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243 - 243 - RADIOLOGICAL LIAISON

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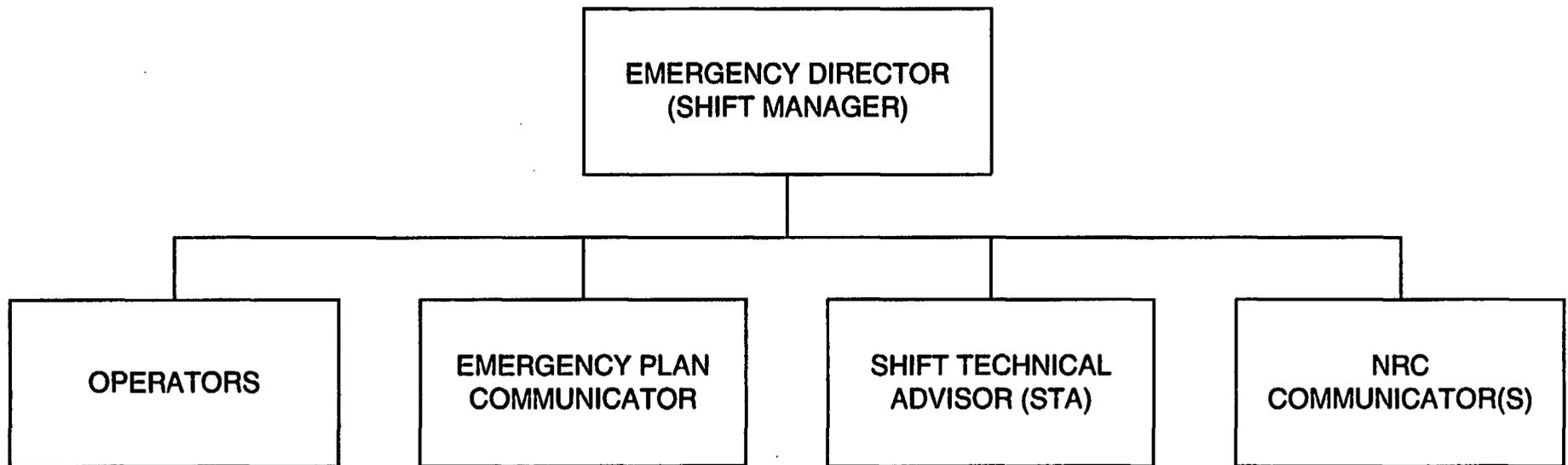
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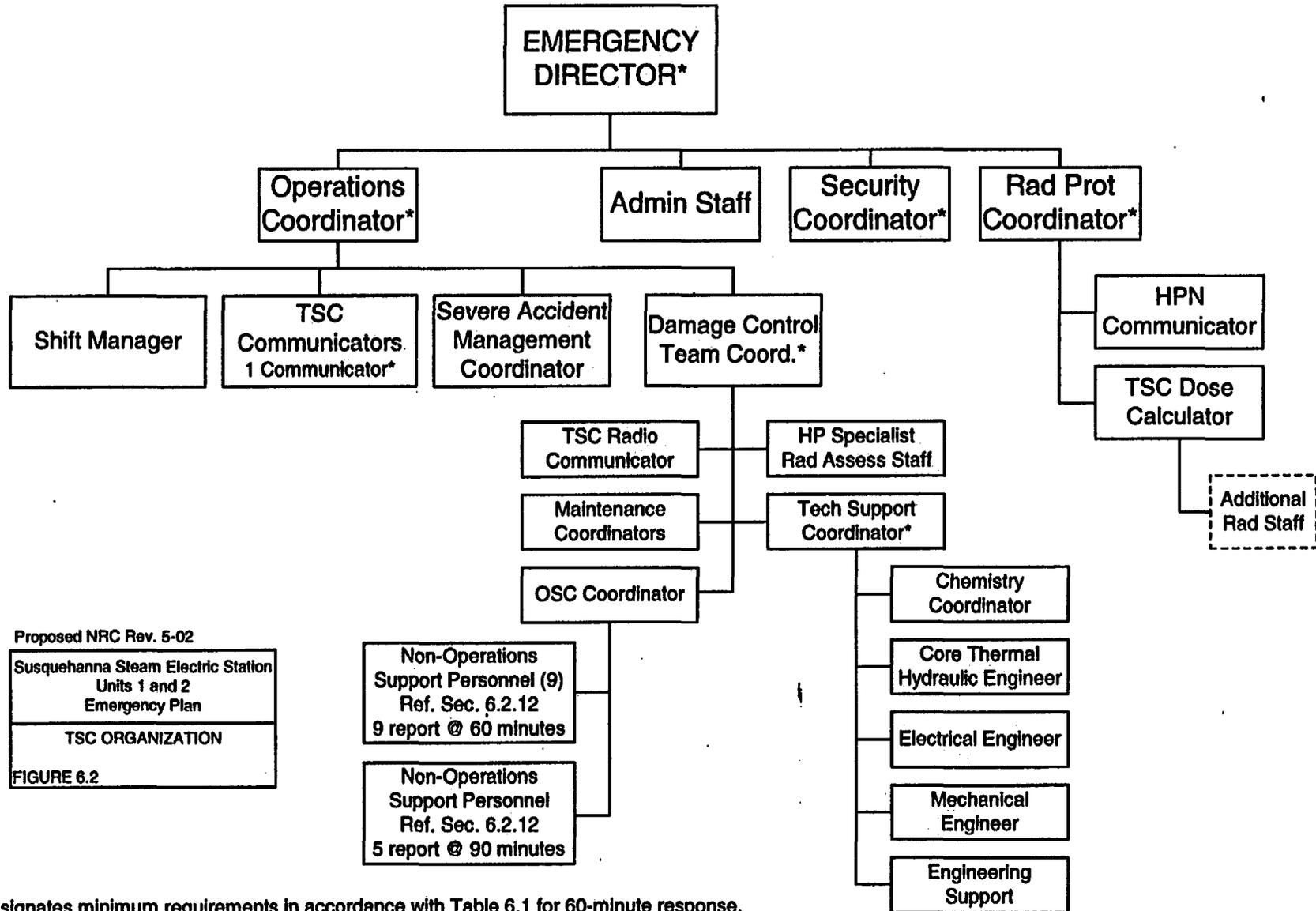
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A045

**EMERGENCY ORGANIZATION
CONTROL ROOM**



TSC ORGANIZATION



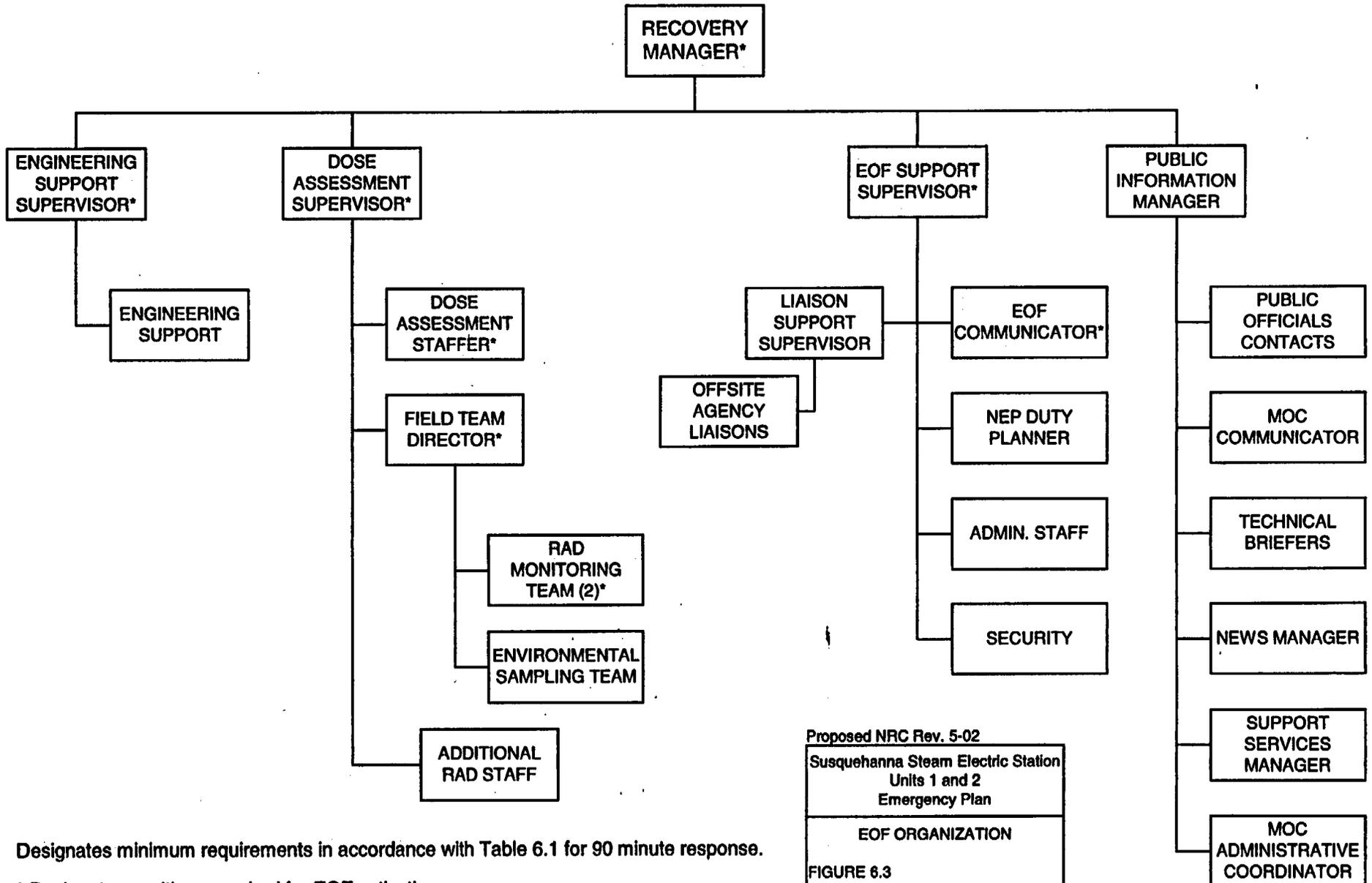
Proposed NRC Rev. 5-02
Susquehanna Steam Electric Station
Units 1 and 2
Emergency Plan
TSC ORGANIZATION
FIGURE 6.2

Designates minimum requirements in accordance with Table 6.1 for 60-minute response.

----- Individuals may be located in the OSC, TSC, or Field.

* Designates positions required for TSC activation.

EOF ORGANIZATION



Designates minimum requirements in accordance with Table 6.1 for 90 minute response.

* Designates positions required for EOF activation.

Proposed NRC Rev. 5-02
Susquehanna Steam Electric Station
Units 1 and 2
Emergency Plan
EOF ORGANIZATION
FIGURE 6.3

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
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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 $\mu\text{Ci/cc}$ 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 $\mu\text{Ci/cc}$ 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 $\mu\text{Ci/cc}$ 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 $\mu\text{Ci/cc}$ 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

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

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 $2.0E+6$ $\mu\text{Ci}/\text{min}$ 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 $2E+8$ $\mu\text{Ci}/\text{min}$ 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 $6.2E8 \mu\text{Ci}/\text{min}$ 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 $6.2E9 \mu\text{Ci}/\text{min}$ 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 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

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

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 quantities 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.

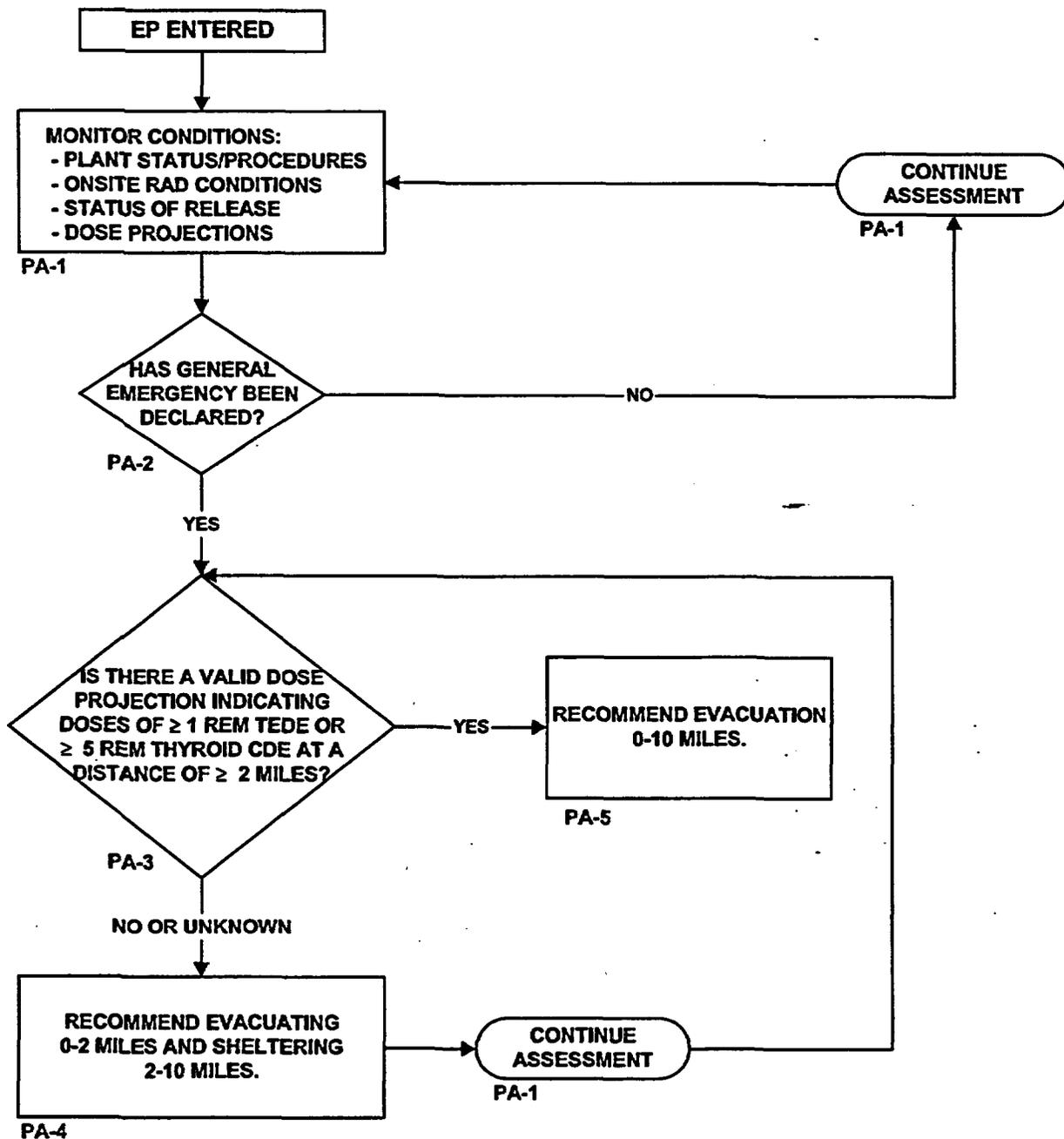
SITE AREA EMERGENCY

EAL# 21.3 None.

GENERAL EMERGENCY

EAL# 21.4 None

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

ENTRY:
INDICATIONS OF A POTENTIAL LIQUID RELEASE
- UNISOLABLE RADWASTE TANK RELEASE
- LEAK TO COOLING TOWER BASIN
- LEAK TO SPRAY POND

PL-1

ENSURE CHEM/ESD
TAKES AND ANALYZES
SAMPLES

PL-2

IS THERE AN
UNPLANNED RELEASE
TO THE RIVER
ATTRIBUTABLE TO THE
EVENT?

No

NO ACTION
REQUIRED

CONTINUE
MONITORING

PL-3

Yes

RAD PERSONNEL NOTIFY
DEP/BRP THAT A RELEASE
HAS OCCURRED

PL-4

IS RELEASE > OR =
TECH REQUIREMENTS (AT
RELEASE POINT)?

No

PL-5

Yes

RAD PERSONNEL NOTIFY
DANVILLE THAT A RELEASE
HAS OCCURRED

PL-6

CHEM/FTD EVALUATES
RELEASE vs PAG

PL-7

DOES RELEASE EXCEED
ANY OF THE SINGLE-NUCLIDE
EC VALUES OR DOES THE
SUM OF EC FRACTIONS
EXCEED 0.85
AT DANVILLE?

No

RAD PERSONNEL
NOTIFY DEP/BRP
THAT NO PAR IS
REQUIRED

PL-10

PL-8

Yes

RAD PERSONNEL NOTIFY DEP/BRP
FOR DOWNSTREAM USERS TO DIVERT
WATER SUPPLY & ESTIMATED TIME OF
ARRIVAL OF RELEASE AT DANVILLE

PL-9

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

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 \geq TECHNICAL REQUIREMENTS LIMITS (AT THE RELEASE POINT)?

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

(Go to PL-6)

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

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.

LIQUID DISCHARGE DATA SHEETS

Section 1: Release Data

Time of release commencement into river (T_1) _____

Time of release termination (T_2) _____

Duration of release ($T_3 = T_2 - T_1$, expressed in hours) _____ Hours

Sample location(s) _____

NOTE: Complete PART I, II, or III based on location of sample.

Section 2: Determination of Radionuclides (from Part IV)

EC fraction for all radionuclides at Danville (S_d) _____

Section 3: Times of Arrival at Danville

	<u>Transit Time to Danville (from Table 1)</u>	<u>Time of Arrival at Danville</u>
Leading Edge	_____ hrs	_____
Peak Concentration	_____ hrs	_____
Trailing Edge	_____ hrs	_____

LIQUID DISCHARGE DATA SHEETS

Tab 6
EP-PS-243-6

PART I: Complete this part if the results are for a sample obtained directly from the SSES Cooling Tower Blowdown Discharge (CTBD) line. Otherwise, proceed to Part II of this tab. Upon completion of Part I, proceed to Part IV.

Radionuclides in Sample	Co-60	Sr-91	Mo-99	Te-132	I-131	I-133	I-134	I-135	Cs-134	Cs-136	Cs-137	Ba-139	Ba-140	Ba-141	Np-239
Radionuclide Activity Concentrations (C_i) of the Sample ($\mu\text{Ci/ml}$)															
EC Values (L_i) for Radionuclides ($\mu\text{Ci/ml}$) ¹	3E-6	2E-5	2E-5	9E-6	1E-6	7E-6	4E-4	3E-5	9E-7	6E-6	1E-6	2E-4	8E-6	3E-4	2E-5
EC Fractions (F_i) of Radionuclides ²															

- 1 The EC (effluent concentration) values (L_i) are obtained from Table 2, Column 2 of Appendix B to 10CFR20. These EC values correspond to the PAG value (50 mrem CEDE) for river water at Darville.
- 2 Obtain the EC fractions (F_i) by dividing each radionuclide concentration (C_i) by its corresponding EC value (L_i) as follows: $F_i = C_i/L_i$. The EC fractions are those for the water entering the Susquehanna River from the SSES discharge.

LIQUID DISCHARGE DATA SHEETS

Tab 6
EP-PS-243-6

PART II: Complete this part if the results are for a sample obtained from a waste stream entering directly into the SSES Cooling Tower Blowdown Discharge (CTBD) line. This includes results for a sample obtained from the SSES Spray Pond or from the SSES Liquid Radwaste System. Otherwise, proceed to Part III of this tab. Upon completion of Part II, proceed to Part IV.

Flow Rate (F_1) of Waste Stream into the CTBD line (gpm) ¹	
Flow Rate (F_2) of CTBD line (gpm) ²	
Dilution Factor (D_2) for the CTBD line ³	

- 1 Obtain the flow rate (F_1) for the waste stream entering the CTBD line. If the waste stream is the SSES Spray Pond, its flow rate into the CTBD line may be determined as follows: a) Obtain the spray pond level from the Control Room, and b) Using the spray pond level, obtain the flow rate (F_1) for the spray pond from Table 2.
- 2 Obtain the flow rate (F_2) of the CTBD line from the TSC Chemistry Coordinator or TSC Coordinator, if possible. If the actual flow rate can't be obtained from the TSC Coordinator or TSC Chemistry Coordinator, assume that it is 5,000 gpm.
- 3 The dilution factor (D_2) for the CTBD line is obtained by dividing the sum of the waste stream and CTBD line flow rates (F_1+F_2) by the waste stream flow rate (F_1) as follows: $D_2 = (F_1+F_2)/F_1$.

LIQUID DISCHARGE DATA SHEETS

Tab 6
EP-PS-243-6

PART II (Continued)

Radionuclides in Sample	Co-60	Sr-91	Mo-99	Te-132	I-131	I-133	I-134	I-135	Cs-134	Cs-136	Cs-137	Ba-139	Ba-140	Ba-141	Np-239
Radionuclide Activity Concentrations (C_i) of the Sample ($\mu\text{Ci/ml}$)															
Expected Radionuclide Activity Concentration (E_2) in the CTBD Line ($\mu\text{Ci/ml}$) ⁴															
EC Values (L_i) for Radionuclides ($\mu\text{Ci/ml}$) ⁵	3E-6	2E-5	2E-5	9E-6	1E-6	7E-6	4E-4	3E-5	9E-7	6E-6	1E-6	2E-4	8E-6	3E-4	2E-5
EC Fractions (F_i) of Radionuclides ⁶															

- 4 Obtain the radionuclide concentrations expected (E_2) in the CTBD line by dividing the radionuclide concentrations (C_i) by the CTBD line dilution factor (D_2) as follows: $E_2 = C_i/D_2$.
- 5 The EC (effluent concentration) values (L_i) are obtained from Table 2, Column 2 of Appendix B to 10CFR20. These EC values correspond to the PAG value (50 mrem CEDE) for river water at Danville.
- 6 Obtain the EC fractions (F_i) by dividing each expected radionuclide concentration (E_2) by its corresponding EC value (L_i) as follows: $F_i = E_2/L_i$. The EC fractions are those for the water entering the Susquehanna River from the SSES discharge.

LIQUID DISCHARGE DATA SHEETS

Tab 6
EP-PS-243-6

PART III: Complete this part if the results are for a sample obtained from a waste stream entering into the Spray Pond before being released to the SSES Cooling Tower Blowdown Discharge (CTBD) line. Upon completion of Part III, proceed to Part IV.

Volume (V) of Release into the Spray Pond (gallons) ¹	
Dilution Factor (D ₁) for the Spray Pond ²	
Flow Rate (F ₁) of Spray Pond into the CTBD line (gpm) ³	
Flow Rate (F ₂) of CTBD line (gpm) ⁴	
Dilution Factor (D ₂) for the CTBD line ⁵	

- 1 Obtain the volume of the release to the Spray Pond from the TSC Chemistry Coordinator or TSC Coordinator.
- 2 Obtain the dilution factor (D₁) for the Spray Pond by dividing the volume (V) of the release into the Spray Pond by 2E7 as follows:
D₁ = V/2E7.
- 3 Obtain the flow rate (F₁) from the SSES Spray Pond from Table 2. Spray Pond level can be obtained from the Control Room.
- 4 Obtain the flow rate (F₂) of the CTBD line from the TSC Chemistry Coordinator or TSC Coordinator, if possible. If the actual flow rate can't be obtained from the TSC Coordinator or TSC Chemistry Coordinator, assume that it is 5,000 gpm.
- 5 Obtain the dilution factor (D₂) for the CTBD line by dividing the sum of the Spray Pond (waste stream) and CTBD line flow rates (F₁+F₂) by the Spray Pond flow rate (F₁) as follows: D₂ = (F₁ + F₂)/F₁.

LIQUID DISCHARGE DATA SHEETS

Tab 6
EP-PS-243-6

PART III (Continued)

Radionuclides in Sample	Co-60	Sr-91	Mo-99	Te-132	I-131	I-133	I-134	I-135	Cs-134	Cs-136	Cs-137	Ba-139	Ba-140	Ba-141	Np-239
Radionuclide Activity Concentrations (C_i) of the Sample ($\mu\text{Ci/ml}$)															
Expected Radionuclide Activity Concentration (E_1) in the Spray Pond ($\mu\text{Ci/ml}$) ⁶															
Expected Radionuclide Activity Concentration (E_2) in the CTBD Line ($\mu\text{Ci/ml}$) ⁷															
EC Values (L_i) for Radionuclides ($\mu\text{Ci/ml}$) ⁸	3E-6	2E-5	2E-5	9E-6	1E-6	7E-6	4E-4	3E-5	9E-7	6E-6	1E-6	2E-4	8E-6	3E-4	2E-5
EC Fractions (F_i) of Radionuclides ⁹															

- 6 Obtain the radionuclide concentrations expected (E_1) in the Spray Pond by dividing the radionuclide concentrations (C_i) of the sample by the dilution factor (D_1) of the Spray Pond as follows: $E_1 = C_i/D_1$.
- 7 Obtain the radionuclide concentrations expected (E_2) in the CTBD line by dividing the radionuclide concentrations (E_1) by the CTBD line dilution factor (D_2) as follows: $E_2 = E_1/D_2$.
- 8 The EC (effluent concentration) values (L_i) are obtained from Table 2, Column 2 of Appendix B to 10CFR20. These EC values correspond to the PAG value (50 mrem CEDE) for river water at Danville.
- 9 Obtain the EC fractions (F_i) by dividing each expected radionuclide concentration (E_2) by its corresponding EC value (L_i) as follows: $F_i = E_2/L_i$. The EC fractions are those for the water entering the Susquehanna River from the SSES discharge.

LIQUID DISCHARGE DATA SHEETS

Tab 6
EP-PS-243-6

PART IV: Complete this part using the results obtained from either Parts I, II, or III, as applicable.

Undiluted Sum (S) of EC Fractions for all Radionuclides ¹	
River Depth (R _{CR}) Read at the Control Room – 0C653 or ENVR in PICSY ²	
Dispersion Factor to Danville (M) from Table 1	
Diluted Sum (S _d) of EC Fractions for all Radionuclides at Danville ^{3,4}	

- 1 Obtain the undiluted sum (S) of EC fractions for all radionuclides by adding the EC fractions (F_i) for all radionuclides as follows: $S = \sum F_i$. Obtain the EC fractions from either Part I, II, or III, as appropriate.
- 2 If the river depth (R_{EL}) read at the SSES Environmental Lab is available, convert to the depth (R_{CR}) read at the Control Room as follows: $R_{CR} = 12 \times R_{EL} + 126$.
- 3 Obtain the diluted sum (S_d) of EC fractions by dividing the undiluted sum (S) of EC fractions by the dispersion factor (M) as follows: $S_d = S/M$.
- 4 The diluted sum of EC fractions is at Danville after dilution of the SSES effluent by the Susquehanna River enroute.

TABLE 1
SUSQUEHANNA RIVER:
DEPTH - DISPERSION FACTOR - TRANSIT TIME TO DANVILLE

RIVER DEPTH (In)*	DISPERSION AT DANVILLE (M)	TRANSIT TIME (hours)		
		Leading Edge	Peak Conc	Trailing Edge
144	136.4	68.7	74.3	141.2
150	155.5	64.8	70.3	136.5
156	179.2	61.1	66.5	131.9
162	208.3	57.2	62.3	127.2
168	281.3	45.9	52.4	112.9
174	250.6	35.5	41.2	99.7
180	261.5	34.5	40.0	95.6
186	277.8	33.0	38.3	90.2
192	297.3	31.4	36.4	84.0
198	323.6	29.5	34.3	76.7
204	366.7	26.9	31.3	66.7
210	456.6	23.0	27.2	52.7
216	588.2	20.0	24.0	40.8
222	869.6	16.5	20.5	27.5
228	980.4	15.3	19.3	24.3
234	1072	14.7	18.7	23.7
240	1174	14.2	18.2	23.0
246	1285	13.5	17.5	22.5
258	1567	12.2	16.2	21.0
270	2058	10.7	14.7	19.5
282	2597	10.0	14.0	18.7
294	3068	9.8	13.8	18.3
306	3559	9.8	13.8	18.0
318	4082	9.8	13.8	17.7
330	4651	9.7	13.7	17.2
342	5236	9.7	13.7	16.8
354	5882	9.7	13.7	16.3
366	6536	9.5	13.5	16.0
378	7246	9.5	13.5	15.5
390	8000	9.3	13.3	15.0

* For depth readings found between depths stated above, round to closest figure. If value falls exactly between two depths reported above, round to the lesser value.

TABLE 2
DISCHARGE FROM SPRAY POND TO COOLING TOWER BLOWDOWN LINE
VS.
SPRAY POND WATER SURFACE ELEVATION

SPRAY POND WATER SURFACE ELEVATION (feet above msl)	DISCHARGE RATE TO BLOWDOWN CONDUIT (l) (gpm)
678.5	0
.6	541
.7	1,530
.8	2,849
.9	4,445
679.0	6,213
.1	8,166
.2	10,271
.3	12,525
.4	14,804
.5	14,964
.6	15,123
.7	15,279
.8	15,434
.9	15,588
680.0	15,740
.1	15,891
.2	16,040
.3	16,188
.4	16,334
.5	16,480
.6	16,624
.7	16,766
.8	16,907
.9	17,048

SPRAY POND WATER SURFACE ELEVATION (feet above msl)	DISCHARGE RATE TO BLOWDOWN CONDUIT (l) (gpm)
681.0	17,187
.1	17,325
.2	17,462
.3	17,598
.4	17,733
.5	17,867
.6	18,000
.7	18,131
.8	18,262
.9	18,392
682.0	18,521
.1	18,649
.2	18,777
.3	18,903
.4	19,029
.5	19,154
.6	19,278
.7	19,401
.8	19,523
.9	19,645
683.0	19,766
.1	19,886
.2	20,005
.3	20,124
.4	20,242
.5	20,359

SUPPLEMENTAL RADIOLOGICAL DATA COMPARISON

A. EDE RATE AT OSCAR LOCATION

<u>PROJECTED*</u>	<u>Peak Sector</u>	<u>MEASURED</u>	<u>Peak Sector</u>
<u>(mrem/hr)</u>		<u>(mR/hr)</u>	
<input type="checkbox"/> > 1000	_____	<input type="checkbox"/> > 1000	_____
<input type="checkbox"/> 101-1000		<input type="checkbox"/> 101-1000	
<input type="checkbox"/> 11-100		<input type="checkbox"/> 11-100	
<input type="checkbox"/> 0.1-10		<input type="checkbox"/> 0.1-10	
<input type="checkbox"/> < 0.1		<input type="checkbox"/> < 0.1 or Not detectable	

Time of Measurement: _____

Date: _____

B. THY CDE RATE AT OSCAR LOCATION

<u>PROJECTED*</u>	<u>Peak Sector</u>	<u>MEASURED</u>	<u>Peak Sector</u>
<u>(mrem/hr)</u>		<u>(mrem/hr)</u>	
<input type="checkbox"/> > 5000	_____	<input type="checkbox"/> > 5000	_____
<input type="checkbox"/> 501-5000		<input type="checkbox"/> 501-5000	
<input type="checkbox"/> 51-500		<input type="checkbox"/> 51-500	
<input type="checkbox"/> < 50		<input type="checkbox"/> < 50 or Not detectable	

Time of Measurement: _____

Date: _____

* Dose Rate projected at the OSCAR location at the time of measurement.

Affected Unit _____

Control No. _____

**PROTECTIVE ACTION RECOMMENDATION FORM
SUSQUEHANNA STEAM ELECTRIC STATION**

This is a Drill This is **NOT** a Drill Preparer: _____

The EMERGENCY CLASSIFICATION is:			
<input type="checkbox"/> Unusual Event	<input type="checkbox"/> Alert	<input type="checkbox"/> Site Area Emergency	<input type="checkbox"/> General Emergency

Basis: EAL # _____

This represents:

Initial Classification Escalation Reduction No Change in the Classification Status

Emergency Action(s) implemented onsite:

- | | |
|--|--|
| <input type="checkbox"/> None | <input type="checkbox"/> Evacuation of non-essential personnel |
| <input type="checkbox"/> Local Area Evacuation | <input type="checkbox"/> KI to onsite personnel |
| <input type="checkbox"/> Site Accountability | <input type="checkbox"/> Other _____ |

Bases: _____

The PROTECTIVE ACTION RECOMMENDATION is:	
<input type="checkbox"/> No Protective Action Recommendation Required	
<input type="checkbox"/> Evacuate 0-2 miles and Shelter 2-10 miles	<input type="checkbox"/> Relocation
<input type="checkbox"/> Evacuate 0-10 miles	<input type="checkbox"/> Control of Access
	<input type="checkbox"/> Contamination Controls/Decon
<input type="checkbox"/> Divert Danville Drinking Water*	<input type="checkbox"/> Other
*Expected arrival of release at Danville: _____	
This represents: <input type="checkbox"/> Initial <input type="checkbox"/> Change <input type="checkbox"/> No Change in the Protective Action Recommendation	

**COMMENTARY ON FILLING OUT THE
PROTECTIVE ACTION RECOMMENDATION FORM**

1. **Emergency Classification, Basis** – The intent is to list each EAL that led to the current Classification.
2. **Emergency Actions, Bases** – The intent is to describe the bases for the Actions implemented, especially if they are not a mandatory result of the EAL and Classification described above. For the EOF, completion of this line is optional.

Example wording for a local area evacuation may be "local hi rad and hi temp alarms in HPCI pump room." Example wording for administration of KI may be "dose projections > 10 rem to team crimping release path piping."

3. **Plant Status as Basis for PAR** – The intent is to briefly describe key elements of plant status and/or prognosis that entered into the decision making for the PAR that was adopted. Examples to consider may include: operating status (shut down, ATWS, etc.), indications of fuel (or cladding) degradation, ability to cool the core, integrity of primary and secondary containment, status of ventilation treatment (filtration, etc.) and status of remedial or mitigating actions.

An example completed statement for EAL 3.4 may be: High reactor coolant activity and inability to terminate coolant leak outside primary containment within several hours.

4. **Radioactive Release as Basis for PAR** – An event-related release is in progress if any one of the criteria listed on EP-AD-000-511 "Identification of Release in Progress" are met. (See Tab 8.) this judgement is made by the "Facility Lead" (ED or RM), using input from appropriate facility supervision. Knowledge of which criterion was used to state "a release is in progress" will be helpful in the communication process from the PAR form. That criterion may be documented on the PAR form on the blank line below "Weather Conditions."

The rationale for documentation of the basis for the decision regarding total site release rate being > TRM Limits is as follows:

- a. Valid effluent monitor or equivalent information is available and indicates the release exceeds the TRM limit, and/or
- b. Valid in-field readings equal to or greater than 0.1 mrem/hr. whole body, 68.4 mrem/hr. thyroid CDE, or 100 ncpm on an Iodine cartridge are available, or valid RMS "release" alarms have activated.
- c. If valid effluent monitoring or equivalent information is not available, the "Engineering Judgement" box should be checked if EOF/TSC/CR facility management has judged that SSES is releasing above the TRM limits, even though definitive information is not available. This box should not be checked if effluent monitoring or field measurements indicate a release is in progress above TRM limits.

**COMMENTARY ON FILLING OUT THE
PROTECTIVE ACTION RECOMMENDATION FORM**

For the field data confirmation line, the "yes" block should be checked if the correlation between field data and projected data is reasonable (ratio of measured to projected data is between 0.1 and 5.0).

Examples of information to be included on the blank line (below "Weather Conditions") may be the duration of the release, whether release rates are increasing or decreasing, and/or if there was a puff release. The vent(s) that is(are) the primary release point(s) may also be included if relevant to the discussion process. The intent is to document information used in the PAR decision making.

5. **Weather Conditions as Basis for PAR** – Weather conditions that contributed to the PAR decision making should be described. Examples of information to include may be wind direction (or affected sector), wind speed, stability class, precipitation level, and/or ice/snow conditions. If a dose projection printout is to be attached, there is no need to write on information that is on that form.
6. **Dose Projections as Basis for PAR** – The intent is to indicate whether projected doses are less than or greater than values used in the PAR decision making flowchart. Specific listing of calculated TEDE and/or child thyroid CDE values is discouraged. An example supplemental comment may be "controlling dose is child thyroid CDE from releases of radioiodines."
7. **Approval of Form Contents** – The "Facility Lead" (ED or RM) is to approve if changes in Classification or PAR have occurred since the form was last transmitted. If no change has occurred, the "dose assessment lead" (RPC or DASU) normally would approve the form, although the Facility Lead always has the authority to sign the form.

When the Form is believed to be complete, the preparer should double-check the Form's completion status. For example, the preparer should ensure that each set of "boxes" has at least one box checked.

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.