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244 - 244 - DOSE ASSESSMENT STAFFER

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CATEGORY: PROCEDURES TYPE: EP
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A045

SHIFT TAKEOVER CHECKLIST

1. **Accident Status: (DASU)**

   a. Current Emergency Classification: None Unusual Event Alert Site Area General EAL #

   b. Affected Unit(s): 1 2 Both None

   c. Onsite Emergency Actions: ☐ None ☐ Local Area Evacuation ☐ Site Accountability ☐ Evacuation of non-essential personnel

   d. Plant Status: _____

   _____

   _____

   e. Current PAR: _____

   _____

   _____

   f. Last transmitted PAR form: Number: _____ Time: _____

   g. Last DEP/BRP Communication Time: _____

3. **MIDAS Information: (DAST)**

   a. Accident dose calculation method in use: Menu B Menu C Menu D Menu E-W Menu G

   b. Accident Source Term Selection: ATWS Coolant Activity Leak (LOCA) DP-No Fuel Damage (LOCA) Cladding Failure

   (LOCA) Fuel Melt Fuel Handling Accident (Percent Clad Failure or Fuel Melt: _____)

c. Projected Doses (TEDE): @ EPB _____ @ 2 mi _____ @ 10 mi _____

d. Proj. Doses (THY CDE): @ EPB _____ @ 2 mi _____ @ 10 mi _____

e. Has release occurred or is one in progress? Y N If yes: Gaseous Liquid

f. Release type: _____ Monitored _____ Unmonitored

4. **Field Data: (FTD)**

a. Status of Monitoring Teams:

Team Name	Status

b. Measured Field Dose Rates: _____

_____

_____

c. Meteorological Conditions:

Wind From _____ Wind Speed _____ Affected Sector _____

Stability Class _____ Precipitation: None L M H

EMERGENCY CLASSIFICATION

CHECK ☑

1.0 TIMING OF CLASSIFICATION

☐ 1.1 **UNUSUAL EVENT**

An **UNUSUAL EVENT** shall be declared within 15 minutes of having information necessary to make a declaration.

☐ 1.2 **ALERT**

An **ALERT** shall be declared within 15 minutes of having information necessary to make a declaration.

☐ 1.3 **SITE AREA EMERGENCY**

A **SITE AREA EMERGENCY** shall be declared within 15 minutes of having information necessary to make a declaration.

☐ 1.4 **GENERAL EMERGENCY**

A **GENERAL EMERGENCY** shall be declared within 15 minutes of having information necessary to make a declaration.

CLASSIFICATION OF EMERGENCY CONDITIONS

USE OF EMERGENCY CLASSIFICATION MATRIX

NOTE: CONFIRM THAT INDICATORS AND/OR ALARMS REFLECT ACTUAL CONDITIONS PRIOR TO TAKING ACTION BASED ON THE INDICATOR OR ALARM.

The matrix is worded in a manner that assumes parameter values indicated are the actual conditions present in the plant.

The matrix is designed to make it possible to precisely classify an abnormal occurrence into the proper emergency classification based on detailed Emergency Action Level (EAL) descriptions. It is impossible to anticipate every abnormal occurrence. Therefore, before classifying any abnormal occurrence based on the EALs in the matrix, one should verify that the general conditions prevalent in-plant and offsite meet the general class description of the emergency classification. In addition, prior to classification, one should be aware of the ramifications in-plant and particularly offsite of that classification. Special consideration of offsite consequences should be made prior to declaring a **GENERAL EMERGENCY**.

CLASS DESCRIPTIONS

UNUSUAL EVENT - Events that are occurring or have occurred which indicate a potential degradation of the level of safety of the plant. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

ALERT - Events that are occurring or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

SITE AREA EMERGENCY - Events that are occurring or have occurred which involve actual or imminent major failures of plant functions needed for protection of the public. Any releases are not expected to exceed EPA Protective Action Guideline exposure levels except inside the emergency planning boundary.

GENERAL EMERGENCY - Events that are occurring or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Expectation is that releases will exceed EPA Protective Action Guideline exposure levels beyond the emergency planning boundary.

CATEGORY INDEX TO THE MATRIX FOR THE CLASSIFICATION OF EMERGENCY CONDITIONS TABLE OF CONTENTS

1 - AIRCRAFT/TRAIN ACTIVITY

UNUSUAL EVENT

EAL# 1.1 Aircraft crash or train derailment onsite as indicated by:

Visual observation or notification received by control room operator.

ALERT

EAL# 1.2 Aircraft or missile strikes a station structure as indicated by:

Direct observation or notification received by control room operator.

SITE AREA EMERGENCY

EAL# 1.3 Severe damage to safe shutdown equipment from aircraft crash or missile impact when not in cold shutdown, determined by:

(A *and* B *and* C)
A. Direct observation or notification received by control room operator.
and
B. Shift Supervisor evaluation.
and
C. Reactor Coolant temperature greater than 200°F as indicated on Panel 1C651 (2C651).

GENERAL EMERGENCY

EAL# 1.4 None.

2 - CONTROL ROOM EVACUATION

UNUSUAL EVENT

EAL# 2.1 None.

ALERT

EAL# 2.2 Control Room evacuation as indicated by:

(A *and* B)
A. Initiation of control room evacuation procedures.
and
B. Establishment of control of shutdown systems from local stations.

SITE AREA EMERGENCY

EAL# 2.3 Delayed Control Room Evacuation as indicated by:

(A *and* B)
A. Initiation of control room evacuation procedures.
and
B. Shutdown systems control at local stations not established within 15 minutes.

GENERAL EMERGENCY

EAL# 2.4 None.

3 - FUEL CLADDING DEGRADATION

UNUSUAL EVENT

EAL# 3.1 Core degradation as indicated by:

(A *or* B)

A. Valid Off-gas Pre-treatment Monitor high radiation alarm annunciation on Panel 1C651 (2C651) or indication on Panel 1C600 (2C600).

or

B. Reactor coolant activity, determined by sample analysis greater than or equal to 2 µCi/cc of I-131 equivalent.

ALERT

EAL# 3.2 Severe fuel cladding degradation as indicated by:

(A *or* B *or* C *or* D)

A. Valid Off-gas Pre-treatment monitor High-High radiation alarm annunciation on Panel 1C651 (2C651) or indication on Panel 1C600 (2C600).

or

B. Valid Reactor coolant activity greater than 300 µCi/cc of equivalent I-131, as determined by sample analysis.

or

C. Valid Main Steam Line High radiation trip annunciation or indication on Panel 1C651 (2C651).

or

D. Valid containment post accident monitor indication on Panel 1C601 (2C601) greater than 200 R/hr. (An 8R/hr correction factor must be added manually to the indication to offset a downscale error if primary containment temperature exceeds 225 degrees Fahrenheit. Reference EC-079-0521.)

(CONTINUED ON NEXT PAGE)

3 - FUEL CLADDING DEGRADATION (continued)

SITE AREA EMERGENCY

EAL# 3.3 Severely degraded core as indicated by:

(A *or* B)

A. Reactor coolant activity greater than 1,000 µCi/cc of equivalent I-131 as determined by sample analysis.

or

B. Valid containment post accident monitor indication on Panel 1C601 (2C601) greater than 400 R/hr. (An 8 R/hr correction factor must be added manually to the indication to offset a downscale error if primary containment temperature exceeds 225 degrees Fahrenheit. Reference EC-079-0521.)

(CONTINUED ON NEXT PAGE)

3 - FUEL CLADDING DEGRADATION (continued)

GENERAL EMERGENCY

EAL# 3.4.a Fuel cladding degradation. Loss of 2 out of 3 fission product barriers (fuel cladding and reactor coolant pressure boundary) with potential loss of the third barrier (primary containment) as indicated by:

(A *or* B)

A. (1 *and* 2)
   1. Valid containment post accident monitor indication on Panel 1C601 (2C601) greater than 400 R/hr. (An 8 R/hr correction factor must be added manually to the indication to offset a downscale error if primary containment temperature exceeds 225 degrees Fahrenheit. Reference EC-079-0521.)

   and

   2. (a *or* b *or* c)
      a. Containment pressure greater than 40.4 PSIG, indicated on Panel 1C601 (2C601).

      or

      b. A visual inspection of the containment indicates a potential for loss of containment (e.g. anchorage or penetration failure, a crack in containment concrete at tendon).

      or

      c. Other indications of potential or actual loss of primary containment.

or

B. (1 *and* 2)
   1. Reactor coolant activity greater than 1,000 µCi/cc of equivalent I-131 as determined by sample analysis.

   and

   2. Actual or potential failure of reactor coolant isolation valves to isolate a coolant leak outside containment as determined by valve position indication on Panel 1C601 (2C601) or visual inspection.

OR

EAL# 3.4.b Core melt as indicated by:

(A *and* B)

A. Valid containment post accident monitor indication on Panel 1C601 (2C601) greater than 2000 R/hr. (An 8 R/hr correction factor must be added manually to the indication to offset a downscale error if primary containment temperature exceeds 225 degrees Fahrenheit. Reference EC-079-0521.)

and

B. Containment high pressure indication or annunciation on Panel 1C601 (2C601).

4 - GENERAL

UNUSUAL EVENT

EAL# 4.1 Plant conditions exist that warrant increased awareness on the part of plant operating staff or state and/or local offsite authorities as indicated by:

Events that are occurring or have occurred which indicate a potential degradation of the level of safety of the plant. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

ALERT

EAL# 4.2 Other plant conditions exist that warrant precautionary activation of PPL, State, County, and local emergency centers as indicated by:

Events that are occurring or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

SITE AREA EMERGENCY

EAL# 4.3 Other plant conditions exist that warrant activation of emergency centers and monitoring teams or a precautionary notification to the public near the site as indicated by:

Events that are occurring or have occurred which involve actual or imminent major failures of plant functions needed for protection of the public. Any releases are not expected to exceed EPA Protective Action Guideline exposure levels except inside the emergency planning boundary.

GENERAL EMERGENCY

EAL# 4.4 Other plant conditions exist, from whatever, source, that make release of large amounts of radioactivity in a short time period available as indicated by:

Events that are occurring or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Expectation is that releases will exceed EPA Protective Action Guideline exposure levels beyond the emergency planning boundary.

5.- INJURED/CONTAMINATED PERSONNEL

UNUSUAL EVENT

EAL# 5.1 Transportation of externally contaminated injured individual from site to offsite medical facility as deemed appropriate by Shift Supervisor.

ALERT

EAL# 5.2 None.

SITE AREA EMERGENCY

EAL# 5.3 None.

GENERAL EMERGENCY

EAL# 5.4 None.

6 - IN-PLANT HIGH RADIATION

UNUSUAL EVENT

EAL# 6.1 Unanticipated or unplanned concentrations of airborne activity exist in normally accessible areas, which are not due to planned maintenance activities, as indicated by:

Concentrations exceed 500 times the DAC values of 10CFR20 Appendix B, Table I values for a single isotope, or for multiple isotopes where

$$\frac{C_A}{DAC_A}+\frac{C_B}{DAC_B}+\frac{C_C}{DAC_C}\ldots\frac{C_N}{DAC_N}\geq 500$$

ALERT

EAL# 6.2 Unexpected in-plant high radiation levels or airborne contamination which indicates a severe degradation in the control of radioactive material as indicated by:

Area Radiation Monitor reading 1000 times normal annunciation on Panel 1C601 (2C601) or indication on Panel 1C600 (2C600).

SITE AREA EMERGENCY

EAL# 6.3 None.

GENERAL EMERGENCY

EAL# 6.4 None.

7 - LOSS OF AC POWER

UNUSUAL EVENT

EAL# 7.1 Loss of offsite power **or** loss of all onsite AC power supplies as indicated by:

(A *or* B)

A. Loss of power to Startup Transformer 10 **and** 20 annunciation or indication on Panel 0C653.

or

B. Failure of all diesel generators to start or synchronize to the emergency buses by indication or annunciation on Panel 0C653.

ALERT

EAL# 7.2 Loss of all offsite power **and** all onsite AC power supplies as indicated by:

(A *and* B)

A. Loss of power to Startup Transformer 10 **and** 20 annunciation or indication on Panel 0C653.

and

B. Failure of all diesel generators to start or synchronize to the emergency buses by annunciation or indication on Panel 0C653.

SITE AREA EMERGENCY

EAL# 7.3 Loss of all offsite power and loss of all onsite AC power supplies for greater than 15 minutes as indicated by:

(A *and* B *and* C)

A. Loss of offsite power.

and

B. Failure of **all** diesel generators to startup or synchronize to the emergency buses by indication or annunciation on 0C653.

and

C. The above conditions exist for greater than 15 minutes.

GENERAL EMERGENCY

EAL# 7.4 None.

8 - LOSS OF CONTROL ROOM ALARMS AND ANNUNCIATORS

UNUSUAL EVENT

EAL# 8.1 None.

ALERT

EAL# 8.2 Loss of all control room annunciators as indicated by:

In the opinion of the Shift Supervisor, all Control Room annunciators and the Plant Process Computer are lost, or insufficient annunciators are available to safely operate the unit(s) without supplemental observation of plant systems.

SITE AREA EMERGENCY

EAL# 8.3 All annunciators lost and plant transient initiated while annunciators are lost as indicated by:

(A *and* B)

A. In the opinion of the Shift Supervisor, all Control Room annunciators and the Plant Process Computer are lost, or insufficient annunciators are available to safely operate the unit(s) without supplemental observation of plant systems.

and

B. (1 *or* 2 *or* 3 *or* 4)
   1. Low-Low reactor water level indication on Panel 1C651 (2C651) followed by ECCS initiation on Panel 1C601 (2C601).

   or

   2. Reactor coolant temperature change greater than 100°F per hour indication on recorder TR-1R006 on Panel 1C007 (2C007) (Reactor Building elevation 683').

   or

   3. High reactor pressure indication on Panel 1C651 (2C651) and followed by scram indication on Panel 1C651 (2C651).

   or

   4. Any indication that transient has occurred or is in progress.

GENERAL EMERGENCY

EAL# 8.4 None.

9 - LOSS OF DC POWER

UNUSUAL EVENT

EAL# 9.1 None.

ALERT

EAL# 9.2 Loss of onsite vital DC power as indicated by:

(A *and* B)

A. Less than 210 volts on the 250 VDC main distribution Panel buses, 1D652 (2D652) **and** 1D662 (2D662) as indicated by trouble alarms on Panel 1C651 (2C651).

and

B. Less than 105 volts on the 125 VDC main distribution buses 1D612 (2D612), 1D622 (2D622), 1D632 (2D632), **and** 1D642 (2D642) as indicated by trouble alarms on Panel 1C651 (2C651).

NOTE: Buses are not tripped on undervoltage condition.

SITE AREA EMERGENCY

EAL# 9.3 Loss of all vital onsite DC power sustained for greater than 15 minutes as indicated by:

(A *and* B *and* C)

A. Less than 210 volts on the 250 VDC main distribution Panel buses, 1D652 (2D652) **and** 1D662 (2D662) as indicated by trouble alarms on Panel 1C651 (2C651).

and

B. Less than 105 volts on the 125 VDC main distribution buses 1D612 (2D612), 1D622 (2D622), 1D632 (2D632), **and** 1D642 (2D642) as indicated by trouble alarms on Panel 1C651 (2C651).

and

C. The above condition exists for greater than 15 minutes.

NOTE: Buses are not tripped on undervoltage condition.

GENERAL EMERGENCY

EAL# 9.4 None.

10 - LOSS OF DECAY HEAT REMOVAL CAPABILITY

UNUSUAL EVENT

EAL# 10.1 None.

ALERT

EAL# 10.2 Inability to remove decay heat while in plant condition 4, inability to maintain the plant in cold shutdown as indicated by:

Inability to maintain reactor coolant temperature less than 200°F with the reactor mode switch in shutdown; exception is when testing per Special Test Exception TS 3.10.1 which allows maximum temperature of 212°F.

SITE AREA EMERGENCY

EAL# 10.3 Inability to remove decay heat while the plant is shutdown as indicated by:

(A *and* B *and* C)
A. Reactor Mode switch in shutdown.
and
B. Reactor Coolant System temperature greater than 200°F and rising.
and
C. Suppression Pool temperature greater than 120°F and rising.

GENERAL EMERGENCY

EAL# 10.4 Inability to remove decay heat while the plant is shutdown with possible release of large amounts of radioactivity as indicated by:

(A *and* B *and* C)
A. Reactor mode switch in shutdown.
and
B. Reactor coolant system temperature greater than 200°F and rising.
and
C. Suppression pool temperature greater than 290°F indicated on the computer output (MAT 12,13,14,15 or 16).

11 - LOSS OF REACTIVITY CONTROL

UNUSUAL EVENT

EAL# 11.1 Inadvertent Criticality as indicated by:

Unexpected increasing neutron flux indication on Panel 1C651 (2C651).

ALERT

EAL# 11.2 Failure of the Reactor Protection System or the Alternate Rod Insertion System to initiate and complete a scram that brings the reactor subcritical as indicated by:

(A *or* B) *and* (C *and* D *and* E)

A. Trip of at least one sub-channel in each trip system (RPS A and RPS B) as indicated by annunciators and trip status lights on Panel 1C651 (2C651).

or

B. Trip of both trip systems (ARI A and ARI B) as indicated by annunciators on Panel 1C601 (2C601).

and

C. Failure of control rods to insert, confirmed by the full core display indication on Panel 1C651 (2C651) or process computer indications.

and

D. Failure to bring the reactor subcritical confirmed by neutron count rate on the neutron monitoring indication on Panel 1C651 (2C651).

and

E. Reactor power >5% as indicated on Panel 1C651 (2C651).

(CONTINUED ON NEXT PAGE)

11 - LOSS OF REACTIVITY CONTROL (continued)

SITE AREA EMERGENCY

EAL# 11.3 Loss of functions needed to bring the reactor subcritical and loss of ability to bring the reactor to cold shutdown as indicated by:

(A *and* B *and* C *and* D)

A. Inability to insert sufficient control rods to bring the reactor subcritical as indicated by count rate on the neutron monitoring instrumentation on Panel 1C651 (2C651).

and

B. (1 *or* 2)
Failure of both loops of standby liquid control to inject into the vessel indicated by:
1. Low pump discharge pressure indication on Panel 1C601 (2C601).

or

2. Low flow indication on Panel 1C601 (2C601).

and

C. Reactor coolant temperature greater than 200°F, indicated on Panel 1C651 (2C651).

and

D. Reactor power >5% indicated on Panel 1C651 (2C651).

GENERAL EMERGENCY

EAL# 11.4 Loss of functions needed to bring the reactor subcritical and transient in progress that makes release of large amounts of radioactivity in a short period possible as indicated by:

(A *or* B) *and* (C *and* D)

A. Trip of at least one sub-channel in each trip system (RPS A and RPS B), indicated by annunciation or trip status lights on Panel 1C651 (2C651).

or

B. Trip of both systems (ARI A and ARI B) as indicated by annunciators on Panel 1C601 (2C601).

and

C. Loss of SLC system capability to inject, indicated by instrumentation on Panel 1C601 (2C601).

and

D. Reactor power greater than 25% of rated, indicated on Panel 1C651 (2C651).

12 - LOSS OF REACTOR VESSEL INVENTORY

UNUSUAL EVENT

EAL# 12.1 Valid initiation of an Emergency Core Cooling System (ECCS) System as indicated by:

(A *or* B)

A. Initiation of an ECCS System **and** low, low, low reactor water level (-129) annunciation or indication on Panel 1C651 (2C651).

or

B. Initiation of an ECCS System **and** High Drywell Pressure annunciation or indication on Panel 1C601 (2C601).

ALERT

EAL# 12.2 Reactor coolant system leak rate greater than 50 gpm as indicated by:

(A *or* B)

A. Drywell floor drain sump A or B Hi-Hi alarm on Panel 1C601 (2C601) **and** 2 or more drywell floor drain pumps continuously running as indicated on Panel 1C601 (2C601).

or

B. Other estimates of Reactor coolant system leakage indicating greater than 50 gpm.

SITE AREA EMERGENCY

EAL# 12.3 Known loss of coolant accident greater than make-up capacity as indicated by:

Water level below (and failure to return to) top of active fuel for greater than three minutes as indicated on fuel zone level indicator on Panel 1C601 (2C601).

(CONTINUED ON NEXT PAGE)

12 - LOSS OF REACTOR VESSEL INVENTORY (continued)

GENERAL EMERGENCY

EAL# 12.4.a Loss of coolant accident with possibility of imminent release of large amounts of radioactivity as indicated by:

Water level below (and failure to return to) top of active fuel for greater than 20 minutes as indicated on fuel zone level indicator on Panel 1C601 (2C601).

OR

EAL# 12.4.b Loss of Reactor Vessel inventory. Loss of 2 out of 3 fission product barriers (fuel cladding & reactor coolant pressure boundary) with potential loss of the third barrier (primary containment), as indicated by:

(A *or* B)

A. (1 *and* 2 *and* 3)
   1. High drywell pressure annunciation or indication on Panel 1C601 (2C601).

   and

   2. (a *or* b *or* c)
      a. Containment pressure exceeds 40.4 PSIG as indicated on Panel 1C601 (2C601).

      or

      b. A visual inspection of the containment indicates a potential or actual loss of containment (e.g. anchorage or penetration failure).

      or

      c. Containment isolation valve(s) fail to close as indicated by valve position indication on Panel 1C601 (2C601).

   and

   3. Reactor Vessel level drops below (and fails to return to) top of active fuel for greater than three minutes as indicated on fuel zone level indicator on Panel 1C601 (2C601).

or

B. (1 *and* 2)
   1. Failure of reactor pressure vessel isolation valves to isolate coolant break outside containment as indicated by valve position indication on Panel 1C601 (2C601) or visual inspection.

   and

   2. Reactor vessel level drops below (and fails to return to) top of active fuel for greater than three minutes as indicated on fuel zone level indicator on Panel 1C601 (2C601).

13 - NATURAL PHENOMENA

UNUSUAL EVENT

EAL# 13.1 Natural phenomenon occurrence as indicated by:

(A *or* B *or* C)
A. Tornado impact on site.
or
B. Hurricane impact on site.
or
C. Earthquake detected by seismic instrumentation systems on Panel 0C696.

ALERT

EAL# 13.2 Natural Phenomenon Occurrence as indicated by:

(A *or* B *or* C)
A. Tornado with reported wind velocities greater than 200 mph impacting on site.*
or
B. Reported hurricane or sustained winds greater than 70 mph.*
or
C. Earthquake at greater than operating basis earthquake (OBE) levels as indicated on Panel 0C696.

* **Telephone numbers for the National Weather Bureau are located in the Emergency Telephone Directory.**

(CONTINUED ON NEXT PAGE)

13 - NATURAL PHENOMENA (continued)

SITE AREA EMERGENCY

EAL# 13.3 Severe natural phenomenon occurrence, with plant not in cold shutdown, as indicated by:

(A *and* B)

A. Reactor Coolant Temperature greater than 200°F as indicated on Panel 1C651 (2C651).

and

B. (1 *or* 2 *or* 3)

1. Reported hurricane or sustained winds greater than 80 mph.*

or

2. Earthquake with greater than Safe Shutdown Earthquake (SSE) levels as indicated on Panel 0C696.

or

3. Tornado with reported wind velocities greater than 220 mph impacting on site.*

GENERAL EMERGENCY

EAL# 13.4 None.

* **Telephone numbers for the National Weather Bureau are located in the Emergency Telephone Directory.**

14 - ONSITE FIRE/EXPLOSION

UNUSUAL EVENT

EAL# 14.1 Significant fire within the plant as indicated by:

(A *and* B)
A. Activation of fire brigade by Shift Supervisor.
and
B. Duration of fire longer than 15 minutes after time of notification.

OR

Explosion inside security protected area, with no significant damage to station facilities, as indicated by:

Visual observation or notification received by control room operator and Shift Supervisor evaluation.

ALERT

EAL# 14.2 On-site Fire/Explosion as indicated by:

(A *or* B)
A. Fire lasting more than 15 minutes and fire is in the vicinity of equipment required for safe shutdown of the plant and the fire is damaging or is threatening to damage the equipment due to heat, smoke, flame, or other hazard.
or
B. (1 *and* 2)
Explosion damage to facility affecting plant operation as determined by:
1. Direct observation or notification received by control room operator.
and
2. Shift Supervisor observation.

(CONTINUED ON NEXT PAGE)

14 - ONSITE FIRE/EXPLOSION (continued)

SITE AREA EMERGENCY

EAL# 14.3 Damage to safe shutdown equipment due to fire or explosion has occurred when plant is not in cold shutdown, and damage is causing or threatens malfunction of equipment required for safe shutdown of the plant as determined by:

(A *and* B *and* C)
A. Direct observation or notification received by control room operator.
and
B. Shift Supervisor evaluation.
and
C. Reactor Coolant Temperature greater than 200°F as indicated on Panel 1C651 (2C651).

GENERAL EMERGENCY

EAL# 14.4 None.

15 - RADIOLOGICAL EFFLUENT

UNUSUAL EVENT

EAL# 15.1 Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds 2 times the Technical Requirements Manual limits for 60 minutes or longer.

EAL# 15.1 (1 or 2 or 3)

1. Valid Noble Gas vent stack monitor reading(s) that exceeds a total site release rate of 2.0E+6 µCi/min and that is sustained for 60 minutes or longer.

OR

2. Confirmed sample analyses for airborne releases indicates total site release rates at the site boundary with a release duration of 60 minutes or longer resulting in dose rates of:

   a) Noble gases >1000 mrem/year whole body, **or**
   b) Noble gases >6000 mrem/year skin, **or**
   c) I-131, I-133, H-3, and particulates with half lives >8 days >3000 mrem/year to any organ (inhalation pathways only).

OR

3. Confirmed sample analyses for liquid releases indicates concentrations with a release duration of 60 minutes or longer in excess of two time the Technical Requirements Manual liquid effluent limits.

(CONTINUED ON NEXT PAGE)

15 - RADIOLOGICAL EFFLUENT (continued)

ALERT

EAL# 15.2 Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds 200 times Technical Requirement Manual limits for 15 minutes or longer.

EAL# 15.2 (1 or 2 or 3)

1. Valid Noble Gas vent stack monitor reading(s) that exceeds a total site release rate of 2E+8 µCi/min and that is sustained for 15 minutes or longer.

OR

2 Confirmed sample analyses for airborne releases indicates total site release rates at the site boundary for 15 minutes or longer resulting in dose rates of:

   a) Noble gases >1.0E+5 mrem/year whole body, **or**
   b) Noble gases >6.0E+5 mrem/year skin, **or**
   c) I-131, I-133, H-3, and particulates with half-lives >8 days >3.0E+5 mrem/year to any organ (inhalation pathways only).

OR

3. Confirmed sample analyses for liquid releases indicates concentrations in excess of 200 times the Technical Requirements Manual liquid effluent limits for 15 minutes or longer.

(CONTINUED ON NEXT PAGE)

15 - RADIOLOGICAL EFFLUENT (continued)

SITE AREA EMERGENCY

EAL# 15.3 Dose at the Emergency Plan boundary resulting from an actual or imminent release of gaseous radioactivity exceeds 100 mrem whole body TEDE or 500 mrem child thyroid CDE for the actual or projected duration of release.

EAL# 15.3 (1 or 2 or 3 or 4 or 5)

1. Valid Noble Gas vent stack monitor readings(s) that exceeds a total release rate 6.2E8 µCi/min for greater than 15 minutes and Dose Projections are not available.

   Note: If the required dose projection cannot be completed within the 15 minute period, then the declaration must be made based on a valid sustained monitor reading(s).

OR

2. Valid dose assessment using actual meteorology indicates projected doses greater than 100 mrem whole body TEDE or 500 mrem child thyroid CDE at or beyond the EPB.

OR

3. A valid reading sustained for 15 minutes or longer on the RMS perimeter radiation monitoring system greater than 100 mR/hr.

OR

4. Field survey results indicate Emergency Planning boundary dose rates exceeding 100 mR/hr expected to continue for more than one hour.

OR

5. Analyses of field survey samples indicate child thyroid dose commitment at the Emergency Planning Boundary of 500 mrem for one hour of inhalation.

(CONTINUED ON NEXT PAGE)

15 - RADIOLOGICAL EFFLUENT (continued)

GENERAL EMERGENCY

EAL# 15.4 Dose at the Emergency Planning Boundary resulting from an actual or imminent release of gaseous radioactivity exceeds 1000 mrem whole body TEDE or 5000 mrem child thyroid CDE for the actual or projected duration of the release using actual meteorology.

EAL# 15.4 (1 or 2 or 3 or 4 or 5)

1. Valid Noble Gas vent stack monitor readings(s) that exceed a total release rate of 6.2E9 μCi/min for greater that 15 minutes and Dose Projections are not available.

   Note: If the required dose projection cannot be completed within the 15 minute period, then the declaration must be made based on a valid sustained monitor reading(s).

OR

2. Valid dose assessment using actual meteorology indicates projected doses greater than 1000 mrem whole body TEDE or 5000 mrem child thyroid CDE at or beyond the EPB.

OR

3. A valid reading sustained for 15 minutes or longer on the RMS perimeter radiation monitoring system greater than 1000 mR/hr.

OR

4. Field survey results indicate Emergency Planning Boundary dose rates exceeding 1000 mR/hr expected to continue for more than one hour.

OR

5. Analyses of field survey samples indicate child thyroid dose commitment at the Emergency Planning Boundary of 5000 mrem for one hour of inhalation.

16 - SECURITY EVENT

UNUSUAL EVENT

EAL# 16.1 Security threat or attempted entry or attempted sabotage as indicated by:

(A *or* B *or* C)

A. A report from Security of a security threat, attempted entry, or attempted sabotage of the owner controlled area adjacent to the site.

or

B. Any attempted act of sabotage which is deemed legitimate in the judgment of the SHIFT SUPERVISOR/EMERGENCY DIRECTOR, and affects plant operation.

or

C. A site specific credible security threat notification.

ALERT

EAL# 16.2 Ongoing Security Compromise as indicated by:

(A *or* B)

A. A report from Security that a security compromise is at the site but no penetration of protected areas has occurred.

or

B. Any act of sabotage which results in an actual or potential substantial degradation of the level of safety of the plant as judged by the SHIFT SUPERVISOR/EMERGENCY DIRECTOR.

SITE AREA EMERGENCY

EAL# 16.3 An ongoing adversary event threatens imminent loss of physical control of plant as indicated by:

(A *or* B)

A. Report from Security that the security of the plant vital area is threatened by unauthorized (forcible) entry into the protected area.

or

B. Any act of sabotage which results in actual or likely major failures of plant functions needed for protection of the public as judged by the SHIFT SUPERVISOR/EMERGENCY DIRECTOR.

(CONTINUED ON NEXT PAGE)

16 - SECURITY EVENT (continued)

GENERAL EMERGENCY

EAL# 16.4 Loss of physical control of facilities as indicated by:

(A *or* B)

A. Report from Security that a loss of physical control of plant vital areas has occurred.

or

B. Any act of sabotage which results in imminent significant cladding failure or fuel melting with a potential for loss of containment integrity or the potential for release of significant amounts of radioactivity in a short time as judged by the SHIFT SUPERVISOR/EMERGENCY DIRECTOR.

17 - SPENT FUEL RELATED INCIDENT

UNUSUAL EVENT

EAL# 17.1 Unanticipated or unplanned concentrations of airborne activity exist in normally accessible areas, which is not due to planned maintenance activities, as indicated by:

Concentrations exceed 500 times the DAC values of 10CFR20 Appendix B, Table I values for a single isotope, or full multiple isotopes where

$$\frac{C_A}{DAC_A}+\frac{C_B}{DAC_B}+\frac{C_C}{DAC_C}\ldots\frac{C_N}{DAC_N}\geq 500$$

ALERT

EAL# 17.2 Unexpected in-plant high radiation levels or airborne contamination which indicates a severe fuel handling accident as indicated by:

Refuel floor area radiation monitor reading 1000 times normal annunciation on Panel 1C601 (2C601) or indication on Panel 1C600 (2C600).

(CONTINUED ON NEXT PAGE)

17 - SPENT FUEL RELATED INCIDENT (continued)

SITE AREA EMERGENCY

EAL# 17.3.a Major damage to irradiated fuel with actual or clear potential for significant release of radioactive material to the environment as indicated by:

(A *and* B)

A. Dropping, bumping, or otherwise rough handling of a new **OR** irradiated fuel bundle with irradiated fuel in the pool.

and

B. (1 *or* 2)

1. Refueling floor area radiation monitor reading 1000 times normal annunciation on Panel 1C601 (2C601) or indication on Panel 1C600 (2C600).

or

2. Reactor Building vent stack monitoring system high radiation annunciation or indication on Panel 0C630 or 0C677.

OR

EAL# 17.3.b Damage to irradiated fuel due to uncontrolled decrease in the fuel pool level to below the level of the fuel as indicated by:

(A *and* B)

A. (1 *or* 2)

1. Uncovering of irradiated fuel confirmation by verification of significant leakage from spent fuel pool.

or

2. Visual observation of water level below irradiated fuel in the pool.

and

B. (1 *or* 2)

1. Refueling floor area radiation monitor annunciation on Panel 1C651 (2C651) or indication on Panel 1C600 (2C600).

or

2. Reactor Building vent stack monitoring system high radiation annunciation or indication on Panel 0C630 or 0C677.

GENERAL EMERGENCY

EAL# 17.4 None.

18 - STEAM LINE BREAK

UNUSUAL EVENT

EAL# 18.1 None.

ALERT

EAL# 18.2 MSIV malfunction causing leakage as indicated by:

(A *and* B)
A. Valid MSIV closure signal or indication on Panel 1C601 (2C601).
and
B. (1 *or* 2)
1. Valid Main Steam Line flow indication on Panel 1C652 (2C652).
or
2. Valid Main Steam Line radiation indication on Panel 1C600 (2C600).

(CONTINUED ON NEXT PAGE)

18 - STEAM LINE BREAK (continued)

SITE AREA EMERGENCY

EAL# 18.3 Steam line break occurs outside of containment without isolation as indicated by:

(A *or* B *or* C *or* D)

A. (1 *and* 2)

1. Failure of both MSIVs in the line with the leak to close as indicated by position indication on Panel 1C601 (2C601).

and

2. (a *or* b)
   a. High MSL flow annunciation on Panel 1C601 (2C601) or indication on Panel 1C652 (2C652).
   or
   b. Other indication of main steam leakage outside containment.

or

B. (1 *and* 2)

1. Failure of RCIC steam isolation valves HV-F008 and HV-F007 to close as indicated on Panel 1C601 (2C601).

and

2. (a *or* b *or* c *or* d *or* e *or* f)
   a. RCIC steamline pipe routing area high temperature annunciation on Panel 1C601 (2C601), or indication on Panel 1C614 (2C614).
   or
   b. RCIC equipment area high temperature annunciation on Panel 1C601 (2C601) or indication on Panel 1C614 (2C614).
   or
   c. RCIC steamline high flow annunciation on Panel 1C601 (2C601).
   or
   d. RCIC steamline tunnel ventilation high delta temperature annunciation on Panel 1C601 (2C601).
   or
   e. RCIC turbine exhaust diaphragm high pressure annunciation on Panel 1C601 (2C601).
   or
   f. Other indication of steam leakage from the RCIC system.

(CONTINUED ON NEXT PAGE)

18 - STEAM LINE BREAK (continued)

SITE AREA EMERGENCY (continued)

or

C. (1 *and* 2)

1. Failure of HPCI steam isolation valves HV-F002 and HV-F003 to close as indicated by position indicator on Panel 1C601 (2C601).

and

2. (a *or* b *or* c *or* d *or* e *or* f)
   a. HPCI steamline pipe routing area high temperature annunciation on Panel 1C601 (2C601), or indication on Panel 1C614 (2C614).

   or

   b. HPCI equipment area high temperature annunciation on Panel 1C601 (2C601) or indication on Panel 1C614 (2C614).

   or

   c. HPCI steamline high flow annunciation on Panel 1C601 (2C601).

   or

   d. HPCI steamline tunnel ventilation high delta temperature annunciation on Panel 1C601 (2C601).

   or

   e. HPCI turbine exhaust diaphragm high pressure annunciation on Panel 1C601 (2C601).

   or

   f. Other indication of steam leakage from the HPCI system.

or

D. Any other un-isolatable steam line breaks.

GENERAL EMERGENCY

EAL# 18.4 None.

19 - TOXIC/FLAMMABLE GASES

UNUSUAL EVENT

EAL# 19.1 Nearby or onsite release of potentially harmful quantifies of toxic or flammable material as indicated by:

Visual observation or notification received by the control room operator.

ALERT

EAL# 19.2 Entry of toxic or flammable gases into the facility, with subsequent habitability problem as indicated by:

Visual observation, direct measurement, or notification received by the control room operator.

SITE AREA EMERGENCY

EAL# 19.3 Toxic or flammable gases enter vital areas, restricting access and restricted access constitutes a safety problem, as determined by:

(A *and* B)
A. Shift Supervisor's evaluation.
and
B. Visual observation, direct measurement, or notification received by control room operator.

GENERAL EMERGENCY

EAL# 19.4 None.

20 - TECHNICAL SPECIFICATION SAFETY LIMIT

UNUSUAL EVENT

EAL# 20.1 Abnormal occurrences which result in operator complying with any of the Technical Specification SAFETY LIMIT ACTION statements indicated by:

(A *or* B *or* C *or* D)

A. Exceeding THERMAL POWER, low pressure or low flow safety limit 2.1.1.1.

or

B. Exceeding THERMAL POWER, high pressure and high flow safety limit 2.1.1.2.

or

C. Exceeding REACTOR VESSEL WATER LEVEL safety limit 2.1.1.3.

or

D. Exceeding REACTOR COOLANT SYSTEM PRESSURE safety limit 2.1.2.

ALERT

EAL# 20.2 None.

SITE AREA EMERGENCY

EAL# 20.3 None.

GENERAL EMERGENCY

EAL# 20.4 None.

21 – DRY FUEL STORAGE

UNUSUAL EVENT

EAL# 21.1.a. Situations are occurring or have occurred during the transport of the irradiated spent fuel to the onsite storage facility, which jeopardize the integrity of the spent fuel or its container as indicated by:

(A *or* B)

A. Radiological readings exceed 2 R/hour at the external surface of any transfer cask or horizontal storage module.

or

B. Radiological readings exceed 1 R/hour one foot away from the external surface of any transfer cask or horizontal storage module.

OR

EAL# 21.1.b. Situations are occurring or have occurred at the irradiated spent fuel storage facility, which jeopardize the integrity of the dry cask storage system as indicated by:

(A *or* B)

A. Radiological readings exceed 2 R/hour at the external surface of any transfer cask or horizontal storage module.

or

B. Radiological readings exceed 1 R/hour one foot away from the external surface of any transfer cask or horizontal storage module.

ALERT

EAL# 21.2 None.

SITE AREA EMERGENCY

EAL# 21.3 None.

GENERAL EMERGENCY

EAL# 21.4 None

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

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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)[1] dose shall not exceed 10 rem.

1.1.2 Dose to any organ (CDE)[2], including the skin and extremity (SDE)[3], shall not exceed 100 rem.

1.1.3 Dose to the lens of the eye shall not exceed 30 rem (LDE)[4].

☐ 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)[1] doses shall not exceed 25 rem.

1.2.2 Planned dose to any organ (CDE)[2], 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)[4].

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)[(2)], 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.

(2) 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 [2] 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.)

[2] 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 [2] 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.

[2] The Committed Dose Equivalent to the thyroid from radioiodine.

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

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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)[2] 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 RWPs #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)[1] for the performance of support duties on the site of the Susquehanna SES.

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

(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.

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[a]

Whole Body Absorbed Dose (rad)	Early Fatalities[b] (percent)	Whole Body Absorbed Dose (rad)	Prodromal Effects[c] (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 that 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.

MIDAS OPERATING PROCEDURE

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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-clock **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 ΔT 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:

NO PRECIPITATION	**0(zero)**
DRIZZLE or MIST	**LIGHT**
STEADY RAIN	**MEDIUM**
HEAVY DOWNPOUR	**HEAVY**

   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 µCi/min.

   b. In the column labeled **TOT I-131 RELEASE**, enter the site total I-131 release rate in µCi/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:

      TOT NG RELEASE (µCi/min)/1000 = TOT I-131 RELEASE (µCi/min)

   c. In the column labeled **TOT P RELEASE**, enter the site total particulate release rate in µCi/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:

      TOT NG RELEASE (µCi/min)/10,000 = TOT P RELEASE (µCi/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 SCRN]**.

      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 ΔT 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:

NO PRECIPITATION	**0(zero)**
DRIZZLE or MIST	**LIGHT**
STEADY RAIN	**MEDIUM**
HEAVY DOWNPOUR	**HEAVY**

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 SCRN]**.

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 ΔT 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:

NO PRECIPITATION	**0(zero)**
DRIZZLE or MIST	**LIGHT**
STEADY RAIN	**MEDIUM**
HEAVY DOWNPOUR	**HEAVY**

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 SCRN]**.

      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 µCi/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 ΔT 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:

NO PRECIPITATION	**0(zero)**
DRIZZLE or MIST	**LIGHT**
STEADY RAIN	**MEDIUM**
HEAVY DOWNPOUR	**HEAVY**

   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 µCi/cc. A zero (0) value may be entered for the net count per minute or µCi/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 SCRN]**.

      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 ΔT 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:

NO PRECIPITATION	**0(zero)**
DRIZZLE or MIST	**LIGHT**
STEADY RAIN	**MEDIUM**
HEAVY DOWNPOUR	**HEAVY**

   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 SCRN].**

      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

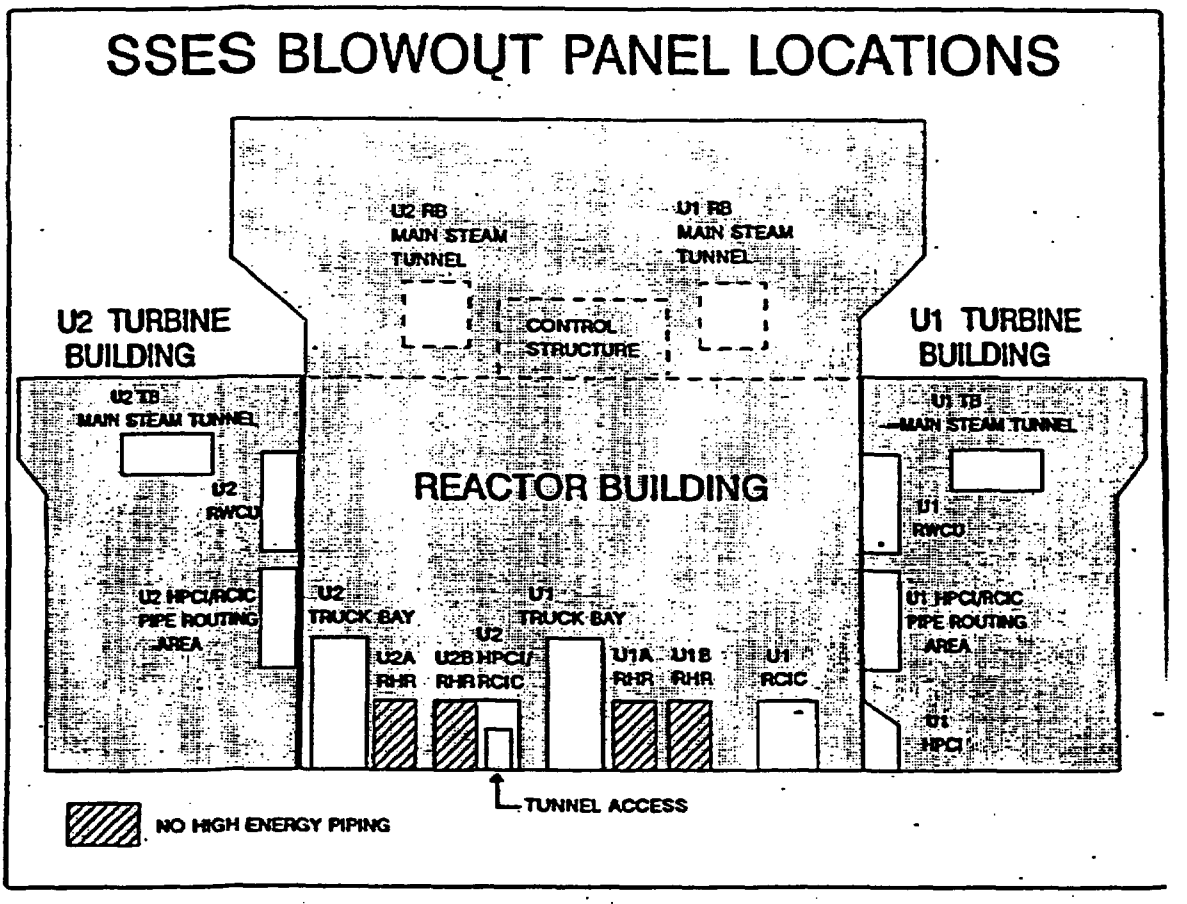

SSES BLOWOUT PANEL LOCATIONS
U2 RB MAIN STEAM TUNNEL
U1 RB MAIN STEAM TUNNEL
U2 TURBINE BUILDING
CONTROL STRUCTURE
U1 TURBINE BUILDING
U2 TB MAIN STEAM TUNNEL
U1 TB MAIN STEAM TUNNEL
REACTOR BUILDING
U2 RWCU
U1 RWCU
U2 HPCI/RCIC PIPE ROUTING AREA
U2 TRUCK BAY
U1 TRUCK BAY
U1 HPCI/RCIC PIPE ROUTING AREA
U2A RHR
U2B RHR
U2 HPCI/ RCIC
U1A RHR
U1B RHR
U1 RCIC
U1 HPCI
TUNNEL ACCESS
NO HIGH ENERGY PIPING

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
RCIC PUMP ROOM	(µCi/min)	(µCi/min)	(µCi/min)
[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
HPCI PUMP ROOM	(µCi/min)	(µCi/min)	(µCi/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
HPCI/RCIC ROUTING AREA	(µCi/min)	(µCi/min)	(µCi/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
RWCU PENETRATION ROOM	(µCi/min)	(µCi/min)	(µCi/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
RB/TB MAIN STEAM TUNNEL	(µCi/min)	(µCi/min)	(µCi/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).

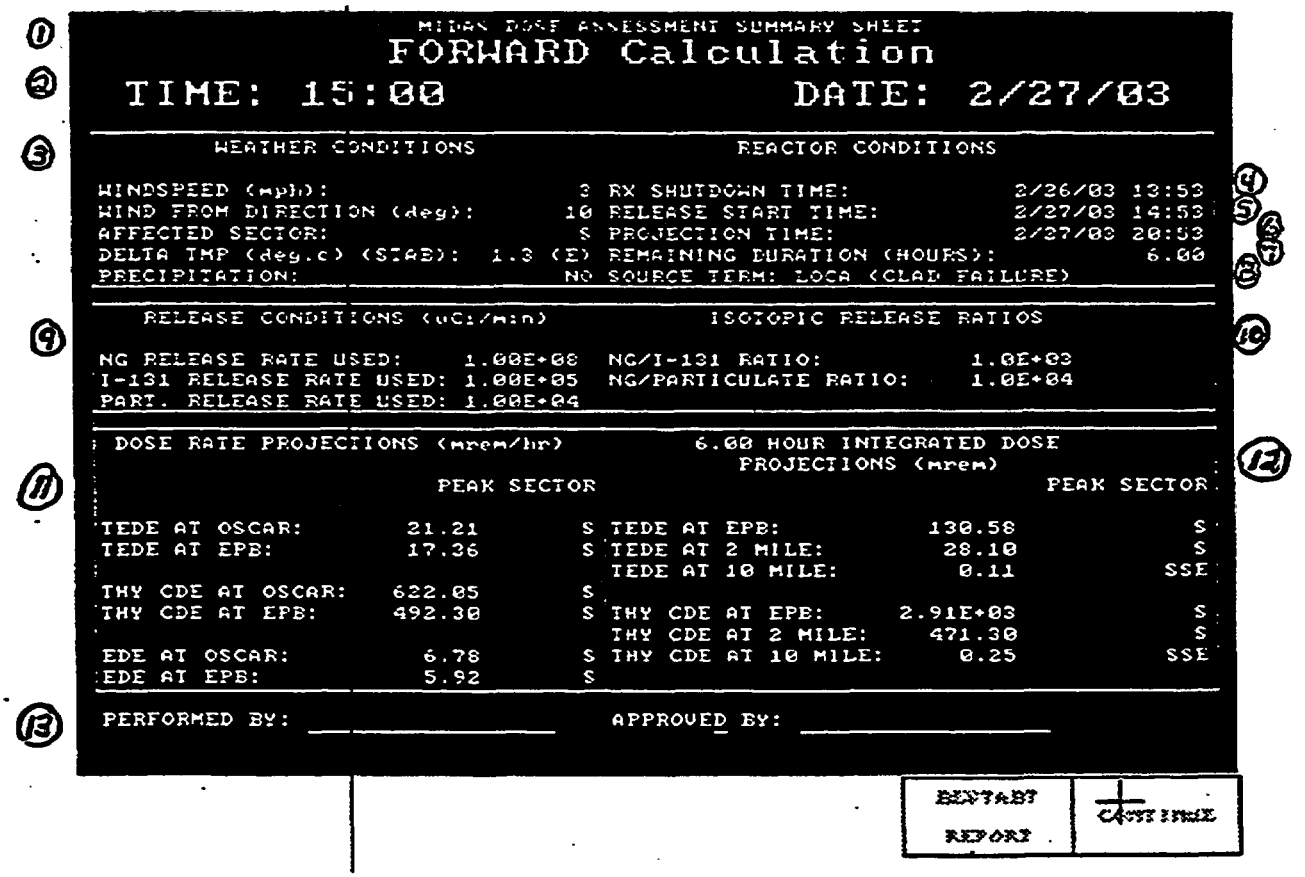
12. INTEGRATED DOSE PROJECTIONS

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)		PEAK SECTOR	6.00 HOUR INTEGRATED DOSE PROJECTIONS (mrem)		PEAK SECTOR
TEDE AT OSCAR:	21.21	S	TEDE AT EPB:	130.58	S
TEDE AT EPB:	17.36	S	TEDE AT 2 MILE:	28.10	S
			TEDE AT 10 MILE:	0.11	SSE
THY CDE AT OSCAR:	622.05	S			
THY CDE AT EPB:	492.30	S	THY CDE AT EPB:	2.91E+03	S
			THY CDE AT 2 MILE:	471.30	S
EDE AT OSCAR:	6.78	S	THY CDE AT 10 MILE:	0.25	SSE
EDE AT EPB:	5.92	S			

PERFORMED BY: _____ APPROVED BY: _____

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)

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)

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**

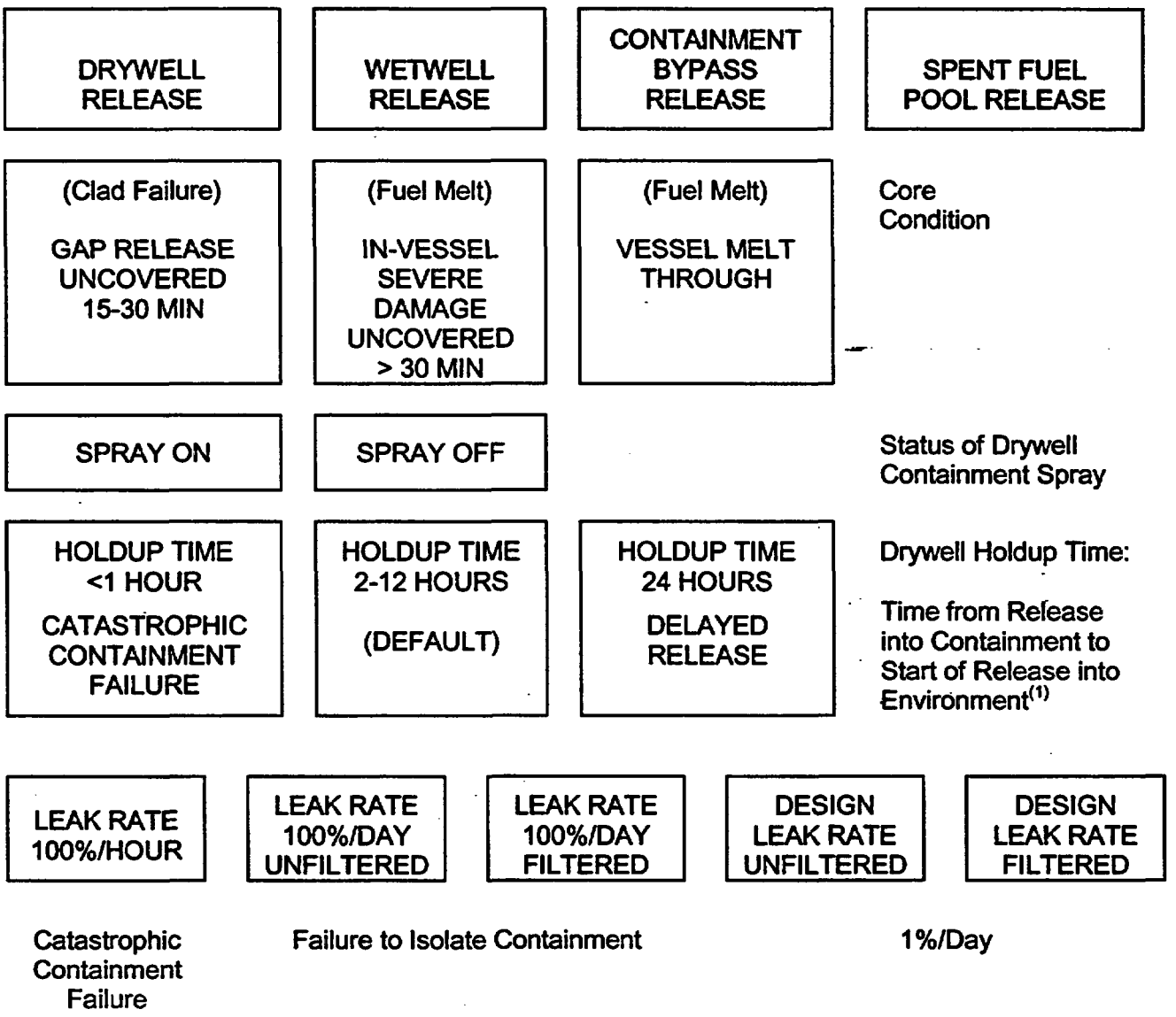
This accident is a zircalloy fire in spent fuel that results in an activity release similar to a core melt. It assumes that the activity is filtered by the Standby Gas Treatment System prior to release.

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.

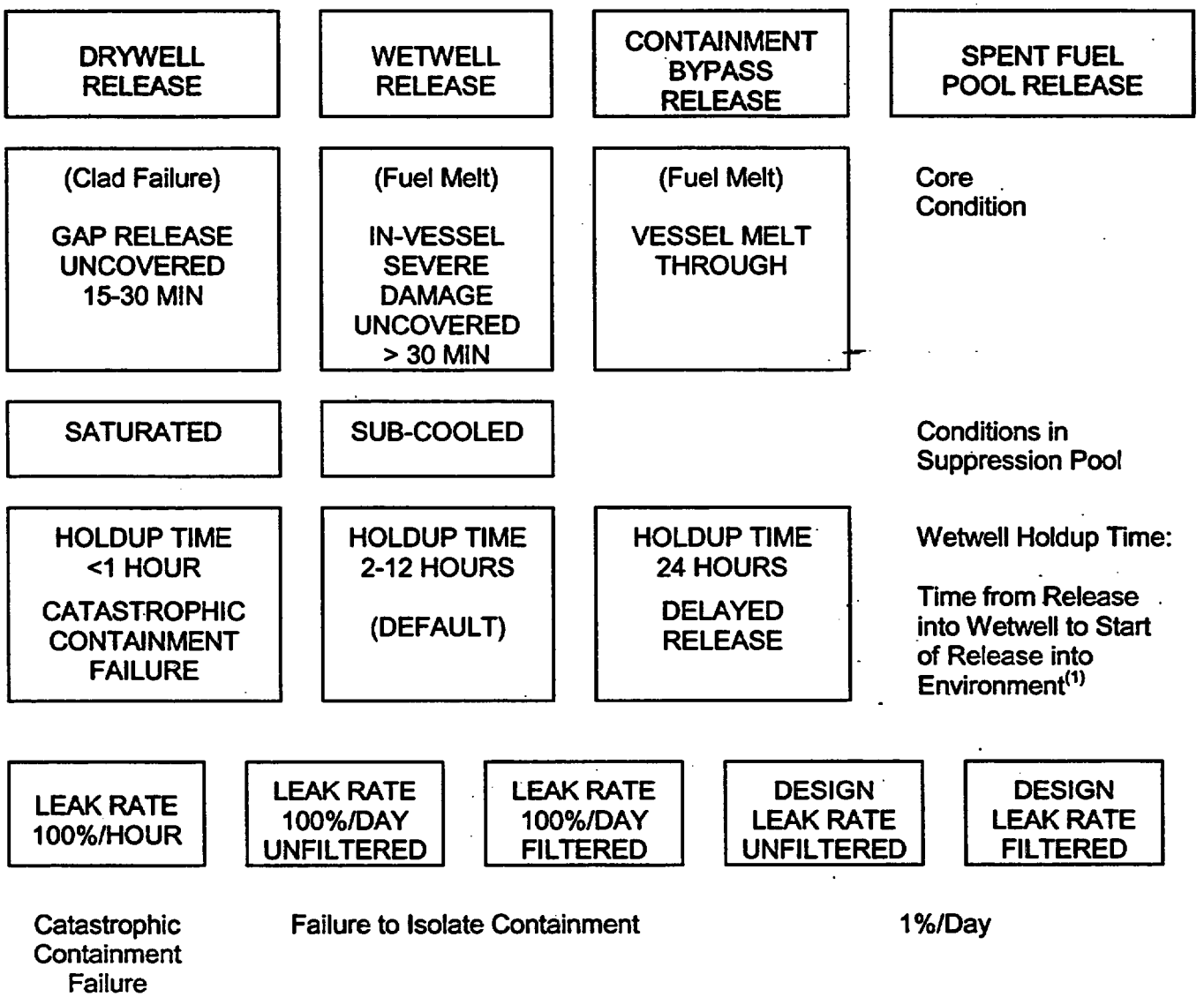
NOTE: Menu C (from NUREG-1228 Event Tree Analyses) is used to relatively quickly provide a bounding estimate of offsite dose, for situations where there are substantial uncertainties in prediction of source term and any resultant doses.

NUREG 1228 MENU STRUCTURE FOR DRYWELL RELEASE



(1) 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



(1) 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 plateout by natural processes and water sprays prior to release to the environment.

NUREG 1228 MENU STRUCTURE FOR CONTAINMENT BYPASS RELEASE

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

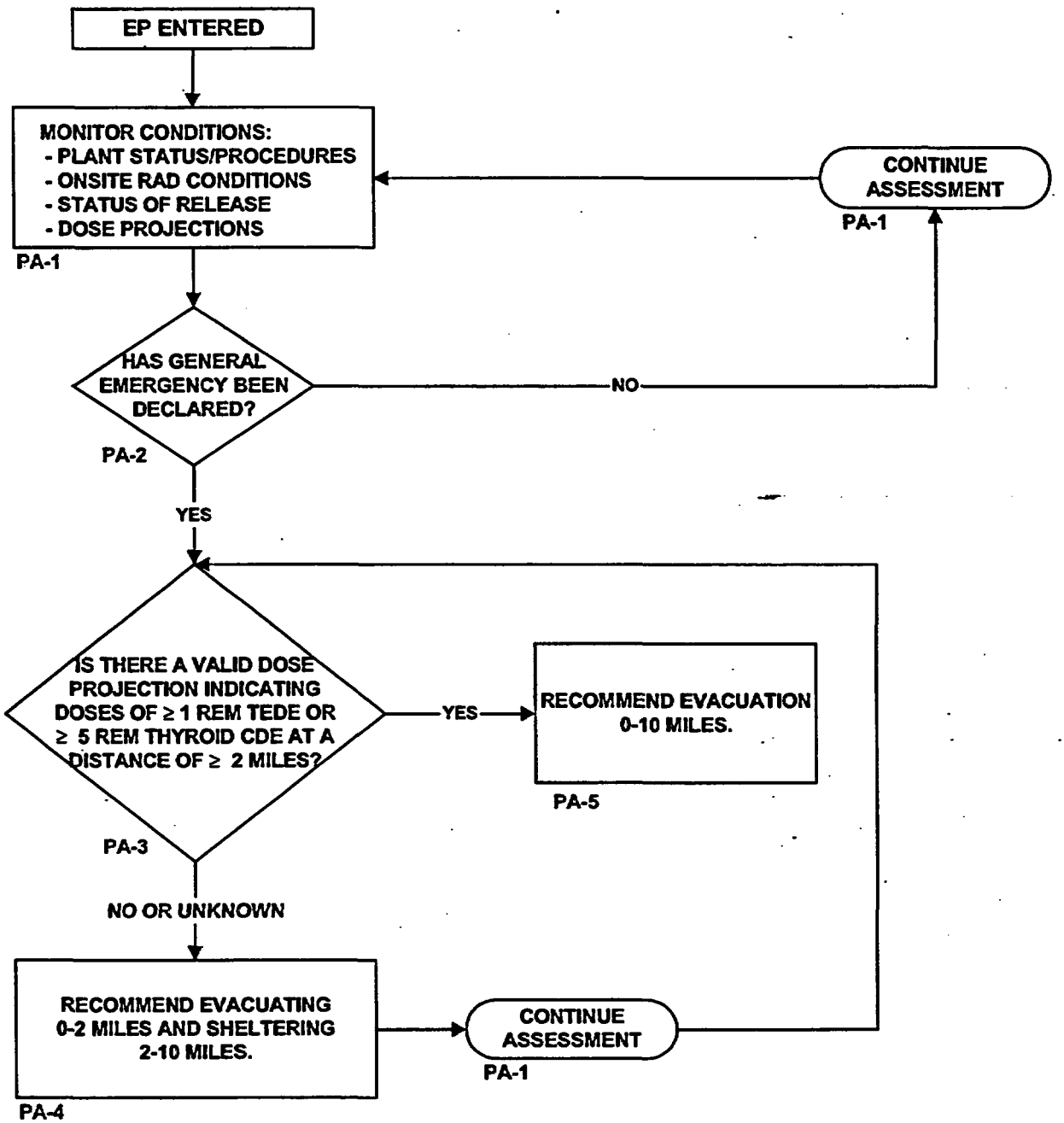
NUREG 1228 MENU STRUCTURE FOR SPENT FUEL POOL RELEASE

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

Catastrophic Failure of Secondary Containment

(1) 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.

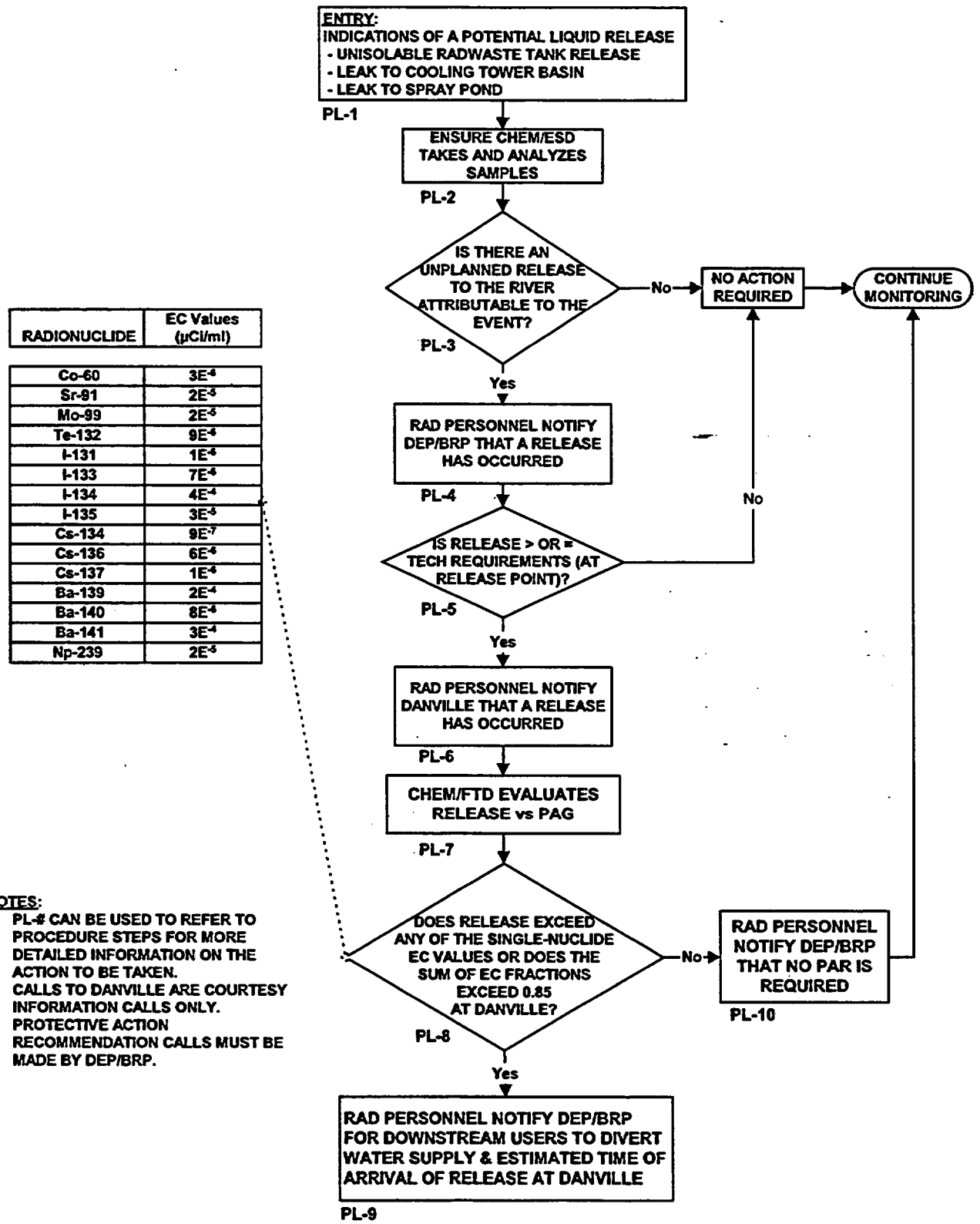
PAR AIRBORNE RELEASES



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



RADIONUCLIDE	EC Values (µCi/ml)
Co-60	$3E^{-4}$
Sr-91	$2E^{-5}$
Mo-99	$2E^{-5}$
Te-132	$9E^{-6}$
I-131	$1E^{-6}$
I-133	$7E^{-6}$
I-134	$4E^{-4}$
I-135	$3E^{-5}$
Cs-134	$9E^{-7}$
Cs-136	$6E^{-6}$
Cs-137	$1E^{-6}$
Ba-139	$2E^{-4}$
Ba-140	$8E^{-6}$
Ba-141	$3E^{-4}$
Np-239	$2E^{-5}$

NOTES:
1. PL-# CAN BE USED TO REFER TO PROCEDURE STEPS FOR MORE DETAILED INFORMATION ON THE ACTION TO BE TAKEN.
2. CALLS TO DANVILLE ARE COURTESY INFORMATION CALLS ONLY. PROTECTIVE ACTION RECOMMENDATION CALLS MUST BE MADE BY DEP/BRP.

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)

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)**

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

☐ **YES —** If the projected doses at 2 miles are ≥ 1 REM TEDE or ≥ 5 REM CDE child thyroid, then full evacuation (0-10 miles) is recommended. **(Go to PA-5)**

☐ **NO/UNKNOWN — (Go to PA-4)**

☐ 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.

☐ 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)

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

(Go to PL-3)

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)

LIQUID (CONT'D)

PL-5 IS RELEASE ≥ 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.

☐ **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)

☐ **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.

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)

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.

☐ 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.

RADIOLOGICAL DOSE ASSESSMENT PHONE LOG

This form is intended for communication of dose assessment results from the TSC to the EOF (or EOF to TSC) when a facility is unable to transmit a copy of the MIDAS DOSE ASSESSMENT SUMMARY SHEET. HIGH PRIORITY items (1-6) are required inputs for the dose assessments. LOW PRIORITY items (7-10) are highly desired but not essential. The LOW PRIORITY items may be omitted if time constraints exist.

HIGH PRIORITY

1. **CURRENT (15) MINUTE CALCULATION TIME PERIOD**

DATE	TIME

2.

UNITS	EPB (MREM)	2 MILE (MREM)	10 MILE (MREM)
TEDE			
THY CDE			

3.

DATE	TIME	
		REACTOR SHUTDOWN
		START OF RELEASE

4. **ACCIDENT MENU SELECTION**

☐ MENU B: FORWARD CALCULATIONS OR ☐ MENU G: BLOWOUT PANEL CALCULATIONS (MONITORED RELEASE or BLOWOUT PANEL CALCULATION)
☐ MENU E-W: BACK CALCULATIONS

FIELD MONITOR PARAMETER SELECTION

	FIELD MONITOR READING (MR/HR)
	DISTANCE FROM PLANT (MILES)

IODINE CARTRIDGE

	NET CPM		µCi/cc		DEFAULT MIX

5. **SOURCE TERM CHARACTERIZATION**

☐ ATWS
☐ NORMAL RX COOLANT ACTIVITY
☐ LOCA (RX DP-NO FD)
☐ LOCA (CLAD FAILURE) _____
☐ LOCA (FUEL MELT) _____%
☐ FUEL HANDLING ACCIDENT

BLOWOUT PANEL LIFTED:

☐ RCIC PUMP ROOM
☐ HPCI PUMP ROOM
☐ HPCI/RCIC ROUTING AREA
☐ RWCU PENETRATION ROOM
☐ RB/TB MAIN STEAM TUNNEL

6. **(REMAINING) DURATION OF RELEASE**

	(MINUTES)

LOW PRIORITY

7.

SITE TOTAL RELEASE RATES (µCi/min)		Measured or Default
NOBLE GAS		
I-131		
PARTICULATES		

8. **PROJECTION TIME** (IF OTHER THAN 6 HOURS)

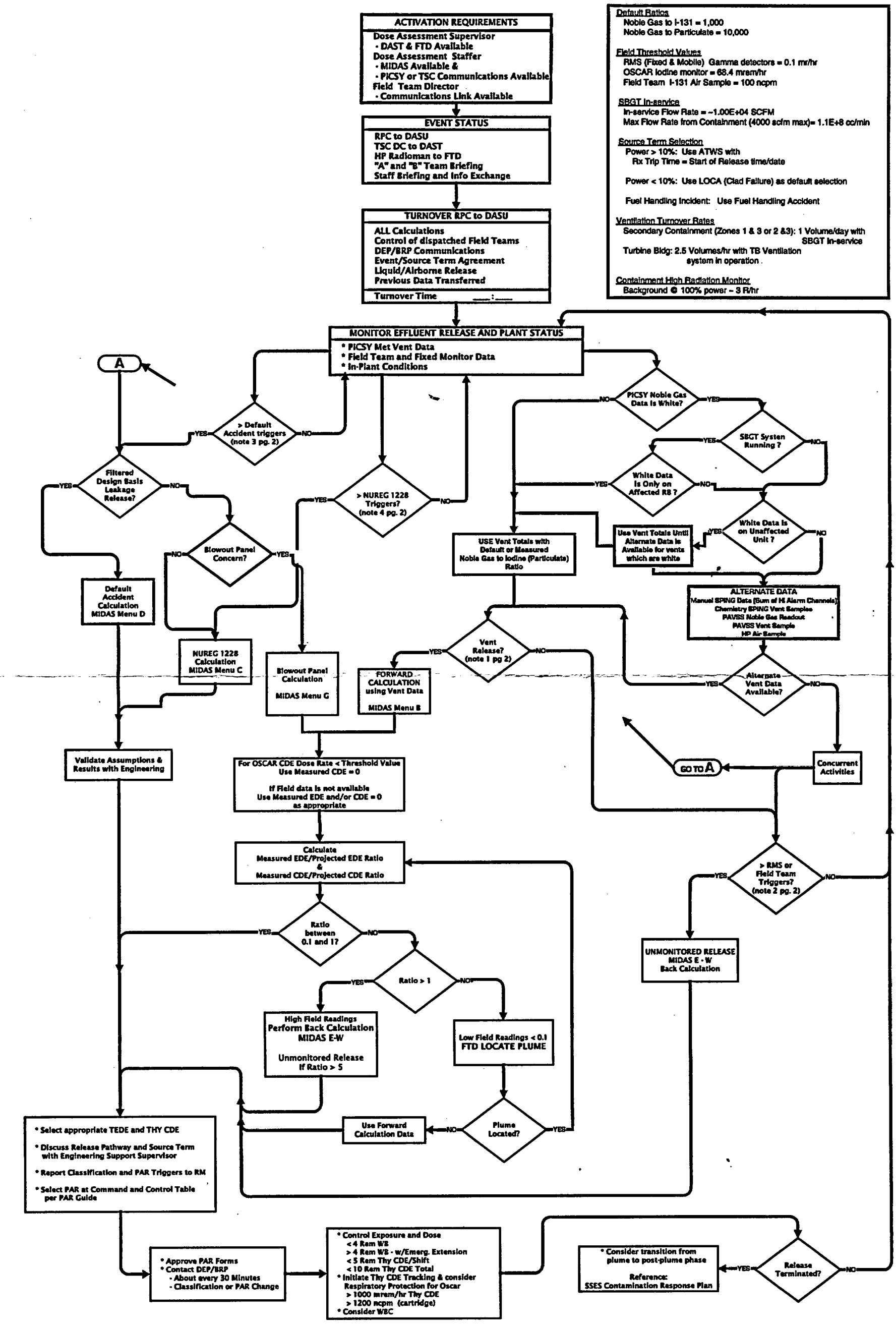
9.

MET DATA		
10 m WIND SPEED		(MPH)
10 m WIND DIRECTION		(DEG FROM)
STABILITY CLASS		(DEG C)
RAIN		(IN/15 MINUTES)

10.

EPB DOSE RATES		
	MREM/HR	SECTOR
EDE		
CDE		

EOF DOSE ASSESSMENT FLOWCHART



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DOSE ASSESSMENT EMERGENCY ACTION LEVELS

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**
◆ AIRBORNE RELEASE Total NG Release Rate > 1.0E6 µci/min** or Entry into one of the following EALs* EAL 3, 15, 17, 18 or 21 with a DSC breached or Initiation of SBGT for treatment of activity within Containment* or A release above normal levels attributable to a declared event* or An unmonitored release is in progress * Perform one calculation unless directed otherwise ** Perform dose projections every 15 minutes	◆ AIRBORNE RELEASE ** ≥ 0.1 mrem/hr EDE (ASP1 or RMS gamma reading) ≥ 68.4 mrem/hr Thy CDE (OSCAR RMS Iodine) ≥ 100 ncpm on Iodine Cartridge ** Perform dose projections every 15 minutes		◆ UNFILTERED VENT RELEASE ◆ RELEASE RATE > DESIGN BASIS 1%/DAY ◆ CORE UNCOVERED > 15 MINUTES ◆ SPENT FUEL POOL RELEASE	◆ LIQUID RELEASE Liquid Effl. ≥ TRM
◆ EAL 15.1 (Unusual Event) >2.0E6 µci/min NG for 60 min. or longer				◆ EAL 15.1 Liquid Effl. ≥ 2 x TRM for 60 min
◆ EAL 15.2 (Alert) >2.0E8 µci/min NG for 15 min. or longer		EAL 3.2 SEVERE CLAD DEGRADATION >200 R/hr CHRM or >300 µci/cc DE Iodine-131		◆ EAL 15.2 Liquid Effl. ≥ 200 x TRM for 15 min
◆ EAL 15.3 (Site Area Emergency) >6.2E8 µci/min NG for greater than15 min & dose projection not available Note: If dose projection cannot be made within 15 minute period, then declaration to be made on valid sustained NG release rate. PROJECTED DOSE @ EPB >100 mrem TEDE or >500 mrem THY CDE	◆ EAL 15.3 RMS PERIMETER MONITORING SYSTEM > 100 mR/hr for 15 min or longer FIELD TEAM SURVEY RESULTS @ EPB > 100 mR/hr & expected for 60 min or ≥ 500 mrem THY CDE for one hour of inhalation	◆ EAL 3.3 SEVERELY DEGRADED CORE > 400 R/hr CHRM or > 1000 µci/cc DE Iodine-131		
◆ EAL 15.4 (General Emergency) >6.2E9 µci/min NG for greater than15 min & dose projection not available Note: If dose projection cannot be made within 15 minute period, then declaration to be made on valid sustained NG release rate. PROJECTED DOSE @ EPB ≥ 1000 mrem TEDE or ≥ 5000 mrem THY CDE	◆ EAL 15.4 RMS PERIMETER MONITORING SYSTEM > 1000 mR/hr for 15 min or longer FIELD TEAM SURVEY RESULTS @ EPB > 1000 mR/hr & expected for 60 min or ≥ 5000 mrem THY CDE for one hour of inhalation	◆ EAL 3.4 CORE MELT > 400R/hr CHRM plus listed conditions or > 1000 µci/cc DE Iodine-131 or > 2000 R/hr CHRM		

PICSY VENT RELEASE RATES GUIDELINES

SITE TOTAL RELEASE RATES

µCi/min

	RELEASE	UNUSUAL EVENT	ALERT
EAL Reference:	**N/A** as read in PICSY	**15.1** for 60 min	**15.2** as read in PICSY
NOBLE GAS:	**Any noticeable increase above pre-event values**	**2.00E+6**	**2.00E+8**

IDENTIFICATION OF RELEASE IN PROGRESS

There is a radiological release in progress if ANY of the following are true:

1.0 Any release rates above Technical Specifications or Technical Requirements Manual limits, OR

2.0 Entry into the Emergency Plan for the listed EALs:

- 3.0 Fuel Clad Degradation
- 15.0 Radiological Effluents
- 17.0 Spent Fuel Related Incident
- 18.0 Steam Line Break
- 21 Dry Fuel Storage, AND the DSC has been breached, OR

3.0 The Shift Manager/ED/RM has reason to believe that an unmonitored release is in progress even though plant indications are otherwise normal, OR

4.0 Initiation of the Standby Gas Treatment System for treatment of activity within containment, OR

5.0 Any radiological release above normal levels to the environment, detected by effluent monitors

5.1 or environmental monitoring,

5.2 and attributable to a declared event.

5.3 Normal levels are the highest reading in the last 24 hours prior to the emergency, excluding the current peak value. The Dose Assessment Staff is not required to determine this quantitatively. Dose Assessment Staff should identify a release in progress if:

- release rates are visibly higher than known data prior to the start of the event, OR
- information is received from Operations that release rates are above normal levels and are attributable to a declared event.

5.4 Field monitoring readings above instrument lower limits of detection or RMS readings yielding unanticipated alarms.