

# MANUAL HARD COPY DISTRIBUTION DOCUMENT TRANSMITTAL 2003-29455

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THE FOLLOWING CHANGES HAVE OCCURRED TO THE HARDCOPY OR ELECTRONIC MANUAL ASSIGNED TO YOU:

130 - 130 - HP II DOSE CALCULATOR: EMERGENCY PLAN- POSITION SPECIFIC PROCEDURE

REMOVE MANUAL TABLE OF CONTENTS DATE: 04/16/2003

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CATEGORY: PROCEDURES TYPE: EP

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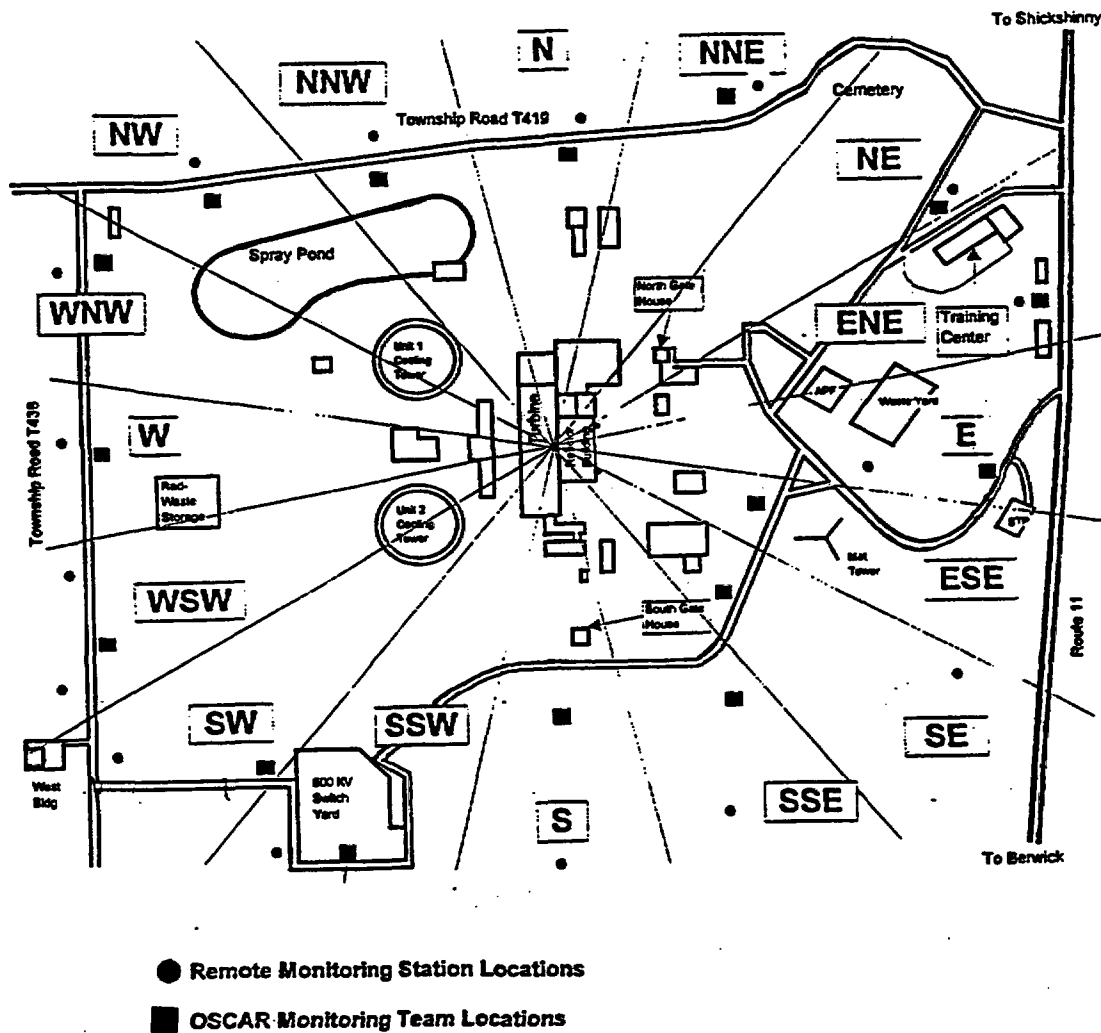
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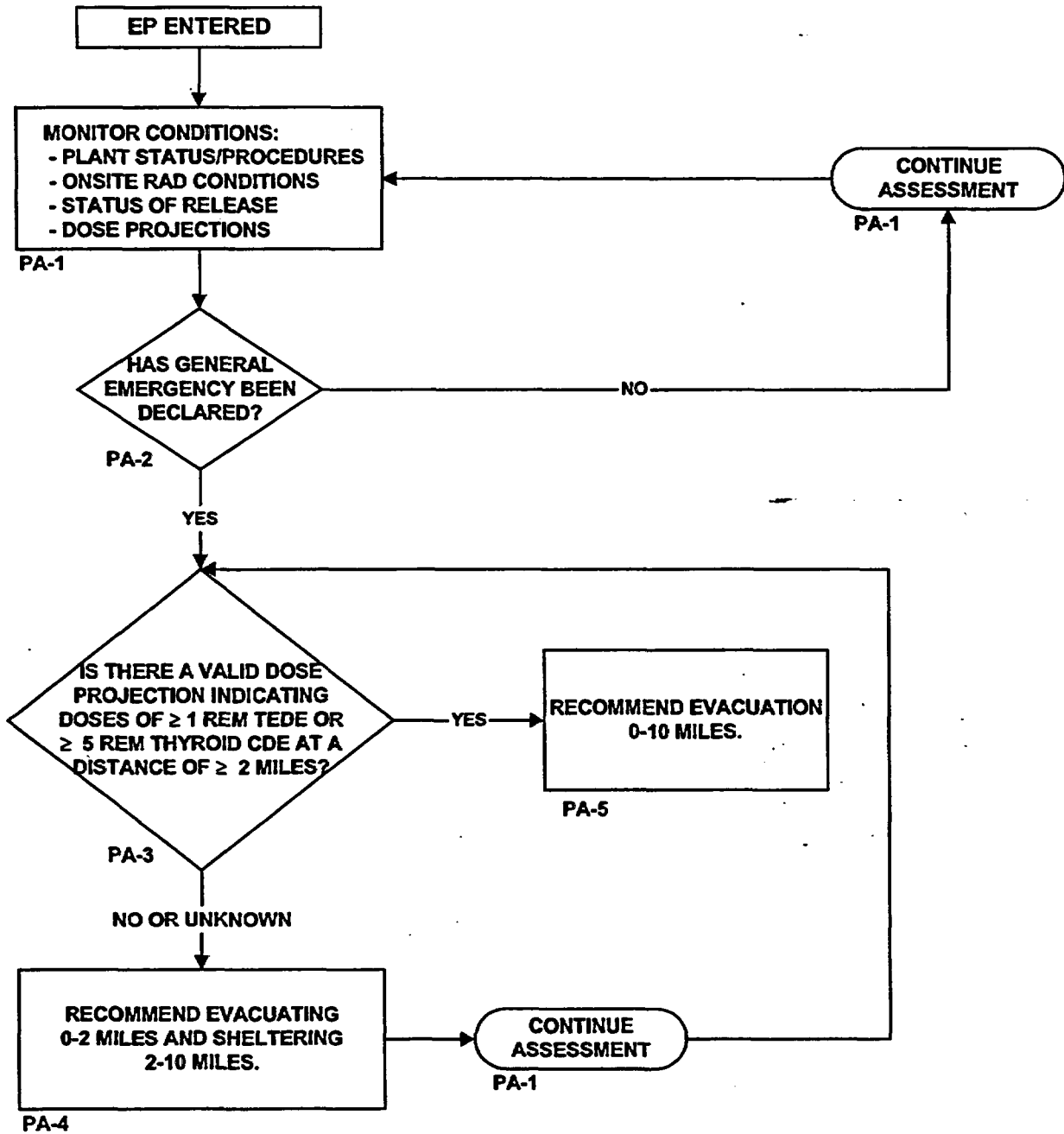
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**ONSITE EMERGENCY MONITORING LOCATIONS**



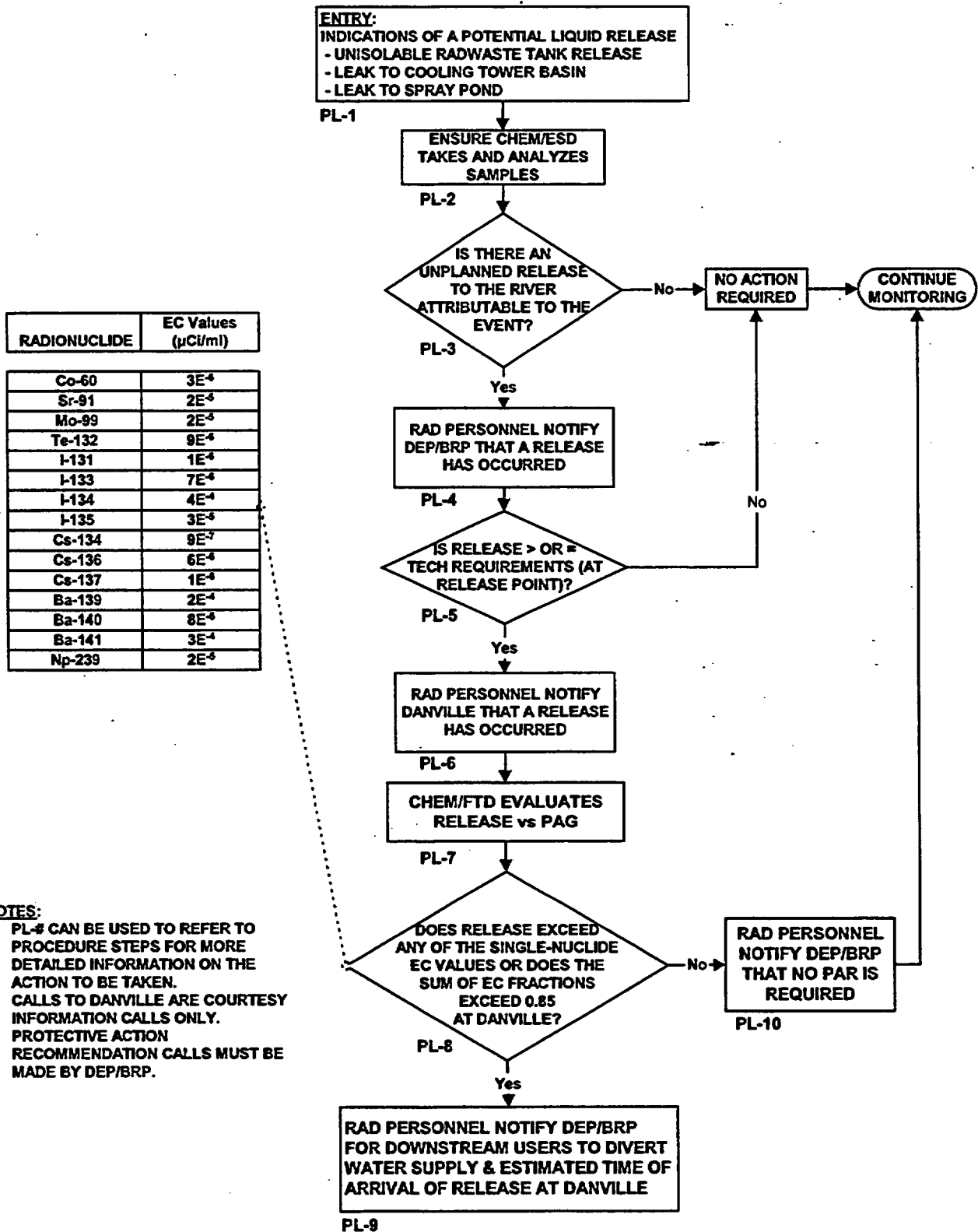
## PAR AIRBORNE RELEASES



### NOTES:

1. PA-# CAN BE USED TO REFER TO PROCEDURE STEPS FOR MORE DETAILED INFORMATION ON THE ACTION TO BE TAKEN.
2. DOSE PROJECTIONS DO NOT INCLUDE DOSE ALREADY RECEIVED.
3. TEDE - WHOLE BODY (TEDE) IS THE SUM OF EFFECTIVE DOSE EQUIVALENT RESULTING FROM EXPOSURE TO EXTERNAL SOURCES. THE COMMITTED EFFECTIVE DOSE EQUIVALENT (CEDE) FROM ALL SIGNIFICANT INHALATION PATHWAYS AND THE DOSE DUE TO GROUND DEPOSITION.
4. CDE - COMMITTED DOSE EQUIVALENT TO THE CHILD THYROID.

## PAR LIQUID RELEASES



## **PUBLIC PROTECTIVE ACTION RECOMMENDATION GUIDE**

### **AIRBORNE RELEASES**

#### ☐ **PA-1 MONITOR CONDITIONS FOR PAR APPLICATION**

The following conditions should be continuously evaluated to determine if a PAR should be implemented or changed:

- Plant status and prognosis for changes in conditions
- Onsite radiological conditions
- Status of actual or potential radioactive releases
- Offsite dose projections or actual offsite radiological conditions
- Escalation in Emergency Classification (i.e., General)

**(Go to PA-2)**

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#### **PA-2 HAS A GENERAL EMERGENCY BEEN DECLARED?**

- ☐ **YES** — If a GENERAL EMERGENCY has been declared, a PAR must be made within 15 minutes of the emergency declaration. The PAR requirement is found in NUREG-0654. **(Go to PA-3)**
- ☐ **NO** — If a GENERAL EMERGENCY has not been declared, continue to monitor plant status, parameter trends, and prognosis for termination or escalation of the event. **(Go to PA-1)**

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#### **PA-3 IS THERE A VALID DOSE PROJECTION INDICATING DOSES OF $\geq 1$ REM TEDE OR $\geq 5$ REM CDE CHILD THYROID AT A DISTANCE OF $> 2$ MILES?**

- ☐ **YES** — If the projected doses at 2 miles are  $\geq 1$  REM TEDE or  $\geq 5$  REM CDE child thyroid, then full evacuation (0-10 miles) is recommended. **(Go to PA-5)**
- ☐ **NO/UNKNOWN** — **(Go to PA-4)**

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#### ☐ **PA-4 RECOMMEND EVACUATION 0-2 MILES; SHELTER 2-10 MILES**

Limited Evacuation (0-2 miles) and sheltering is appropriate for events that are significant enough to cause a General Emergency classification and dose projections are low, unknown, or below full evacuation guidelines.

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#### ☐ **PA-5 EVACUATE 0-10 MILES**

Full evacuation of members of the general public is recommended at this point based on the emergency classification and dose projections.

**LIQUID**

☐ **PL-1 ENTRY**

This section is entered when there are indications of a potential unplanned radioactive liquid release.

Indications of potential unplanned releases include:

- an unisolable radwaste tank release
- leaks to cooling tower basin
- leak to spray pond

**(Go to PL-2)**

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☐ **PL-2 CHEMISTRY/ENVIRONMENTAL SAMPLING DIRECTOR (ESD) TAKES AND ANALYZES SAMPLE**

**(Go to PL-3)**

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**PL-3 IS THERE AN UNPLANNED RELEASE TO THE RIVER?**

- ☐ **YES —** An unplanned release to the river has occurred when event-related radioactive materials are released to the river that are not controlled by the release methodologies described in the ODCM and applicable Chemistry procedures.

**(Go to PL-4)**

- ☐ **NO —** If there is no unplanned release to the river, then no notifications are required and monitoring should continue.

---

☐ **PL-4 RAD PERSONNEL NOTIFY DEP/BRP THAT A RELEASE HAS OCCURRED**

Depending on which facility is activated, the notification to BRP will be made by the RPC (TSC), Dose Assessment Supervisor, or Radiological Liaison at the EOF.

**DO NOT MAKE ANY PROTECTIVE ACTION RECOMMENDATIONS AT THIS TIME.**

**(Go to PL-5)**

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**LIQUID (CONT'D)**

**PL-5 IS RELEASE  $\geq$  TECHNICAL REQUIREMENTS LIMITS (AT THE RELEASE POINT)?**

- ☐ **YES —** Releases are at or greater than Technical Requirements limits when Chemistry determines that the limits are exceeded based on methodologies described in the ODCM and applicable Chemistry procedures.

**(Go to PL-6)**

- ☐ **NO —** If the release is  $<$  Technical Requirements limits, then no further notifications are required and monitoring should continue.

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☐ **PL-6 RAD PERSONNEL NOTIFY DANVILLE THAT A RELEASE HAS OCCURRED**

Depending on which facility is activated, the notification to Danville will be made by the RPC (TSC), Dose Assessment Supervisor, or Radiological Liaison at the EOF.

**DO NOT MAKE ANY PROTECTIVE ACTION RECOMMENDATIONS AT THIS TIME.**

**(Go to PL-7)**

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☐ **PL-7 CHEM/FTD EVALUATES RELEASE VERSUS PAGs**

The results of the sample analysis are compared to the PAGs for radionuclides in drinking water. The analysis calculates the expected concentration at Danville, taking into account the dilution afforded by the river.

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**PL-8 DOES RELEASE EXCEED PAGs (AT DANVILLE)?**

- ☐ **YES —** If a single isotope exceeds its effluent concentration (EC) value or the sum of EC fractions exceeds 0.85, then a protective action recommendation should be made for downstream water users (e.g., Danville) to **DIVERT DRINKING WATER** supply to a backup supply or terminate user intake until the release has passed.

**(Go to PL-9)**

- ☐ **NO —** If the PAGs are not exceeded, monitoring should continue and the State should be notified that no PAR for the liquid release is required.

**(Go to PL-10)**

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**LIQUID (CONT'D)**

**☐ PL-9 RAD PERSONNEL NOTIFY DEP/BRP OF PAR.**

Depending on which facility is activated, the PAR notification to DEP/BRP will be made by the RPC (TSC), Dose Assessment Supervisor, or Radiological Liaison at the EOF. The **PAR FORM** shall be used to document the PAR.

**DO NOT COMMUNICATE THE PROTECTIVE ACTION RECOMMENDATION TO DANVILLE. THE DEP/BRP IS RESPONSIBLE FOR THIS COMMUNICATION AND ANY COMMUNICATION TO OTHER DRINKING WATER SUPPLIERS OR WATER USERS.**

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**☐ PL-10 RAD PERSONNEL NOTIFY DEP/BRP**

No PAR is required. Depending on which facility is activated, the RPC (TSC), Dose Assessment Supervisor, or Radiological Liaison at the EOF shall notify DEP/BRP that no PAR is required.

## **PPL EMERGENCY PERSONNEL DOSE ASSESSMENT AND PROTECTIVE ACTION RECOMMENDATION (PAR) GUIDE**

| <u>TABLE OF CONTENTS</u> |   |             |
|--------------------------|---|-------------|
| <u>SECTION</u>           |   | <u>PAGE</u> |
| 1.0                      | EMERGENCY DOSE LIMITS   | 2           |
| 2.0                      | EMERGENCY EXPOSURE/ACCIDENTAL OVEREXPOSURE                              | 3           |
| 3.0                      | PROTECTIVE ACTIONS  | 3           |
| 4.0                      | EMERGENCY EXPOSURE NOTIFICATION AND<br>HEALTH CONSEQUENCE INVESTIGATION | 7           |
|                          | EMERGENCY EXPOSURE EXTENSIONS   | 8           |
|                          | HEALTH PHYSICS AND ALARA CONSIDERATIONS DURING AN EMERGENCY             | 12          |

**NOTE:**      **EMERGENCY EXPOSURE EXTENSION REQUEST FORM** and **POTASSIUM IODIDE TRACKING FORM** can be found as Forms EP-AD-000-135 and EP-AD-000-141, respectively.

## PPL EMERGENCY PERSONNEL DOSE ASSESSMENT AND PROTECTIVE ACTION RECOMMENDATION (PAR) GUIDE

### CHECK ☐

#### 1.0 Limits for EMERGENCY doses.

- ☐ 1.1 An EMERGENCY DOSE AUTHORIZATION (see EMERGENCY EXPOSURE EXTENSIONS) may be granted in order to protect facilities, and or equipment to substantially limit the escape of radioactive effluents or control fires. The maximum planned doses are:

- 1.1.1 Whole body (TEDE)<sup>(1)</sup> dose shall not exceed 10 rem.
- 1.1.2 Dose to any organ (CDE)<sup>(2)</sup>, including the skin and extremity (SDE)<sup>(3)</sup>, shall not exceed 100 rem.
- 1.1.3 Dose to the lens of the eye shall not exceed 30 rem (LDE)<sup>(4)</sup>.

- ☐ 1.2 An EMERGENCY dose authorization may be granted for life-saving actions or protection of large populations. The maximum doses are:

- 1.2.1 Planned whole body (TEDE)<sup>(1)</sup> doses shall not exceed 25 rem.
- 1.2.2 Planned dose to any organ (CDE)<sup>(2)</sup>, including skin and extremity doses, shall not exceed 250 rem.
- 1.2.3 Dose to the lens of the eye shall not exceed 75 rem (LDE)<sup>(4)</sup>.

- 1.3 RARE situations may occur in which a dose GREATER THAN those specified in SECTION 1.2 above for emergency dose would be unavoidable to carry out a lifesaving operation or to avoid extensive exposure of large populations. It is not possible to prejudge the risk that one should be allowed to take to save lives of others, therefore no upper limit has been established.

(1) The sum of the Effective Dose Equivalent resulting from the exposure to external sources and the Committed Effective Dose Equivalent incurred from all significant inhalation pathways during the early phase.

(2) The Committed Dose Equivalent to the thyroid from radioiodine.

(3) Shallow Dose Equivalent.

(4) Lens Dose Equivalent.

## **PPL EMERGENCY PERSONNEL DOSE ASSESSMENT AND PROTECTIVE ACTION RECOMMENDATION (PAR) GUIDE**

### **CHECK ☐**

- 2.0 For any **EMERGENCY EXPOSURE OR ACCIDENTAL OVEREXPOSURE**, the assessment actions in step 2 of the **EMERGENCY EXPOSURE EXTENSIONS** must be performed.

### **3.0 PROTECTIVE ACTIONS**

#### ☐ 3.1 Potassium Iodide

- 3.1.1 For thyroid doses that are strongly expected to exceed 10 rem (CDE)<sup>(2)</sup>, ingestion of a KI dose of 130 mg (100mg - iodine) should be recommended, except as noted in paragraph 3.1.2, to personnel whose emergency assignment or qualifications do not allow other protective measures to be taken (e.g. respiratory protection, evacuation, relocation, etc.) to maintain the dose to the thyroid at less than 10 rem.

**NOTE:** HHS/FDA guidance is that adults over 40 years of age need take KI only in the case of a projected large internal radiation dose to the thyroid (> 500 rem) to prevent hypothyroidism; the guidance is 10 rem for adults over age 18 to age 40.

- 3.1.2 KI should not be administered to any emergency worker who:
- a. does not concur with its use, or
  - b. has a known allergic reaction to iodine and/or foods containing iodine such as shellfish, or
  - c. has been directed by their Physician or Pharmacist to avoid ingestion of iodine and/or foods containing iodine such as shellfish.

<sup>(2)</sup> The Committed Dose Equivalent to the thyroid from radioiodine.

## **PPL EMERGENCY PERSONNEL DOSE ASSESSMENT AND PROTECTIVE ACTION RECOMMENDATION (PAR) GUIDE**

### **CHECK ☐**

3.1.3 Onsite issuance of KI for iodine prophylaxis requires the approval of the **EMERGENCY DIRECTOR**. Issuance to EOF and FIELD EMERGENCY MONITORING/SAMPLING TEAM personnel requires the approval of the **RECOVERY MANAGER** when the EOF has relieved the TSC of emergency management activities. The **EMERGENCY DIRECTOR** will approve issuance prior to that time. These approvals must be documented on the **POTASSIUM IODIDE (KI) TRACKING FORM**.

3.1.4 Unless the **EMERGENCY DIRECTOR** or **RECOVERY MANAGER** instructs personnel to do otherwise, the KI tablets should generally be taken as soon as possible after thyroid dose exceeding 10 rem CDE <sup>(2)</sup> is projected.

NOTE: Stable iodine (KI) is most effective when administered immediately prior to exposure to radioiodine. Significant blockage of the thyroid dose can be provided by administration within a few hours after uptake of radioiodine.

3.15 In the event a significant exposure to the thyroid is projected to continue over a period of several days the **CONSULTING RADIOLOGICAL PHYSICIAN** should be requested to provide a recommended KI dosage for subsequent KI usage. (See Emergency Telephone Directory for telephone number.)

3.16 Until input/advice from the **CONSULTING RADIOLOGICAL PHYSICIAN** is available, a quarter of a tablet should be taken on days of exposure that follow the day on which the initial full tablet dose (130 mg) was taken.

3.17 If a worker expresses concern with the use of KI and/or is unsure if it will interact with his/her current medication,

- a. the **CONSULTING RADIOLOGICAL PHYSICIAN** should be requested to provide input/advice to the individual concerning the administration and cessation of KI use prior to its ingestion by the individual. (See Emergency Telephone Directory for telephone number.)

<sup>(2)</sup> The Committed Dose Equivalent to the thyroid from radioiodine.

## **PPL EMERGENCY PERSONNEL DOSE ASSESSMENT AND PROTECTIVE ACTION RECOMMENDATION (PAR) GUIDE**

### **CHECK ☐**

- b. control and track workers' dose, to limit their projected thyroid dose to 40 rem total organ dose. As warranted, ensure adjusted RWP controls and dose extensions are in place.

**3.1.8** Should the projected dose to the thyroid not exceed 10 rem CDE <sup>(2)</sup> but the worker expresses the strong desire to use KI, the worker may do so at his/her own risk. In such case, the RPC or DASU as appropriate will inform the worker of the potential risks and benefits as described below and will recommend the person contact the CONSULTING RADIOLOGICAL PHYSICIAN for further guidance.

**NOTE:** Radiation exposure to the thyroid glands of adults does not appear to lead to cancer but has been shown to cause other deterministic effects (such as hypothyroidism resulting from thyroid ablation) from very high radiation doses to the thyroid.

For persons over 40 years of age, HHS/FDA recommends KI only for projected doses to the thyroid of above 500 rem, to prevent hypothyroidism.

The National Council on Radiation Protection and Measurement (NCRP Report No. 55) concludes that the risk of adverse effects from use of KI is on the order of 5 in 10 million.

In some cases, hyperthyroidism (excessive functional activity of the thyroid gland) is possible. Those most at risk are patients with thyroid pathologies. This is most common in patients with goiter. This complication can be serious when the person also has heart disease. The risk of adverse effects is higher in adults of age 45 years and older, due to the frequency of diagnosed and sub-clinical thyroid disease and the use of certain prescription pharmaceuticals that would lead to a drug interaction.

<sup>(2)</sup> The Committed Dose Equivalent to the thyroid from radioiodine.

## PPL EMERGENCY PERSONNEL DOSE ASSESSMENT AND PROTECTIVE ACTION RECOMMENDATION (PAR) GUIDE

CHECK ☐

HHS/FDA observes that short-term administration of KI at thyroid blocking doses is safe. The risks of stable iodine administration include sialadenitis (an inflammation of the salivary gland), gastrointestinal disturbances, allergic reactions, and minor rashes. Other risks may apply if repeated doses of KI are ingested.

3.1.9 If the individual states the intent to take KI absent a projected dose of 10 rem (CDE)<sup>(2)</sup> or more, the RPC or DASU will document in his/her logbook that individual's intent, that information on risks and benefits was described to the individual, and the statement that the individual was notified that ingestion was at the individual's own risk.

3.1.10 For an injured and/or contaminated worker sent to a hospital for treatment, the patient will be under the care of the attending physician. As such, plant procedures no longer apply and KI issuance will be at the discretion of the attending physician. The physician can rely on a senior Health Physics Technician Level II or Health Physics Management to provide the in-plant radiological data on which to base their decision.

☐ 3.2 Protective measures should be implemented for EOF personnel at the direction of the **DOSE ASSESSMENT SUPERVISOR**, within the bounds of RWP's #8001 and #8002. Consultation with and approval by the RPC is needed for RWP revisions.

☐ 3.3 Exposures to members of local offsite support groups, (ambulance workers, fire fighters) shall not exceed 500 mrem (TEDE)<sup>(1)</sup> for the performance of support duties on the site of the Susquehanna SES.

<sup>(2)</sup> The Committed Dose Equivalent to the thyroid from radioiodine.

<sup>(1)</sup> The sum of the Effective Dose Equivalent resulting from the exposure to external sources and the Committed Effective Dose Equivalent incurred from all significant inhalation pathways during the early phase.

## **PPL EMERGENCY PERSONNEL DOSE ASSESSMENT AND PROTECTIVE ACTION RECOMMENDATION (PAR) GUIDE**

**CHECK** ☐

- 4.0 EMERGENCY EXPOSURE NOTIFICATIONS AND A HEALTH CONSEQUENCE INVESTIGATION** must be conducted for any emergency exposure as outlined in step 6 of the Emergency Exposure Extensions.

**NOTE:** Reference for section 3.1 are as follows:

1. HHS/FDA Guidance-Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies, December 2001.
2. LeGuen, B. et.al., French Approach for the Distribution of Iodine Tablets in the Vicinity of Nuclear Power Plants, Health Physics 2002.
3. PEMA, Report to the REPAC from the Potassium Iodide Working Group, January 2001.

## EMERGENCY EXPOSURE EXTENSIONS

**CHECK ☐**

1. Fill out the attached **EMERGENCY EXPOSURE EXTENSION REQUEST** Form.

2. Review the following factors:

- ☐ Rescue personnel should be volunteers or professional rescuers.
- ☐ Other considerations being equal (e.g., skill, potential need for person on another mission) personnel above the age of 45 are preferred.
- ☐ Rescue personnel should be familiar and briefed with the consequences of exposure.
- ☐ Women capable of reproduction should not take part in an effort requiring **EMERGENCY** exposure.
- ☐ Use of personnel with high lifetime cumulative exposure should be discouraged.
- ☐ All reasonable measures must be taken to control contamination and internal exposure.
- ☐ Exposure under these conditions shall be limited to once in a lifetime.
- ☐ For exposures greater than 25 rem whole body (TEDE), the persons undertaking any emergency operation in which the dose will exceed 25 rem to the whole body (TEDE) should do so only on a voluntary basis and with full awareness of the risks involved, including the numerical levels of dose at which acute effects of radiation will be incurred and numerical estimates of the risk of delayed effects. See the following two tables for general information concerning Health Effects & Cancer Risks.

## EMERGENCY EXPOSURE EXTENSIONS

CHECK ☐

Health Effects Associated with Whole Body Absorbed Doses Received Within a Few Hours<sup>(a)</sup>

| Whole Body Absorbed Dose (rad) | Early Fatalities <sup>(b)</sup> (percent) | Whole Body Absorbed Dose (rad) | Prodromal Effects <sup>(c)</sup> (percent affected) |
|--------------------------------|---|--------------------------------|---|
| 140                            | 5   | 50                             | 2   |
| 200                            | 15  | 100                            | 15  |
| 300                            | 50  | 150                            | 50  |
| 400                            | 85  | 200                            | 85  |
| 460                            | 95  | 250                            | 98  |

- (a) Risks will be lower for protracted exposure periods.
- (b) Supportive medical treatment may increase the dose at which these frequencies occur by approximately 50 percent.
- (c) Symptoms (nausea, vomiting) which occur within a few hours after exposure to large doses of radiation and which usually precede more serious health effects.

Approximate Cancer Risk to Average Individuals from 25 Rem Effective Dose Equivalent Delivered Promptly

| Age at Exposure (years) | Approximate Risk of Premature Death (deaths per 1,000 persons exposed) | Average Years of Life Lost If Premature Death Occurs (years) |
|-------------------------|--|--|
| 20 to 30                | 9.1  | 24   |
| 30 to 40                | 7.2  | 19   |
| 40 to 50                | 5.3  | 15   |
| 50 to 60                | 3.5  | 11   |

3. Review the **HEALTH PHYSICS AND ALARA CONSIDERATIONS DURING EMERGENCIES** which is attached.
4. Obtain appropriate approval signatures as outlined in the table below.

| EXTENSION        |                | APPROVAL           | ACTIONS  |
|------------------|----------------|--------------------|--|
| FROM mrem (TEDE) | TO mrem (TEDE) |                    |  |
| 4000             | <25000         | (ED or RM) and RPC | ALARA REVIEW AND APPLY EMERGENCY EXPOSURE CONSIDERATIONS |
| >25000           |                | (ED or RM) and RPC | ALL OF ABOVE AND BRIEFING ON RISKS                       |

## EMERGENCY EXPOSURE EXTENSIONS

### CHECK ☐

5. If the Emergency Dose Extension is for greater than 4 rem (TEDE), have the volunteer sign the **EMERGENCY EXPOSURE REQUEST** Form acknowledging that they are a volunteer and are fully aware of the radiological risks of acute and delayed effects.
6. Upon completion of the activity requiring the Emergency Exposure perform the following:
  - ☐ Collect, process, and evaluate personnel dosimetry devices when technically appropriate.
  - ☐ Investigate the circumstances of all emergency exposures and confirm the dose received.
  - ☐ Notify the NRC of emergency exposure as follows:

Immediate notification of the NRC is required for:

    - a. Exposure of the whole body of greater than 25 rem (TEDE); or
    - b. Exposure of the skin of the whole body of greater than 150 rem (SDE); or
    - c. Exposure of the extremities of greater than 375 rem (SDE).

Notification of the NRC within 24 hours is required for:

    - a. Exposure of the whole body of greater than 5 rem (TEDE); or
    - b. Exposure of the skin of the whole body of greater than 30 rem (SDE); or
    - c. Exposure of the extremities of greater than 75 rem (SDE).
  - ☐ Assess the health consequences of all emergency exposures. Consult with a physician to determine the need for and extent of physical and biochemical examinations.
  - ☐ Whole body greater than 25 rem (TEDE) should result in an examination of the exposed person by a physician.
  - ☐ If internal exposure is suspected, quantitative measurements should be made as soon as reasonably feasible. Bioassays are required based on the following:
    - Nasal smear or facial contamination greater than 1,000 cpm above background.
    - Greater than 4 DAC-HRS in a day or less, or 20 DAC-HRS in a week or less.

## HEALTH PHYSICS AND ALARA CONSIDERATIONS DURING EMERGENCIES

### **CHECK** ☐

#### **1.0 Evaluate radiological conditions.**

##### **1.1 Obtain detailed survey data to ascertain:**

- 1.1.1 Beta-Gamma radiation levels**
- 1.1.2 Need for neutron measurements**
- 1.1.3 Contamination levels and protective clothing requirements**
- 1.1.4 Airborne radioactive materials**
- 1.1.5 Variability of conditions over space and time**

##### **1.2 Evaluate personnel status.**

- 1.2.1 Determine available dose under normal administrative dose objectives.**
- 1.2.2 If essential, obtain approval from RADIATION PROTECTION COORDINATOR/EMERGENCY DIRECTOR for persons expected to exceed administrative objectives.**
- 1.2.3 Follow criteria in PPL Emergency Personnel Dose Assessment and Protective Action Recommendation Guide when emergency exposures are deemed appropriate by EMERGENCY DIRECTOR.**
- 1.2.4 Assess individual's history of exposure to airborne materials.**
- 1.2.5 Assess individual's skills in relation to proposed task.**
- 1.2.6 Assess individual's lifetime exposure history.**

## HEALTH PHYSICS AND ALARA CONSIDERATIONS DURING EMERGENCIES

**CHECK** ☐

- 1.3 Determine proper type and placement of dosimeters.

- 1.3.1 Evaluate need for additional whole body dosimeters.

**NOTE:** For emergency exposures above 4 rem, the placement of several dosimeters on an individual is recommended to determine spatial distribution of dose to the individual.

- 1.3.2 Evaluate need and placement of extremity dosimeters.

- 1.3.3 Evaluate need for additional dosimetry devices such as high range self-reading dosimeters, electronic dosimeters, and neutron dosimeters.

- 1.3.4 Evaluate need for time keeping.

- 1.4 Determine proper respirator equipment required to perform task.

**NOTE:** For tasks expected to last more than several hours, consider need for relief of team members.

- 1.5 Review the following ALARA items:

**NOTE:** The detail and scope of ALARA reviews are to be commensurate with the magnitude of doses expected, numbers of people involved, and urgency of required task.

- 1.5.1 Consider the trend of exposures vs. the importance of the task:

- a. Important and critical task with rising exposure rates will require the dispatch of teams as quickly as possible to reduce exposures.
- b. Unimportant or less critical task could be delayed until exposure rates begin to trend downward.

## HEALTH PHYSICS AND ALARA CONSIDERATIONS DURING EMERGENCIES

**CHECK** ☐

1.5.2

When time permits the following should be included in the ALARA review:

- a. Consider the use of remote handling devices or other special tools.
- b. Consider the use of portable shielding.
- c. Consider the need for mock-ups or other practice exercises.
- d. Assess the number of people required to assure all have essential productive roles.
- e. Consider the magnitude of doses received by team members in transit to work location.

## MET/VENT DATA ACQUISITION OPTIONS

The following are sources of meteorological and ventilation data at Susquehanna SES:

### A. ACQUISITION OF MET/VENT DATA FROM THE PICSY TERMINAL

1. From the SSES LOGO display, select **E-PLAN MENU** or type **EPM** and **[ENTER]**.
2. All required meteorological and ventilation (MET/VENT) inputs for the MIDAS dose projections can be obtained by selecting the MET/VENT DATA display option on the E-PLAN menu.
  - a. Vent and Primary Met Tower Data is displayed on page 1 of this display.
  - b. Use the **PAGE FORWARD** command if the Back-up Tower data is required.
  - c. Should neither the Primary or Back-up Tower be available, obtain the Downriver Tower data as follows:
    - 1) At the command line, type **GD\_VMS05B** and **[ENTER]** for Downriver Tower wind speed.
    - 2) At the command line, type **GD\_VMX09B** and **[ENTER]** for Downriver Tower wind direction.
    - 3) At the command line, type **GD\_VMX10B** and **[ENTER]** for Downriver Tower sigma theta.
    - 4) Press Escape **[ESC]** to return to the SSES Logo display.
  - d. Other options – see Step 6 below.
3. If the Primary Met Tower  $\Delta T$  data is not available, determine the wind speed corrected stability class as follows:
  - a. Determine the initial (uncorrected) stability class using the measured value of sigma theta and the Supplemental Meteorological Information Table 1 (or page 2 of the PICSY screen).
  - b. Determine the wind speed corrected stability classification using the initial classification, the measured wind speed, and, as appropriate, either Table 2 or Table 3.

4. The PICSY QUALITY CODES for the display colors are as follows:

|                 |                                    |
|-----------------|------------------------------------|
| <b>YELLOW:</b>  | <b>DATA ACCEPTABLE</b>             |
| <b>RED:</b>     | <b>DATA EXCEEDS WARNING LIMIT</b>  |
| <b>MAGENTA:</b> | <b>DATA EXCEEDS ALARM SETPOINT</b> |
| <b>WHITE:</b>   | <b>DATA SUSPECT</b>                |

5. If a hard copy printout of the information is required you may either:

- a. Select the PRINT option using the pull down menu (screen copy takes approximately 3 minutes to complete); or

- b. Initiate the MET/VENT DATA LOG option as follows:

1) On the E-PLAN menu, select the FREE FORMAT LOG MENU.

2) To activate the TSC log, press [F1], [22], and [ENTER].

To activate the EOF log, press [F1], [9], and [ENTER].

**NOTE:** Be sure to read the log description because there are 2 logs for the TSC and 2 logs for the EOF.

3) The log will start printing at the next quarter hour.

4) To deactivate the TSC log, press [F3], [22], and [ENTER].

To deactivate the EOF log, press [F3], [9], and [ENTER].

6. If historical MET/VENT information is required, refer to the following instructions:

a. At the command line, type: **GD\_^METVENT1** and [ENTER].

b. Group point display for that display file will come up. Press the [F3] key for history. (See bottom of screen for F key menu.) A dialog box will appear.

c. The work file name to be used is ARCHIVE.D, which is the default for that field.

d. Enter the desired retrieval time. Click on OK.

e. Group point display will return with values for the specified retrieval time.

f. Press the [F4] key to step through data points from the specified retrieval time to the current time.

**NOTE:** Not all desired data is likely to be available for any one particular point in time.

- g. Press the **[F4]** key if you want to step slowly through the data. Press the **[F5]** key if you want to step quickly through the data. (See bottom of screen for F key menu for more options.)
  - h. The group point display will return to real time when history is complete. A message at the top of the screen will alert you that it is returning to real time.
6. To exit the menu, select the **[ESC]** key.
- B. Site-specific meteorological information can be obtained by contacting either ABS Consulting or the National Weather Service (NWS).
1. ABS Consulting

ABS Consulting is the primary meteorological contractor for the Susquehanna Steam Electric Station (SSES). ABS Consulting has the ability to interrogate the primary and backup meteorological towers on a real-time basis and provide short and long-term weather forecasts for the site and surrounding area.

**ABS Consulting provides this emergency service to PPL ONLY during normal working hours.** The SSES Project Manager's name, phone number and mailing address are as follows:

|   |
|---|
| <p>ABS Consulting<br/>Mark Abrams</p> <p>(301) 907-9100<br/>(301) 921-2362 (Fax)</p> <p>ABS Consulting<br/>Suite 200<br/>4 Research Place<br/>Rockville, MD 20850</p> |
|---|

## 2. NATIONAL WEATHER SERVICE

The National Weather Service's (NWS) primary meteorological support responsibility for a radiological emergency at SSES resides with the NWS office at Binghamton, New York. In the event the Binghamton office is unable to provide this support, the designated backup is the NWS office in State College, Pennsylvania.

The role of the local NWS office is to provide weather information and forecasts in support of emergency response activities at SSES. The NWS can be consulted over the telephone if data interpretations, assessment, or forecasting assistance are needed.

This information will include the following:

- Forecasts at current time and 6 hours of:
  - a. 10-meter and 60-meter wind speed and wind direction, \_\_\_
  - b. Precipitation rate in inches per 15 minutes, and,
  - c. Boundary layer atmospheric stability described as **STABLE, UNSTABLE, or NEUTRAL**.
- Estimates of current 10-meter and 60-meter wind speed and wind direction in the event of complete loss of onsite and offsite meteorological instrumentation.
- General weather forecast from current time to 48 hours with special emphasis on significant weather occurrences such as major changes in wind speed, wind direction or synoptic weather patterns.
- Periodic weather updates at time intervals dictated by the on-going weather and emergency situation.

**NOTE: The NWS should ONLY be contacted when meteorological support from ABS Consulting is not available (i.e., weekends, holidays, and during the overnight hours).**

Whenever contacting the NWS, be sure to provide the following information:

- Name, Title, Facility, and Location
- Reason for the call
- Status of the Emergency
- Return telephone number

**The following telephone numbers are UNLISTED and should only be used for EMERGENCY situations.**

|  |
|--|
| <b>PRIMARY CONTACT</b><br><b>NWS EMERGENCY METEOROLOGICAL SUPPORT OFFICE</b>   |
| <p>National Weather Service Office<br/>Binghamton Regional Airport<br/>32 Dawes Drive<br/>Johnson City, NY 13795</p> <p>(607) 798-6625<br/>(607) 729-7629<br/>(607) 798-6624 (Fax)</p> |

|  |
|--|
| <b>BACKUP CONTACT</b><br><b>NWS EMERGENCY METEOROLOGICAL SUPPORT OFFICE</b>  |
| <p>National Weather Service Office<br/>227 W. Beaver Avenue, Suite 402<br/>State College, PA 16801</p> <p>(814) 237-1152<br/>(814) 237-1153<br/>(814) 234-9703 (Fax)</p> |

## PLANT COMPUTER METEOROLOGICAL DATA POINT IDENTIFIERS

| METEOROLOGICAL<br>PARAMETER  | POINT ID* | UNITS   | AVERAGING<br>PERIOD |
|--|-----------|---------|---------------------|
| <b>PRIMARY TOWER - east of the plant, 300' high red/white tower.</b> |           |         |                     |
| 10m Wind Direction   | vma03     | degrees | 15 minutes          |
| 10m Wind Speed   | vma06     | mph     | 15 minutes          |
| Delta T "A"  | vma01     | °C/50m  | 15 minutes          |
| Delta T "B"  | vma02     | °C/50m  | 15 minutes          |
| 60m Wind Direction   | vma04     | degrees | 15 minutes          |
| 60m Wind Speed   | vma07     | mph     | 15 minutes          |
| 10m Sigma Theta  | vma10     | degrees | 15 minutes          |
| 60m Sigma Theta  | vmx24     | degrees | 15 minutes          |
| Precipitation Rate   | vma09     | in/hr   | 15 minutes          |
| Ambient Temperature  | vmt08b    | °F      | 1 hour              |
| <b>BACKUP TOWER - across from the SSES Learning Center.</b>          |           |         |                     |
| 10m Wind Direction   | vma05     | degrees | 15 minutes          |
| 10m Wind Speed   | vma08     | mph     | 15 minutes          |
| 10m Sigma Theta  | vma12     | degrees | 15 minutes          |
| <b>DOWNRIVER TOWER - on Route 93 just east of Nescopeck.</b>         |           |         |                     |
| 10m Wind Direction   | vmx09b    | degrees | 2 minutes**         |
| 10m Wind Speed   | vms05b    | mph     | 2 minutes**         |
| 10m Sigma Theta  | vmx10b    | degrees | 2 minutes**         |

\* Letters are given here in lower case to differentiate the letter o from the number 0.

# SUPPLEMENTARY METEOROLOGICAL INFORMATION TABLES

TABLE 1

| ATMOSPHERIC STABILITY CLASSIFICATION |                   |                                  |   |                                      |                     |
|--------------------------------------|-------------------|----------------------------------|---|--------------------------------------|---------------------|
| Stability Class                      |                   | Delta<br>Temperature<br>(°C/50m) | (Alternate)<br>Sigma Theta<br>(degrees) | Plume Width<br>@ 10 miles<br>(miles) | % of Hrs at<br>SSES |
| Code                                 | Title             |                                  |   |                                      |                     |
| A                                    | Very Unstable     | ≤-.95                            | ≥22.5                                   | 5.7                                  | 6                   |
| B                                    | Unstable          | -.94 to -.85                     | 17.5 to 22.4                            | 4.3                                  | 3                   |
| C                                    | Slightly Unstable | -.84 to -.75                     | 12.5 to 17.4                            | 3.3                                  | 4                   |
| D                                    | Neutral           | -.74 to -.25                     | 7.5 to 12.4                             | 2.3                                  | 35                  |
| E                                    | Slightly Stable   | -.24 to .75                      | 3.8 to 7.4                              | 1.6                                  | 32                  |
| F                                    | Stable            | .76 to 2.0                       | 2.1 to 3.7                              | 1.1                                  | 12                  |
| G                                    | Very Stable       | >2.0                             | <2.1                                    | .75                                  | 8                   |

TABLE 2

## DAYTIME

(08:00 to 18:00)

| Initial Stability Class/<br>Wind Speed (MPH) | FINAL<br>VALUE |
|--|----------------|
| <b>A</b>                                     |                |
| Wind Speed < 7                               | A              |
| 7 ≤ Wind Speed < 9                           | B              |
| 9 ≤ Wind Speed < 13                          | C              |
| Wind Speed ≥ 13                              | D              |
| <b>B</b>                                     |                |
| Wind Speed < 9                               | B              |
| 9 ≤ Wind Speed < 13                          | C              |
| Wind Speed ≥ 13                              | D              |
| <b>C</b>                                     |                |
| Wind Speed < 13                              | C              |
| Wind Speed ≥ 13                              | D              |
| <b>D, E, F, G</b>                            |                |
| Any wind speed.                              | D              |

TABLE 3

## NIGHTTIME

(18:00 to 08:00)

| Initial Stability Class/<br>Wind Speed (MPH) | FINAL<br>VALUE |
|--|----------------|
| <b>A</b>                                     |                |
| Wind Speed < 6                               | F              |
| 6 ≤ Wind Speed < 8                           | E              |
| Wind Speed ≥ 8                               | D              |
| <b>B</b>                                     |                |
| Wind Speed < 5                               | F              |
| 5 ≤ Wind Speed < 7                           | E              |
| Wind Speed ≥ 7                               | D              |
| <b>C</b>                                     |                |
| Wind Speed < 5                               | E              |
| Wind Speed ≥ 5                               | D              |
| <b>D</b>                                     |                |
| Any wind speed.                              | D              |
| <b>E</b>                                     |                |
| Wind Speed < 11                              | E              |
| Wind Speed ≥ 11                              | D              |
| <b>F,G</b>                                   |                |
| Wind Speed < 7                               | F              |
| 7 ≤ Wind Speed < 11                          | E              |
| Wind Speed ≥ 11                              | D              |

Example: If wind speed is 9 mph and sigma theta is 18 degrees @ 10 a.m., the initial stability class from Table 1 is "B" and the wind speed corrected stability class from Table 2 is "C".

**TABLE 4**

| <b>WIND SECTORS AND DISTANCES</b> |               |                        |                                    |                                   |                                    |                                      |
|-----------------------------------|---------------|------------------------|------------------------------------|-----------------------------------|------------------------------------|--------------------------------------|
| <b>Wind From</b>                  |               | <b>Affected Sector</b> | <b>Affected EPB* Distance (mi)</b> | <b>On-Site Team Distance (mi)</b> | <b>Site Boundary Distance (mi)</b> | <b>% of Hrs Sector Affected SSES</b> |
| <b>Degrees</b>                    | <b>Sector</b> |                        |                                    |                                   |                                    |                                      |
| 348 - 11                          | N             | S                      | 0.34                               | 0.25                              | 0.38                               | 6                                    |
| 12 - 33                           | NNE           | SSW                    | 0.34                               | 0.37                              | 0.39                               | 9                                    |
| 34 - 56                           | NE            | SW                     | 0.34                               | 0.33                              | 0.61                               | 12                                   |
| 57 - 78                           | ENE           | WSW                    | 0.34                               | 0.39                              | 1.22                               | 11                                   |
| 79 - 101                          | E             | W                      | 0.34                               | 0.37                              | 1.03                               | 6                                    |
| 102 - 123                         | ESE           | WNW                    | 0.34                               | 0.41                              | 0.61                               | 4                                    |
| 124 - 146                         | SE            | NW                     | 0.34                               | 0.35                              | 0.66                               | 4                                    |
| 147 - 168                         | SSE           | NNW                    | 0.34                               | 0.29                              | 0.59                               | 4                                    |
| 169 - 191                         | S             | N                      | 0.34                               | 0.29                              | 0.59                               | 5                                    |
| 192 - 213                         | SSW           | NNE                    | 0.34                               | 0.39                              | 0.78                               | 7                                    |
| 214 - 236                         | SW            | NE                     | 0.34                               | 0.42                              | 0.58                               | 11                                   |
| 237 - 258                         | WSW           | ENE                    | 0.34                               | 0.52                              | 0.49                               | 7                                    |
| 259 - 281                         | W             | E                      | 0.34                               | 0.45                              | 0.48                               | 4                                    |
| 282 - 303                         | WNW           | ESE                    | 0.34                               | 0.18                              | 0.50                               | 3                                    |
| 304 - 326                         | NW            | SE                     | 0.34                               | 0.20                              | 0.43                               | 3                                    |
| 326 - 348                         | NNW           | SSE                    | 0.34                               | 0.20                              | 0.41                               | 5                                    |

\* EPB distances established at Exclusion Area Boundary distance of 1800 ft.

## VENT MONITOR DATA ACQUISITION

1. Determine which Channel is alarming on the SPING Control Terminal.
2. Press [PRINT] 6 [ENTER] to obtain a printout of all channels in HI Alarm.
3. Determine Alarming Unit and Channel numbers from Printout.

| DESCRIPTION | UNIT # |
|-------------|--------|
| RB1         | 3      |
| RB2         | 4      |
| TB1         | 5      |
| SBGT        | 6      |
| TB2         | 7      |
| PAVSS TB1   | 8      |
| PAVSS SBGT  | 9      |
| PAVSS TB2   | 10     |

| DESCRIPTION      | CHANNEL # |
|------------------|-----------|
| NOBLE GAS (LO)   | 5         |
| NOBLE GAS (MID)  | 7         |
| NOBLE GAS (HI)   | 9         |
| PAVSS N.G. (MID) | 1         |
| PAVSS N.G. (HI)  | 2         |

4. Obtain Noble Gas concentrations in  $\mu\text{Ci}/\text{min}$  for each Alarming Unit and Channel as follows:
  - a. Press [HIST 10 MIN] UNIT # [-] CHANNEL # [ENTER].
  - b. Press [PRINT] [FILE] [ENTER].
  - c. Examine the last full 10-minute data period (next to last concentration value).
    1. If LO range  $<2.2\text{E}^{-2} \mu\text{Ci}/\text{cc}$ , proceed to step 4d to obtain release rates in the  $\mu\text{Ci}/\text{cc}/\text{min}$ .
    2. If LO range  $>2.2\text{E}^{-2} \mu\text{Ci}/\text{cc}$ , repeat steps 4a and 4b using the MID range detector.
    3. If MID range  $>7.8\text{E}^{-1} \mu\text{Ci}/\text{cc}$ , repeat steps 4a and 4b using the HI range detector.
  - d. After the concentration history file is printed out, press [-] to scroll to "RELEASE RATE" and press [ENTER]. Wait for the panel display to change, press [PRINT] [FILE] [ENTER] to print corresponding release rates in  $\mu\text{Ci}/\text{minute}$ .
  - e. Repeat steps 4a through 4d for all alarming noble gas channels.
5. Sum the release rates for Noble Gas channels in alarm and use this value for the MIDAS dose calculations.

## MIDAS OPERATING PROCEDURE

### TABLE OF CONTENTS

| <u>SECTION</u>   | <u>PAGE</u> |
|--|-------------|
| A. INTRODUCTION/SYSTEM STARTUP   | 2           |
| B. MENU B: FORWARD CALCULATIONS  | 4           |
| C. MENU C: EVENT TREE NUREG-1228 CALCULATIONS                              | 10          |
| D. MENU D: DEFAULT ACCIDENT CALCULATIONS                                   | 14          |
| E. MENU E-W: BACK CALCULATIONS   | 17          |
| F. MENU G: BLOWOUT PANEL CALCULATIONS                                      | 23          |
| G. DESCRIPTION OF INFORMATION PROVIDED ON THE MIDAS<br>DOSE SUMMARY REPORT | 29          |
| H. INFORMATION FOR DISTANCES BETWEEN 10 AND 50 MILES                       | 33          |
| I. ACCIDENT DESCRIPTIONS   | 34          |

## A. INTRODUCTION/SYSTEM STARTUP

1. The following conventions are used in this procedure to describe computer operations:
  - a. Bold, upper case text (i.e., **CURRENT DATE**), denotes text which appears on the screen.
  - b. Underlined, uppercase text (i.e., LOGIN) denotes text to be typed.
  - c. Bracketed, upper case text (i.e., [ENTER]), denotes special keys which are to be pressed.
  - d. Most mouse selections can be made with a single click.
    - Single click **RESET** to cancel previous screen selections.
    - Double click **RESET** to back out of present menu.
    - Double click to **EXIT** menu.
2. The met and vent spreadsheet will appear with all of the meteorological and ventilation release rate parameters across the top of the page. The current time period is highlighted in the left-hand column. The first time interval is 2 hours before the current time and the last time interval is 16 hours after the current time.
3. All required meteorological and ventilation data for MIDAS can be obtained using the MET/VENT DATA ACQUISITION OPTIONS tab.
4. To start MIDAS on a DOS computer:
  - a. Turn ON each component (monitor, computer, and printer) of the computer system on which MIDAS is loaded.
  - b. At the MIDAS logon screen, enter the password **MIDAS** and [ENTER].
  - c. At the MIDAS MAIN MENU screen, select A: MIDAS (Dose Calculator) and [ENTER].
  - d. The system will then display the **CURRENT DATE**. If the date is correct, press [ENTER]. If this date is incorrect, type the correct date using the format which is illustrated in the prompt and press [ENTER].
  - e. The system will then display the **CURRENT TIME**, which is stored in the computer system's clock (24-hour clock format). If the time is correct, press [ENTER]. If this time is incorrect, type the correct time using the format which is illustrated in the prompt and press [ENTER].

- f. The MIDAS logon screen will now appear for 20 seconds.
  - g. The **ACCIDENT MENU SELECTION** screen will appear. Select the appropriate calculation option and **CONFIRM** your selection.
- 5. To exit MIDAS on a DOS computer, double-click **EXIT** on each menu screen that appears. At the **SECURITY MENU**, press [F8] to log off.
- 6. To start MIDAS on a Windows computer:
  - a. Turn on each component (monitor, computer, and printer) of the computer system on which MIDAS is loaded.
  - b. At the **WINDOWS LOGIN** Screen, press [**CANCEL**].
  - c. On the System Desktop, double click on the **MIDAS** Icon.
  - d. The system will then display the **CURRENT DATE**. If the date is correct, press [**ENTER**]. If the date is incorrect, type the correct date using the format which is illustrated in the prompt and press [**ENTER**].
  - e. The system will then display the **CURRENT TIME**, which is stored in the computer system's clock (24-hour clock format). If the date is correct, press [**ENTER**]. If the date is incorrect, type the correct time using the format which is illustrated in the prompt and press [**ENTER**].
  - f. The MIDAS logon screen will now appear for a short time.
  - g. The **ACCIDENT MENU SELECTION** screen will appear. Select the appropriate calculation option and **CONFIRM** your selection.
- 7. To exit MIDAS on a Windows computer, double-click **EXIT** on each menu screen that appears until you return to the System Desktop.
  - a. On the System Desktop, select **START, SHUTDOWN, SHUTDOWN THE COMPUTER**, and press [**YES**].

**B. MENU B: FORWARD CALCULATIONS**

**REQUIRED INPUTS**

ENGINEERING OR OPERATIONS SUPPORT IS REQUESTED FOR THESE CALCULATIONS.

**PLANT CONDITIONS**

- TIME OF REACTOR SHUTDOWN
- RELEASE START TIME
- DURATION OF RELEASE
- PROJECTION TIME
- ACCIDENT SOURCE TERM SELECTION

**MET DATA**

- 10 M WIND SPEED
- 10 M WIND DIRECTION
- STABILITY CLASS
- PRECIPITATION RATE

**VENT DATA**

- SITE TOTAL NOBLE GAS RELEASE RATES
- SITE TOTAL I-131 RELEASE RATES  
(if available from Chemistry or as directed by RPC/DASU)
- SITE TOTAL PARTICULATE RELEASE RATES  
(if available from Chemistry or as directed by RPC/DASU)

1. The **MET/VENT DATA CONTROL TABLE** screen will appear.

- a. Select **START NEW SCENARIO** and then **CONFIRM, OR**
- b. If you have already initiated calculations and wish to modify either the existing met spreadsheet file or vent spreadsheet, select **CURRENT SCENARIO EDIT** and **CONFIRM**.

**NOTE:** **CURRENT SCENARIO EDIT** will include releases/doses from previous time steps, if applicable.

- c. Other options are available in the lower right hand section of the display if you wish to **RESET** or change your initial selection or **EXIT** the screen.

2. The **METEOROLOGICAL DATA** spreadsheet will appear with all of the required meteorological parameters across the top of the page. Place the cursor on the data period corresponding to the start of release. Input the following met data:

**NOTE 1:** If the met data remains the same for successive time periods, the operator need only enter the met data once. MIDAS will persist the data to future time periods automatically.

**NOTE 2:** If a value is to be repeated in a field it can still be manually copied down the spreadsheet using the K (copy last) key while that value is highlighted.

- a. In the column labeled **10M SPD**, enter the wind speed from the 10 meter onsite (primary) meteorological tower in MILES PER HOUR (MPH).

**NOTE:** If the primary meteorological tower data is not available, refer to the Met Vent Data Acquisition Options tab for other options.

If the primary meteorological tower wind speed remains at "zero" during freezing and/or other inclement weather, that data point is likely invalid, and the backup tower wind speed should be used if available.

- b. In the column labeled **10M WD**, enter the wind direction from the 10-meter onsite (primary) meteorological tower in DEGREES FROM (DEG FM).

- c. In the column labeled **STAB CLS**, enter the actual value for  $\Delta T$  in DEGREES CENTIGRADE (preferred method) or the wind speed corrected stability class (Letter Code) if the primary tower data is not available. MIDAS will convert the letter entry to a numerical value.

- d. In the column labeled **RAIN-LMH**, enter the precipitation rate in INCHES PER 15 MINUTES (IN/15M). Divide the PICSY precipitation rate (inches/hr) by 4. If the precipitation rate is not available, estimation may be made by using the following table:

|                         |                 |
|-------------------------|-----------------|
| <b>NO PRECIPITATION</b> | <u>0</u> (zero) |
| <b>DRIZZLE or MIST</b>  | <u>L</u> IGHT   |
| <b>STEADY RAIN</b>      | <u>M</u> EDIUM  |
| <b>HEAVY DOWNPOUR</b>   | <u>H</u> EAVY   |

- e. Type X when all data has been entered to save the data and exit out of the meteorological spreadsheet.

3. A **WEATHER SELECTION** screen will appear if any of the meteorological data inputs are missing from the spreadsheet.
  - a. If this screen appears, select **RESET** until you have returned to the **MET/VENT DATA CONTROL TABLE** screen.
  - b. Select **CURRENT SCENARIO EDIT** and enter any missing meteorological values on the spreadsheet.
  - c. Type **X** when all data has been entered to save the data and exit out of the meteorological spreadsheet.

4. The vent (**GASEOUS VENT AND FLOW**) spreadsheet will appear next. Enter current vent data. The data entry for each 15-minute period is as follows:

**NOTE:** Vent data may be entered in a regular numerical presentation (10000) or in scientific notation (1.0E+04).

- a. In the column labeled **TOT NG RELEASE**, enter the site total noble gas release rate in  $\mu\text{Ci}/\text{min}$ .
- b. In the column labeled **TOT I-131 RELEASE**, enter the site total I-131 release rate in  $\mu\text{Ci}/\text{min}$ . Unless valid data is available from Chemistry or data is authorized for use by the RPC/DASU, the I-131 release rate should be calculated as follows:

$$\text{TOT NG RELEASE } (\mu\text{Ci}/\text{min}) / 1000 = \text{TOT I-131 RELEASE } (\mu\text{Ci}/\text{min})$$

- c. In the column labeled **TOT P RELEASE**, enter the site total particulate release rate in  $\mu\text{Ci}/\text{min}$ . Unless valid data is available from Chemistry or data is authorized for use by the RPC/DASU, the particulate release rate should be calculated as follows:

$$\text{TOT NG RELEASE } (\mu\text{Ci}/\text{min}) / 10,000 = \text{TOT P RELEASE } (\mu\text{Ci}/\text{min})$$

- d. When the data entry is complete, press the **X** key to save the information and exit the spreadsheet.

5. From the **ACCIDENT SOURCE TERM SELECTION** screen, select an appropriate accident source term, then **CONFIRM**. Select **RESET** if you wish to change your previous selection.

If no specific information on the type of release is available from Engineering, use the following as a guide in the selection of appropriate accident source term.

- a. Obtain Reactor Power from Engineering, Operations, or as follows:
    - 1) From PICSY, select Unit #1 or Unit #2 formats to view affected unit.
    - 2) Type STA and press **[ENTER]**.
    - 3) "Reactor Power" is in the top left section.
    - 4) Click on **MET VENT** to return to the Met/Vent data display.
  - b. If the reactor is operating at or greater than 10% power, select the **ATWS** source term.
  - c. If reactor power is at less than 10%, select the **LOCA (Clad Failure)** source term.
  - d. If conditions indicate a fuel handling incident and a release from the refueling floor (Reactor Building floor 818'), select **Fuel Handling Accident**.
6. The **RELEASE TIMING SELECTION** screen will appear next. There are three lines to the screen.
    - a. On Line 1, select **TRIP DATE** (date and time of reactor trip). Using the calendar wheel, enter the appropriate date and time of reactor trip. **CONFIRM** to close the calendar wheel.
      - 1) The time of reactor trip must be equal to or earlier than the **START OF RELEASE**.
      - 2) The time of reactor trip can be set up to roughly one year (8,190 hours) prior to the **START OF RELEASE**.

NOTE (1): MIDAS assumes the reactor must be shutdown before a release can occur. The **TRIP DATE** triggers the start of decay for the accident mix.

NOTE (2): Even during an **ATWS**, where a release is in progress and the reactor has not shut down, a **TRIP DATE** must be entered to run MIDAS. It is recommended the same date and time for the **START OF RELEASE** be used for the **TRIP DATE**. Entering a date and time for reactor trip has no impact on decay of the **ATWS** mix.

b. On Line 2, select **START OF RELEASE**. Using the calendar wheel, enter the appropriate date and time of the start of release. **CONFIRM** to close the calendar wheel.

1) If **START NEW SCENARIO** was selected, the **START OF RELEASE** date/time entered should be the current date/time at which you are starting the calculation.

2) If **CURRENT SCENARIO EDIT** was selected, the previously entered **START OF RELEASE** should still be used, if met/vent date have been entered for each 15-minute period since that **START OF RELEASE**. Otherwise, select **RESET** until **START NEW SCENARIO** is selected.

NOTE: The **START OF RELEASE** is defined as the date and time of the first vent data entry.

c. On Line 3, select **REMAINING DURATION** of the release. Using the numpad enter the duration of release, in minutes, and select **EN** or press **[ENTER]** to close the numpad. If the duration of release is not known, use the default of 360 minutes.

NOTE: The **REMAINING DURATION (DURATION OF RELEASE)** can use forecasted or persisted data for up to 16 hours into the future.

d. Select **CONFIRM** to continue with the calculation or **RESET** to change any of your previous choices.

7. The **PPL SUMMARY DATA SELECTION** screen allows the user to select different options for the **MIDAS DOSE ASSESSMENT SUMMARY SHEET**.
  - a. Select the projection time from the left-hand column if other than the default of six hours is needed.

NOTE: The 0.25-hour projection time should be used with extreme caution. Projected doses can be substantially underestimated.
  - b. Select the **PEAK SECTOR** dose rate option; then **CONFIRM**. If you wish to change any of your previous choices, select **RESET**.

NOTE: The **PEAK SECTOR** is used to determine the highest dose rate in all 16 sectors. The alternate selection (**CURRENT AFFECTED SECTOR**) is applicable only when estimated dose rates from the current release period alone are requested by the RPC/DASU.
8. After the calculations have completed, the **MIDAS DOSE ASSESSMENT SUMMARY SHEET** will be displayed on the screen.
  - a. If you want to select a different projection time or sector designation from the **PPL SUMMARY DATA SELECTION** screen, select **RESTART REPORT**.
  - b. If you wish to view additional report options, select **CONTINUE** and, on the next page, **MORE REPORTS**.
  - c. If you wish to continue with the next calculation, double click **EXIT**. This will return you to the **ACCIDENT MENU SELECTION** screen where the dose calculation process can be repeated using updated input values.
  - d. If a hard copy is desired of any printout or plot displayed on the screen, press **[PRINT SCRNL]**.

NOTE: If a hard-copy printout is made of the **MIDAS DOSE ASSESSMENT SUMMARY SHEET**, be sure to fill in the required information documenting the name of the dose calculator and approver.

**C. MENU C: EVENT TREE NUREG-1228 CALCULATIONS**

**REQUIRED INPUTS**

ENGINEERING OR OPERATIONS SUPPORT IS REQUESTED FOR THESE CALCULATIONS.

**PLANT CONDITIONS**

- RELEASE PATHWAY
- CORE CONDITION, INCLUDING PERCENT OF CLAD FAILURE OR FUEL MELT
- CONTAINMENT CONDITIONS
- FILTRATION
- PROJECTION TIME

**MET DATA**

- 10 M WIND SPEED
- 10 M WIND DIRECTION
- STABILITY CLASS
- PRECIPITATION RATE

1. The **EVENT TREE NUREG-1228 SELECTION** screen will appear.

- a. Using information provided by Engineering Support or Operations, select one cell in each row of the menu. When a cell in the current row is selected, the next row then appears.

**NOTE:** Event tree menu selections, which include a definition of plant release parameters, are included (Section I) for each NUREG-1228 accident release scenario.

- b. Using information provided by Engineering Support, select percent clad failure or percent fuel melt as follows:

- (1) Left-click on percent clad failure (fuel melt).
- (2) Using the numpad on the screen, input the percent clad failure (fuel melt) provided by Engineering Support, the EN (ENTER).
- (3) **CONFIRM** your entry if correct. If incorrect, re-perform steps (1) and (2).

- c. **CONFIRM** entries to continue with the calculation or **RESET** if you wish to change any of your selections. You may also double-click **EXIT** to return to the **ACCIDENT MENU SELECTION** screen.

2. The **MET/VENT DATA CONTROL TABLE** screen will appear.
  - a. Select **START NEW SCENARIO** and then **CONFIRM**.
  - b. Other options are available in the lower right hand section of the display if you wish to **RESET** your initial entries or **EXIT** the screen.
3. The **METEOROLOGICAL DATA** spreadsheet will appear with all of the required meteorological parameters across the top of the page.

**NOTE:** Ensure met data is entered for the current time. MIDAS will persist the data to future time periods automatically.

- a. In the column labeled **10M SPD**, enter the wind speed from the 10-meter onsite (primary) meteorological tower in **MILES PER HOUR (MPH)**.

**NOTE:** If the primary meteorological tower data is not available, refer to the Met Vent Data Acquisition Options tab for other options.

If the primary meteorological tower wind speed remains at "zero" during freezing and/or other inclement weather, that data point is likely invalid, and the backup tower wind speed should be used if available.

- b. In the column labeled **10M WD**, enter the wind direction from the 10-meter onsite (primary) meteorological tower in **DEGREES FROM (DEG FM)**.
- c. In the column labeled **STAB CLS**, enter the actual value for  $\Delta T$  in **DEGREES CENTIGRADE** (preferred method) or the wind speed corrected stability class (Letter Code) if the primary tower data is not available. MIDAS will convert the letter entry to a numerical value.
- d. In the column labeled **RAIN-LMH**, enter the precipitation rate in **INCHES PER 15 MINUTES (IN/15M)**. Divide the PICSY precipitation rate (inches/hr) by 4. If the precipitation rate is not available, estimation may be made by using the following table:

|                         |                 |
|-------------------------|-----------------|
| <b>NO PRECIPITATION</b> | <u>0</u> (zero) |
| <b>DRIZZLE or MIST</b>  | <u>L</u> IGHT   |
| <b>STEADY RAIN</b>      | <u>M</u> EDIUM  |
| <b>HEAVY DOWNPOUR</b>   | <u>H</u> EAVY   |

- e. Type X when all data has been entered to save the data and exit out of the meteorological spreadsheet.
4. A **WEATHER SELECTION** screen will appear if any of the meteorological data inputs are missing from the spreadsheet.
- a. If this screen appears, select **RESET** until you have returned to the **MET/VENT DATA CONTROL TABLE** screen.
  - b. Select **CURRENT SCENARIO EDIT** and enter any missing meteorological values on the spreadsheet.
  - c. Type X when all data has been entered to save the data and exit out of the meteorological spreadsheet.
5. The **PPL SUMMARY DATA SELECTION** screen allows the user to select different options for the **MIDAS DOSE ASSESSMENT SUMMARY SHEET**.
- a. Select the projection time from the left-hand column if other than the default of six hours is needed.  
  
NOTE: The 1-hour projection time should be used with caution. Projected doses can be underestimated.
  - b. Select the **PEAK SECTOR** dose rate option; then **CONFIRM**. If you wish to change any of your previous choices, select **RESET**.  
  
NOTE: The **PEAK SECTOR** is used to determine the highest dose rate in all 16 sectors. The alternate selection (**CURRENT AFFECTED SECTOR**) is applicable only when estimated dose rates from the current release period alone are requested by the RPC/DASU.
6. After the calculations have completed, the **MIDAS DOSE ASSESSMENT SUMMARY SHEET** will be displayed on the screen.
- a. If you want to select a different projection time or sector designation from the **PPL SUMMARY DATA SELECTION** screen, select **RESTART PROGRAM**.
  - b. If you wish to view additional report options, select **CONTINUE** and, on the next page, **MORE REPORTS**.
  - c. If you wish to continue with the next calculation, double click **EXIT**. This will return you to the **ACCIDENT MENU SELECTION** screen where the dose calculation process can be repeated using updated input values.

- d. If a hard copy is desired of any printout or plot displayed on the screen, press **[PRINT SCR]**.

**NOTE (1):** If a hard-copy printout is made of the **MIDAS DOSE ASSESSMENT SUMMARY SHEET**, be sure to fill in the required information documenting the name of the dose calculator and approver.

**NOTE (2):** Engineering Support or Operations concurrence with the selections may be documented by their representatives' signatures on the printout.

**D. MENU D: DEFAULT ACCIDENT CALCULATIONS**

**REQUIRED INPUTS**

ENGINEERING OR OPERATIONS SUPPORT IS REQUESTED FOR THESE CALCULATIONS.

**MET DATA**

- 10 M WIND SPEED
- 10 M WIND DIRECTION
- STABILITY CLASS
- PRECIPITATION RATE

**SOURCE TERM**

- ACCIDENT SOURCE TERM SELECTION
- PERCENT OF CLAD FAILURE OR FUEL MELT
- PROJECTION TIME

1. The **MET/VENT DATA CONTROL TABLE** screen will appear.
  - a. Select **START NEW SCENARIO** and then **CONFIRM**.
  - b. Other options are available in the lower right hand section of the display if you wish to **RESET** your initial entries or **EXIT** the screen.
2. The **METEOROLOGICAL DATA** spreadsheet will appear with all of the required meteorological parameters across the top of the page.

**NOTE:** Ensure met data is entered for the current time. MIDAS will persist the data to future time periods automatically.

- a. In the column labeled **10M SPD**, enter the wind speed from the 10-meter onsite (primary) meteorological tower in **MILES PER HOUR (MPH)**.

**NOTE:** If the primary meteorological tower data is not available, refer to the Met Vent Data Acquisition Options tab for other options.

If the primary meteorological tower wind speed remains at "zero" during freezing and/or other inclement weather, that data point is likely invalid, and the backup tower wind speed should be used if available.

- b. In the column labeled **10M WD**, enter the wind direction from the 10-meter onsite (primary) meteorological tower in DEGREES FROM (DEG FM).
- c. In the column labeled **STAB CLS**, enter the actual value for  $\Delta T$  in DEGREES CENTIGRADE (preferred method) or the wind speed corrected stability class (Letter Code) if the primary tower data is not available. MIDAS will convert the letter entry to a numerical value.
- d. In the column labeled **RAIN-LMH**, enter the precipitation rate in INCHES PER 15 MINUTES (IN/15M). Divide the PICSY precipitation rate (inches/hr) by 4. If the precipitation rate is not available, estimation may be made by using the following table:

|                         |                 |
|-------------------------|-----------------|
| <b>NO PRECIPITATION</b> | <u>0</u> (zero) |
| <b>DRIZZLE or MIST</b>  | <u>L</u> IGHT   |
| <b>STEADY RAIN</b>      | <u>M</u> EDIUM  |
| <b>HEAVY DOWNPOUR</b>   | <u>H</u> EAVY   |

- e. Type X when all data has been entered to save the data and exit out of the meteorological spreadsheet.
3. A **WEATHER SELECTION** screen will appear if any of the meteorological data inputs are missing from the spreadsheet.
    - a. If this screen appears, select **RESET** until you have returned to the **MET/VENT DATA CONTROL TABLE** screen.
    - b. Select **CURRENT SCENARIO EDIT** and enter any missing meteorological values on the spreadsheet.
    - c. Type X when all data has been entered to save the data and exit out of the meteorological spreadsheet.
  4. From the **ACCIDENT SOURCE TERM SELECTION** screen, select an appropriate accident source term, then **CONFIRM**.
  5. A **PERCENT FAILURE FOR LOCA** screen will appear if the clad failure or fuel melt accident source term is selected. Input the percent of clad failure or fuel melt using the numpad and **CONFIRM**.

6. The **PPL SUMMARY DATA SELECTION** screen allows the user to select different options for the **MIDAS DOSE ASSESSMENT SUMMARY SHEET**.
  - a. Select the projection time from the left-hand column if other than the default of six hours is needed.

NOTE: The 1-hour projection time should be used with caution. Projected doses can be underestimated.
  - b. Select the **PEAK SECTOR** dose rate option; then **CONFIRM**. If you wish to change any of your previous choices, select **RESET**.

NOTE: The **PEAK SECTOR** is used to determine the highest dose rate in all 16 sectors. The alternate selection (**CURRENT AFFECTED SECTOR**) is applicable only when estimated dose rates from the current release-period alone are requested by the RPC/DASU.
7. After the calculations have completed, the **MIDAS DOSE ASSESSMENT SUMMARY SHEET** will be displayed on the screen.
  - a. If you want to select a different projection time or sector designation from the **PPL SUMMARY DATA SELECTION** screen, select **RESTART PROGRAM**.
  - b. If you wish to view additional report options, select **CONTINUE** and, on the next page, **MORE REPORTS**.
  - c. If you wish to continue with the next calculation, double click **EXIT**. This will return you to the **ACCIDENT MENU SELECTION** screen where the dose calculation process can be repeated using updated input values.
  - d. If a hard copy is desired of any printout or plot displayed on the screen, press **[PRINT SCR]**.

NOTE: If a hard-copy printout is made of the **MIDAS DOSE ASSESSMENT SUMMARY SHEET**, be sure to fill in the required information documenting the name of the dose calculator and approver.

**E. MENU E-W: BACK CALCULATIONS**

**REQUIRED INPUTS**

ENGINEERING OR OPERATIONS SUPPORT IS REQUESTED FOR THESE CALCULATIONS.

**PLANT CONDITIONS**

- TIME OF REACTOR SHUTDOWN
- RELEASE START TIME
- DURATION OF RELEASE
- ACCIDENT SOURCE TERM SELECTION
- PROJECTION TIME

**MET DATA**

- 10 M WIND SPEED
- 10 M WIND DIRECTION
- STABILITY CLASS
- PRECIPITATION RATE

**FIELD DATA**

- 3 FT (CW) SURVEY METER READING
- DISTANCE FROM PLANT
- IODINE CARTRIDGE NET CPM, IODINE CONCENTRATION  $\mu\text{Ci/cc}$ , OR DEFAULT IODINE MIX

1. The **MET/VENT DATA CONTROL TABLE** screen will appear.
  - a. Select **START NEW SCENARIO** and then **CONFIRM**.
  - b. If you have already initiated calculations and wish to modify the existing met spreadsheet file, select **CURRENT SCENARIO EDIT** and **CONFIRM**.
  - c. Other options are available in the lower right hand section of the display if you wish to **RESET** your initial entries or **EXIT** the screen.

2. The **METEOROLOGICAL DATA** spreadsheet will appear with all of the required meteorological parameters across the top of the page.

**NOTE:** Ensure met data is entered for the current time. MIDAS will persist the data to future time periods automatically.

- a. In the column labeled **10M SPD**, enter the wind speed from the 10-meter onsite (primary) meteorological tower in MILES PER HOUR (MPH).

**NOTE:** If the primary meteorological tower data is not available, refer to the Met Vent Data Acquisition Options tab for other options.

If the primary meteorological tower wind speed remains at "zero" during freezing and/or other inclement weather, that data point is likely invalid, and the backup tower wind speed should be used if available.

- b. In the column labeled **10M WD**, enter the wind direction from the 10-meter onsite (primary) meteorological tower in DEGREES FROM (DEG FM).
- c. In the column labeled **STAB CLS**, enter the actual value for  $\Delta T$  in DEGREES CENTIGRADE (preferred method) or the wind speed corrected stability class (Letter Code) if the primary tower data is not available. MIDAS will convert the letter entry to a numerical value.
- d. In the column labeled **RAIN-LMH**, enter the precipitation rate in INCHES PER 15 MINUTES (IN/15M). Divide the PICSY precipitation rate (inches/hr) by 4. If the precipitation rate is not available, estimation may be made by using the following table:

|                         |                       |
|-------------------------|-----------------------|
| <b>NO PRECIPITATION</b> | <b><u>0</u>(zero)</b> |
| <b>DRIZZLE or MIST</b>  | <b><u>L</u>IGHT</b>   |
| <b>STEADY RAIN</b>      | <b><u>M</u>EDIUM</b>  |
| <b>HEAVY DOWNPOUR</b>   | <b><u>H</u>EAVY</b>   |

- e. Type **X** when all data has been entered to save the data and exit out of the meteorological spreadsheet.

3. A **WEATHER SELECTION** screen will appear if any of the meteorological data inputs are missing from the spreadsheet.
  - a. If this screen appears, select **RESET** until you have returned to the **MET/VENT DATA CONTROL TABLE** screen.
  - b. Select **CURRENT SCENARIO EDIT** and enter any missing meteorological values on the spreadsheet.
  - c. Type **X** when all data has been entered to save the data and exit out of the meteorological spreadsheet.
4. From the **ACCIDENT SOURCE TERM SELECTION** screen, select an appropriate accident source term, then **CONFIRM**.

If no specific information on the type of release is available from Engineering, use the following as a guide in the selection of an appropriate accident source term:

- a. Obtain Reactor Power from Engineering, Operations, or as follows:
  - 1) From PICSY, select Unit #1 or Unit #2 formats to view affected unit.
  - 2) Type STA and press [ENTER].
  - 3) "Reactor Power" is in the top left section.
  - 4) Click on **MET VENT** to return to the Met/Vent data display.
- b. If the reactor is operating at or greater than 10% power, select the **ATWS** source term.
- c. If reactor power is at less than 10%, select the **LOCA (Clad Failure)** source term.
- d. If conditions indicate a fuel handling incident and a release from the refueling floor (Reactor Building floor 818'), select **Fuel Handling Accident**.

5. The next screen is the **FIELD MONITOR PARAMETER SELECTION** screen. Select the appropriate cells and input the information requested using the numpad on the screen or enter the data using the computer keyboard. Once the data entry is complete, **CONFIRM** to continue with the calculation.
  - a. Enter Field Team or ERMS Fixed Monitor gamma (EDE) dose rate whichever is appropriate.
  - b. Enter the distance of the Field Team or Fixed Monitor from the plant as noted on the RMS Report or for the on-site team as noted on Table 4 of EP-AD-000-124.
  - c. If iodine air sample data is available, enter either the **IODINE CARTRIDGE** reading in net counts per minute or an **IODINE CONCENTRATION** value in  $\mu\text{Ci/cc}$ . A zero (0) value may be entered for the net count per minute or  $\mu\text{Ci/cc}$  measurement, if indicated.
  - d. If iodine data is not available, select the **DEFAULT MIX** option to characterize the iodine source term.
6. On the **RELEASE TIMING SELECTION** screen, enter the estimated remaining duration for the release, then **CONFIRM**. If the duration of release is not known, use the default of 360 minutes.
7. The **PPL SUMMARY DATA SELECTION** screen allows the user to select different options for the **MIDAS DOSE ASSESSMENT SUMMARY SHEET**.
  - a. Select the projection time from the left-hand column if other than the default of six hours is needed.

NOTE: The 1-hour projection time should be used with caution. Projected doses can be underestimated.
  - b. Select the **PEAK SECTOR** dose rate option; then **CONFIRM**. If you wish to change any of your previous choices, select **RESET**.

NOTE: The **PEAK SECTOR** is used to determine the highest dose rate in all 16 sectors. The alternate selection (**CURRENT AFFECTED SECTOR**) is applicable only when estimated dose rates from the current release period alone are requested by the RPC/DASU.

8. After the calculations have completed, the **MIDAS DOSE ASSESSMENT SUMMARY SHEET** will be displayed on the screen.
- a. If you want to select a different projection time or sector designation from the **PPL SUMMARY DATA SELECTION** screen, select **RESTART PROGRAM**.
  - b. If you wish to view additional report options, select **CONTINUE** and, on the next page, **MORE REPORTS**.
  - c. If you wish to continue with the next calculation, double click **EXIT**. This will return you to the **ACCIDENT MENU SELECTION** screen where the dose calculation process can be repeated using updated input values.
  - d. If a hard copy is desired of any printout or plot displayed on the screen, press **[PRINT SCR]**.

**NOTE:** If a hard-copy printout is made of the **MIDAS DOSE ASSESSMENT SUMMARY SHEET**, be sure to fill in the required information documenting the name of the dose calculator and approver.

- e. Remote Monitoring System perimeter monitoring location dose rates can be displayed by MIDAS using the perimeter monitoring dose rate screen option.

**NOTE:** The displayed values are only numeric dose estimates based on MIDAS calculations. They are not "real-time" readings from the perimeter monitor system.

Directions for accessing the MIDAS perimeter monitor dose rate screen option are as follows:

- 1) At the **MIDAS DOSE ASSESSMENT SUMMARY SHEET** screen, select **CONTINUE**.
- 2) On the next screen select **MORE REPORTS**.
- 3) From the **MORE REPORTS SELECTION** screen, select **FM GAMMA DOSE RATE PLOT** and **CONFIRM**.
- 4) From the **REPORT PARAMETER SELECTION** screen, choose the appropriate projection time and **CONFIRM**.
- 5) From the **MAP SELECTION** screen, select **MAP SCALE** and input 1.25 miles, then **CONFIRM**.

- 6) On the next screen, select **MAP FEATURES**.
- 7) On the next screen, select **CALCULATED PERIMETER MON DOSE RATES** and **CONFIRM**.
- 8) To exit, select **CONTINUE, MORE REPORTS**, and **EXIT**.

**F. MENU G: BLOWOUT PANEL CALCULATIONS**

**REQUIRED INPUTS**

ENGINEERING OR OPERATIONS SUPPORT IS REQUESTED FOR THESE CALCULATIONS.

**PLANT CONDITIONS**

- TIME OF REACTOR SHUTDOWN
- RELEASE START TIME
- PROJECTION TIME
- BLOWOUT PANEL ASSUMED TO HAVE LIFTED (RELEASE PATHWAY)
- CORE CONDITION, INCLUDING PERCENT OF CLAD FAILURE OR CORE MELT

**MET DATA**

- 10 M WIND SPEED
- 10 M WIND DIRECTION
- STABILITY CLASS
- PRECIPITATION RATE

1. The **MET/VENT DATA CONTROL TABLE** screen will appear.
  - a. Select **START NEW SCENARIO** and then **CONFIRM, OR**
  - b. If you have already initiated calculations and wish to modify the existing met spreadsheet file, select **CURRENT SCENARIO EDIT** and **CONFIRM**.

**NOTE:**       **CURRENT SCENARIO EDIT** will include releases/doses from previous time steps, if applicable.
  - c. Other options are available in the lower right hand section of the display if you wish to **RESET** or change your initial selection or **EXIT** the screen.

2. The **METEOROLOGICAL DATA** spreadsheet will appear with all of the required meteorological parameters across the top of the page. Place the cursor on the data period corresponding to the start of release. Input the following met data:

**NOTE 1:** If the met data remains the same for successive time periods, the operator need only enter the met data once. MIDAS will persist the data to future time periods automatically.

**NOTE 2:** If a value is to be repeated in a field it can still be manually copied down the spreadsheet using the **K** (copy last) key while that value is highlighted.

- a. In the column labeled **10M SPD**, enter the wind speed from the 10 meter onsite (primary) meteorological tower in MILES PER HOUR (MPH).

**NOTE:** If the primary meteorological tower data is not available, refer to the Met Vent Data Acquisition Options tab for other options.

If the primary meteorological tower wind speed remains at "zero" during freezing and/or other inclement weather, that data point is likely invalid, and the backup tower wind speed should be used if available.

- b. In the column labeled **10M WD**, enter the wind direction from the 10-meter onsite (primary) meteorological tower in DEGREES FROM (DEG FM).
- c. In the column labeled **STAB CLS**, enter the actual value for  $\Delta T$  in DEGREES CENTIGRADE (preferred method) or the wind speed corrected stability class (Letter Code) if the primary tower data is not available. MIDAS will convert the letter entry to a numerical value.
- d. In the column labeled **RAIN-LMH**, enter the precipitation rate in INCHES PER 15 MINUTES (IN/15M). Divide the PICSY precipitation rate (inches/hr) by 4. If the precipitation rate is not available, estimation may be made by using the following table:

|                         |                       |
|-------------------------|-----------------------|
| <b>NO PRECIPITATION</b> | <b><u>0</u>(zero)</b> |
| <b>DRIZZLE or MIST</b>  | <b><u>L</u>IGHT</b>   |
| <b>STEADY RAIN</b>      | <b><u>M</u>EDIUM</b>  |
| <b>HEAVY DOWNPOUR</b>   | <b><u>H</u>EAVY</b>   |

- e. Type **X** when all data has been entered to save the data and exit out of the meteorological spreadsheet.

3. The **BLOWOUT PANEL SELECTION** screen will appear.

**NOTE:** Blowout panel locations are shown on Figure 1 of this procedure tab.

- a. Using information provided by Engineering Support or Operations, select one cell in each row of the menu. When a cell in the current row is selected, the next row then appears.
- b. **CONFIRM** entries to continue with the calculation or **RESET** if you wish to change any of your selections. You may also double-click **EXIT** to return to the **ACCIDENT MENU SELECTION** screen.
- c. On the **PERCENT CLAD FAILURE** (or **PERCENT FUEL MELT**) screen, using information provided by Engineering Support, select percent clad failure or percent fuel melt as follows:
  - (1) Left-click on percent clad failure (fuel melt).
  - (2) Using the numpad on the screen, input the percent clad failure (fuel melt) provided by Engineering Support, then EN (ENTER).
  - (3) **CONFIRM** your entry if correct. If incorrect, re-perform steps (1) and (2).

**NOTE:** Release rates used by MIDAS are those shown in Table 1 of this procedure tab, multiplied by the percent clad failure (fuel melt) entered, expressed as a fraction (e.g., the multiplier for 50% fuel melt would be 0.5).

4. A **WEATHER SELECTION** screen will appear if any of the meteorological data inputs are missing from the spreadsheet.

- a. Missing information will be indicated by a black box (with white lettering) in the left-hand column.
  - (1) Left-click on the black box in the left column.
  - (2) Using the numpad on the screen, input the response to the missing data.
  - (3) Repeat steps (1) and (2) to supply any other required information.
  - (4) **CONFIRM** your entry if correct. If incorrect, re-perform steps (1) and (2) for the data in error.

5. The **PPL SUMMARY DATA SELECTION** screen allows the user to select different options for the **MIDAS DOSE ASSESSMENT SUMMARY SHEET**.

- a. Select the projection time from the left-hand column if other than the default of six hours is needed.

NOTE: The 0.25-hour projection time should be used with extreme caution. Projected doses can be substantially underestimated.

- b. Select the **PEAK SECTOR** dose rate option; then **CONFIRM**. If you wish to change any of your previous choices, select **RESET**.

NOTE: The **PEAK SECTOR** is used to determine the highest dose rate in all 16 sectors. The alternate selection (**CURRENT AFFECTED SECTOR**) is applicable only when estimated dose rates from the current release period alone are requested by the RPC/DASU.

6. After the calculations have completed, the **MIDAS DOSE ASSESSMENT SUMMARY SHEET** will be displayed on the screen.

- a. If you want to select a different projection time or sector designation from the **PPL SUMMARY DATA SELECTION** screen, select **RESTART PROGRAM**.

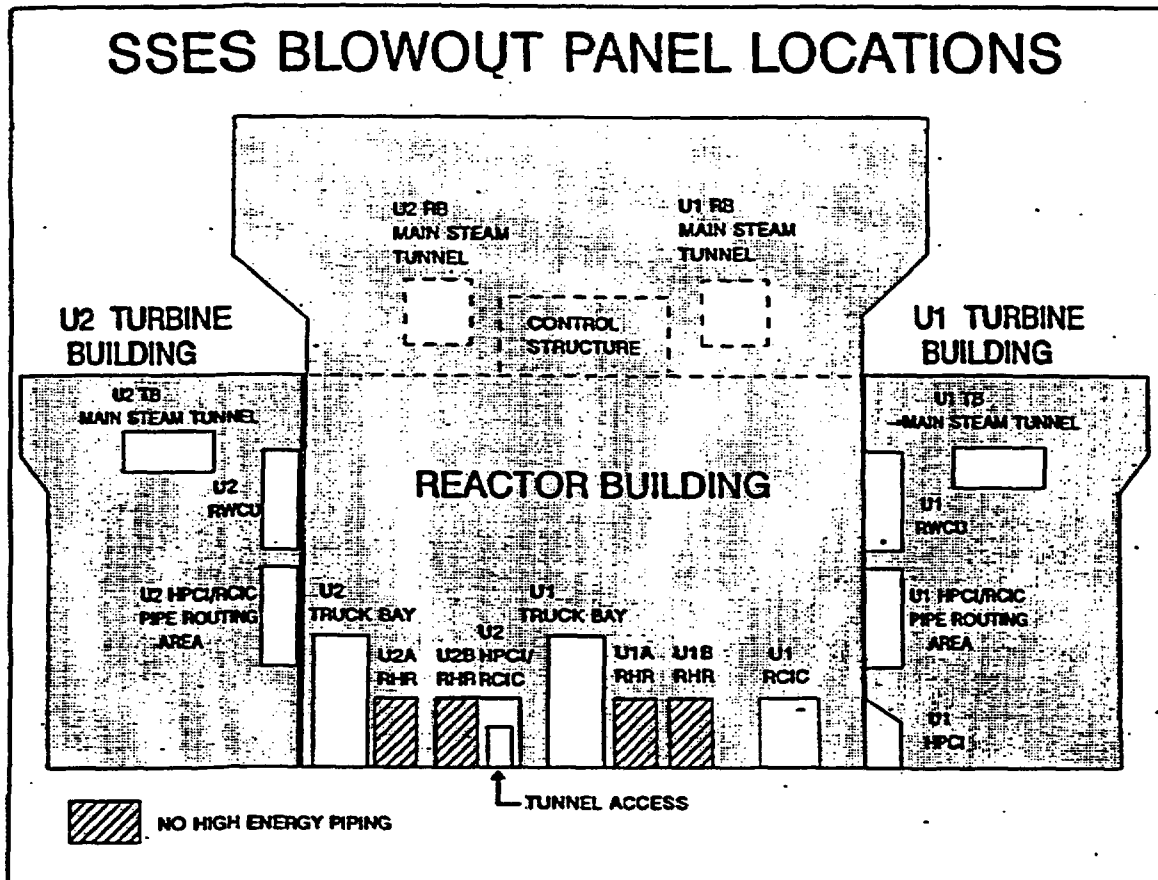
- b. If you wish to view additional report options, select **CONTINUE** and, on the next page, **MORE REPORTS**.

- c. If you wish to continue with the next calculation, double click **EXIT**. This will return you to the **ACCIDENT MENU SELECTION** screen where the dose calculation process can be repeated using updated input values.

- d. If a hard copy is desired of any printout or plot displayed on the screen, press **[PRINT SCR]**.

NOTE: If a hard-copy printout is made of the **MIDAS DOSE ASSESSMENT SUMMARY SHEET**, be sure to fill in the required information documenting the name of the dose calculator and approver.

FIGURE 1



**TABLE 1**  
**EVALUATION OF UNMONITORED**  
**RELEASES FROM STATION BLOWOUT PANELS**

**DIRECTIONS**

1. Select the appropriate station blowout panel location.
2. Select an appropriate accident source term mix.
3. Use the corresponding design base release rates for input into MENU B.
4. Enter the release rates for one (1) fifteen-minute time period.

**NOTE:** If Clad Failure or Fuel Melt mixes are selected, multiply the site total noble gas, I-131, and particulate release rates by the appropriate fraction of clad failure or fuel melt prior to entering the values onto the vent spreadsheet (e.g., the multiplier for 50% FUEL MELT would be 0.5).

| [ 1 ] BLOWOUT PANEL LOCATION          |  | [ 3 ] DESIGN BASIS (SITE TOTAL) RELEASE RATES |                               |                               |
|---------------------------------------|--|---|-------------------------------|-------------------------------|
|                                       |  | NOBLE GAS                                     | I-131                         | PARTICULATE                   |
|                                       |  | ( $\mu\text{Ci}/\text{min}$ )                 | ( $\mu\text{Ci}/\text{min}$ ) | ( $\mu\text{Ci}/\text{min}$ ) |
| <b>RCIC PUMP ROOM</b>                 |  |   |                               |                               |
| [ 2 ] ACCIDENT SOURCE TERM            |  |   |                               |                               |
| Normal Reactor Coolant Activity       |  | 1.2E+02*                                      | 1.8E+02                       | 1.1E+03                       |
| (LOCA) Reactor Depressurization-No FD |  | 2.6E+06                                       | 8.4E+04                       | 2.2E+04                       |
| (LOCA) 100% Clad Failure              |  | 2.1E+09                                       | 2.4E+08                       | 9.1E+07                       |
| (LOCA) 100% Fuel Melt                 |  | 4.3E+10                                       | 1.3E+09                       | 1.7E+09                       |
| <b>HPCI PUMP ROOM</b>                 |  |   |                               |                               |
|                                       |  | ( $\mu\text{Ci}/\text{min}$ )                 | ( $\mu\text{Ci}/\text{min}$ ) | ( $\mu\text{Ci}/\text{min}$ ) |
| Normal Reactor Coolant Activity       |  | 2.1E+03*                                      | 3.2E+03                       | 1.9E+04                       |
| (LOCA) Reactor Depressurization-No FD |  | 4.6E+07                                       | 1.5E+06                       | 3.8E+05                       |
| (LOCA) 100% Clad Failure              |  | 3.7E+10                                       | 4.3E+09                       | 1.6E+09                       |
| (LOCA) 100% Fuel Melt                 |  | 7.5E+11                                       | 2.3E+10                       | 3.0E+10                       |
| <b>HPCI/RCIC ROUTING AREA</b>         |  |   |                               |                               |
|                                       |  | ( $\mu\text{Ci}/\text{min}$ )                 | ( $\mu\text{Ci}/\text{min}$ ) | ( $\mu\text{Ci}/\text{min}$ ) |
| Normal Reactor Coolant Activity       |  | 3.2E+03*                                      | 4.9E+03                       | 2.9E+04                       |
| (LOCA) Reactor Depressurization-No FD |  | 7.0E+07                                       | 2.2E+06                       | 5.8E+05                       |
| (LOCA) 100% Clad Failure              |  | 5.7E+10                                       | 6.5E+09                       | 2.4E+09                       |
| (LOCA) 100% Fuel Melt                 |  | 1.1E+12                                       | 3.5E+10                       | 4.6E+10                       |
| <b>RWCU PENETRATION ROOM</b>          |  |   |                               |                               |
|                                       |  | ( $\mu\text{Ci}/\text{min}$ )                 | ( $\mu\text{Ci}/\text{min}$ ) | ( $\mu\text{Ci}/\text{min}$ ) |
| Normal Reactor Coolant Activity       |  | 7.3E+03*                                      | 5.8E+03                       | 6.6E+04                       |
| (LOCA) Reactor Depressurization-No FD |  | 1.6E+08                                       | 2.6E+06                       | 1.3E+06                       |
| (LOCA) 100% Clad Failure              |  | 1.3E+11                                       | 7.6E+09                       | 5.5E+09                       |
| (LOCA) 100% Fuel Melt                 |  | 2.6E+12                                       | 4.1E+10                       | 1.0E+11                       |
| <b>RB/TB MAIN STEAM TUNNEL</b>        |  |   |                               |                               |
|                                       |  | ( $\mu\text{Ci}/\text{min}$ )                 | ( $\mu\text{Ci}/\text{min}$ ) | ( $\mu\text{Ci}/\text{min}$ ) |
| Normal Reactor Coolant Activity       |  | 2.6E+04*                                      | 3.9E+04                       | 2.3E+05                       |
| (LOCA) Reactor Depressurization-No FD |  | 5.6E+08                                       | 1.8E+07                       | 4.7E+06                       |
| (LOCA) 100% Clad Failure              |  | 4.6E+11                                       | 5.2E+10                       | 1.9E+10                       |
| (LOCA) 100% Fuel Melt                 |  | 9.1E+12                                       | 2.8E+11                       | 3.7E+11                       |

FD = FUEL DAMAGE

\* Value less than the TRM limit for noble gas release rate.

REFERENCE: EC-RADN-1018, Evaluation of Unmonitored Releases from Station Blowout Panels, Revision 1, File R2-1.

**G. DESCRIPTION OF INFORMATION PROVIDED ON THE MIDAS DOSE ASSESSMENT SUMMARY SHEET**

**1. CALCULATION TYPE**

Menu option chosen for the calculation. Examples are Forward Calculation or Event Tree Calculation.

**2. CURRENT TIME PERIOD**

Current meteorological time period used for dose projections provided on quarter hour increments to match met spreadsheet entries.

**3. WEATHER CONDITIONS**

Meteorological data (wind speed, wind direction, affected sector, stability class, and precipitation rate) used for the summary report dose projections.

**4. REACTOR SHUTDOWN TIME**

Date and time of reactor shutdown.

**5. RELEASE START TIME**

This is the date and time of first dose calculation as indicated by the first positive vent release rate value entered on the vent data spreadsheet or if the vent spreadsheet is not used, the date and time of the calculation..

NOTE: For MENU C: EVENT TREE NUREG-1228 CALCULATIONS, MENU D: DEFAULT CALCULATIONS, and MENU E-W: BACK CALCULATIONS, it is conservatively assumed that the date and time of reactor shutdown is concurrent with the start of release.

**6. PROJECTION TIME**

This is the time X hours into the future, starting from the beginning of the current meteorological time period. "X" is the number of hours the user chooses as the projection time (e.g., 6 hours).

**7. REMAINING DURATION**

This is the remaining duration of the release for the calculation type chosen. For Event Tree calculations, that is always 24 hours and for Blowout Panel calculations, 0.25 hours.

**8. SOURCE TERM (for Forward and Back Calculations)**

Identifies the source term used for the current dose projection summary report calculations. Choice of six options:

- ATWS-Normal Reactor Coolant Activity (UNDECAYED)
- Normal Reactor Coolant Activity (DECAYED)
- (LOCA) Coolant Activity Leak with Depressurization Spike-No Fuel Damage
- (LOCA) Cladding Failure-Gap Release
- (LOCA) Fuel Melt-Early In-Vessel Release
- Fuel Handling Accident

**9. RELEASE CONDITIONS**

This section lists the release rates used in the calculation. The values are taken from user input for Forward calculations, inferred from user input of event conditions (Event Tree, Default, and Blowout Panel calculations, or inferred from user input of measured data in the field (Back calculations).

- 10.** Content of this section varies by Calculation Type. The objective is to provide information about the assumptions used to infer the Release Conditions for the calculation or to provide additional information about the Release Conditions.

For **Forward Calculations**, isotopic release ratios are provided. These may be compared to default ratios and used to infer plant conditions, for example, status of filtration.

For **Event Tree, Default, and Blowout Panel Calculations**, event or default conditions are listed. From those conditions, Release Conditions are inferred.

For **Back Calculations**, measured field data are listed. From those data, Release Conditions are inferred.

**11. DOSE RATE PROJECTIONS**

This table provides the TEDE, EDE, and THYROID CDE dose rates calculated at the OSCAR and EPB distances. These rate calculations are based on a variable projection/integration period for the current affected sector or peak sector (the usual user selection).

**12. INTEGRATED DOSE PROJECTIONS**

This table provides a TEDE and THYROID CDE dose projection calculated at the EPB, 2-mile, and 10-mile distances for varying projection times. The projection time will appear in the header line e.g., 4 HOUR INTEGRATED DOSE PROJECTION. The sector designation for this dose projection is based on the maximum calculated dose determined from all sixteen sectors for the given projection time (peak sector option, usually the user's choice) or the calculated dose for the current affected sector. Information for distances between 10 and 50 miles is available using the "More Reports" feature.

**13. PERFORMED/APPROVED**

The sign-off for calculation results is done for documentation purposes. The intended "approval" does not necessarily mean an independent verification of each input to the calculation but more an interactive discussion between the RPC/HP Level II Dose Calculator and/or DASU/DAST (or dose calculator) to ensure the calculated results are reasonable based on current plant and environmental information.

This sign-off process should occur before the calculated results are used for any emergency classification determinations or protective action recommendations.

| MIDAS DOSE ASSESSMENT SUMMARY SHEET |          |  |                     |
|-------------------------------------|----------|--|---------------------|
| FORWARD Calculation                 |          |  |                     |
| TIME: 15:00                         |          | DATE: 2/27/03                                |                     |
| WEATHER CONDITIONS                  |          | REACTOR CONDITIONS                           |                     |
| WINDSPEED (mph):                    | 3        | RX SHUTDOWN TIME:                            | 2/26/03 13:53       |
| WIND FROM DIRECTION (deg):          | 10       | RELEASE START TIME:                          | 2/27/03 14:53       |
| AFFECTED SECTOR:                    | S        | PROJECTION TIME:                             | 2/27/03 20:53       |
| DELTA TMP (deg.c) (STAB):           | 1.3 (E)  | REMAINING DURATION (HOURS):                  | 6.00                |
| PRECIPITATION:                      | NO       | SOURCE TERM:                                 | LOCA (CLAD FAILURE) |
| RELEASE CONDITIONS (uCi/min)        |          | ISOTOPIC RELEASE RATIOS                      |                     |
| NG RELEASE RATE USED:               | 1.00E+08 | NG/I-131 RATIO:                              | 1.0E+03             |
| I-131 RELEASE RATE USED:            | 1.00E+05 | NG/PARTICULATE RATIO:                        | 1.0E+04             |
| PART. RELEASE RATE USED:            | 1.00E+04 |  |                     |
| DOSE RATE PROJECTIONS (mrem/hr)     |          | 6.00 HOUR INTEGRATED DOSE PROJECTIONS (mrem) |                     |
| PEAK SECTOR:                        |          | PEAK SECTOR:                                 |                     |
| TEDE AT OSCAR:                      | 21.21    | S TEDE AT EPB:                               | 138.58              |
| TEDE AT EPB:                        | 17.36    | S TEDE AT 2 MILE:                            | 28.10               |
|                                     |          | TEDE AT 10 MILE:                             | 0.11                |
| THY CDE AT OSCAR:                   | 622.05   | S  |                     |
| THY CDE AT EPB:                     | 492.30   | S THY CDE AT EPB:                            | 2.91E+03            |
|                                     |          | THY CDE AT 2 MILE:                           | 471.30              |
| EDE AT OSCAR:                       | 6.78     | S THY CDE AT 10 MILE:                        | 0.25                |
| EDE AT EPB:                         | 5.92     | S  |                     |
| PERFORMED BY: _____                 |          | APPROVED BY: _____                           |                     |

NEXT DAY  
REPORT

#### H. INFORMATION FOR DISTANCES BETWEEN 10 AND 50 MILES

1. From the **MIDAS DOSE ASSESSMENT SUMMARY SHEET** screen, select **CONTINUE** and, on the next page, **MORE REPORTS**.
2. Select **TEDE 4-DAY DOSE REPORT** or **THYROID CDE DOSE REPORT**, depending on which **PAR** guide has been exceeded at the 10-mile distance.
3. On the **REPORT PARAMETER SELECTION** screen, select **PROJECTION TIME** until the appropriate **PROJECTION TIME** (0.25, 4, 6, or 9 hours) is displayed on the screen; then select **CONFIRM**.

**NOTE:** The 0.25-hour projection time should be used with extreme caution. Projected doses can be substantially underestimated.

4. The screen will now display projected doses at the **EPB** and at 2, 5, 10, 25, and 50 miles. To obtain finer increments of distance, select **CONTINUE** until the desired range of distances is displayed.

**NOTE:** An objective is to determine the approximate distance from the plant at which dose projections are less than 1 rem **TEDE** and 5 rem **THYROID CDE**. A **PAR** is then likely to be issued to the next furthest 5-mile distance increment from the plant.

**Example:** A **PAR** for distances to 30 miles may be selected if projected doses become less than the **PAG** values (1 rem **TEDE**, 5 rem **THYROID CDE**) between 25 and 30 miles from the plant.

**I. ACCIDENT DESCRIPTIONS**

**DEFAULT ACCIDENT DESCRIPTIONS  
(MENU B AND MENU D)**

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**1. NORMAL REACTOR COOLANT ACTIVITY**

This accident scenario is defined as the release of reactor coolant system liquid and steam activity from the primary coolant system with no damage to the fuel and no activity spiking. The source term for this accident is normal reactor coolant system liquid and steam activity.

**2. LOCA (RX DP-NO FD)**

This accident scenario is defined as the release of reactor coolant system liquid and steam activity from the primary coolant system. Depressurization of the primary coolant system is assumed, resulting in an activity spike in the reactor coolant. The source term for this accident is normal reactor coolant liquid and steam activity plus the depressurization activity spike. There is no fuel damage.

**3. LOCA (CLAD FAILURE)**

This accident scenario is defined as a Loss-of-Coolant Accident which results in damage to the reactor fuel cladding. The source term for this accident is normal reactor coolant liquid and steam activity and a percentage of the activity in the fuel clad gap. For Menu D calculations, that percentage is entered as part of the calculation process. For Menu B calculations, the valid vent data entered define the severity of the event.

**4. LOCA (FUEL MELT)**

This accident scenario is defined as a Loss-of-Coolant Accident which results in damage to the reactor fuel. The source term for this accident is normal reactor coolant liquid and steam activity and a percentage of the activity in the reactor fuel. For Menu D calculations, that percentage is entered as part of the calculation process. For Menu B calculations, the valid vent data entered define the severity of the event.

**5. FUEL HANDLING ACCIDENT**

This accident scenario is defined as a fuel handling accident which results in the release of spent fuel activity. The source term for this accident is spent fuel gap activity assuming a decay time after shutdown of 24 hours.

6. **ATWS**

This accident scenario is used for releases from a reactor unit continuing to operate at or greater than 10% power. The source term for this accident is normal reactor coolant system liquid and steam activity. The source term is undecayed; that is, no reactor trip is assumed to have occurred.

NOTE (1): For Menu D calculations, design basis assumptions are utilized. For example, design basis leakage rates are assumed and iodine filtration efficiency of 99% is assumed in those pathways for which filters are in place.

NOTE (2): The source term for Menu D accident types is fixed. Release rate is calculated by MIDAS by dividing the total activity released by a predetermined release duration (6 hours for all but fuel handling accidents, for which release duration is 2 hours).

**NUREG 1228 EVENT TREE ACCIDENT TYPES  
(MENU C)**

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1. **LOCA - DRYWELL RELEASE**

This accident is a Loss-of-Coolant Accident with an activity release into the drywell which bypasses the suppression pool for which filtration of activity by the Standby Gas Treatment System takes place before release to the environment.

2. **LOCA - WETWELL RELEASE**

This accident is a Loss-of-Coolant Accident with an activity release through the suppression pool for which filtration of activity by the Standby Gas Treatment System takes place before release to the environment.

3. **LOCA - CONTAINMENT BYPASS RELEASE**

This accident is a Loss-of-Coolant Accident with an activity release to the environment that bypasses the containment and the Standby Gas Treatment System.

4. **ZIRCALLOY FIRE IN ONE THREE MONTH OLD BATCH**

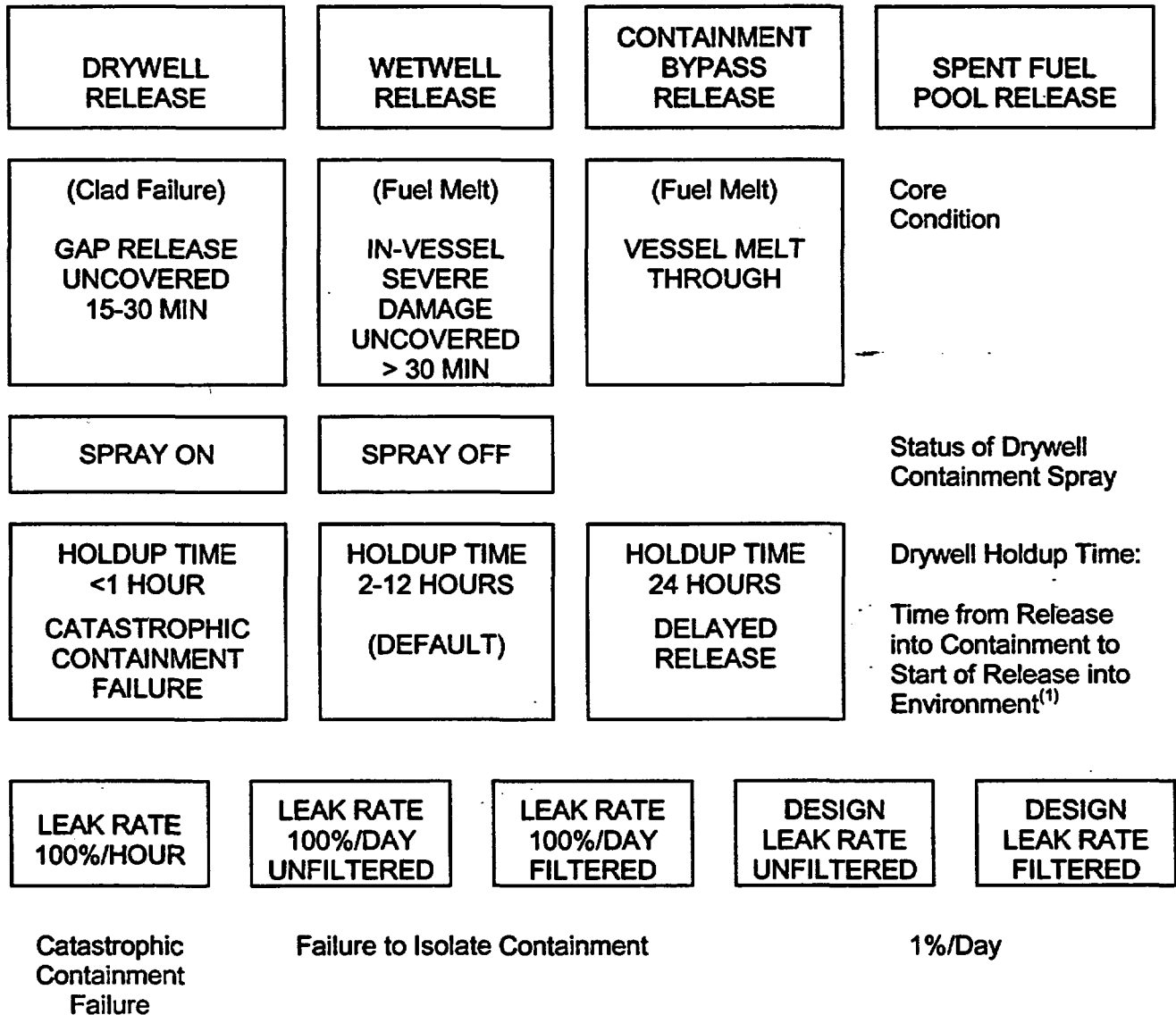
This accident is a zircalloy fire in spent fuel that results in an activity release similar to a core melt. It assumes that the activity is filtered by the Standby Gas Treatment System prior to release.

5. **SPENT FUEL GAP RELEASE**

This accident is a release of fuel gap activity from the spent fuel pool with treatment by the Standby Gas Treatment System prior to release.

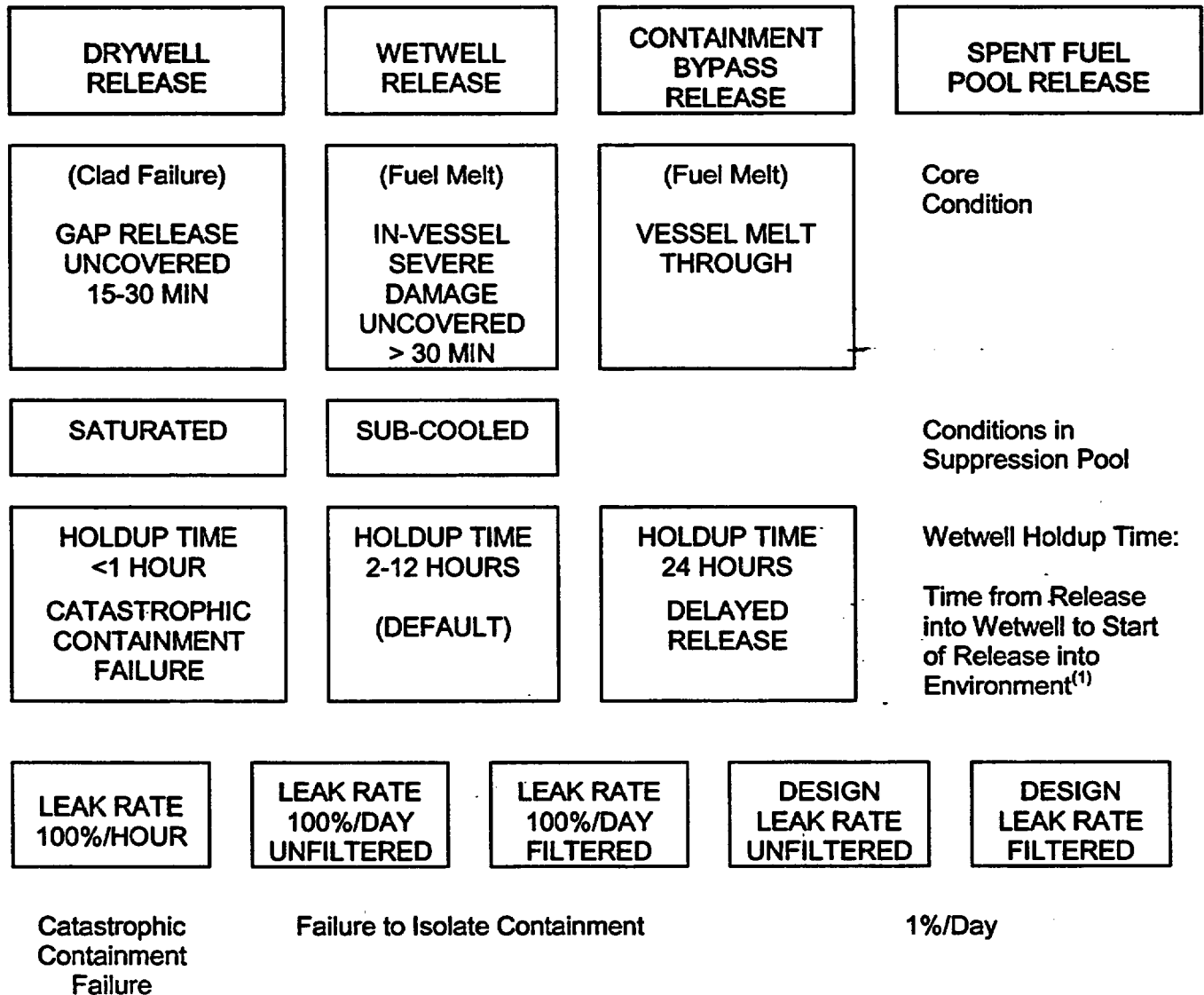
NOTE: Menu C (from NUREG-1228 Event Tree Analyses) is used to relatively quickly provide a bounding estimate of offsite dose, for situations where there are substantial uncertainties in prediction of source term and any resultant doses.

**NUREG 1228 MENU STRUCTURE FOR  
DRYWELL RELEASE**



<sup>(1)</sup> **HOLDUP TIME** is defined as drywell holdup time prior to release to the environment. During this time period, credit is taken for drywell airborne activity removal due to plateout by natural processes and water sprays prior to release to the environment.

**NUREG 1228 MENU STRUCTURE FOR  
WETWELL RELEASE**



<sup>(1)</sup> **HOLDUP TIME** is defined as wetwell holdup time prior to release to the environment. During this time period, credit is taken for wetwell airborne activity removal due to plateau by natural processes and water sprays prior to release to the environment.

**NUREG 1228 MENU STRUCTURE FOR  
CONTAINMENT BYPASS RELEASE**

|  |   |   |   |
|--|---|---|---|
| <b>DRYWELL<br/>RELEASE</b>                                       | <b>WETWELL<br/>RELEASE</b>  | <b>CONTAINMENT<br/>BYPASS<br/>RELEASE</b>     | <b>SPENT FUEL POOL<br/>RELEASE</b>                        |
| (Clad Failure)<br><b>GAP RELEASE<br/>UNCOVERED<br/>15-30 MIN</b> | (Fuel Melt)<br><b>IN-VESSEL<br/>SEVERE<br/>DAMAGE<br/>UNCOVERED<br/>&gt; 30 MIN</b> | (Fuel Melt)<br><b>VESSEL MELT<br/>THROUGH</b> | Core<br>Condition   |
| <b>UNFILTERED</b>  | <b>FILTERED</b>   |   | Is Release Filtered?                                      |
| <b>RELEASE RATE<br/>100%/HOUR</b>                                | <b>RELEASE RATE<br/>100%/DAY</b>  | <b>TYPICAL DESIGN<br/>RELEASE RATE</b>        | Release Rate, in<br>Terms of Percent of<br>Core Inventory |
| Catastrophic<br>Containment Failure                              | Failure to Isolate<br>Containment   | 1%/Day  |   |

**NUREG 1228 MENU STRUCTURE FOR  
SPENT FUEL POOL RELEASE**

|  |   |   |  |
|--|---|---|--|
| <b>DRYWELL RELEASE</b>   | <b>WETWELL<br/>RELEASE</b>                                | <b>CONTAINMENT<br/>BYPASS<br/>RELEASE</b>                   | <b>SPENT FUEL<br/>POOL RELEASE</b>   |
| <b>ZIRCALLOY FIRE<br/>IN ONE 3 MONTH<br/>OLD BATCH</b>                                 | <b>GAP RELEASE<br/>FROM ONE<br/>3 MONTH OLD<br/>BATCH</b> | <b>GAP RELEASE<br/>FROM 15<br/>BATCHES<br/>(TOTAL POOL)</b> | Condition of Spent<br>Fuel   |
| <b>SPRAY ON</b>  | <b>SPRAY OFF<br/>(Default)</b>                            |   | Status of<br>Containment Spray<br>into Pool  |
| <b>HOLDUP TIME<br/>&lt;1 HOUR<br/>CATASTROPHIC<br/>FAILURE OF<br/>REACTOR BUILDING</b> | <b>HOLDUP TIME<br/>2-12 HOURS<br/>(DEFAULT)</b>           |   | Time from Release<br>from Fuel to Start of<br>Release into<br>Environment <sup>(1)</sup> |
| <b>LEAK RATE<br/>100%/HOUR</b>   | <b>LEAK RATE<br/>100%/DAY<br/>UNFILTERED</b>              | <b>LEAK RATE<br/>100%/DAY<br/>FILTERED</b>                  | Release Rate, in<br>Terms of Percent of<br>Source Inventory                              |

Catastrophic Failure of  
Secondary  
Containment

<sup>(1)</sup> HOLDUP TIME for a spent fuel pool release is defined as reactor building holdup time prior to release to the environment. During this time period, credit is taken for reactor building airborne activity removal due to plateout by natural processes and water sprays prior to release to the environment.

## **REMOTE MONITORING SYSTEM BASE STATION INSTRUCTIONS**

- 1.0 Perform RMS Setup/Operational Check prior to initiating field monitoring.

**NOTE:** For RMS keyboard command reference, see *RMS Keyboard Commands* included within this tab.

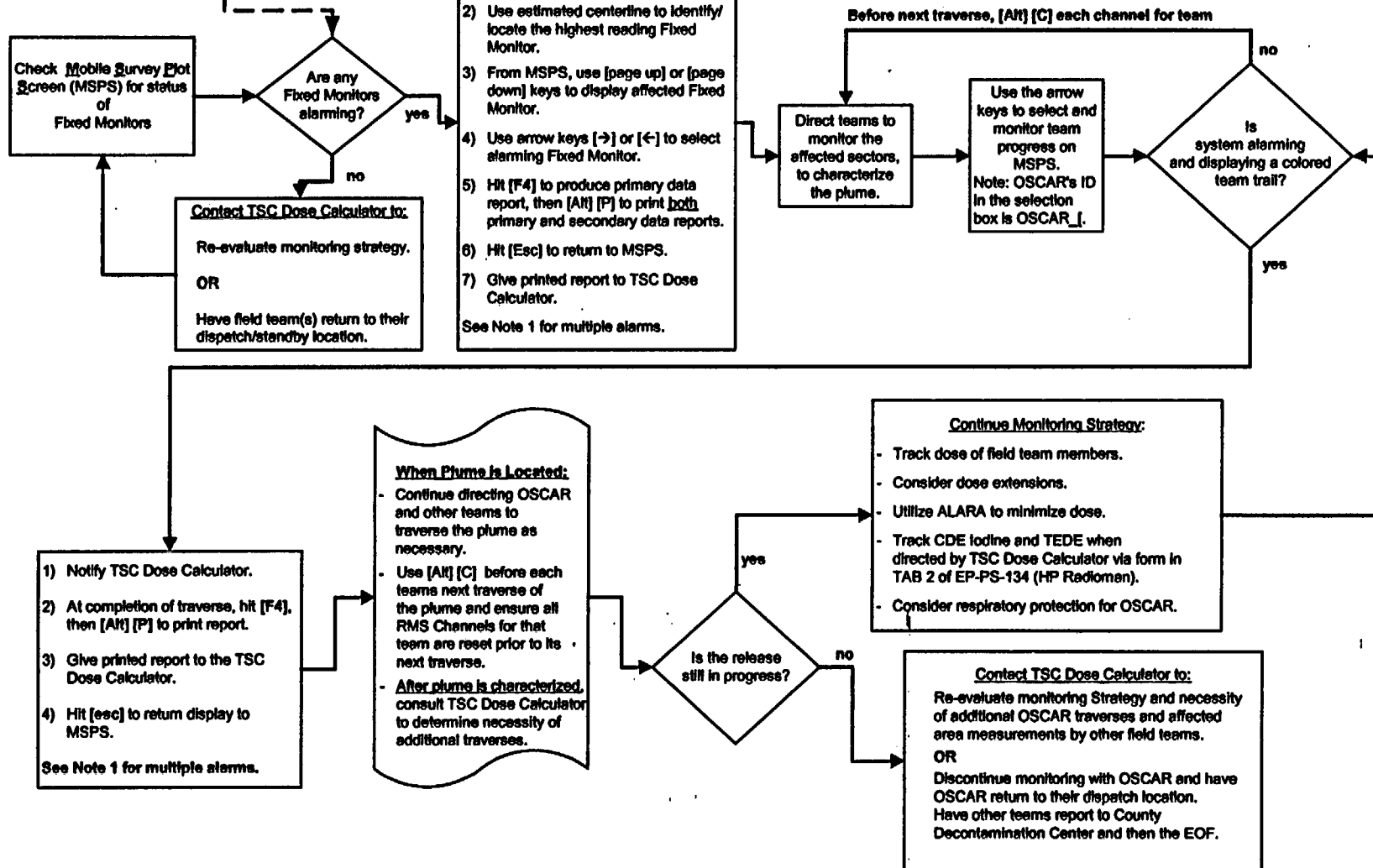
- 1.1 On the RMS terminal, open the panel located above the keyboard and rotate the power switch (first knob, right side) to the ON position.
  - 1.2 Select the Area Monitor Coverage Screen using [←] and [ENTER].
  - 1.3 Input BASE for the requested user name, then [ENTER].
  - 1.4 Input STATION for the requested password, then [ENTER].
  - 1.5 If Mobile Survey Plot screen does not appear, select [1] to bring up the Mobile Survey Plot (MSP).
  - 1.6 Select [S] to display the System Summary Screen.
  - 1.7 Verify RMS operability.
    - 1.7.1 If each *available* Fixed and Remote Monitor reading displayed on the System Summary Screen is being updated approximately every 10 seconds, RMS is considered to be *fully functional*. Utilize Tab B instructions and the attached RMS Monitoring Strategy (flowchart).
    - 1.7.2 If all of the Fixed and Remote Monitors shown on the System Summary Screen are NOT being updated (i.e., there is no incoming radiological telemetry), then go to Tab A, Step 5a.
  - 1.8 Depress [1] key to restore the MSP screen.
- 2.0 Implement RMS Monitoring Strategy in accordance with the flowchart on the following page.

## RMS MONITORING STRATEGY

### RMS ALARMING CONDITIONS

Clear = Off-line  
Gray = On-line  
Yellow = Release in progress  
Red = Site Area Emergency  
Magenta = General Emergency

Note: See RMS Field Measurement Guidelines for RMS Alarm Setpoints.



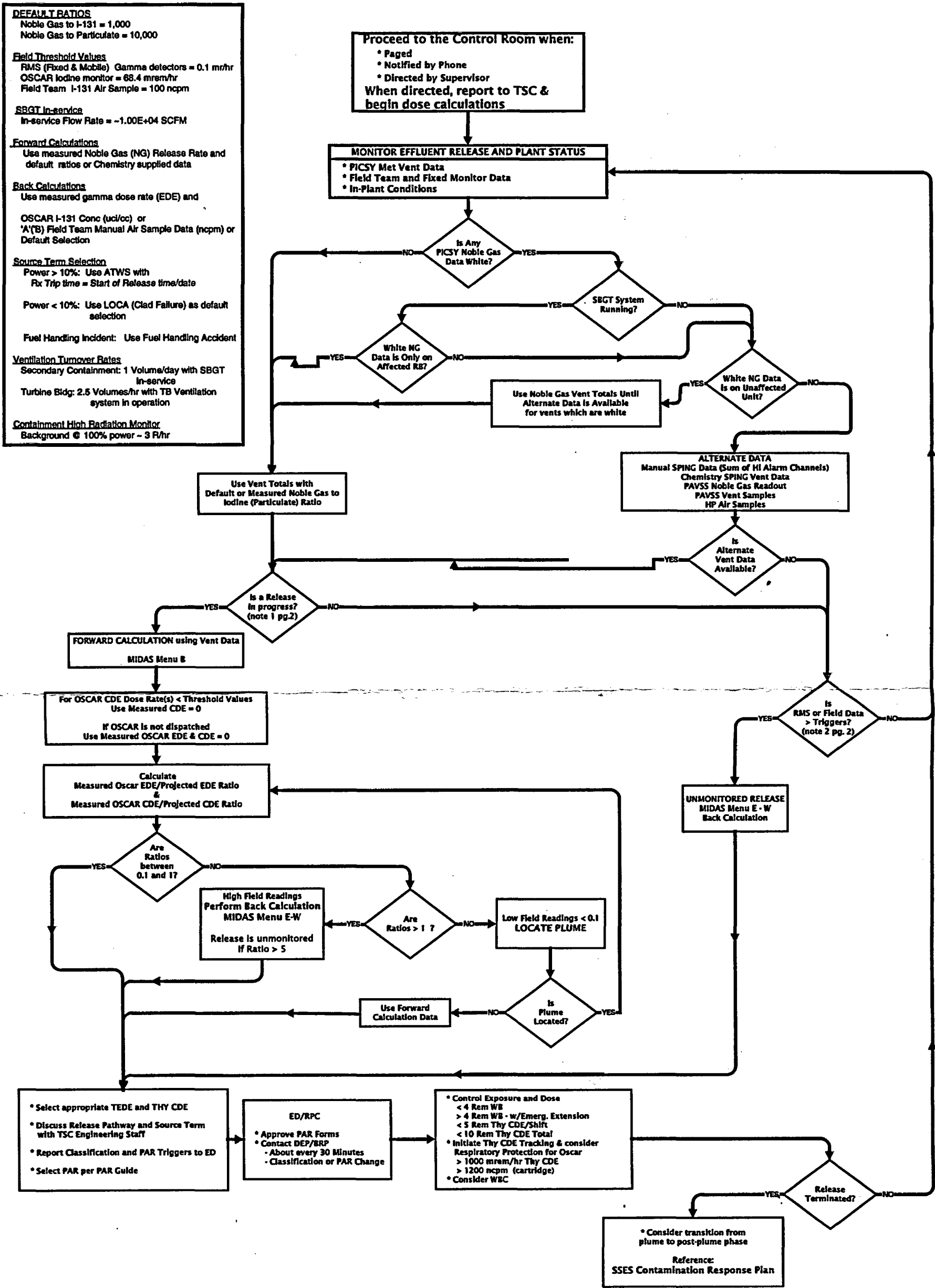
## RMS FIELD MEASUREMENT GUIDELINES

|                                 | RELEASE | SITE AREA<br>EMERGENCY | GENERAL<br>EMERGENCY |
|---------------------------------|---------|------------------------|----------------------|
| <u>RMS</u>                      |         | <u>mrem/hr</u>         |                      |
| GAMMA DOSE RATE:                | 0.1     | 100                    | 1000                 |
| CHILD THYROID<br>CDE DOSE RATE: | 68.4    | 500                    | 5000                 |
| <u>FRISKER</u>                  |         | <u>net cpm</u>         |                      |
| AIR SAMPLE (CARTRIDGE):         | 100     | 600                    | 6000                 |
| <hr/>                           |         |                        |                      |
| Notify TSC Dose Calculator      | ASAP    | IMMEDIATE              | IMMEDIATE            |

**MAGENTA DATA:** Indicates the need for immediate consideration of  
(last column) field team protective actions.

|       |     |    |    |    |    |    |    |     |      |     |       |                      |     |     |     |    |    |   |   |    |
|-------|-----|----|----|----|----|----|----|-----|------|-----|-------|----------------------|-----|-----|-----|----|----|---|---|----|
|       |     |    |    |    |    |    |    |     |      |     |       | US Enhanced Keyboard |     |     |     |    |    |   |   |    |
| Esc   | F1  | F2 | F3 | F4 | F5 | F6 | F7 | F8  | F9   | F10 | F11   | F12                  | Prt | Slk | Pau |    |    |   |   |    |
| `     | 1   | 2  | 3  | 4  | 5  | 6  | 7  | 8   | 9    | 0   | -     | =                    | <-- | Ins | Ha  | Up | NL | / | * | -  |
| ->    | Q   | W  | E  | R  | T  | Y  | U  | I   | O    | P   | ~     |                      | \   | Del | End | Dn | 7  | 8 | 9 | +  |
| CapLk | A   | S  | D  | F  | G  | H  | J  | K   | L    | ;   | '     | <-                   |     |     |     | 4  | 5  | 6 |   |    |
| Shift | Z   | X  | C  | V  | B  | N  | M  | ,   | .    | /   | Shift |                      |     | ^   |     |    | 1  | 2 | 3 | <= |
| Ctrl  | Alt |    |    |    |    |    |    | Alt | Ctrl | <   |       |                      | v   | >   | 8   | .  |    |   |   |    |

TSC DOSE ASSESSMENT FLOWCHART



| NOTE 1   | NOTE 2   | NOTE 3  | NOTE 4   | NOTE 5   |
|--|--|---|--|--|
| VENT RELEASE TRIGGERS  | RMS/FIELD TRIGGERS   | DEFAULT ACCIDENT TRIGGERS   | NUREG 1228 TRIGGERS  | LIQUID RELEASE TRIGGERS  |
| <p>♦ <u>AIRBORNE RELEASE</u></p> <p>Total NG Release Rate &gt; 1.0E6 <math>\mu</math>ci/min** or</p> <p>Entry into one of the following EALs* or</p> <p>EAL 3, 15, 17, 18 or 21 with a DSC breached or</p> <p>Initiation of SBT for treatment of activity within Containment* or</p> <p>A release above normal levels attributable to a declared event* or</p> <p>An unmonitored release is in progress</p> <p>* Perform one calculation unless directed otherwise</p> <p>** Perform dose projections every 15 minutes</p> | <p>♦ <u>AIRBORNE RELEASE**</u></p> <p><math>\geq 0.1</math> mrem/hr EDE (ASP1 or RMS gamma reading)</p> <p><math>\geq 68.4</math> mrem/hr Thy CDE (OSCAR RMS Iodine)</p> <p><math>\geq 100</math> ncpm on Iodine Cartridge</p> <p>** Perform dose projections every 15 minutes</p>         |   | <p>♦ <u>UNFILTERED VENT RELEASE</u></p> <p>♦ <u>RELEASE RATE &gt; DESIGN BASIS</u></p> <p style="text-align: center;"><u>1%/DAY</u></p> <p>♦ <u>CORE UNCOVERED &gt; 15 MINUTES</u></p> <p>♦ <u>SPENT FUEL POOL RELEASE</u></p> | <p>♦ <u>LIQUID RELEASE</u></p> <p>Liquid Effl. <math>\geq</math> TRM</p>                 |
| <p>♦ <u>EAL 15.1 (Unusual Event)</u></p> <p>&gt;2.0E6 <math>\mu</math>ci/min NG for 60 min. or longer</p>  |  |   |  | <p>♦ <u>EAL 15.1</u></p> <p>Liquid Effl. <math>\geq 2 \times</math> TRM for 60 min</p>   |
| <p>♦ <u>EAL 15.2 (Alert)</u></p> <p>&gt;2.0E8 <math>\mu</math>ci/min NG for 15 min. or longer</p>  |  | <p><u>EAL 3.2 SEVERE CLAD DEGRADATION</u></p> <p>&gt;200 R/hr CHRM or</p> <p>&gt;300 <math>\mu</math>ci/cc DE Iodine-131</p>  |  | <p>♦ <u>EAL 15.2</u></p> <p>Liquid Effl. <math>\geq 200 \times</math> TRM for 15 min</p> |
| <p>♦ <u>EAL 15.3 (Site Area Emergency)</u></p> <p>&gt;6.2E8 <math>\mu</math>ci/min NG for greater than 15 min</p> <p>&amp; dose projection not available</p> <p style="text-align: center;">Note:</p> <p>If dose projection cannot be made within 15 minute period, then declaration to be made on valid sustained NG release rate.</p> <p><u>PROJECTED DOSE @ EPB</u></p> <p>&gt;100 mrem TEDE or</p> <p>&gt;500 mrem THY CDE</p>   | <p>♦ <u>EAL 15.3</u></p> <p><u>RMS PERIMETER MONITORING SYSTEM</u></p> <p>&gt; 100 mR/hr for 15 min or longer</p> <p><u>FIELD TEAM SURVEY RESULTS @ EPB</u></p> <p>&gt; 100 mR/hr &amp; expected for 60 min or</p> <p><math>\geq 500</math> mrem THY CDE for one hour of inhalation</p>    | <p>♦ <u>EAL 3.3 SEVERELY DEGRADED CORE</u></p> <p>&gt; 400 R/hr CHRM or</p> <p>&gt; 1000 <math>\mu</math>ci/cc DE Iodine-131</p>  |  |  |
| <p>♦ <u>EAL 15.4 (General Emergency)</u></p> <p>&gt;6.2E9 <math>\mu</math>ci/min NG for greater than 15 min</p> <p>&amp; dose projection not available</p> <p style="text-align: center;">Note:</p> <p>If dose projection cannot be made within 15 minute period, then declaration to be made on valid sustained NG release rate.</p> <p><u>PROJECTED DOSE @ EPB</u></p> <p><math>\geq 1000</math> mrem TEDE or</p> <p><math>\geq 5000</math> mrem THY CDE</p>   | <p>♦ <u>EAL 15.4</u></p> <p><u>RMS PERIMETER MONITORING SYSTEM</u></p> <p>&gt; 1000 mR/hr for 15 min or longer</p> <p><u>FIELD TEAM SURVEY RESULTS @ EPB</u></p> <p>&gt; 1000 mR/hr &amp; expected for 60 min or</p> <p><math>\geq 5000</math> mrem THY CDE for one hour of inhalation</p> | <p>♦ <u>EAL 3.4 CORE MELT</u></p> <p>&gt; 400R/hr CHRM plus listed conditions or</p> <p>&gt; 1000 <math>\mu</math>ci/cc DE Iodine-131 or</p> <p>&gt; 2000 R/hr CHRM</p> |  |  |