Jul. 02, 2002

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REMOVE MANUAL TABLE OF CONTENTS DATE: 05/24/2002

ADD MANUAL TABLE OF CONTENTS DATE: 07/01/2002

CATEGORY: PROCEDURES TYPE: EP ID: EP-PS-104 ADD: PCAF 2002-1439 REV: N/A

UPDATES FOR HARD COPY MANUALS WILL BE DISTRIBUTED WITHIN 5 DAYS IN ACCORDANCE WITH DEPARTMENT PROCEDURES. PLEASE MAKE ALL CHANGES AND ACKNOWLEDGE COMPLETE IN YOUR NIMS INBOX UPON RECEIPT OF HARD COPY. FOR ELECTRONIC MANUAL USERS, ELECTRONICALLY REVIEW THE APPROPRIATE DOCUMENTS AND ACKNOWLEDGE COMPLETE IN YOUR NIMS INBOX.

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## **PROCEDURE CHANGE PROCESS FORM**

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1.	PCAF NO. 2002-1439 2. PAGE 1 OF 6 3. PROC. NO. EP-PS-104 REV. 14
4.	FORMS REVISED - <u>C</u> R 7 , - R, - RR
5.	PROCEDURE TITLE Radiation Protection Coordinator: Emergency Plan Specific Instruction
6.	
	INCORPORATE PCAFS X NO YES #####
	REVISION PCAF DELETION (CHECK ONE ONLY)
7.	SUMMARY OF / REASON FOR CHANGE This PCAF replaces the term "assembly" with "accountability" to be consistent with changes made in Revision 39 of the Emergency Plan.
	Sections impacted are major tasks list; supporting information list; and TAB C
	Continued
8.	DETERMINE COMMITTEE REVIEW REQUIREMENTS (Refer to Section 6.1.4) PORC REVIEW REQ'D?
BL	OCKS 11 THRU 16 ARE ON PAGE 2 OF FORM
17.	Cynthia Smith       254-3233       7       06/14/2002       18. COMMUNICATION OF CHANGE REQUIRED?         PREPARER (Print or Type)       ETN       DATE       18. COMMUNICATION OF CHANGE REQUIRED?
19.	RESPONSIBLE SUPERVISOR DATE DATE DATE SIGNATURE ATTESTS THAT RESPONSIBLE SUPERVISOR HAS CONDUCTED QADR AND TECHNICAL REVIEW UNLESS OTHERWISE DOCUMENTED IN BLOCK 16 OR ATTACHED REVIEW FORMS. CROSS DISCIPLINE REVIEW (IF REQUIRED) HAS BEEN COMPLETED BY SIGNATURE IN BLOCK 16 OR ATTACHED REVIEW FORMS.
20	UFUM APPROVAL 6/11/02 DATE
21.	RESPONSIBLE APPROVER     ENTER N/A IF FUM HAS APPROVAL AUTHORITY       MA     INITIALS

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1. PCA											
	F NO. 2002-1439	2. PAGE 2 OF	= _6	3.	PROC.	NO.	EP-PS	-104	RE	V. <u>14</u>	
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b.	This change is a change is procedure for which 50.55	o any surveillan and 72.48 are i	ce, mainten not applical	hance ( ble. 🖠	or admir		tive		] YES		N/A
с.	This change is bounded to 50.59/72.48 Evaluation is	y a 50.59/72.48 required.	Screen/Ev	aluatio	n, there	fore,	no new	Г	] YES	$\boxtimes$	N/A
	Screen/Evaluation No.	·			<u> </u>						
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14. lsa	a Surveillance Procedure R	eview Checklist	required pe	er NDA	AP-QA-C	)722?		Γ	] YES	$\boxtimes$	NO
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16. Re	views may be documented	below or by atta	aching Docu	16 Beviews may be documented below or by attaching Document Beview Forms NDAP-OA-0101-1				P-QA-01	01-1.		
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## **RADIATION PROTECTION COORDINATOR (RPC):**

Emergency Plan-Position Specific Procedure

WHEN:	Technical Support Center (TSC) is activated
HOW NOTIFIED:	Paged, phone backup
<b>REPORT TO:</b>	TSC Emergency Director
WHERE TO REPORT:	TSC
• 1 Not 1	· · · · · ·

**OVERALL DUTY:** 

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Quantify and assess radiological conditions both on- and off-site, then recommend emergency classification and protective actions.

MAJOR TASKS:	TAB:	REVISION:
Obtain briefing on the emergency.	TAB A	2
Activate TSC Health Physics group and, if needed, request EOF activation.	TAB B	4
Make sure initial habitability is assessed.	TAB C	<del>\$</del> 7
Take inventory of information required to analyze the radiological situation.	TAB D	4
Brief Emergency Director in the TSC on what you know about radiological conditions and Health Physics staff.	TAB E	1
Assess emergency classification and confirm or recommend changes to the Emergency Director.	TAB F	4
Assess and recommend protective actions to the Emergency Director.	TAB G	8
Communicate with DEP/BRP.	TAB H	
Continue assessing radiological situation, updating Emergency Director, TSC staff, and Health Physics staff.	TAB I	6
Evaluate and approve emergency exposure extensions.	TAB J	1

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PCAF

SUPPORTING INFORMATION:	TAB:
Emergency Telephone Instructions	TAB 1
Emergency Organization	TAB 2
Response Levels for Protection Action Guides	TAB 3
SSES Contamination Response Plan	TAB 4
Emergency Facility Form Flow	TAB 5
Emergency Classification	TAB 6
Public Protective Action Recommendation Guide	TAB 7
PPL Emergency Personnel Dose Assessment and Protective Action Recommendation (PAR) Guide	TAB 8
TSC Rad Staff Responsibilities	TAB 9
Personnel-Assembly and Accountability	<b>TAB 10</b>
Emergency Exposure Extensions	TAB 11
<ul> <li>Emergency Forms</li> <li>Protective Action Recommendation Form</li> <li>Emergency Exposure Extension Request</li> </ul>	TAB 12
intentionally Blank	TAB 13
Liquid Discharge Data Sheets	<b>TAB 14</b>
PPL Radiological Representation/Participation in	<b>TAB 15</b>

#### **REFERENCES:**

SSES Emergency Plan

NUREG-0654, Planning Standards and Evaluation Criteria

NUREG-0731, Guidelines for Utility Management Structure and Technical Resources, September 1980

SP-00-308, Emergency Medical Response

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## MAJOR TASK:

4

Make sure initial habitability is assessed.

SP	ECIFIC TASKS:	HON	l:	
1.	Check-that initial habitability is assessed in the TSC, Control	1a.	Upon based	TSC activation, assess habitability I on:
	Team Staging Area and Accountability Areas.		(1)	CREOASS rad and chlorine monitors.
	• <u></u>	NOT C re	E: hem La ecircula rotectio	b ventilation has no filters or tion system for airborne/chlorine m.
			(2) (3) (4)	TSC rad Conditions. In-plant ARM/CAMS. SPING and wind direction.
2.	See that initial habitability is assessed at other inhabited	2a.	Consi areas	der habitability at other inhabited such as:
	conditions.	•	(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11)	North Gate house. South Gate house. West Building. Energy Information Center. Nuclear Learning Center. Ecology III. White House. Sewage Treatment Plant. Access Processing Facility. Peach Stand. Vehicle Maintenance Shed.

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(11) Vehicle Maintenance S(12) Security Firing Range.

2b. Provide guidance as needed.

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SPECIFIC TASKS:	НОМ	
	2c.	Consider both radiological and non-radiological, (for example, chlorine), conditions.
-	2d.	Consider mobilizing (remote) ARM's or CAM's to onsite habitability areas.
		HELP
	P	ersonnel Assembly and Accountability See TAB 10

3. When required, check habitability of the Offsite Chemistry Lab located in the West Building.

°C N

3a. Assess habitability of the offsite lab when notified by chemistry that samples from the site are to be taken there for analysis.

PAGE

## SSES CONTAMINATION RESPONSE PLAN

## TABLE OF CONTENTS

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3.0	CONT		3
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5.0	RELE	ASE CRITERIA IN RESTRICTED AREA	6
	5.1 5.2	Structures and Equipment Personal Property	6 7

#### SSES CONTAMINATION RESPONSE PLAN

#### 1.0 OVERVIEW

This plan describes actions to be taken in response to emergency conditions which result in deposition of radioactive contamination as a result of a release from the Susquehanna Steam Electric Station. Deposition may be within the restricted area, within the site boundary, offsite or a combination of these.

This plan considers only actions to be taken which are PPL's responsibility and does not describe emergency response agency actions outside the PPL site boundary or public protective action implementation.

This plan is applicable when an emergency condition has been declared at SSES, an accidental release of radioactive material has occurred and the release has been terminated.

Ground contamination occurs as a result of the deposition of radioactive particulate material released into the atmosphere. It may be in the form of particulates at the time of release or it may result from the decay of gaseous radionuclides. Since these materials, and the resultant dose rates, may persist for an extended period of time following termination of a release, qualitative and quantitative analysis is necessary to assess long-term exposures. In addition, variability of levels within the affected area is expected to be high, due to meteorological and terrain conditions, and ultimately may require days or weeks of sampling to ensure adequate characterization.

#### 2.0 DEFINITIONS

- 2.1 LEGAL SITE BOUNDARY "That line beyond which the land is not leased, owned, or otherwise controlled by the licensee."
- 2.2 RESTRICTED AREA The area encompassed by the inner security fence.
- 2.3 EMERGENCY PLAN BOUNDARY Same as the Exclusion Area, i.e. that area around Susquehanna SES within a radius of 1800 feet determined in accordance with 10CFR100.16.

The EPB is used to calculate offsite dose rates, project dose to the public, and to determine necessary Protective Action Recommendations for the public.

2.4 EMERGENCY PLANNING ZONE - An area approximately ten miles in radius around SSES for which emergency planning consideration of the plume exposure pathway has been given in order to ensure prompt and

effective actions can be taken to protect the public in the event of an accident at SSES.

2.5 INGESTION PATHWAY ZONE - An area approximately fifty miles in radius around SSES for which emergency planning consideration for the ingestion exposure pathway has been given.

#### 3.0 CONTAMINATION ASSESSMENT

- 3.1 Upon termination of a release, the following actions should be done:
  - 3.1.1 Perform smear samples and direct frisk of ground, building and temporary structure surfaces inside the restricted area which are believed to be in the plume pathway in order to determine the extent of the affected area.

Results which exceed 1000 dpm/100 cm<sup>2</sup> removable (smear survey) contamination or exceed 100 cpm above background on a frisker shall be designated contaminated.

Affected areas and/or equipment shall be roped/taped off as appropriate and posted as contaminated.

- 3.1.2 Perform isotopic analysis of a representative sample of onsite smears if not previously performed. Use of portable gamma spectroscopy equipment may be considered to assist in characterization of the depositions.
- 3.1.3 Perform smear samples and direct frisk survey of ground surfaces and all vehicles, equipment, and facilities outside the restricted area and within the site boundary believed to be in the plume pathway to determine the extent of affected areas.
  - **NOTE:** Results which exceed 1000 dpm/100 cm<sup>2</sup> removable contamination or exceed 100 cpm above background on a frisker shall be designated contaminated.

Use of the portable gamma spectroscopy system may be considered to assist in the characterization of the deposition.

3.1.4 Initiate surveys of building ventilation intakes to determine if airborne radioactive material was drawn into air supply systems. Surveys of noncontrolled zone areas such as the S&A Building, South Building, trailers, etc. should be performed prior to allowing personnel to reenter these areas. Air conditioners running at the time of the release should also be surveyed.

- a. Initiate surveys of building areas in unrestricted areas (such as APF, SLC, etc.) believed to be in the plume pathway prior to allowing personnel to re-enter these areas.
- b. Perform surveys of the service air and instrument air intakes and components to determine if these systems are contaminated. Air samples from the service air system should also be considered. Use of supplied air respiratory protection should be prevented until the evaluation is complete.
- 3.1.5 Direct Chemistry personnel to:
  - a. Sample standing water in the storm drainage system, roofs, equipment, pools, etc.
  - b. Sample the site drinking water supply. Prevent the use of drinking water until water evaluation is complete.
  - c. Initiate sampling of the Sewage Treatment Facility. If influent conditions permit, discharge should be prevented until analysis is complete. Liquid release dose calculations may be required if the discharge cannot be diverted.
- 3.1.6 Perform contamination surveys of areas outside the site boundary as directed by the Emergency Director or Recovery Manager. The State has primary responsibility for survey of these areas; however, it is expected that PPL assistance will be requested to assist in delineation of affected areas. Survey locations outside the site boundary should be as accurately described as possible by the monitoring teams. Isotopic analysis of a representative sample of smears should be performed as soon as practical.
- 3.1.7 Perform environmental sampling in accordance with EP-PS-248, Field Team Director.
- 3.1.8 Consider covering contaminated surfaces (building roofs, grounds and/or equipment) with reinforced plastic covering to minimize the spread of contamination until decontamination can take place.
- 3.1.9 Plug applicable building roof drains to prevent runoff of contaminated water.
- 3.1.10 Consider use of bladders to isolate storm drains and/or drainage channels in the event of precipitation. The Spill Response Team and PPC plan maybe used to assist in these actions.

- 3.1.11 Request that engineering personnel identify any other normally clean plant systems which may have become contaminated during the release and survey, as necessary.
- 3.1.12 Coordinate with the Field Team Director to have Ecology-III personnel perform soil sampling of affected areas within the site boundary in accordance with the EREMP procedure for soil sampling.

#### 4.0 DECONTAMINATION

- 4.1 Building(s), Structure(s), Removable Equipment Decontamination
  - 4.1.1 Should be performed as soon as practical following termination of the release.
    - **NOTE:** Methods used for decontamination should generate limited quantities of waste water. Run off into the plant drainage system should be avoided if possible. Water generated should be collected, sampled, analyzed and treated as necessary.
  - 4.1.2 Decontamination methods include, but are not limited to:
    - a. Wipe down with approved decontamination chemicals
    - b. Strippable paint
    - c. Washing (water must be collected, sampled and treated, if contaminated, prior to disposal)
    - d. Transport of movable equipment into radiologically controlled areas for decon
    - e. Fix contamination using paint, plastic sealants, concrete, etc.
    - f. Control areas until activity decays to acceptable levels, if release into environment is unlikely
- 4.2 Water Decontamination
  - 4.2.1 Treatment of contaminated water from the following sources may be required:
    - a. Roof drains previously plugged or routed to temporary tanks

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- b. Water collected in the storm drainage system
- c. Decontamination of buildings, equipment and vehicles
- d. Collected water on site such as in the CST berm or Spray Pond
- e. Hydrolasing and/or flushing of roof drains, drainage systems, etc.
- 4.2.2 Contractor assistance and a portable demineralizer may be required.

#### 5.0 RELEASE CRITERIA IN RESTRICTED AREA

- 5.1 Structures and Equipment
  - 5.1.1 Release criteria for structures and equipment inside the Restricted Area are:
    - a. Surfaces should be decontaminated to levels below the following:
      - (1) Removable contamination: <1000 dpm/100 cm<sup>2</sup>
      - (2) Fixed contamination: <100 cpm above background on a frisker or equivalent instrumentation
    - b. If decontamination below these levels is not possible, alternatives include:
      - (1) Disposal of the material as waste
      - (2) Fix contamination using paint, plastic sealants, etc. resulting dose rate shall be less than 10 mrem per year (see NOTE on next page).
    - c. Ground contamination of soils, rocks, paved surfaces, etc. inside the restricted area should be removed if the area is small. For larger areas, levels which would not result in dose to an individual in excess of 10 mrem/year are acceptable.
      - **NOTE:** This guidance is in accordance with NUREG/CR-289, PNL-5429, "Residual Radionuclide Contamination Within and Around Commercial Nuclear Power Plants," February 1986.

This level is considered sufficiently low so as not to endanger the health and safety of either SSES site workers or members of the general public. Records of these areas and final levels of radioactivity must be maintained for the life of the Plant and should be included in the decommissioning plan.

#### 5.2 Personal Property

- 5.2.1 Contamination levels on personal property being removed from the restricted area, including vehicles, must be reduced to less than the following:
  - a. Removable  $<1000 \text{ dpm}/100 \text{ cm}^2$
  - b. Fixed <100 cpm above background on a frisker (or equivalent instrumentation)

## **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 <u>ALERT</u>

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**.

## POLICY STATEMENT ON EMERGENCY DECLARATIONS

#### Policy

When an emergency action level (EAL) is exceeded but the plant quickly returns below the EAL, the emergency should be declared. If appropriate, the emergency can also be downgraded or terminated at essentially the same time and the Emergency Notification Form can say the emergency was declared and terminated (or downgraded) minutes later.

#### Example

The main steam lines isolate on high radiation due to a large oil intrusion into the vessel. The isolation on high radiation is a trigger to declare an Alert. If it can quickly be determined that the cause was not damage to the fuel and we should not be in an Alert, then the Alert should be declared and terminated with the same notification report.

#### <u>Basis</u>

Declaring the emergency will notify interested offsite personnel and will demonstrate that we recognize that we exceeded an EAL. Immediately terminating or downgrading will avoid activation of company and offsite facilities that are not required for this event.

## **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

#### CATEGORY **EVENT** PAGE 1 2 3 FUEL CLADDING DEGRADATION 8 4 5 6 7 8 LOSS OF CONTROL ROOM ALARMS AND ANNUNCIATORS 15 9 LOSS OF DC POWER ...... 16 10 LOSS OF DECAY HEAT REMOVAL CAPABILITY 17 11 LOSS OF REACTIVITY CONTROL 18 12 13 14 15 16 17 18 19 20 21

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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.

#### <u>ALERT</u>

**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.

#### <u>ALERT</u>

**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.

<u>and</u>

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).

<u>or</u>

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

#### <u>ALERT</u>

**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).
- <u>or</u>
- B. Valid Reactor coolant activity greater than 300 μCi/cc of equivalent I-131, as determined by sample analysis.

<u>or</u>

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

<u>or</u>

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)

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## **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  $\mu$ Ci/cc of equivalent I-131 as determined by sample analysis.

<u>or</u>

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).

<u>or</u>

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).

<u>or</u>

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

<u>or</u>

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

and

 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.

#### <u>OR</u>

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 PP&L, 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.

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#### 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

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

## 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 <u>or</u> 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.

<u>or</u>

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

#### <u>ALERT</u>

EAL# 7.2 Loss of all offsite power <u>and</u> 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 <u>all</u> 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.

#### <u>ALERT</u>

**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).

<u>or</u>

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

<u>or</u>

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

<u>or</u>

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

#### **GENERAL EMERGENCY**

EAL# 8.4 None.

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## 9 - LOSS OF DC POWER

#### UNUSUAL EVENT

EAL# 9.1 None.

#### <u>ALERT</u>

#### 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), <u>and</u> 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.

<u>and</u>

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.

<u>and</u>

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).

#### <u>ALERT</u>

**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).

#### <u>or</u>

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).

#### <u>and</u>

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).

<u>or</u>

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

<u>and</u>

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).

#### <u>or</u>

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 <u>and</u> low, low, low reactor water level (-129) annunciation or indication on Panel 1C651 (2C651).

<u>or</u>

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

#### <u>ALERT</u>

**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) <u>and</u> 2 or more drywell floor drain pumps continuously running as indicated on Panel 1C601 (2C601).

<u>or</u>

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).

<u>OR</u>

**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).

<u>or</u>

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).

<u>or</u>

- 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.

<u>and</u>

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.

<u>or</u>

B. Hurricane impact on site.

or

C. Earthquake detected by seismic instrumentation systems on Panel 0C696.

#### <u>ALERT</u>

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.\*

<u>or</u>

- 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.\*
  - <u>or</u>
  - 2. Earthquake with greater than Safe Shutdown Earthquake (SSE) levels as indicated on Panel 0C696.

<u>or</u>

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.

<u>OR</u>

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.

#### <u>ALERT</u>

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.

<u>or</u>

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.a** Radiological gaseous effluents exceed 2 times the Technical Requirement Limits for 60 minutes or longer as indicated by:

(A or B)

- A. Valid Building Vent Stack Monitoring System (SPING) indications on Panel 0C630 or 0C677.
  - 1. Noble gases >1.70E+6 μCi/min., or
  - 2. I-131 >2.08E+2 μCi/min., or
  - 3. Particulate >1.54E+3 µCi/min., or

<u>or</u>

- B. Confirmed sample analyses for gaseous releases indicating total site release rates exceed:
  - 1. Noble gases >1000 mrem/year whole body, or
  - 2. Noble gases >6000 mrem/year skin, or
  - 3. I-131, I-133, H-3, and particulates with half-lives >8 days >3000 mrem/year to any organ (inhalation pathways only).

## <u>OR</u>

**EAL# 15.1.b** Radiological liquid effluents exceed Technical Requirement Limits for instantaneous release as indicated by:

Report of radiological liquid effluent exceeding Technical Requirement Limits. This includes effluent sources such as Service Water or RHR Service Water Loops A or B.

#### (CONTINUED ON NEXT PAGE)

## 15 - RADIOLOGICAL EFFLUENT (continued)

#### <u>ALERT</u>

**EAL# 15.2.a** Radiological gaseous effluents exceed 200 times the Technical Requirement Limits for 15 minutes or longer as indicated by:

(A or B)

- A. Valid Building Vent Stack Monitoring System (SPING) indications on Panel 0C630 or 0C677.
  - 1. Noble gases >1.70E+8 μCi/min., or
  - 2. I-131 >2.08E+4 μCi/min., <u>or</u>
  - 3. Particulate >1.54E+5  $\mu$ Ci/min.

<u>or</u>

- B. Confirmed sample analyses for gaseous releases indicating total site release rates exceed:
  - 1. Noble gases >1.0E+5 mrem/year whole body, or
  - 2. Noble gases >6.0E+5 mrem/year skin, or
  - 3. I-131, I-133, H-3, and particulates with half-lives >8 days >3.0E+5 mrem/year to any organ (inhalation pathways only).

## <u>OR</u>

**EAL# 15.2.b** Radiological liquid effluents exceed 10 times Technical Requirement Limits for instantaneous release as indicated by:

Report of radiological liquid effluent release exceeding 10 times Technical Requirement Limits. This includes effluent sources such as Service Water or RHR Service Water Loops A or B.

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## 15 - RADIOLOGICAL EFFLUENT (continued)

#### SITE AREA EMERGENCY

**EAL# 15.3** Radiological effluent corresponds to greater than 50 mrem W.B.<sup>(1)</sup> or 250 mrem thyroid<sup>(2)</sup> for a half-hour or 500 mrem W.B.<sup>(1)</sup> or 2500 mrem thyroid<sup>(2)</sup> for 2 minutes at the emergency plan boundary as indicated by:

<u>OR</u>

Emergency plan boundary dose is projected to exceed 500 mrem W.B. <sup>(1)</sup> within 1 hour as indicated by:

(A or B)

A. Dose projections based on:

(1 or 2)

1. Building vent stack monitoring system indications on Panel 0C630 or 0C677.

<u>or</u>

2. Field monitoring data onsite or offsite.

<u>or</u>

B. Dose projections based on:

(1 or 2)

1. Building vent stack monitoring system indications on Panel 0C630 or 0C677.

<u>or</u>

2. Field monitoring data onsite or offsite

#### (CONTINUED ON NEXT PAGE)

- <sup>(1)</sup> The sum of the Effective Dose Equivalent resulting from the exposure to external sources and the Committed Effective Dose Equivalent incurred from all significant inhalation pathways during the early phase.
- <sup>(2)</sup> Committed Dose Equivalent to the thyroid from radioiodine.

## **15 - RADIOLOGICAL EFFLUENT (continued)**

#### **GENERAL EMERGENCY**

EAL# 15.4 Radiological effluent release corresponds to 1 rem whole body<sup>(1)</sup> or 5 rem<sup>(2)</sup> thyroid at the emergency plan boundary as indicated by:

OR

Offsite doses are projected to exceed 1 rem whole body<sup>(1)</sup> or 5 rem thyroid<sup>(2)</sup> due to the event as indicated by:

(A or B)

A. Dose projections based on:

(1 or 2 or 3)

1. Building Vent Stack Monitoring System indication on Panel 0C630 or 0C677.

or

2. Field monitoring data onsite or offsite.

or

3. In-plant conditions.

or

B. Dose projections based on:

(1 or 2 or 3)

1. Building Vent Stack Monitoring System indication on Panel 0C630 or 0C677.

or

2. Field monitoring data onsite or offsite.

or

- 3. In-plant conditions.
- (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) Committed Dose Equivalent to the thyroid from radioiodine.

## **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.
- <u>or</u>

I

- B. Any attempted act of sabotage which is deemed legitimate in the judgment of the SHIFT SUPERVISOR/EMERGENCY DIRECTOR, and affects plant operation.
- <u>or</u>
- C. A site specific credible security threat notification.

#### <u>ALERT</u>

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.

<u>or</u>

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.

<u>or</u>

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.

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## **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.
- <u>or</u> .
- 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

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

#### <u>ALERT</u>

**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 <u>OR</u> 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).

<u>or</u>

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

## 

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.

<u>or</u>

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).

<u>or</u>

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).

<u>and</u>

B. (1 or 2)

1. Valid Main Steam Line flow indication on Panel 1C652 (2C652).

<u>or</u>

2. Valid Main Steam Line radiation indication on Panel 1C600 (2C600).

#### (CONTINUED ON NEXT PAGE)

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## **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).

#### <u>and</u>

- 2. (a or b)
  - a. High MSL flow annunciation on Panel 1C601 (2C601) or indication on Panel 1C652 (2C652).

<u>or</u>

b. Other indication of main steam leakage outside containment.

<u>or</u>

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).

<u>or</u>

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

<u>or</u>

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

<u>or</u>

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

<u>or</u>

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

<u>or</u>

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

#### (CONTINUED ON NEXT PAGE)

#### **18 - STEAM LINE BREAK (continued)**

#### SITE AREA EMERGENCY (continued)

#### <u>or</u>

- <u>C.</u> (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).

<u>and</u>

- 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).

<u>or</u>

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

or

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

<u>or</u>

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

or

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

<u>or</u>

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 <u>ACTION</u> 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.

<u>or</u>

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

<u>or</u>

C. Exceeding REACTOR VESSEL WATER LEVEL safety limit 2.1.1.3.

<u>or</u>

D. Exceeding REACTOR COOLANT SYSTEM PRESSURE safety limit 2.1.2.

#### <u>ALERT</u>

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.

<u>or</u>

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

<u>OR</u>

**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.

<u>or</u>

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

#### <u>ALERT</u>

EAL# 21.2 None.

#### SITE AREA EMERGENCY

EAL# 21.3 None.

#### GENERAL EMERGENCY

EAL# 21.4 None.

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## PP&L EMERGENCY PERSONNEL DOSE ASSESSMENT AND PROTECTIVE ACTION RECOMMENDATION (PAR) GUIDE

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**EMERGENCY EXPOSURE EXTENSION REQUEST FORM** and **POTASSIUM IODIDE TRACKING FORM** can be found immediately following EP-AD-000-125.

## PP&L EMERGENCY PERSONNEL DOSE ASSESSMENT AND PROTECTIVE ACTION RECOMMENDATION (PAR) GUIDE (continued)

#### 

- 1.0 Limits for EMERGENCY doses.
- 1.1 An EMERGENCY DOSE AUTHORIZATION (see EMERGENCY EXPOSURE EXTENSIONS) may be granted in order to protect facilities, and or equipment to substantially limit the escape of radioactive effluents or control fires. The maximum planned doses are:
  - 1.1.1 Whole body (TEDE)<sup>(1)</sup> dose shall not exceed 10 Rem.
  - 1.1.2 Dose to any organ (CDE)<sup>(2)</sup>, including the skin and extremity (SDE)<sup>(3)</sup>, shall not exceed 100 Rem.
  - 1.1.3 Dose to the lens of the eye shall not exceed 30 Rem (LDE)<sup>(4)</sup>.
- 1.2 An EMERGENCY dose authorization may be granted for life-saving actions or protection of large populations. The maximum doses are:
  - 1.2.1 Planned whole body (TEDE)<sup>(1)</sup> doses shall not exceed 25 Rem.
  - 1.2.2 Planned dose to any organ (CDE)<sup>(2)</sup>, including skin and extremity doses, shall not exceed 250 Rem.
  - 1.2.3 Dose to the lens of the eye shall not exceed 75 Rem (LDE)<sup>(4)</sup>.
  - 1.3 **RARE** situations may occur in which a dose **GREATER THAN** those specified in SECTION 1.2 above for emergency dose would be unavoidable to carry out a lifesaving operation or to avoid extensive exposure of large populations. It is not possible to prejudge the risk that one should be allowed to take to save lives of others, therefore no upper limit has been established.
- (1) The sum of the Effective Dose Equivalent resulting from the exposure to external sources and the committed effective Dose Equivalent incurred from all significant inhalation pathways during the early phase.
- (2) The Committed Dose Equivalent to the thyroid from radioiodine.
- (3) Shallow Dose Equivalent.
- (4) Lens Dose Equivalent.

## PP&L EMERGENCY PERSONNEL DOSE ASSESSMENT AND PROTECTIVE ACTION RECOMMENDATION (PAR) GUIDE (continued)

#### 

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 lodide
  - 3.1.1 For emergency workers entering areas where a committed dose equivalent, (CDE)<sup>(2)</sup>, to the thyroid from radioiodine could be 25 Rem or greater, the **Consulting Radiological Physician** should provide input concerning the administration and cessation of KI intake. (See Emergency Telephone Directory for telephone number.)
  - 3.1.2 For thyroid exposures that are strongly expected to exceed 25 Rem, (CDE)<sup>(2)</sup>, KI doses of 130 mg (100 mg - iodine) per day should be administered.

Unless the **EMERGENCY DIRECTOR** or **RECOVERY MANAGER** instructs personnel to do otherwise, the KI tablets should generally be taken <u>as soon as possible</u> after thyroid exposure exceeding 25 Rem (CDE)<sup>(2)</sup> is projected.

- NOTE: Stable lodine (KI) is most effective when administered immediately prior to exposure to radioiodine. Significant blockage of the thyroid dose can be provided by administration within one or two hours after uptake of 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.
- (2) The Committed Dose Equivalent to the thyroid from radioiodine.
- (3) Shallow Dose Equivalent.
- (4) Lens Dose Equivalent.

## PP&L EMERGENCY PERSONNEL DOSE ASSESSMENT AND PROTECTIVE ACTION RECOMMENDATION (PAR) GUIDE (continued)

#### 

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

## **EMERGENCY EXPOSURE EXTENSIONS**

#### 

- 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 (continued)

## 

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

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

a Risks will be lower for protracted exposure periods.

- <sup>b</sup> Supportive medical treatment may increase the dose at which these frequencies occur by approximately 50 percent.
- <sup>c</sup> 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

		Average Years of Life Lost if
Age at Exposure	Approximate Risk of Premature Death	Premature Death Occurs
(years)	(deaths per 1,000 persons exposed)	(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	ТО		
mrem	mrem		
(TEDE)	(TEDE)		
4000	<25000	ED and RPC/RM and DASU	ALARA REVIEW AND
			APPLY EMERGENCY
			EXPOSURE
			CONSIDERATIONS
			ALL OF ABOVE AND
>25000		ED and RPC/RM and DASU	BRIEFING ON RISKS

## EMERGENCY EXPOSURE EXTENSIONS (continued)

#### 

- 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 immediately. 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

#### 

- 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 PP&L 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 (continued)

#### 

- □ 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 (continued)

#### 

- 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.

## **PERSONNEL ACCOUNTABILITY** (As defined in SP-00-309, Personnel Accountability)

## ACCOUNTABILITY READER LOCATIONS

SITE BUILDING	READER LOCATION	
Service & Administration Building – North	S&A Cafeteria	
	S&A Large Conference Room 2 <sup>nd</sup> Floor	
	Effluents Management Meeting Area	
-	Facilities Management Meeting Area	
Warehouse Facility	Large Conference Room 2 <sup>nd</sup> Floor	
South Building – Two Story	First Floor	
	Main Hallway – East Doorway	
	Main Hallway – West Doorway	
	Main Hallway – Center	
	Second Floor	
	Main Hallway – North Exit	
	Main Hallway – South Exit	
	Main Hallway – West Exit	
South Building – Three Story	First Floor	
	North End Near Elevator	
	South End Near Doorway to Maintenance	
	Center Hallway	
	Second Floor	
-	North End Near Elevator	
	South End Near West Stairway	
	Third Floor	
· ·	North End Near Elevator	
	South End Near West Stairway	

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## PERSONNEL ACCOUNTABILITY AREAS AND LEADER ASSIGNMENTS

Accountability Area Designator	Accountability Area	Work Groups	Accountability Area Leader
ACCOUNTABILITY AREA A	S&A Building Cafeteria ETN 254-1624	All Personnel located in S&A Building All floors except those noted in Assembly Area B	<b>PRIMARY:</b> Industrial Safety Supervisor
ACCOUNTABILITY AREA B	Effluents Management Meeting Area ETN 254-1644	Effluents Management Facilities Management Chemistry Admin ISI-ISD	PRIMARY: Effluents Mgmt. Supervisor
ACCOUNTABILITY AREA C	Warehouse Large Conference Room ETN 254-3186	Procurement	PRIMARY: MgrNuc Procurement
ACCOUNTABILITY AREA D	Electrical Maintenance I&C Shop 1 <sup>st</sup> Floor Two Story South Building ETN 254-3713	All Personnel located in the Two Story South Building	PRIMARY: Production Supervisor I&C
ACCOUNTABILITY AREA E	Cafeteria Conference Room 1 <sup>st</sup> Floor Three Story South Building ETN 254-1685	All Personnel located on the 1 <sup>st</sup> Floor of the Three Story South Building	<b>PRIMARY:</b> Production Supervisor Maintenance
ACCOUNTABILITY AREA F	Conference Room 211 2 <sup>nd</sup> Floor of the Three Story South Building ETN 254-1211	All Personnel located on the 2 <sup>nd</sup> and 3 <sup>rd</sup> Floor of the Three Story South Building	<b>PRIMARY:</b> Radiation Protection Manager
ACCOUNTABILITY AREA G	Technical Support Center Control Structure Elevation 741 ETN 254-3045	All Personnel Responding to Fill Emergency Plan Positions in the TSC	PRIMARY: TSC Administrative Coordinator

## **ACCOUNTABILITY ROSTER**

ACCOUNTABILITY AREA: \_\_\_\_\_

DATE: \_\_\_/\_\_/\_\_\_

ACCOUNTABILITY AREA LEADER: \_\_\_\_\_

Name (Last, First)	Badge #	Name (Last, First)	Badge #
		······	
~			

#### **INSTRUCTIONS:**

- 1. The **Accountability Area Leader** will direct all personnel in the assembly area to complete this roster in the event the Accountability Card Reader system is inoperable.
- 2. **On-site Personnel** will print their name and SSES badge number in the areas provided on this form.
- 3. After completion, notify **Security** and follow their direction to forward the rosters.