3.1 **IF** the folder already exists,
THEN it is recommended the entire folder be replaced with the folder on the disk.

i	<u>NOTE</u>	i
	The program files copied from the URI CD to the URI folder, sub folders and files are cannot be NOT read only. Files copied from CD are automatically set to read-only. URI must be able to read write to the folders and individual files or the program will not start properly. The RASCAL engine will give a "fatal Fortran error" if unable to write to the folder and other files (.e.g., MOBSPROC.dbg).	

- 1.4 **ATTEMPT TO** start the program by double clicking the URI executable file on the target computer.
- 1.5 An assessment must be run to ensure all the files are in place to complete the calculation and printing can be performed. It is recommended this be performed by someone who does **NOT** have administrative rights to the computer.
- 1.6 **IF** the program is being installed by IT,
THEN
VERIFY all common shortcuts to the program as time permits.

Attachment 2 - Alternate Meteorology Methodologies

1.0 INSTRUCTIONS

1.1 **IF** the site meteorological data is unavailable from the plant computer system, **THEN** **OBTAIN** the following data from another source:

- Wind Speed – Make sure the supplied speeds are in the same units as those used by the selected meteorological tower.
- Wind Direction FROM – If wind directions are supplied as compass points (N, NNE, NE, etc.) then they can be converted directly by double clicking the corresponding cell in the table and selecting the direction.
- Stability Class or Delta T – Make sure the supplied Delta T values are in the same units as those required in Tables 2-1

1.2 **OBTAIN** the data in the following preferred order

- Control Room Meteorological Instruments.
- National Weather Service via the NWS web site. See Table 2-1 for determination of Stability Class
- Broadcasted data such as alert radio systems, broadcast radio or television stations or transcribed automated data from local airports. See Table Attachment 2-1 for determination of Stability Class
- Direct Observation Estimate at the site. See Table Attachment 2-1 for determination of Stability Class

Table Attachment 2-1 Stability Class Determination using Observations							
Surface Wind Speed (mph)	Daytime Solar Radiation			Heavy Overcast Rain	Nighttime Conditions		
	<i>For moderate cloud cover move one column to the right</i>				Thin overcast (>1/2 cloud cover)	< 3/8 cloud cover	Heavy Overcast Rain
	Summer Clear Sky	Spring/Fall Clear Sky	Winter Clear Sky				
< 9.0	A	A-B	B	D	F	G	D
9.0	A-B	B	C	D	E	F	D
to 13.5	B	B-C	C	D	D	E	D
> 13.5	C	C-D	D	D	D	D	D

Attachment 4 - Air Sample and Thyroid Dose Calculations

1.0 **INSTRUCTIONS**

- 1.1 From the Detailed Assessment Form menu, **SELECT** Calculations => Air Sample Calculations.

i	<u>NOTE</u>	i
	Many of the options available on the form will not be active due to the particular air sampling and counting processes used at the individual sites. If not active proceed to the next step.	

- 1.2 **SELECT** the Particulate Filter counting equipment.
- 1.3 **IF** a particulate filter is not available,
THEN
SELECT "None".
- 1.4 **IF** the field team used a Count Rate Meter to count the particulate filter,
THEN
SELECT the specific meter used.
- 1.5 **ENTER** the count rate meter Background Count Rate in CPM.
- 1.6 **ENTER** the particulate filter gross Count Rate in CPM.
- 1.7 **IF** the field team used a Counter (scaler) to count the particulate filter,
THEN
SELECT the specific meter used.
- 1.8 **ENTER** the Background Count Time in minutes.
- 1.9 **ENTER** the Background counts.
- 1.10 **ENTER** the Filter Count Time in minutes.
- 1.11 **ENTER** the particulate filter gross counts.
- 1.12 **SELECT** the Iodine Cartridge counting equipment.
- 1.13 **IF** an iodine cartridge is not available,
THEN
SELECT "None".
- 1.14 **IF** the field team used a Count Rate Meter to count the iodine cartridge,
THEN
SELECT the specific meter used.

- 1.15 **ENTER** the count rate meter Background Count Rate in CPM.
- 1.16 **ENTER** the iodine cartridge gross Count Rate in CPM.
- 1.17 **IF** the field team used a Counter (scaler) to count the iodine cartridge,
THEN
SELECT the specific meter used.
- 1.18 **ENTER** the Background Count Time in minutes.
- 1.19 **ENTER** the Background counts.
- 1.20 **ENTER** the cartridge Count Time in minutes.
- 1.21 **ENTER** the cartridge gross counts.
- 1.22 **If** the sample was returned with a flow rate and a sample collection time, **then**
SELECT "Utilize Flow Rate and Sample Collection Times"
- 1.23 **SELECT** the appropriate flow rate, CFM or LPM.
- 1.24 **ENTER** the sample flow rate.
- 1.25 **ENTER** the sample collection time in minutes.
- 1.26 **IF** the sample was returned with a total flow,
THEN
SELECT "Enter Total Flow".
- 1.27 **SELECT** the appropriate volume units, Cubic Feet or Liters.

- 1.28 **ENTER** the total sample flow.
- 1.29 Once all errors have been resolved, particulate filter and iodine cartridge results in $\mu\text{Ci/cc}$ will be calculated along with a Lower Limit of Detection (LLD)
- 1.30 If the net sample results are below the calculated LLD, the LLD in the corresponding units will be displayed. The resultant value will **NOT** be used in the calculated total I-131 concentration.
- 1.31 If the net sample results are at or above the calculated LLD, the calculated I-131 concentration will be displayed. The resultant value will be used in the calculated total I-131 concentration.
- 1.32 **PRESS** the "Transfer to Field Team Calc" button to automatically enter the calculated total I-131 concentration in the I-131 Conc. textbox on the Field Team tab.
- 1.33 **IF** an Optional Estimated Thyroid Dose Calculation is needed,
THEN
ENTER the time the team was in the plume in hours in the Exposure Time textbox. The estimated Thyroid Dose in rem will be calculated.
- 1.34 **PRESS** Print to print the sample results report.
- 1.35 **PRESS** Cancel to exit and close the form.

Attachment 5 - Conversion Calculations

URI provides methods to perform conversion calculations to recalculate data obtained from other non-standard sources to units usable within URI. Conversion calculations exist to convert:

- Concentrations and flow rates to release rates
- Distances
- Velocities
- Volumes

From the Detailed Assessment form menu, **SELECT** Calculations => Conversion Calculations

ENTER the value(s) into the appropriate textboxes

SELECT the units to match the entered value(s)

SELECT the units to convert to.

Attachment 6 - Distance and Bearing

1.0 INSTRUCTIONS

- 1.1 URI provides methods to determine distance and bearing from any two points given a latitude and longitude of each. These can be either predetermined fixed points or any two points consisting of a latitude and longitude. This can be useful if field teams return survey result locations in geographic coordinates.
- 1.2 From the Detailed Assessment form menu, **SELECT** Calculations => Distances and Bearings
- 1.3 **SELECT** the data format to use for inputting coordinates.
- 1.4 **SELECT** the method which best meets the data supplied
- 1.5 Point to Point – Determines the distance and bearing based strictly on predetermined receptor points. The user cannot enter or modify any point locations
- 1.6 **SELECT** the Point A Receptor Point of interest.
- 1.7 **SELECT** the Point B Receptor Point of interest.
- 1.8 The Distance and Bearing will be calculated from Point A to Point B.
- 1.9 Point to Any Lat/Lon – Determines the distance and bearing based on a predetermined receptor point and any entered Latitude and Longitude.
- 1.10 **SELECT** the Point A Receptor Point of interest.
- 1.11 **ENTER** the Point B Latitude and Longitude. Latitudes north of the equator are **Positive** values. Longitudes west of the Prime Meridian are **Negative** values.
- 1.12 The Distance and Bearing will be calculated from Point A to Point B.
- 1.13 Any Lat/Lon to Any Lat/Lon – Determines the distance and bearing based on any entered Latitude and Longitude.
- 1.14 **ENTER** the Point A Latitude and Longitude. Latitudes north of the equator are **Positive** values. Longitudes west of the Prime Meridian are **Negative** values.
- 1.15 **ENTER** the Point B Latitude and Longitude. Latitudes north of the equator are **Positive** values. Longitudes west of the Prime Meridian are **Negative** values.
- 1.16 The Distance and Bearing will be calculated from Point A to Point B.

Attachment 7 - Time to Threshold

1.0 INSTRUCTIONS

- 1.1 URI provides a time to threshold report that calculates when the threshold will be exceeded at each of the predetermined RASCAL reporting distances. The report uses the highest dose calculated for each distance divided by the release duration to obtain a rate. This rate is then used to calculate the number of hours and minutes until each of the thresholds is exceeded. This report:
- 1.1.1 Does not account for any subsequent decay of deposited radionuclides over the displayed time frame.
 - 1.1.2 Reported times do not account for previously released doses or deposition due to previous releases.
 - 1.1.3 Thresholds are reported for the Unusual Event, Alert, Site Area Emergency and General Emergency classifications.
- 1.2 If no threshold value was set by the administrator for a classification N/A is reported.
- 1.3 If a calculated time to threshold exceeds 100 hours >100:00 is displayed.
- 1.4 **SELECT** the Print button to print the report to the default printer.

Attachment 8 - EDE to TEDE Ratios

1.0 INSTRUCTIONS

- 1.1 URI provides a report that calculates the ratios of EDE to TEDE with Iodine and without Iodine. These ratios are useful in determining how readings on external dosimeters (Deep Dose Equivalent) might correspond to TEDE values.
- 1.2 From the Detailed Assessment form menu, **SELECT** Calculations => EDE to TEDE Ratios
- 1.3 Ratios will be calculated for the key distances of 2, 5 and 10 miles.
- 1.4 EDE/TEDE Ratio with Iodine is an indication of the amount of iodine in the release mix. The greater the amount of iodine the greater the whole body dose that may not be measured on a self-reading dosimeter. As the ratio gets smaller (approaches 0) the actual TEDE will increase but will not be accounted for on the self-reading dosimeter. Dose limits should be adjusted accordingly to ensure TEDE is not exceeded if individuals such as field team members or emergency workers will be entering these areas.
- 1.5 Some states require these ratios to perform dose limit calculations. The calculated ratios can be printed and supplied to the state as needed.

Attachment 9 - Detailed Source Term Data

Though each URI printed dose assessment report provides a calculated release rate, additional source term data is available that might be useful to external entities performing dose assessments using other assessment programs. This report contains a complete listing of the isotopes of interest, isotopic half-life, process reduction factor effects and available fractions.

1. From the Detailed Assessment form menu, **SELECT** Calculations => Source Term Data
2. The calculated source term data will be displayed

Attachment 10 - Left Intentionally blank

Attachment 11 - Process Reduction Factor Determination for Pressurized Water Reactors

1.0 INSTRUCTIONS

1.1 DETERMINE the Holdup Times as follows:

- 1.1.1 **IF** the holdup time is not applicable to the actual release pathway,
THEN
SELECT Specific Time and **ENTER** 0 hours.
- 1.1.2 Turbine Building
- A. **SELECT** < 2 Hours if ventilation is running.
- B. **IF** ventilation is off,
THEN
SELECT best option based on estimated building leakage rate or
SELECT <2 hours if unknown.
- 1.1.3 Auxiliary Building
- A. **SELECT** < 2 Hours if ventilation is running
- B. **IF** ventilation is off,
THEN
SELECT best option based on estimated building leakage rate or
SELECT <2 hours if unknown.
- 1.1.4 Primary Containment
- A. **IF** the affected volume has remained static with no significant additions to the source term
AND a specific holdup time can be determined,
THEN
SELECT the appropriate range from the options provided
OR
SELECT the Specific Time option and **ENTER** the holdup time in hours.
- B. **IF** the affected volume has not remained static with significant additions to the source term,
THEN
SELECT < 2 hours. This is the normally selected option if fuel damage is on-going.

- C. IF 'Catastrophic Failure' is selected as the basis for flow for the dose assessment,
THEN
SELECT <2 hours.

1.2 **DETERMINE** the spray status as follows:

- 1.2.1 IF Spray is not applicable to the actual release pathway,
THEN
SELECT Off.

- 1.2.2 IF Spray is running,
THEN
SELECT On.

- 1.2.3 IF Spray is not running
OR the status of Spray can not be determined,
THEN
SELECT Off.

- 1.2.4 IF the volume has remained static with no significant additions to the source term
AND a specific spray time can be determined,
THEN
SELECT Specific Time option and ENTER the spray run time in hours. This is **NOT** a normally selected option if fuel damage is on-going.

1.3 **DETERMINE** filter status as follows:

- 1.3.1 IF the filter is not applicable to the actual release pathway,
THEN
SELECT Not Working.

- 1.3.2 IF the filter is working
OR the status of the filter can not be determined,
THEN
SELECT Working.

- 1.3.3 IF the filter is not working,
THEN
SELECT Not Working.

1.4 **DETERMINE** Steam Generator Status as follows:

- 1.4.1 IF the Steam Generator wide range level indicator is $\geq 100\%$,
THEN
SELECT Solid.

- 1.4.2 **IF** the Steam Generator wide range level indicator is $< 10\%$,
THEN
SELECT Dry.
- 1.4.3 **IF** the Steam Generator wide range level indicator is $\geq 10\%$ and $< 100\%$,
THEN
SELECT Boiling.
- 1.4.4 **IF** the Steam Generator water level can not be determined
AND is being fed secondary water,
THEN
SELECT Boiling,
OTHERWISE SELECT Dry.

Attachment 12 - Spent Fuel Pool Status Selection

1.0 INSTRUCTIONS

1.1 DETERMINE the spent fuel status as follows:

- 1.1.1 **IF** the spent fuel pool is normally cooled and the incident involves cooled fuel under water,
THEN
SELECT 'Under water'.
- 1.1.2 **IF** the spent fuel pool is draining, fuel is overheating, the pool may be boiling, but there is still some heat removal and the fuel is not yet on fire,
THEN
SELECT 'Partially Covered'.
- 1.1.3 **IF** the pool is essentially dry and a Zr – air reaction (fire) has begun,
THEN
SELECT 'Dry'.
- 1.1.4 **IF** dry cask incident,
THEN
SELECT Dry Cask.