



10 CFR 50.54(q)  
10 CFR 50.4(b)(5)

LR-N19-0104

November 15, 2019

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Salem Nuclear Generating Station, Units 1 and 2  
Renewed Facility Operating License Nos. DPR-70 and DPR-75  
NRC Docket Nos. 50-272 and 50-311

Hope Creek Generating Station  
Renewed Facility Operating License No. NPF-57  
NRC Docket No. 50-354

Subject: Emergency Plan Document Revision Implemented October 30, 2019

Pursuant to 10 CFR 50.54(q) and 10 CFR 50.4(b)(5), PSEG Nuclear LLC (PSEG) is submitting 10 CFR 50.54(q) Summary Analysis Report, numbered 2019-55, for the Emergency Plan Document revision implemented on October 30, 2019 (Attachment 1). A copy of the revised Emergency Plan document has been included in its entirety as Enclosure 1.

There are no regulatory commitments contained in this letter.

Should you have any questions, or require further information regarding this submittal, please contact Mr. Phil Quick, at (856) 339-3262.

Respectfully,

A handwritten signature in black ink, appearing to read "S. Barr".

Stephen T. Barr  
Manager, Emergency Preparedness

Attachment 1 – 10 CFR 50.54(q) Summary Analysis Report: 2019-55

Enclosure 1 – Emergency Plan Document Revisions

cc (with Attachment 1): USNRC Administrator, Region I  
USNRC Project Manager  
USNRC Senior Resident Inspector, Salem  
USNRC Senior Resident Inspector, Hope Creek  
(without Enclosures): NJDEP Bureau of Nuclear Engineering  
PSEG Corporate Commitment Tracking Coordinator  
PSEG Station Commitment Tracking Coordinator

**ATTACHMENT 1**

**10 CFR 50.54(q) Summary Analysis Report:  
2019-55**

**ATTACHMENT 3**  
**10CFR50.54(q) SUMMARY ANALYSIS REPORT**

Page 1 of 2  
Revision 0

**50.54Q I.D. Number:** 2019-55

**50.54Q Title:** NC.EP-EP.ZZ-0314(Q), Rev. 0, Offsite Dose Assessment Using the Unified Rascal Interface

(Doc #, Rev. #, Name, If applicable)

**Description of the change made to the Emergency Plan/Procedures:**

New procedure that provides instruction on using the Unified Rascal Interface (URI) as a backup for the primary dose assessment software program, Meteorological Information and Dose Assessment System (MIDAS). URI will only be used in the event that MIDAS cannot be utilized.

**Description of why the change is editorial (if not editorial, N/A this block):**

N/A

**Description of the licensing basis affected by the change to the Emergency Plan/Procedure (if not affected, omit this element):**

Emergency Plan Section 10 discusses dose assessment capabilities and specifically discusses the capabilities of the MIDAS dose assessment software. URI will be implemented as a backup with similar capabilities but will not be used as a replacement for MIDAS. Implementation of URI does not supersede the conditions discussed in this section and satisfies the ability to perform dose assessment if all installations of the MIDAS software were to be determined as unavailable.

Emergency Plan sections 3 and 9 also discuss the assignments of ERO positions to perform dose assessment and the capabilities of the TSCs and EOF to perform "computerized dose assessment".

**A description of how the change to the Emergency Plan/Procedures still complies with regulation:**

10CFR50 Appendix E discusses the need to have capability to perform dose projection using real-time meteorological information and to have a description of how these projections will be made. Implementation of URI and the associated procedure will continue to meet this requirement in the event that MIDAS is determined to be unavailable in all emergency response facilities.

**ATTACHMENT 3**  
**10CFR50.54(q) SUMMARY ANALYSIS REPORT**

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Revision 0

**50.54Q I.D. Number:** 2019-55

**50.54Q Title:** NC.EP-EP.ZZ-0314(Q), Rev. 0, Offsite Dose Assessment Using the Unified Rascal Interface

(Doc #, Rev. #, Name, If applicable)

A description of why the proposed change was not a reduction in the effectiveness of the Emergency Plan/Procedure:

URI and the associated procedure is being added as a backup to MIDAS, the primary dose assessment software. This is an enhancement to the dose assessment program and does not represent a reduction in effectiveness of the PSEG Nuclear Emergency Plan.

**ENCLOSURE 1**

**Emergency Plan Document Revision  
Implemented on October 30, 2019**

**PSEG NUCLEAR L.L.C**  
**PSEG Nuclear Common**  
**EMERGENCY PREPAREDNESS**  
**NC.EP-EP.ZZ-0314(Q) - Rev. 0**

**OFFSITE DOSE ASSESSMENT USING THE UNIFIED RASCAL INTERFACE**

**ADHERENCE LEVEL:** LEVEL 2 - REFERENCE USE

Biennial Review Performed:    Yes ☐    No ☒

Configuration Change Packages and Affected Document Numbers incorporated into this revision:

- None

OTSCs incorporated into this revision:

- None

Operational Experience (OPEX) incorporated into this revision:

- None

Revision Summary	
Location	Description of Change
	<ul style="list-style-type: none"><li>• New procedure.</li></ul>

# OFFSITE DOSE ASSESSMENT USING THE UNIFIED RASCAL INTERFACE

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**OFFSITE DOSE ASSESSMENT USING THE UNIFIED RASCAL  
INTERFACE**

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**1.0 PURPOSE AND SCOPE****1.1 Purpose**

- 1.1.1. This procedure provides the methods and instructions for performing offsite dose assessment using the Unified RASCAL Interface (URI) by the EOF Duty Dose Assessors.
- 1.1.2. URI is the backup dose assessment software. MIDAS should be used in all cases unless identified as unavailable by the RAC or RSM.

**1.2 Scope**

- 1.2.1. None

**2.0 PRECAUTIONS AND LIMITATIONS****2.1 Precautions**

- 2.1.1. Sections/Steps in this procedure may be **PERFORMED** in the order deemed appropriate for the emergency situation. Only Sections/Steps that are applicable to the specific URI dose assessment mode of operation being **PERFORMED** need to be followed. \_\_\_\_\_
- 2.1.2. Initials should be used in the place keeping sign-offs next to the step being **PERFORMED**. Place keeping may be suspended for simple and repetitive steps, after first use, if approved by supervisor in accordance with HU-AA-104-101. \_\_\_\_\_
- 2.1.3. When performing dose assessment for Salem the R-46 Main Steam Line Monitor should only be use as an effluent monitor if a primary to secondary leak is occurring and the Steam Generator is releasing directly to atmosphere through the safety relief valve(s) SRV or through the atmospheric vent (MS-10). If the R-46 monitor is changing, verification of an atmospheric pathway should be obtained. \_\_\_\_\_

**2.2 Limitations**

- 2.2.1. This procedure is used for dose assessment during emergencies for the purposes of providing input to protective action decisions. The Integration Assessment mode is not addressed in this procedure as it is solely used to perform evaluation after the event. \_\_\_\_\_
- 2.2.2. Prior to starting dose assessment activities determine the active effluent pathways by checking for effluent flows. \_\_\_\_\_
- Hope Creek - NPV, SPV, FRVS and HTV
  - Salem - Plant Vent (Steam Generator to Atmosphere must be determined by visual observations)

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- 2.2.3. Dose Assessment should be performed using 10 or 15 minute average radiation monitor system (RMS) and meteorological (MET) data. **IF** instantaneous monitor readings quickly increase by > a factor of 10 instantaneous data may be used but

**THEN** shall be followed up with 10-15 minute average data when considering a change to Protective Actions. All input parameters are entered into URI manually.

---

- 2.2.4. URI can only calculate doses for a single release pathway at one time. **IF** releases are occurring via multiple release pathways

**THEN** individual dose assessments will need to be run for each release separately and added together using the Summation process. When considering multiple release pathways and the highest release rate is more than a factor of 100 from other releases, these other pathways would not have to be included in the assessment.

---

- 2.2.5. **IF** there are multiple releases from Salem and/or Hope Creek

**THEN** Summation is used to add the offsite doses, for each pathway, to allow decision makers to determine if the projected dose will exceed the EPA Protective Action Guideline (PAG) of >1,000 mRem TEDE or >5,000 mRem Thyroid CDE beyond the Site Boundary.

---

- 2.2.6. 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 but are described in separate attachments or forms or are described in the URI User manual/Annex documents. These are listed in the references section of the procedure.
- 

### **3.0 PREREQUISITES**

#### **3.1 Responsibilities**

- 3.1.1. The EOF Duty Dose Assessor will:
- 

- **ENSURE** dose assessment systems are operable when the EOF is staffed and start evaluation of radiological conditions prior to activation, dose assessment will be initiated as directed by the Radiological Support Manager. Dose Assessment results are not included with the Station Status Checklist (SSCL) until a declared release is in progress.
- **MONITOR** radiological and meteorological parameters and **PERFORM** additional dose assessments periodically and as conditions change.

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- **INFORM** the Radiological Support Manager (RSM) when conditions change.

**NOTE**

This is an administrative procedure and the procedure actions may be performed in any sequence or may not apply.

For definitions of terms refer to Attachment 13.

**4.0 INSTRUCTIONS****4.1 Start-Up**

4.1.1. **START** the URI application for the affected site. Either URI Hope Creek or URI Salem (Salem URI is used for both units). (If multiple releases both URI Salem and URI Hope Creek can be open on the same computer simultaneously.)

4.1.2. **IF** the program fails to start or has fatal error,  
  
**THEN GO TO** another computer where URI is installed and/or request IT assistance from the IT Supervisor in the EOF.

4.1.3. **IF** dose assessments are being run during a drill or exercise,  
  
**THEN** the 'Print "This is a Drill" on all reports' checkbox option shall be checked, on the initial screen. This will automatically indicate that the data is for a drill on all printed or viewed reports.

4.1.4. **SELECT** Rapid Assessment from the File menu or toolbar (Lightning Bolt icon) (Detailed Assessment is the preferred method in the EOF.) (Section 4.2)

**OR**

4.1.5. **SELECT** Detailed Assessment from the File menu or toolbar (Cloud icon) (Section 4.3).

4.1.6. **IF** assessment data is already available,  
  
**THEN SELECT** Sum Assessment from the file menu or toolbar (blue Sigma icon) (Section 4.4) when it's desired to evaluate multiple pathways for a PAR decision.

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## 4.2 Rapid Dose Assessment (if available)

4.2.1. **DETERMINE** the Source Term as follows:

1. **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". \_\_\_\_\_

2. **IF** the Fuel Clad barrier remains intact per the Emergency Action Levels,

**THEN**

- a. **SELECT** Fuel Clad Damage as "No".

- b. **IF** the Reactor Power Level has changed by >15% / hour since the start of the event,

**THEN SELECT** Conditions for Coolant Spiking as "Yes",

**OTHERWISE SELECT** Conditions for Coolant Spiking as "No". \_\_\_\_\_

3. **IF** damage has occurred to spent fuel,

**THEN SELECT** "Damaged Spent Fuel Assembly". \_\_\_\_\_

4.2.2. **DETERMINE** the Reactor Shutdown status as follows:

1. For Non-ATWS events (BWR) or Non-ATWT events (PWR):

- a. **IF** the reactor is NOT shutdown,

**THEN ENSURE** the "Reactor Shutdown" checkbox is unchecked. \_\_\_\_\_

- b. **IF** the reactor is shutdown, **THEN**

(1) **CHECK** the "Reactor Shutdown" checkbox. \_\_\_\_\_

(2) **ENTER** the Date and Time the reactor was shutdown. \_\_\_\_\_

- c. **IF** a spent fuel event, **THEN**

(1) **CHECK** the "Last Irradiated" checkbox. \_\_\_\_\_

(2) **ENTER** the Date and Time core with the involved fuel assembly was last shutdown. \_\_\_\_\_

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2. For ATWS events (BWR) or ATWT events (PWR):
- a. **IF** the reactor power is  $\geq 5\%$ ,  
  
**THEN ENSURE** the "Reactor Shutdown" checkbox is unchecked. \_\_\_\_\_
  - b. **IF** the reactor power is  $< 5\%$ , **THEN**
    - (1) **CHECK** the "Reactor Shutdown" checkbox. \_\_\_\_\_
    - (2) **ENTER** the Date and Time the reactor power was reduced below 5%. \_\_\_\_\_
  - c. **SELECT** the "Release Point Pathway" that best represents the release in progress. Additional detail for each pathway, including available effluent monitors, is available by hovering the mouse over each pathway description. \_\_\_\_\_
  - d. **SET** the meteorological data as follows:
    - (1) **SELECT** the applicable meteorological tower (in URI different elevations are considered separate towers) by checking the corresponding checkbox in the "Use" column of the Meteorological Data table. **IF** multiple towers are present,  
  
**THEN SELECT** the tower that best represents the release point height. \_\_\_\_\_

## NOTE

Only ONE on-site tower may be selected for any single assessment.

- (2) **IF** the meteorological data is available from the plant computer system, **THEN**
  - **ENTER** the Wind Speed in mph for the appropriate tower. \_\_\_\_\_
  - **ENTER** the Wind Direction the wind is coming **FROM** for the appropriate tower. \_\_\_\_\_
  - **ENTER** the  $\Delta T$ , if  $\Delta T$  is not available enter the Stability Class letter. \_\_\_\_\_

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- **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. \_\_\_\_\_

- **SELECT** the precipitation status that best represents the current precipitation. **IF** precipitation is unknown,

**THEN SELECT** "None" from the dropdown list. The following can be used as guidance: \_\_\_\_\_

- None - No rain or snow.
- 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.

- e. **DETERMINE** the Release Duration by either using the default of 4.0 hours or an estimate provided by Operations or Engineering:

(1) **ENTER** the estimated Release Duration. \_\_\_\_\_

- f. **DETERMINE** if the effluent monitors are available. 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. \_\_\_\_\_

- g. **IF** effluent monitors are available for the selected pathway,

**THEN SELECT** Yes. This is the preferred method for performing dose assessments. \_\_\_\_\_

- h. **IF** multiple monitors or multiple lists of monitors are presented,

**THEN SELECT** the appropriate monitor. \_\_\_\_\_

- i. **ENTER** the monitor reading for the selected monitor \_\_\_\_\_

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- j. Depending on the pathway selected and the associated selected monitor effluent flow rate data may be required. **DETERMINE** applicable flow as follows:

- (1) **IF** a Release Point Flow Rate is requested,

**THEN ENTER** the flow rate in the units requested from SPDS. (A default value should be present based on max capacity, if unknown use the default value.)

---

- (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 open
- Number of ADV's or PORV's open

- (3) **IF** a Calculated Steam Table Flow Rate is requested, **THEN**

- **SELECT** either Temperature or Pressure from the options and then **ENTER** the corresponding system parameter value.
  - **ENTER** the Mass Flow rate.
- 

- k. **IF** effluent monitors are NOT available for the selected pathway,

**THEN SELECT** No. Depending on the pathway selected the following options are available.

---

- l. **IF** the Estimated RCS Leak Rate option is enabled, **THEN**

- (1) **ENTER** the Reactor Coolant System leak rate in gpm. **OR**
- 

- (2) **SELECT** the "I Don't Know" option. An assumed leak rate will be calculated.
- 

- m. **IF** the Containment Leakage option is enabled, **THEN**

- (1) **ENTER** the High Range Area monitor reading. **OR**
-

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- (2) **SELECT** the "No Monitor Available or Applicable" option. Calculated damage assumptions will be used.
- 

- n. **IF** accident is spent fuel and monitors and containment leakage are not applicable, **THEN**

- (1) **SELECT** Unmonitored Damaged Spent Fuel Assembly.
- 

**NOTE**

If any errors are present there will be a message on the Process Assessment button frame and the "Calculation cannot be completed until all errors are resolved".

---

- o. **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.

---

**NOTE**

1. Calculating doses out to 10 miles would be assumed to be the usual choice in almost every situation even if a 50 mile calculation is also needed.
  2. Use 50 miles if it is expected that the doses may exceed PAGs 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.
- 

- p. If the estimated total release exceeds the available activity (e.g. total normal coolant inventory or total core inventory) by a pre-defined amount, a warning will be provided that the projected release may be excessive. The assessment may still be processed OR the assumptions in the assessment can be modified. If not modified the note will state "Total released activity exceeds the estimated available activity. Inventory comparison warning ratio of X.XX was OVERRIDDEN by the user."
- 

- q. **IF** the assessment total release warning occurs,

**THEN SELECT** whether to continue despite the warning or to return to the Rapid form to modify the assessment assumptions to reduce the projected activity.

---



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- r. **SELECT** Print or Print Preview from the Menu or Toolbar to view or print the dose assessment results. \_\_\_\_\_
- s. **PROVIDE** the dose projection to the Radiological Support Manager for comparison to the Emergency Action Levels and the Current Protective Action Recommendation. \_\_\_\_\_
- t. CAUTION: The report also contains the Recommended Classification. Disregard any Recommended Classifications by the URI dose assessment software. Use the protective action procedure to determine the appropriate response to the dose assessment results. **ENSURE** this section of the report is blacked out before transmission to any other organization, to avoid confusion. \_\_\_\_\_

## 4.3 ERO "Detailed" Dose Assessment

- 4.3.1. **SELECT** Detailed Assessment from the File menu or toolbar (Cloud icon). \_\_\_\_\_
- 4.3.2. **DETERMINE** the Source Term as follows:
  - 1. **DETERMINE** the Source Term for the assessment based on the core conditions and/or type of accident that has occurred. Discuss the Source Term conditions with the RSM if necessary. \_\_\_\_\_
  - 2. **IF** the source term is from the Reactor Coolant System (RCS) without core damage  
  
**THEN SELECT** Normal Coolant.
  - 3. **IF** any of the following have occurred:
    - The reactor has changed power level by >15% / hour since the start of the event.
    - A rapid depressurization of the RCS has occurred.
    - Chemistry has determined that an Iodine spike has occurred.**THEN CHECK** the Spiking checkbox. \_\_\_\_\_
  - 4. **IF** Spiking was selected,  
  
**THEN DETERMINE** the Spiking Factor. \_\_\_\_\_

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5. **IF** a post power change RCS DEI sample result is available,  
**THEN CALCULATE** the Spiking Factor as follows:
- a. **SELECT** Calculations => Spiking Factors from the menu  
and then **ENTER** the DEI concentration. \_\_\_\_\_
  - b. **IF** the calculated spiking factor is <1,  
**THEN ENTER** '1'. \_\_\_\_\_
  - c. **IF** the calculated Spiking Factor is >1 and < 1000,  
**THEN ENTER** the calculated value. \_\_\_\_\_
  - d. **IF** the calculated Spiking Factor is > 1000,  
**THEN ENTER** a value of 1000. \_\_\_\_\_
6. **IF** a post power change RCS sample is **not** available,  
**THEN ACCEPT** the default Spiking Factor, which is 30. \_\_\_\_\_

**NOTE**

RCS source term basis will allow special isotopes like tritium to be scaled to the other isotopes in the release since the release rates are based on the coolant release. Core damage source terms will not include tritium or other isotopes that are not related to the core inventory. Use Summation (discussed below) to include tritium or other special isotopes for core damage releases.

- 4.3.3. **IF** the source term is from the RCS with core damage,  
**THEN SELECT** Reactor Core Accident. \_\_\_\_\_
- 4.3.4. **SELECT** the Type of Damage (Clad/Melt) as determined by technical support. **IF** the information is not available,  
**THEN SELECT** Clad. \_\_\_\_\_
- 4.3.5. **IF** the source term is from spent fuel damage,  
**THEN SELECT** Spent Fuel Accident. \_\_\_\_\_

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- 4.3.6. **IF** the spent fuel release is unmonitored and other alternate source term estimates are unavailable,

**THEN SELECT** Un-Monitored Spent Fuel Accident with No other method available.

---

- 4.3.7. **IF** the source term is from a Waste Gas Decay Tank or other special mix not related to the core or coolant,

**THEN SELECT** the Waste Gas Tank.

---

- 4.3.8. **OPEN** the Pathways form to determine the release point Pathway as follows:

1. **SELECT** the pathway that best represents the release in progress.
- 

**NOTE**

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.

---

- 4.3.9. **DETERMINE** the correct process reduction settings and (if applicable) Spent Fuel Pool condition using the descriptions in the User's Guide and Attachments 10, 11, and 12. Default values will be initially selected based current selections if changes are appropriate the defaults can be changed.
- 

**NOTE**

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.

The default meteorological tower will be suggested for the pathway chosen unless directed otherwise the default tower should be used.

---

- 4.3.10. **ENTER** the Site Meteorological Tower data as follows:

1. **SELECT** the applicable Site meteorological tower (in URI different elevations are considered separate towers) to be used in the assessment by checking the corresponding checkbox in the "Use" column of the Meteorological Data table, if not previously checked when the pathway was selected.
-

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2. **IF** multiple Site Towers are present,

**THEN SELECT** the tower that best represents the release point height.

**NOTE**

Only ONE on-site tower may be used at one time.

3. **IF** the meteorological data is available from the plant computer system, **THEN**

- a. **ENTER** the Wind Speed in mph the appropriate tower.
- b. **ENTER** the Wind Direction the wind is coming **FROM** for the appropriate tower.
- c. **ENTER** the  $\Delta T$  or the Stability Class directly.

- 4.3.11. **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.

- 4.3.12. **SELECT** the precipitation status that best represents the current precipitation. **IF** precipitation is unknown,

**THEN SELECT** "None" from the dropdown list. The following can be used as guidance:

- None - No rain or snow.
- 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.

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4.3.13. **DETERMINE** the Reactor Status as follows:

1. **IF** the Source Term is Normal Coolant or Reactor Core Accident,  
**THEN**

- a. For Non-ATWS (BWR)/Non-ATWT (PWR) events **IF** the reactor is not shutdown,

**THEN ENSURE** the Reactor Shutdown checkbox is unchecked. \_\_\_\_\_

- b. **IF** the reactor is shutdown,

**THEN CHECK** the Reactor Shutdown checkbox. \_\_\_\_\_

- c. **ENTER** the Date and Time the reactor was shutdown. \_\_\_\_\_

- d. For ATWS (BWR)/ATWT (PWR) events

- (1) **IF** the reactor power is >5%,

**THEN ENSURE** the Reactor Shutdown checkbox is unchecked. \_\_\_\_\_

- (2) **IF** the reactor power is <5%, **THEN**

- **CHECK** the Reactor Shutdown checkbox. \_\_\_\_\_

- **ENTER** the date and time the reactor power was reduced below 5%. \_\_\_\_\_

- 4.3.14. **IF** the Source Term is Spent Fuel Accident,

**THEN CHECK** the Last Irradiated checkbox. \_\_\_\_\_

- 4.3.15. **IF** it can be determined when the fuel assemblies involved were last in the core,

**THEN ENTER** the date and time. \_\_\_\_\_

- 4.3.16. **IF** the date the fuel assembly was last in the reactor cannot be determined,

**THEN ENTER** the date of the most recent shutdown ended. \_\_\_\_\_

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4.3.17. **IF** the source term is from an Alternate mix (e.g. Waste Gas Decay Tank), **THEN**

1. **IF** the Date and Time the tank was isolated can be determined, **THEN**

a. **CHECK** the Decay From checkbox. \_\_\_\_\_

b. **ENTER** the date and time the tank was isolated. \_\_\_\_\_

2. **IF** the Date and Time cannot be determined,

**THEN ENSURE** the Decay From checkbox is **not** checked. \_\_\_\_\_

4.3.18. **IF** any other source term was selected,

**THEN ENSURE** the Reactor Shutdown checkbox is **not** checked. \_\_\_\_\_

4.3.19. **DETERMINE** the Release Duration by either of the following methods:

1. **ENTER** the estimated Release Duration or accept the default.  
**OR** \_\_\_\_\_

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

- Monitored Release - Uses installed effluent monitors. **GO TO** Step 4.3.21. \_\_\_\_\_
- Containment Leakage - Uses the coolant or core conditions including percent core damage or containment high radiation monitor readings. **GO TO** Step 4.3.24. \_\_\_\_\_
- RCS Leakage - Uses a Reactor Coolant System leak rate. **GO TO** Step 4.3.27. \_\_\_\_\_
- Release Point Sample - Uses actual effluent sample results in uCi/cc. **GO TO** Step 4.3.30. \_\_\_\_\_

## NOTE

This is the best way to include tritium in a core damage scenario. \_\_\_\_\_

- Field Team - Back calculates based on field team survey and sample results. **GO TO** Step 4.3.33. \_\_\_\_\_
- GRR (Gross Release Rates) - Uses either gross Particulate, Iodine and Noble Gas release rates or individual isotopic release rates in uCi/sec. **GO TO** Step 4.3.36. \_\_\_\_\_

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- Unmonitored Spent Fuel - Tab is automatically 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 4.3.39.

## 4.3.21. Monitored Release

1. **SELECT** the effluent pathway's most appropriate monitor.
2. **ENTER** the monitor reading for the selected monitor.

**NOTE**

Depending on the pathway selected and the associated selected monitor additional flow rate data may be required.

3. **DETERMINE** applicable flow related data as follows:
  - a. **IF** a Release Point Flow Rate is requested,  
  
**THEN ENTER** the flow rate in the units requested.  
Default values may be present and would be based on the maximum flow for the pathway, if available enter the actual flow from the pathway.
  - 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 open
    - Number of ADV's or PORV's open
  - c. **IF** the requested flow is for the HTV monitor,  
  
**THEN REFER** to NC.EP-EP.ZZ-0313, Attachment 5, Table 1 (HTV Flow Values). **DETERMINE** the Torus pressure from the HC SPDS and **FIND** the corresponding flow in Table 1, in cfm.

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- d. **IF** a Calculated Steam Table Flow Rate is requested,  
**THEN**
- (1) **SELECT** either Temperature or Pressure from the options and then **ENTER** the corresponding system parameter. \_\_\_\_\_
  - (2) **ENTER** the Mass Flow rate of the faulted generator only. \_\_\_\_\_

4.3.22. **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. \_\_\_\_\_

**NOTE**

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

4.3.23. **GO TO** Step 4.3.42, "Dose Assessment Results". \_\_\_\_\_

4.3.24. Containment Leakage

1. **SELECT** the appropriate Method from any enabled options. \_\_\_\_\_
2. **IF** % Fuel Damage is selected,  
  
**THEN ENTER** the percent damage that corresponds to the Source Term, Type of Damage (Clad or Melt). \_\_\_\_\_
3. **IF** the Containment Radiation Monitor is selected,  
  
**THEN ENTER** the corresponding high range radiation monitor reading. \_\_\_\_\_
4. **DETERMINE** the appropriate containment gas space volume Release Mode from the enabled options as follows.
  - a. **SELECT** "Leakage" when using the default percent primary containment leakage or a percent leakage determined through calculation. **ENTER** the leak rate as a percent. To determine the preset default leakage, hover the mouse over the textbox. \_\_\_\_\_



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- b. **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". \_\_\_\_\_

- c. **IF** the primary containment has at least a 1-ft<sup>2</sup> hole providing a direct release path to the environment,

**THEN SELECT** "Catastrophic Failure". \_\_\_\_\_

- d. **SELECT** "Calc'd Cont. Leak Rate" when using a calculated leak rate. ENTER the leak rate in cfm. \_\_\_\_\_

- e. **SELECT** "Venting using Pressure Change" when intentionally venting a pressurized containment to use a calculated average flow rate based on the containment volume, pressure change in PSIG and release duration. \_\_\_\_\_

- 4.3.25. **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. \_\_\_\_\_

**NOTE**

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

- 4.3.26. **GO TO** Step 4.3.42, "Dose Assessment Results". \_\_\_\_\_

- 4.3.27. RCS Leakage

1. **SELECT** the appropriate Method from any enabled options. \_\_\_\_\_

2. **IF** % Fuel Damage is selected,

**THEN ENTER** the percent damage that corresponds to the Source Term, Type of Damage (Clad or Melt). \_\_\_\_\_

3. **DETERMINE** the appropriate RCS liquid leakage Release Mode from the enabled options as follows:

- a. **IF** the leak rate is unknown,

**THEN SELECT** "Unknown Leak Rate". \_\_\_\_\_

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b. **IF** the leak rate is known,

**THEN SELECT** "Calculated RCS Leak Rate" and **ENTER**  
the coolant leak rate in gpm. \_\_\_\_\_

4.3.28. **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. \_\_\_\_\_

**NOTE**

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

4.3.29. **GO TO** Step 4.3.42, "Dose Assessment Results". \_\_\_\_\_

4.3.30. Release Point Sample

1. **ENTER** the release point flow rate in cfm. \_\_\_\_\_

2. **ENTER** the release concentrations in uCi/cc for each  
corresponding isotope. \_\_\_\_\_

3. For tritium or other special isotope not scaled to the core  
inventory:

a. **USE** Release Point Sample in combination with other  
scaling methods. \_\_\_\_\_

b. **IF** other scaling methods are used to determine the  
release rate of core activity, \_\_\_\_\_

**THEN ENTER ONLY** the tritium concentration for the  
Release Point Sample Method to include the tritium. \_\_\_\_\_

c. **IF** using Release Point Sample to add a special isotope  
like tritium, \_\_\_\_\_

**THEN DO NOT** include the other sample results IF  
another scaling method is used for the core inventory.  
Including the other sample results in combination with  
other scaling methods will duplicate the doses from the  
core inventory release. \_\_\_\_\_

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**NOTE**

Release point sample should be used only if noble gas, iodine and particulate data is available **OR** to include a special isotope like tritium that is not scaled to the core inventory. 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.

4.3.31. **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.

**NOTE**

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

4.3.32. **GO TO** Step 4.3.42, "Dose Assessment Results".

4.3.33. Field Team results

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

**NOTE**

Distance may not exceed 10 miles, so 50 mile assessments are not available in the Field Team method.

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

3. Field Team air sample results

- a. **IF** a field team air sample is available, **THEN**

- (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  $\mu\text{Ci/cc}$ .

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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. \_\_\_\_\_

**NOTE**

Field team air samples should not be used with very long (approx. greater than 10000 hours) decay times. With long decay times, the field team air sample is not used. \_\_\_\_\_

d. **ENTER** the time the field team survey data was taken. \_\_\_\_\_

4. **ENTER** a location where the sample was taken, if desired (optional). \_\_\_\_\_

4.3.34. **IF** all errors have been resolved, \_\_\_\_\_

**THEN PRESS** the 10 Miles button on the Process Assessment frame to run the dose assessment. \_\_\_\_\_

4.3.35. **GO TO** Step 4.3.42, "Dose Assessment Results". \_\_\_\_\_

4.3.36. Group Release Rates

1. **DETERMINE** the methodology as follows:

a. **IF** a total Noble Gas, Iodine, and Particulate release rate is available, \_\_\_\_\_

**THEN SELECT** "Total Noble Gas, Iodine, and Particulate Release Rates". \_\_\_\_\_

b. **ENTER** the release rate for each Group Release Rate. \_\_\_\_\_

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**NOTE**

Group Release Rate calculations should be used only if noble gas, iodine and particulate channel data is available. Leaving a class of effluent blank will cause the dose assessment to be incomplete by assuming that group is actually zero, but if values are actually zero, that is acceptable for a complete dose assessment.

- c. **IF** individual isotopic release rates are available,  
**THEN SELECT** "Individual Isotopic Release Rates".
- d. **ENTER** the release rates in  $\mu\text{Ci/sec}$  for each corresponding isotope.

**NOTE**

Group Release Rate individual isotopic release rate calculations should be used only if noble gas, iodine and particulate channel 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.

- 4.3.37. **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.

**NOTE**

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

- 4.3.38. **GO TO** Step 4.3.42, "Dose Assessment Results".

- 4.3.39. Unmonitored spent fuel

- 4.3.40. **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.

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**NOTE**

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

4.3.41. **GO TO** "Dose Assessment Results" below (4.3.42).

4.3.42. Dose Assessment Results

1. If the estimated total release exceeds the available activity (e.g. total normal coolant inventory or total core inventory) by a pre-defined amount, a warning will be provided that the projected release may be excessive. The assessment may still be processed OR the assumptions in the assessment can be modified. If the results are not modified a note will state that the "Total released activity exceeds the estimated available activity. Inventory comparison warning ratio of X.XX was OVERRIDDEN by the user."
2. **IF** the assessment total release warning occurs  
  
**THEN, SELECT** whether to continue despite the warning or to return to the "Detailed" form to modify the assessment assumptions.
3. 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.
  - a. Dose Assessment Report - This report contains assessment results and release information. It may be:
    - Previewed from the print preview toolbar button (page and magnifying glass icon).
    - Printed to the default printer from the print toolbar button (printer icon).
    - 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 a web browser.
  - b. Receptor Point Report - This report contains calculated values for the predetermined receptor points. It may be:
    - Previewed from the print preview toolbar button.

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- Printed to the default printer from the print toolbar button.
  - 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 a web browser.
- c. 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.
- d. 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.
- (1) **SELECT** the 2, 5 or 10 mile map to view for 10 mile assessment. 50 mile map view is preset for 50 mile assessment from the Map menu bar option.
- (2) **SELECT** the footprint results for either TEDE Dose or CDE Thyroid Dose from the Display menu bar option.
- (3) **SELECT** a map Zoom Level.
- (4) **SELECT** the Display Options from the Options menu bar selection.
- RASCAL Sectors - 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.
  - RASCAL Puffs - Draws the 41 x 41 grids on the map which represents the doses beyond 2.25 miles (10 mile assessment) or at and beyond 10 miles (50 mile assessment). Column 1 is on the left with row 1 on the bottom.

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- Sectors - Displays the classic 16, 22.5° sectors.
- 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.
- Receptor Points - Displays the preset points of interest. Additional information can be obtained by double clicking each point as needed.
- Show Balloon - Displays an information balloon when the mouse is dragged across the map.

(5) **SELECT** File / Print from the menu bar to print the contents of the map displayed in the window to the default printer.

---

(6) **SELECT** File / Print 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 a web browser.

---

4.3.43. **PROVIDE** the dose projection to the Radiological Support Manager for comparison to the Emergency Action Levels (EAL) and the Current Protective Action Recommendation. No Protection Action Recommendations (PAR) are suggested by this program.

4.3.44. **CAUTION:** The report also contains the Recommended Classification. Disregard any Recommended Classifications by the URI dose assessment software. Use the protective action procedure to determine the appropriate response to the dose assessment results. **ENSURE** this section of the report is blacked out before transmission to any other organization, to avoid confusion.

---

#### **4.4 Concurrent Assessment Summation**

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

---

4.4.2. **DETERMINE** the summation as follows:

1. **SELECT** the existing assessment results to sum.
-



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**NOTE**

- Summed assessments should be concurrent - within minutes of each other or ongoing and overlapping.
- Summation may be the best way to include special isotopes like tritium that are not included in the core inventory but are separately assessed from release point samples or other methods.

2. **ENTER** (type or drag-and-drop) the file names in the file name grid.
3. Details of the content of the included files can be viewed by hovering the mouse over the file name in the Summation form.

**NOTE**

- A mixture of 10 and 50 mile assessments will not sum.
- Up to five concurrent assessments may be summed.

4. **ENABLE** or **DISABLE** summation of individual entered files by selecting the 'Include' checkbox on each line.
5. **DELETE** files from the list using the red x icon.

**4.4.3. Dose Assessment Results**

1. **SELECT** one of the reports below and choose options from the toolbar on the assessment method tab to either print or preview the dose assessment results.
2. Dose Assessment Report - This report contains assessment results and release information. It may be:
  - Previewed from the print preview toolbar button (page and magnifying glass icon).
  - Printed to the default printer from the print toolbar button (printer icon).
  - 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 a web browser.

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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. Receptor Point Report - This report contains calculated values for the predetermined receptor points. It may be:
  - Previewed from the print preview toolbar button (page and magnifying glass icon).
  - Printed to the default printer from the print toolbar button (printer icon).
  - 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 a web browser.
5. 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 from the Map menu option. \_\_\_\_\_
  - b. **SELECT** the footprint results for either TEDE Dose or CDE Thyroid Dose from the Display menu option. \_\_\_\_\_
  - c. **SELECT** a map Zoom Level. \_\_\_\_\_
  - d. **SELECT** the Display Options from the Display menu selection. \_\_\_\_\_
    - RASCAL Sectors - 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.
    - RASCAL Puffs - Draws the 41 x 41 grids on the map which represents the doses beyond 2.25 miles (10 mile assessment) or at and beyond 10 miles (50 mile assessment). Column 1 is on the left with row 1 on the bottom.
    - Sectors - Displays the classic 16, 22.5° sectors.

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- 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.
- Receptor Points - Displays the preset points of interest. Additional information can be obtained by double clicking each point as needed.
- Show Balloon - Displays an information balloon when the mouse is dragged across the map.

- e. **SELECT** File / Print from the menu to print the contents of the map displayed in the window to the default printer.
- f. **SELECT** File / Print to XPS from the menu 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 a web browser.

4.4.4. **PROVIDE** the dose projection to the Radiological Support Manager.

4.4.5. CAUTION: The report also contains the Recommended Classification. Disregard any Recommended Classifications by the URI dose assessment software. Use the protective action procedure to determine the appropriate response to the dose assessment results. **ENSURE** this section of the report is blacked out before transmission to any other organization, to avoid confusion.

**4.5 Integration Assessments****NOTE**

Integration Assessments are available in the URI program but are not intended for use for making protective action recommendations by the ERO. Integrations are intended for longer term follow-up and overall assessment of an event later or after the fact. Instructions for Integration Assessments are provided in a separate document.

**END of Instructions****5.0 REFERENCES AND COMMITMENTS****5.1 Commitments**

5.1.1. None

**5.2 Performance References**

5.2.1. EP-Aid-025, Get Weather from NOAA

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**5.3 Developmental References**

- 5.3.1. 10CFR50.47(b)(14), Emergency Plans
- 5.3.2. 10CFR50, Appendix E.IV.F, Emergency Planning and Preparedness for Production and Utilization Facilities
- 5.3.3. NUREG 0654/FEMA-REP-1, Criteria for the Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants (and Supplements)
- 5.3.4. Unified RASCAL Interface User's Guide
- 5.3.5. Response Technical Manual RTM-Vol 1, Rev. 5
- 5.3.6. NUREG 1228 Source Term Estimation During Incident Response to Severe Nuclear Power Plant Accidents October 1988
- 5.3.7. Integration Assessment User Guide

**6.0 RECORDS**

- Manager - EP to ensure that procedure is retained as a record.

**OFFSITE DOSE ASSESSMENT USING THE UNIFIED RASCAL  
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In the event the URI computer program does not run when initiated, go to any other computer that has URI installed and run URI from that location. URI is installed on multiple computers in the EOF. If any further assistance is needed contact the IT Supervisor in the EOF.

For additional information refer to:

VTD #433147

Critical Software Package #A-5-ZZ-NCS-0443 Volume 2 is the URI Install / Recovery Software Media and can be retrieved from Records Management if necessary

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## Attachment 2, Alternate Meteorology Methodologies

A. IF the site meteorological data is unavailable from the plant computer system, THEN the following data will need to be obtained from another source:

- Wind Speed - **MAKE** sure the supplied speeds are in mph which are 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 EP-Aid 50, Determination of Stability Class. \_\_\_\_\_

B. **OBTAIN** the data in the following preferred order:

- Any other Emergency Facility SPDS computer. Network problems could possibly only cause issues in one facility or possibly more. \_\_\_\_\_
- Call the National Weather Service (NWS) in Mount Holly, NJ at 609-261-6604 (direct line to Duty Forecasters desk) or 609-261-6602 (main line to building). \_\_\_\_\_
- NWS Mount Holly Website Online use EP-Aid-025, Get Weather from NOAA. \_\_\_\_\_

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**Attachment 3, Pre-Calculated Release Point Flow Rates**

The values below are the maximum fan capacities for the indicated vent pathway.

Site	Point Description	Flow Rate
Salem	Plant Vent Effluent Fan	125,000 CFM
	Containment Leakage:	
	Design Basis 0.1% per day	1.82 CFM
	10% per day	1.82E+02 CFM
	100% per day	1.82E+03 CFM
	Catastrophic Failure 100% in one hour	4.37E+04 CFM
Hope Creek	FRVS Effluent Fan	9,000 CFM
	SPV Effluent Fan	440,000 CFM
	NPV Effluent Fan	41,600 CFM
	HTV (at Primary Containment Design Pressure)	6.29E+04 CFM
	Containment Leakage:	
	Design Basis 0.5% per day	1.10 CFM
	10% per day	2.13E+01 CFM
	100% per day	2.13E+03 CFM
	Catastrophic Failure 100% in one hour	5.11E+03 CFM

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## Attachment 4, Air Sample and Thyroid Dose Calculations

- From the Detailed Assessment Form menu, **SELECT** Calculations => Air Sample Calculations **IF AVAILABLE** \_\_\_\_\_
- **SELECT** the Particulate Filter counting equipment. \_\_\_\_\_
- IF a particulate filter is not available, THEN SELECT "None". \_\_\_\_\_
- IF the field team used a Count Rate Meter to count the particulate filter, THEN SELECT the specific meter used \_\_\_\_\_
- **ENTER** the count rate meter Background Count Rate in CPM. \_\_\_\_\_
- **ENTER** the particulate filter gross Count Rate in CPM. \_\_\_\_\_
- IF the field team used a Counter (scaler) to count the particulate filter, THEN SELECT the specific meter used. \_\_\_\_\_
- **ENTER** the Background Count Time in minutes. \_\_\_\_\_
- **ENTER** the Background counts. \_\_\_\_\_
- **ENTER** the Filter Count Time in minutes. \_\_\_\_\_
- **ENTER** the particulate filter gross counts. \_\_\_\_\_
- IF the field team used an Exposure Rate Meter to count the particulate filter, THEN SELECT the specific meter used. \_\_\_\_\_
- **ENTER** the Exposure rate meter Background in mR/hr. \_\_\_\_\_
- **ENTER** the particulate filter gross reading in mR/hr. \_\_\_\_\_
- **SELECT** the Iodine Cartridge counting equipment. \_\_\_\_\_
- IF an iodine cartridge is not available, THEN SELECT "None". \_\_\_\_\_
- IF the field team used a Count Rate Meter to count the iodine cartridge, THEN SELECT the specific meter used. \_\_\_\_\_
- **ENTER** the count rate meter Background Count Rate in CPM. \_\_\_\_\_
- **ENTER** the iodine cartridge gross Count Rate in CPM. \_\_\_\_\_



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## Attachment 4, Air Sample and Thyroid Dose Calculations (continued)

- IF the field team used a Counter (scaler) to count the iodine cartridge, THEN **SELECT** the specific meter used. \_\_\_\_\_
- **ENTER** the Background Count Time in minutes. \_\_\_\_\_
- **ENTER** the Background counts. \_\_\_\_\_
- **ENTER** the cartridge Count Time in minutes. \_\_\_\_\_
- **ENTER** the cartridge gross counts. \_\_\_\_\_
- IF the field team used an Exposure Rate Meter to count the iodine cartridge, THEN **SELECT** the specific meter used. \_\_\_\_\_
- **ENTER** the Exposure rate meter Background in mR/hr. \_\_\_\_\_
- **ENTER** the cartridge gross reading in mR/hr. \_\_\_\_\_
- IF the sample was returned with a flow rate and a sample collection time, THEN **SELECT** "Utilize Flow Rate and Sample Collection Times". \_\_\_\_\_
- **SELECT** the appropriate flow rate, CFM **or** LPM. \_\_\_\_\_
- **ENTER** the sample flow rate. \_\_\_\_\_
- **ENTER** the sample collection time in minutes. \_\_\_\_\_
- IF the sample was returned with a total flow, THEN **SELECT** "Enter Total Flow". \_\_\_\_\_
- **SELECT** the appropriate volume units, Cubic Feet **or** Liters. \_\_\_\_\_
- **ENTER** the total sample flow. \_\_\_\_\_

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## Attachment 4, Air Sample and Thyroid Dose Calculations (continued)

## NOTE

- 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).
- IF the net sample results are below the calculated LLD, THEN the LLD in the corresponding units will be displayed. The resultant value will not be used in the calculated total I-131 concentration.

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- **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.
- 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.
- **PRESS** Print to print the sample results report.
- **PRESS** Cancel to exit and close the form.

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**OFFSITE DOSE ASSESSMENT USING THE UNIFIED RASCAL  
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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. \_\_\_\_\_

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## Attachment 6, Distance and Bearing

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.

- From the Detailed Assessment form menu, **SELECT** Calculations => Distances and Bearings. \_\_\_\_\_
- **SELECT** the data format to use for inputting coordinates. \_\_\_\_\_
- **SELECT** the method which best meets the data supplied \_\_\_\_\_

Point to Point - Determines the distance and bearing based strictly on predetermined receptor points. The user cannot enter or modify any point locations.

- **SELECT** the Point A Receptor Point of interest. \_\_\_\_\_
- **SELECT** the Point B Receptor Point of interest. \_\_\_\_\_
- The Distance and Bearing will be calculated from Point A to Point B.

Point to Any Lat/Lon - Determines the distance and bearing based on a predetermined receptor point and any entered Latitude and Longitude.

- **SELECT** the Point A Receptor Point of interest. \_\_\_\_\_
- **ENTER** the Point B Latitude and Longitude. Latitudes north of the equator are **Positive** values. Longitudes west of the Prime Meridian are **Negative** values. \_\_\_\_\_
- The Distance and Bearing will be calculated from Point A to Point B.

Any Lat/Lon to Any Lat/Lon - Determines the distance and bearing based on any entered Latitude and Longitude.

- **ENTER** the Point A Latitude and Longitude. Latitudes north of the equator are **Positive** values. Longitudes west of the Prime Meridian are **Negative** values. \_\_\_\_\_
- **ENTER** the Point B Latitude and Longitude. Latitudes north of the equator are **Positive** values. Longitudes west of the Prime Meridian are **Negative** values. \_\_\_\_\_
- The Distance and Bearing will be calculated from Point A to Point B.

**OFFSITE DOSE ASSESSMENT USING THE UNIFIED RASCAL  
INTERFACE****Rev: 0****Attachment 7, Time to Threshold**

URI provides an optional 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:

- Does not account for any subsequent decay of deposited radionuclides over the displayed time frame.
- Reported times do not account for previously released doses or deposition due to previous releases.
- Thresholds are reported for the Unusual Event, Alert, Site Area Emergency and General Emergency classifications.
- IF no threshold value was set by the administrator for a classification, THEN N/A is reported.
- IF a calculated time to threshold exceeds 100 hours, THEN >100:00 is displayed.
- **SELECT** the Print button to print the report to the default printer. \_\_\_\_\_

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**Attachment 8, EDE to TEDE Ratios**

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.

- From the Detailed Assessment form menu, **SELECT** Calculations => EDE to TEDE Ratios.
- Ratios will be calculated for the key distances of 2, 5 and 10 miles.
- 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.
- Some states require these ratios to perform dose limit calculations. The calculated ratios can be printed and supplied to the state as needed.

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**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.

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

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**Attachment 10, Process Reduction Factor Determination for Hope Creek**

**A. DETERMINE** the Holdup Times as follows:

1. IF the holdup time is not applicable to the actual release pathway,  
THEN SELECT Specific Time and **ENTER** 0 hours \_\_\_\_\_
2. Turbine Building
  - a. IF ventilation is running, THEN SELECT < 2 hours. \_\_\_\_\_
  - b. IF ventilation is off, THEN SELECT best option based on  
estimated building leakage rate OR select <2 hours if unknown. \_\_\_\_\_
3. Drywell / Suppression Pool / Torus
  - 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  
THEN ENTER the holdup time in hours. \_\_\_\_\_
  - b. IF 'Catastrophic Failure' is selected as the basis for flow for the  
dose assessment, THEN SELECT <2 hours. \_\_\_\_\_
  - c. IF the affected area has not remained static and there have  
been significant recent additions to the source term, THEN  
**SELECT** < 2 hours. This is the normally selected option if fuel  
damage is on-going. \_\_\_\_\_
4. Reactor Building / Secondary Containment
  - a. IF the release is **not** through a normal ventilation pathway,  
such as a blowout panel or hole in the side of the building,  
THEN SELECT < 2 hours. \_\_\_\_\_
  - b. IF the release is through a normal ventilation pathway, THEN  
**SELECT** a holdup time based on one of the following:
    - (1) IF FRVS is not running (normal building HVAC flow,  
SPV), THEN SELECT < 2 hours \_\_\_\_\_
    - (2) IF FRVS is running, THEN SELECT 2-24 hours. \_\_\_\_\_



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## Attachment 10, Process Reduction Factor Determination for Hope Creek (continued)

## B. DETERMINE the Torus / Suppression Pool Status as follows:

1. IF the effluent stream does not pass through the Torus / Suppression Pool **or** is unknown, THEN **SELECT** Bypassed. \_\_\_\_\_
2. IF the effluent stream is passing through the Torus / Suppression Pool **and** the Torus / Suppression Pool water temperature is > 212°F, THEN **SELECT** Saturated, OTHERWISE **SELECT** Subcooled. (If Torus Pressure is elevated check with Engineering for the Saturation Temperature, at that temp. and substitute that for >212 °F above). \_\_\_\_\_

## C. DETERMINE the Spray status as follows:

1. IF Spray is not applicable to the actual release pathway, THEN **SELECT** Off. \_\_\_\_\_
2. IF Spray is running, THEN **SELECT** On. \_\_\_\_\_
3. IF Spray is not running **or** the status of Spray cannot be determined, THEN **SELECT** Off. \_\_\_\_\_
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 then **ENTER** the spray run time in hours. This is **not** a normally selected option if fuel damage is on-going. \_\_\_\_\_

## D. DETERMINE filter status as follows:

1. IF the filter is not applicable to the actual release pathway, THEN **SELECT** Not Working. \_\_\_\_\_
2. IF the filter is working **or** the status of the filter cannot be determined, THEN **SELECT** Working. \_\_\_\_\_
3. IF the filter is not working, THEN **SELECT** Not Working. \_\_\_\_\_

# OFFSITE DOSE ASSESSMENT USING THE UNIFIED RASCAL INTERFACE

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## Attachment 11, Process Reduction Factor Determination for Salem

### A. DETERMINE the Holdup Times as follows:

1. IF the holdup time is not applicable to the actual release pathway, THEN SELECT Specific Time and **ENTER** 0 hours. \_\_\_\_\_
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. \_\_\_\_\_
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. \_\_\_\_\_
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 then **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. \_\_\_\_\_

### B. DETERMINE the spray status as follows:

1. IF Spray is not applicable to the actual release pathway, THEN SELECT Off. \_\_\_\_\_
2. IF Spray is running, THEN SELECT On. \_\_\_\_\_
3. IF Spray is not running **or** the status of Spray cannot be determined, THEN SELECT Off. \_\_\_\_\_

OFFSITE DOSE ASSESSMENT USING THE UNIFIED RASCAL  
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**Attachment 11, Process Reduction Factor Determination for Salem (continued)**

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 then **ENTER** the spray run time in hours. This is not a normally selected option if fuel damage is on-going. \_\_\_\_\_

**C. DETERMINE** filter status as follows:

1. IF the filter is not applicable to the actual release pathway, THEN SELECT Not Working. \_\_\_\_\_
2. IF the filter is working **or** the status of the filter cannot be determined, THEN SELECT Working. \_\_\_\_\_
3. IF the filter is not working, THEN SELECT Not Working. \_\_\_\_\_

**D. DETERMINE** Steam Generator Status as follows:

1. IF the event is at PWRs THEN:
- a. IF the Steam Generator wide range level indicator is  $\geq 100\%$ , THEN SELECT Solid. \_\_\_\_\_
- b. IF the Steam Generator wide range level indicator is  $< 10\%$ , THEN SELECT Dry. \_\_\_\_\_
- c. IF the Steam Generator wide range level indicator is  $\geq 10\%$  and  $< 100\%$ , THEN SELECT Boiling. \_\_\_\_\_
- d. IF the Steam Generator water level cannot be determined **and** is being fed secondary water, THEN SELECT Boiling, OTHERWISE SELECT Dry. \_\_\_\_\_

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## Attachment 12, Spent Fuel Pool Status Selection

**DETERMINE** the spent fuel status as follows:

- IF the spent fuel pool is normally cooled and the incident involves cooled fuel under water, THEN **SELECT** 'Under water'. \_\_\_\_\_
- 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'. \_\_\_\_\_
- IF the pool is essentially dry and a Zr – air reaction (fire) has begun, THEN **SELECT** 'Dry'. \_\_\_\_\_

**OFFSITE DOSE ASSESSMENT USING THE UNIFIED RASCAL  
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**Attachment 13, Definition of Terms**

- ATWS: Anticipated Transient Without SCRAM (BWR).
- ATWT: Anticipated Transient Without TRIP (PWR).
- 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.
- 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.
- Deep Dose Equivalent (DDE): The dose equivalent to the whole body that will be received from radiation external to the body.
- 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 and may include prescription of KI. (EPA-400)
- 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.
- 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.