

10CFR50, Appendix E

July 2, 2003

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001**Subject: Peach Bottom Atomic Power Station, Units 2 & 3
Facility Operating License Nos. DPR-44 and DPR-56
NRC Docket Nos. 50-277 and 50-278****EP-AA-1007, Revision 7, "Exelon Nuclear Radiological
Emergency Plan Annex"**

Enclosed is the revised Radiological Emergency Plan Annex for Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3. This procedure is required to be submitted within thirty (30) days of its revision in accordance with 10CFR50, Appendix E, and 10CFR50.4.

Also, enclosed is a copy of a computer generated report index identifying the latest revisions of the PBAPS procedures.

If you have any questions or require additional information, please do not hesitate to contact us.

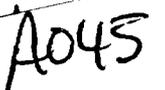
Very truly yours,



M. P. Gallagher
Director - Licensing & Regulatory Affairs
Mid-Atlantic Regional Operating Group

Enclosures

cc: H. J. Miller, Administrator, Region I, USNRC (w/ Enclosures)
A. C. McMurtry, USNRC Senior Resident Inspector, PBAPS (w/o Enclosures)
J. P. Boska, USNRC, Senior Project Manager (w/ Enclosures)



ENCLOSURE 1

PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 & 3

**Docket Nos. 50-277
50-278**

**License Nos. DPR-44
DPR-56**

EMERGENCY PROCEDURES

**EP-AA-1007, "Exelon Nuclear Radiological
Emergency Plan Annex"
Revision 7**



EP-AA-1007
Revision 7
May 2003

EXELON NUCLEAR

RADIOLOGICAL EMERGENCY PLAN ANNEX
FOR
PEACH BOTTOM ATOMIC POWER STATION

Submitted: *D. Taillent* Date: 5/16/03
MAROG Emergency Preparedness Manager

Authorized: *D. Taillent* Date: 5/16/03
Corporate Functional Area Manager

Authorized: *Claymore* *Sr. J.A. Benjamin* Date: 6/2/03
Vice President, Licensing and Regulatory Affairs

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REVISION HISTORY

<u>REVISION</u>	<u>REVISION DATE</u>	<u>EFFECTIVE DATE</u>
0	August 2002	August 30, 2002
1	September 2002	September 2002
2	November 2002	November 2002
3	January 2003	January 2003
4	February 2003	February 20, 2003
5	February 2003	March 2003
6	April 2003	May 9, 2003
7	May 2003	June 30, 2003

Section 1: Introduction

As required in the conditions set forth by the Nuclear Regulatory Commission (NRC) for the operating licenses for the Exelon Nuclear Stations, the management of Exelon recognizes its responsibility and authority to operate and maintain the nuclear power stations in such a manner as to provide for the safety of the general public.

The Exelon Emergency Preparedness Program consists of the Exelon Nuclear Standardized Radiological Emergency Plan, Station Annexes, emergency plan implementing procedures, and associated program administrative documents. The Exelon Nuclear Standardized Radiological Emergency Plan outlines the basis for response actions that would be implemented in an emergency. Planning efforts common to all Exelon Nuclear stations are encompassed within the Emergency Plan.

This document serves as the Peach Bottom Atomic Power Station Annex and contains information and guidance that is unique to the station. This includes Emergency Action Levels (EALs), and facility geography and location for a full understanding and representation of the station's emergency response capabilities. The Station Annex is subject to the same review and audit requirements as the Exelon Nuclear Standardized Radiological Emergency Plan per EP-AA-120, "Emergency Plan Administration".

1.1 Facility Description

The Peach Bottom Atomic Power Station (PBAPS) is a fixed nuclear facility operated by Exelon Nuclear. The station consists of one High Temperature Gas Cooled Reactor designated as Unit 1, which is in the SAFSTOR status of decommissioning, two operating Boiling Water Reactors designated as Units 2 and 3, and an Independent Spent Fuel Storage Installation (ISFSI).

The PBAPS station is located partly in York County and partly in Lancaster County in southeastern Pennsylvania, on the west shore of Conowingo Pond, near the mouth of Rock Run Creek. The plant is about 38 miles NNE of Baltimore, MD; 65 miles WSW of Philadelphia, PA; 45 miles SE of Harrisburg, PA; and 20 miles SSE of Lancaster, PA. Conowingo Pond is a reservoir formed by the backwater of Conowingo Dam on the Susquehanna River; the dam is located about 9 miles downstream from PBAPS. The nearest communities are Delta, PA, and Cardiff, MD, located approximately 4 and 6 miles WSW of the site, respectively.

For more specific site location information, refer to the Updated Final Safety Analysis Report (UFSAR) for Peach Bottom Atomic Power Station.

1.2 Emergency Planning Zones

The Plume Exposure Emergency Planning Zone (EPZ) for Peach Bottom Atomic Power Station shall be an area surrounding the Station with a radius of about ten miles. The exact physical boundaries are determined by the Commonwealth of Pennsylvania, State of Maryland, and affected Counties). Refer to Figure PBAPS 1-1.

The Ingestion Pathway Emergency Planning Zone (EPZ) for Peach Bottom Atomic Power Station shall be an area surrounding the Station with a radius of about 50 miles. Refer to Figure PBAPS 1-2.

1.3 Participating Governmental Agencies

The overall responsibility for the management of the effects of accidental off-site releases of radioactivity resulting from either a nuclear power plant or a transportation accident rests with state and local governments.

The Commonwealth of Pennsylvania organizations having prime responsibility in matters of radiation hazards are the Pennsylvania Emergency Management Agency (PEMA) and the Bureau of Radiation Protection (BRP) of the Pennsylvania Department of Environmental Protection. State of Maryland organizations having primary responsibility in matters of radiation hazards are the Maryland Emergency Management Agency (MEMA) and the Technical Support Program of the Maryland Department of the Environment (MDE).

County and local governments are responsible for the protection of public health and safety within their jurisdiction. Similarly, organizations in the Commonwealth of Pennsylvania and States of Maryland, Delaware, and New Jersey are responsible for the protection of the public in their states. Cooperation with the States of Delaware and New Jersey is necessary because these states are within the Ingestion Pathway EPZ.

These civil agencies will respond to provide support in the event of an emergency in the areas indicated below.

1.3.1 Pennsylvania Emergency Management Agency (PEMA)

Responsibilities of PEMA are outlined in Annex E, "Radiological Emergency Response to Nuclear Power Plant Incidents" of the Commonwealth of Pennsylvania Emergency Operations Plan.

1.3.2 Department of Environmental Protection, Bureau of Radiation Protection (DEP/BRP)

Responsibilities of DEP/BRP are outlined in Annex E of the Commonwealth of Pennsylvania Emergency Operations Plan.

1.3.3 Pennsylvania State Police

Responsibilities of the State Police are set forth in Annex E of the Commonwealth of Pennsylvania Emergency Operations Plan.

1.3.4 Maryland Emergency Management Agency (MEMA)

MEMA responsibilities are outlined in Annex Q, "Fixed Nuclear Facility Radiological Emergency Plan".

1.3.5 Maryland Department of the Environment, Emergency Operations and Technical Support Program

Responsibilities of MDE Emergency Operations and Technical Support Program are outlined in Annex Q, "Fixed Nuclear Facility Radiological Emergency Plan".

1.3.6 Maryland State Police

Responsibilities of the State Police are set forth in Annex Q, "Fixed Nuclear Facility Radiological Emergency Plan".

1.3.7 State Of Delaware

The State of Delaware's border is located within the 50-mile Ingestion Pathway for PBAPS. The State would be notified if protective actions are required within that area. No direct support is provided to PBAPS.

1.3.8 State Of New Jersey

The State of New Jersey's border is located within the 50-mile Ingestion Pathway for PBAPS. The State would be notified if protective actions are required within that area. No direct support is provided to PBAPS.

1.3.9 County Governments

County government agencies have agreements regarding responsibilities for coping with emergencies. These agencies include three counties in Pennsylvania, York, Lancaster, and Chester; and two counties in Maryland, Cecil and Harford.

a. Pennsylvania Counties

Annex E of the Commonwealth of Pennsylvania Emergency Operations Plan defines "risk counties" as those within a 10-mile radius of a fixed nuclear facility. For Peach Bottom, the risk counties are:

- York County
- Lancaster County
- Chester County

The responsibilities assigned to these counties are in Annex E of the Commonwealth of Pennsylvania Emergency Operations Plan.

b. Maryland Counties

Harford and Cecil Counties in Maryland may potentially be affected by an incident at the Peach Bottom Atomic Power Station. Responsibilities assigned to these counties are outlined in Annex Q, "Fixed Nuclear Facility Radiological Emergency Plan".

Refer to Table PBAPS 1-1 for a list of offsite radiological emergency response organizations and response plans in support of the Peach Bottom Atomic Power Station's Emergency Preparedness Program.

Table PBAPS 1-1: Offsite Radiological Emergency Response Organizations and Response Plans

The following state, local and emergency plans are available and filed under separate cover.

- Annex E - "Radiological Emergency Response to Nuclear Power Plant Incidents" - to Commonwealth of Pennsylvania Emergency Operations Plan.
- Chester County Radiological Emergency Response Plan for Incidents at Peach Bottom Atomic Power Station:

Municipality

West Nottingham Township

School District

Oxford

- State of Maryland Disaster Assistance Plan, Annex Q, Radiological Emergency Plan.
- Lancaster County Emergency Operations Plan, Annex E, Part 2 - PBAPS

Municipalities

Fulton Township

Drumore Township

Martic Township

Quarryville Borough

Little Britain Township

Providence Township

East Drumore Township

School District

Solanco

Penn Manor

Table PBAPS 1-1: Offsite Radiological Emergency Response Organizations and Response Plans (Cont'd)

- York County Emergency Operations Plan, Annex E, Part 2 - PBAPS

Municipalities

Lower Chanceford Township

Fawn Grove Township

Fawn Borough

Delta Borough

Peach Bottom Township

School Districts

Red Lion

South Eastern

- Harford County Emergency Operations Plan - PBAPS

School District

Harford County

- Cecil County Emergency Operations Plan - PBAPS

School

Conowingo Elementary

- State of Delaware Emergency Plan

- State of New Jersey Emergency Plan

Figure PBAPS 1-1: 10-Mile Plume Exposure Pathway EPZ

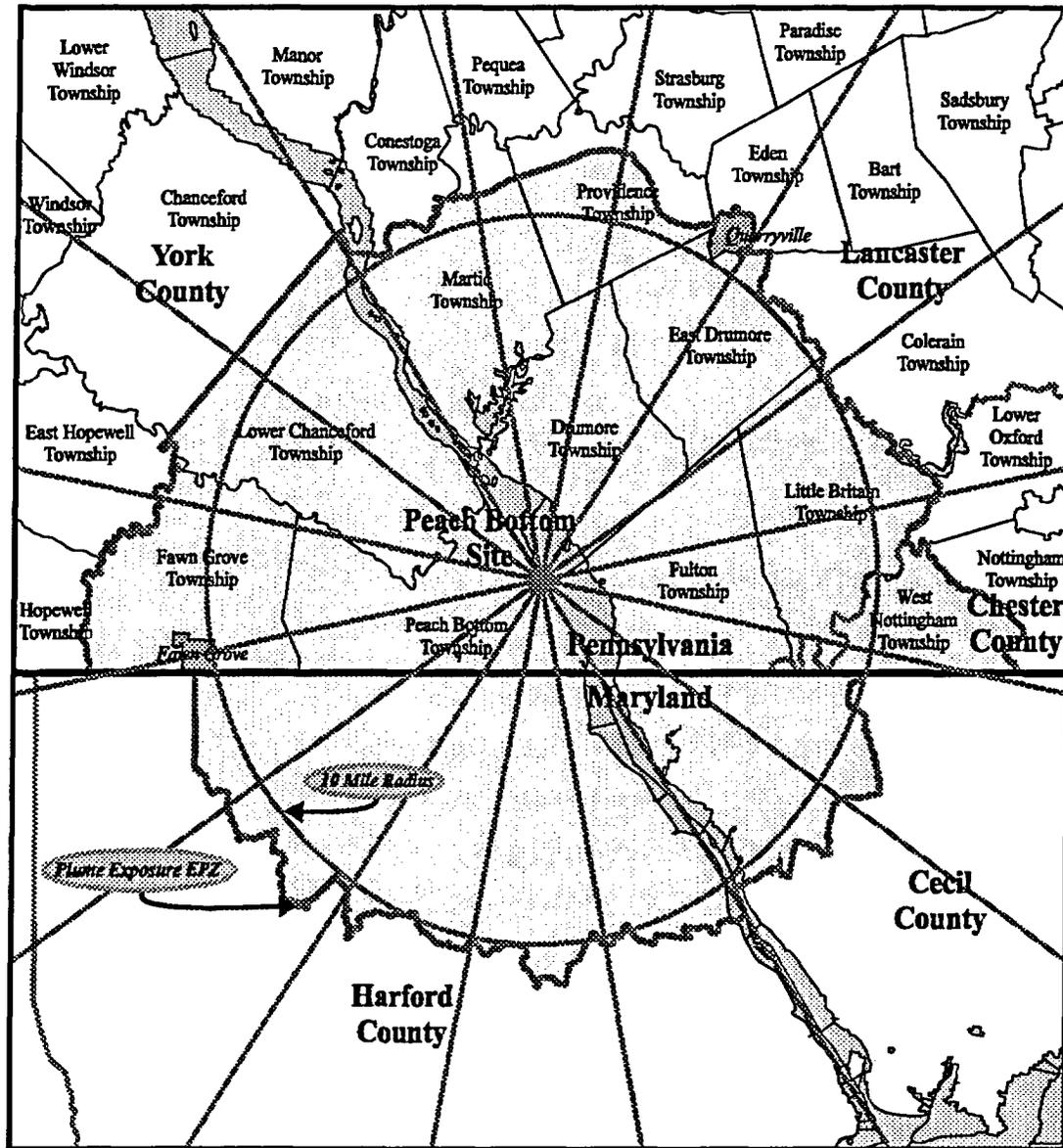
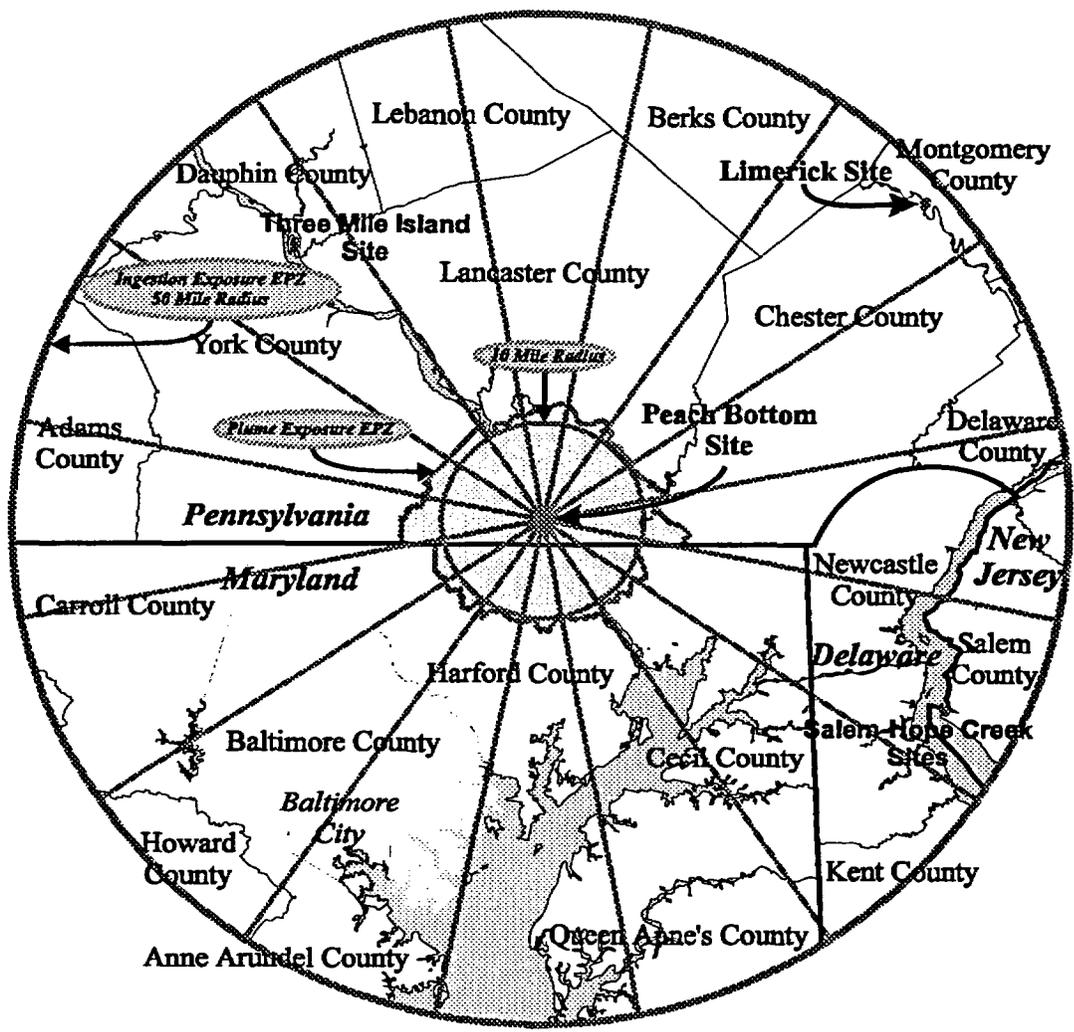


Figure PBAPS 1-2: 50-Mile Ingestion Pathway EPZ



Section 2: Organizational Control of Emergencies

Initial response to any emergency is by the normal plant organization present at the site on a 24 hours per day basis as described in PBAPS UFSAR Figure 13.2.2. Once an emergency is declared, the Emergency Response Organization (ERO) is activated as described in Section B.4 of the Exelon Nuclear Standardized Radiological Emergency Plan.

2.1 Shift Organization Staffing

Required on-shift staffing in support of emergency response activities is 16 people. This on-shift staffing level exceeds the Exelon Nuclear Standardized Radiological Emergency Plan commitment of ten (10) people, based on existing commitments supporting the elimination of 30-minute augmentation goal from Table B-1 of NUREG-0654/FEMA-REP-1.

A listing of minimum shift complement is provided in Table PBAPS 2-1 of the Annex for Peach Bottom Atomic Power Station (PBAPS). Based on existing on-shift staffing commitments, the "Minimum Shift Size" for the purposes of NUREG-0654, Table B-1 comparison is 16 persons versus the 10 persons specified in the Exelon Nuclear Standardized Radiological Emergency Plan. These six (6) additional on-shift positions include:

- 2nd Emergency Communicator
- Two Field Survey Team Members
- One Radwaste Operator (Equipment Operator)
- One Instrument and Controls Technician
- 3rd Radiation Protection Technician (two at affected station and 3rd at unaffected station performing dose assessor function).

2.1.1 Shift Dose Assessment

The on-shift dose assessment function will be performed by a shift Radiation Protection Technician (RPT) at Limerick Generating Station. However, Peach Bottom Atomic Power Station will maintain the capability to perform a shift dose assessment, if necessary.

2.1.2 Shift Emergency Communicators

The Shift Communicator performs notifications to the State and County organizations until relieved by the TSC, and assists in the initiation of the ERO Callout System as directed. The Communicator position is staffed by a designated on-shift individual capable of responding to the Control Room immediately in support of the initiation of offsite notifications within 15 minutes of event classification.

A 2nd on-shift individual will be designated to support communications with the NRC over the Emergency Notification System (ENS) until relieved by the TSC.

Activation of the automated ERO call out system will be performed by the Shift Manager, but may be delegated to a Control Room Emergency Communicator or available on-shift staff.

2.1.3 Shift Technical Advisor (STA) / Incident Assessor

Section B.1 of the Exelon Nuclear Standardized Radiological Emergency Plan outlines the On-Shift Emergency Response Organization Assignment of the STA. Peach Bottom Atomic Power Station has deemed the following as an acceptable method of implementing Section B.1 in reference to the STA.

The responsibilities of the STA are delineated on OP-AA-101-111, "Roles and Responsibilities of On-Shift Personnel." If the STA is the Shift Manager or Unit Supervisor, then another Senior Reactor Operator (SRO) shall assist as Incident Assessor during unexpected conditions and transients. Per Table B-1, the on-shift STA or Incident Assessor shall also provide core/thermal hydraulics support to Control Room staff.

2.2 Emergency Response Organization (ERO) Staffing

Refer to Table PBAPS 2-1 of the PBAPS Annex, "Minimum Staffing Requirements", for a comparison against the Exelon Nuclear Standardized Radiological Emergency Plan of 60-minute and full augmentation commitments.

2.2.1 Emergency Onsite Organization (Figure PBAPS 2-2)

No changes in augmentation positions or staffing levels for the Technical Support Center (TSC), Operations Support Center (OSC) and Control Room from that specified in the Exelon Nuclear Standardized Radiological Emergency Plan.

2.2.2 Emergency Offsite Organization (Figure PBAPS 2-3)

Based on existing interface and staffing agreements, representatives from the Commonwealth of Pennsylvania and State of Maryland will respond to the Emergency Operations Facility (EOF), allowing direct face-to-face communications. As such, the State Environs Communicator position, listed under the Exelon Nuclear Standardized Radiological Emergency Plan, is not staffed at the Coatesville EOF. Rather the EOF Environmental Coordinator will interface directly with State representatives present in the EOF.

An EOF Access Controller has been added to the Full Augmentation complement to support existing facility access control measures.

2.2.3 Emergency Public Information Organization (Figure PBAPS 2-4)

Based on the co-location of the EOF with the Joint Public Information Center (JPIC) the following Emergency News Center (ENC) functions, as described in Sections B.5.c and B.7 of the Exelon Nuclear Standardized Radiological Emergency Plan, have been eliminated or consolidated with corresponding JPIC positions. These differences in staffing are:

- Public Information Liaison was deleted.
- Radiation Protection Spokesperson was incorporated into the Radiological Advisor position
- Technical Spokesperson was incorporated into the Technical Advisor position

2.3 Emergency Response Organization (ERO) Training

Training is conducted in accordance with Section O.5 of the Exelon Nuclear Standardized Radiological Emergency Plan per TQ-AA-113, "ERO Training and Qualification." Retraining is performed on an annual basis, which is defined as every 12 months \pm 3 months (25% grace period).

2.4 Non-Exelon Nuclear Support Groups

Agreements exist on file with or are verified current annually by the MAROG Corporate Emergency Preparedness Group for the following support agencies:

- Pennsylvania Emergency Management Agency, (PEMA)
- Pennsylvania Bureau of Radiation Protection, (DER/BRP)
- Pennsylvania State Police
- Maryland Emergency Management Agency, (MEMA)
- Maryland Department of the Environment, Radiological Health Program, (MDE)
- Cecil County, Emergency Management and Civil Defense Agency
- Chester County Department of Emergency Service
- Harford County Division of Emergency Operations
- Lancaster County Emergency Management Agency
- York County Emergency Management Agency
- Memo of Understanding with Maryland Emergency Management Agency, Harford County Division of Emergency Operations, and Cecil County Emergency Management and Civil Defense Agency
- Delta-Cardiff Volunteer Fire/Ambulance Company
- Harford Memorial Hospital
- Sadowsky Surgical Associates, PA
- York Hospital

Additionally, Exelon Nuclear has contractual agreements with several companies whose services would be available in the event of a radiological emergency. These agencies are listed in Appendix 3 of the Standard Plan. Emergency response coordination with governmental agencies and other support organizations is discussed in Section A of the Standard Plan.

2.5 Nuclear Steam Systems Supplier (NSSS)

General Electric Company maintains an Emergency Response Organization, which can provide technical assistance from their home office or at the site.

2.6 Architect/Engineer

Bechtel or other contractors may be involved in the technical analysis or construction activities associated with the emergency response or recovery operation. Each such organization will designate a lead representative who will have the same responsibilities, within their scope of work, as described for the NSSS Contractor.

Table PBAPS 2-1: Minimum Staffing Requirements

Functional Area	Major Tasks	Emergency Positions	^(b) Minimum Shift Size	^(a) 60 Minute Augmentation	Full Augmentation
1. Plant Operations and Assessment of Operational Aspects	Control Room Staff	Shift Manager Control Room Supervisor Reactor Operator Equipment Operator	1 1 2 2		
2. Emergency Direction and Control ^(c)	Command and Control / Emergency Operations	Shift Emergency Director (CR) Station Emergency Director (TSC) Corporate Emergency Director (EOF)	1 ^(b)	1 1	
3. Notification & Communication	Emergency Communications Plant Status In-Plant Team Control Technical Activities Governmental	Shift Personnel ^(d) TSC Director (TSC) EOF Director (EOF) State/Local Communicator ENS Communicator HPN Communicator Operations Communicator (CR/TSC) Damage Control Comm. (CR/TSC/OSC) Technical Communicator (TSC) EOC Communicator (EOF) State EOC Liaison ^(h) (PEMA/MEMA) Regulatory Liaison (EOF)	2	1 1 1 (EOF) 1 (TSC) 1 (EOF)	1 (TSC) 1 (EOF) 1 (TSC)
4. Radiological Accident Assessment and Support of Operational Accident Assessment	Offsite Dose Assessment Offsite Surveys Onsite Surveys In-plant Surveys Chemistry RP Supervisory	Radiation Protection Personnel ^(e) Dose Assessment Coordinator (EOF) Dose Assessor (EOF) Radiation Controls Coordinator (TSC) Environmental Coordinator (EOF) Field Team Communicator (EOF) Off-Site Field Team Personnel ^(m) RP Personnel RP Technicians Chemistry Personnel ⁽ⁿ⁾ Radiation Protection Manager (TSC/EOF)	1 2 1 1	1 1 2 2 2 1 2	1 1 1 (g) 1 (g) 1 (g) 1 (g)

Table PBAPS 2-1: Minimum Staffing Requirements (Cont'd)

Functional Area	Major Tasks	Emergency Positions	^(b) Minimum Shift Size	^(a) 60 Minute Augmentation	Full Augmentation	
5. Plant System Engineering, Repair and Corrective Actions	Technical Support	STA / Incident Assessor ^(p) (CR)	1			
		Technical Manager (TSC)		1		
		Core/Thermal Hydraulics Engineer (TSC)	1 ^(o)	1		
		Mechanical Engineer (TSC)		1		
		Electrical Engineer (TSC)		1		
		SAMG Decision Maker (TSC)		1 ^(o)		
		SAMG Evaluator (TSC)		2 ^(o)		
		Operations Manager (TSC)		1		
		Radiation Controls Engineer (TSC)				1
		Mechanical Maintenance ⁽ⁿ⁾ (OSC)	1 ^(o)	2	(g)	
	Rad Waste Operator	1		(g)		
	Electrical Maintenance ⁽ⁿ⁾ (OSC)	1 ^(o)	2	(g)		
	Instrument & Control (I&C) (OSC)	1				
	Maintenance Manager (TSC)		1			
	OSC Director (OSC)		1			
Assistant OSC Director (OSC)				1		
OPs Lead & Support Personnel (OSC)				(g)		
Accident Analysis	Technical Support Manager (EOF)			1		
Operations Advisor (EOF)				1		
Technical Advisor (EOF)				1		
6. In-Plant Protective Actions	Radiation Protection	RP Personnel ^(e)	3 ^(b)	4	(g)	
7. Fire Fighting	--	Fire Brigade	(i)			
8. First Aid and Rescue Operations	--	Plant Personnel	2 ^(b)		(g)	
9. Site Access Control and Personnel Accountability	Security & Accountability	Security Team Personnel	(k)	(k)		
	EOF Security	Security Coordinator ^(q) (TSC/Cantera EOF) Access Controller (EOF)			2 1	
10. Resource Allocation and Administration	Logistics / Administration	Logistics Manager (EOF)		1		
		Logistics Coordinator (TSC)			1	
		Administrative Coordinator (EOF)			1	
		Clerical Staff (TSC/OSC/EOF)			(g)	
		Events Recorder (EOF)			1	
Computer Specialist (EOF)				1		
SUB-TOTAL:			16	34	28+	

Table PBAPS 2-1: Minimum Staffing Requirements (Cont'd)

Functional Area	Major Tasks	Emergency Positions	^(b) Minimum Shift Size	^(a) 60 Minute Augmentation	Full Augmentation
11. Public Information	Media Interface	Corporate Spokesperson (JPIC) Rad Protection Spokesperson/Advisor (JPIC) Technical Spokesperson/Advisor (JPIC)		1	1 1
	Information Development	Public Information Director (JPIC) News Writer (JPIC)		1	1
	Media Monitoring and Rumor Control	Communications Department (JPIC)			1 (g)
	Facility Operation and Control	JPIC Director (JPIC) JPIC Coordinator (JPIC) Administrative Coordinator (JPIC) Events Recorder (EOF) Clerical Staff (JPIC) Access Controls (JPIC)		1	1 1 1 (g) 1
SUB-TOTAL:			0	3⁽ⁱ⁾	7+
			^(b) Minimum Shift Size	Total On-Call ^(l) Minimum Staff	Total Full Augmentation
TOTAL:			16	37	35+

- ^(a) Response time is based on optimum travel conditions.
- ^(b) For each unaffected nuclear unit in operation, maintain at least one Control Room Supervisor, one Reactor Operator, and one Equipment Operator, except that units sharing a Control Room may share a Control Room Supervisor if all functions are covered.
- ^(c) Overall direction of facility response to be assumed by the Corporate Emergency Director (EOF) when all centers are fully manned. Direction of minute-to-minute facility operations and "non-delegable" responsibilities for event classification and emergency exposure controls remain with the Station Emergency Director (TSC). The Shift Manager, as Shift Emergency Director, shall function as acting Station Emergency Director prior to TSC activation.
- ^(d) Refer to Section 2.1.2 for a description of on-shift assessment staffing.
- ^(e) Refer to Section 2.1.1 for description of on-shift dose assessment staffing.
- ^(f) May be provided by personnel assigned other functions. Personnel can fulfill multiple functions.
- ^(g) Personnel numbers depend on the type and extent of the emergency.
- ^(h) Staffing of the County EOC Liaison position is not required based on agreements with offsite agencies; however, every effort will be made to dispatch an Exelon Nuclear representative upon request from County EOC Director.
- ⁽ⁱ⁾ Fire Brigade per UFSAR / TRM, as applicable.
- ^(k) Per Security Plan.
- ^(l) The following Emergency Public Information Organization personnel will be designated "minimum staffing" (on-call) positions but are not subject to the 60-minute response time requirement: Corporate Spokesperson, Public Information Director and JPIC Director.
- ^(m) Each Field Survey Team consists of a Lead and Driver. Primarily the Lead will be an RP Technician (RPT); however, additional personnel qualified as RadWorker and trained in radiological exposure, ALARA principles and contamination control measures, may also serve as Lead to provide for long-term staff relief.
- ⁽ⁿ⁾ OSC Group Leads can be used initially to fill 60-minute augmentation technical/craft positions in Maintenance, RP and Chemistry.
- ^(o) Refer to Section 2.1.3 for description of on-shift STA/Incident Assessor staffing requirements.
- ^(p) TSC Security Coordinator position will be staffed by PBAPS Security personnel. The EOF Security Coordinator position will be staffed by Corporate Security personnel at the Mid-West ROG Cantera Offices and will be contacted as part of the TSC activation process.

Figure PBAPS 2-1: Exelon Overall ERO Command Structure

Bolded Boxes indicate minimum staffing positions.

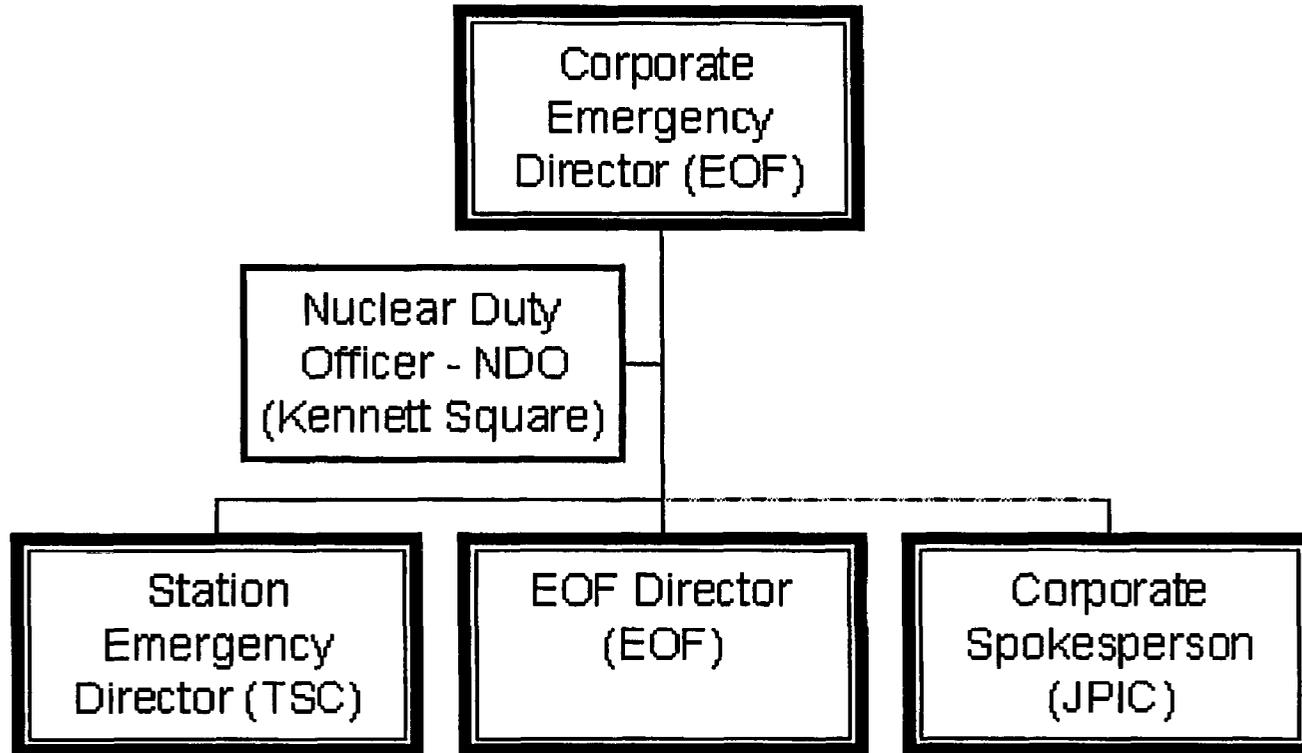
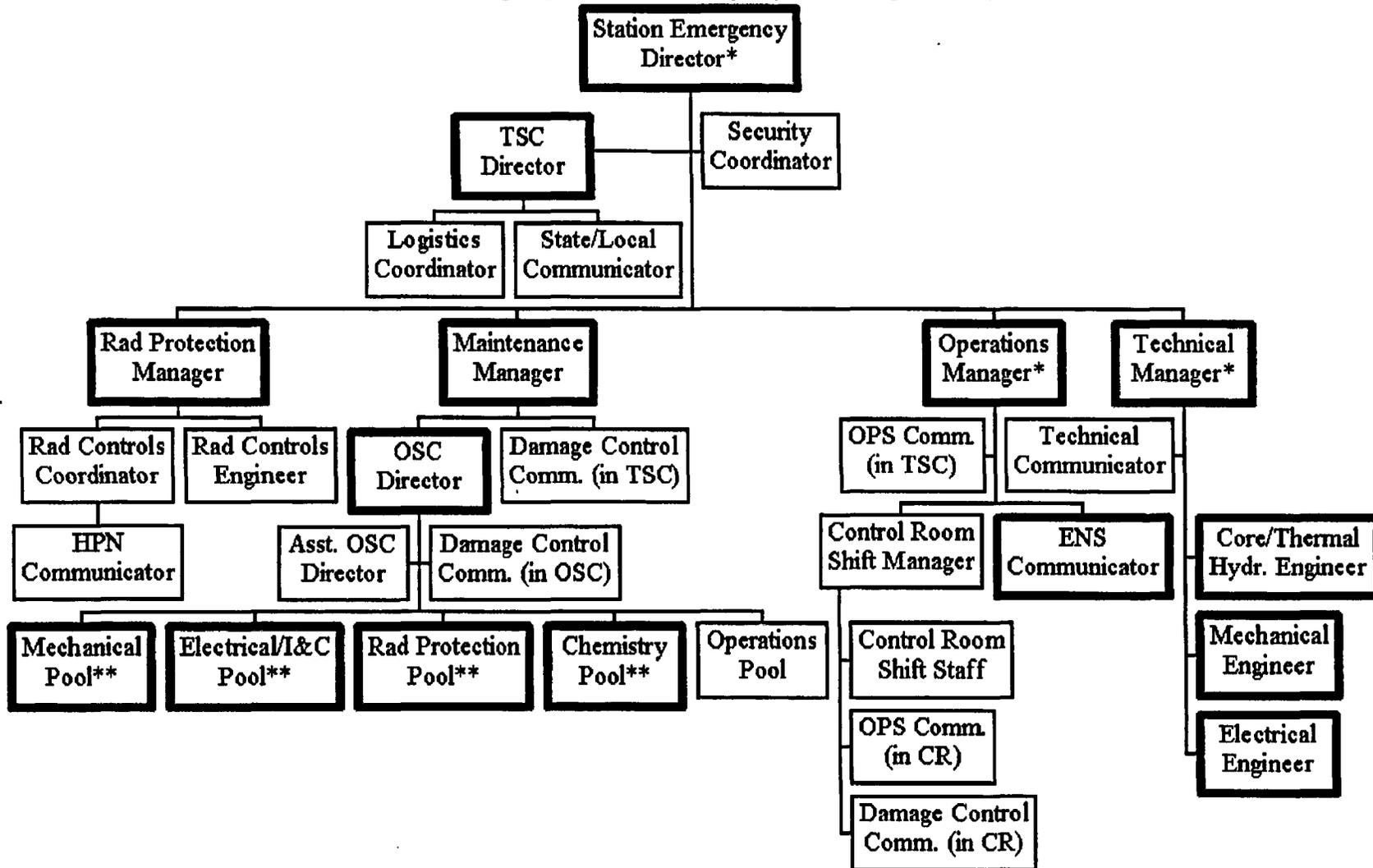


Figure PBAPS 2-2: Emergency Onsite Organization

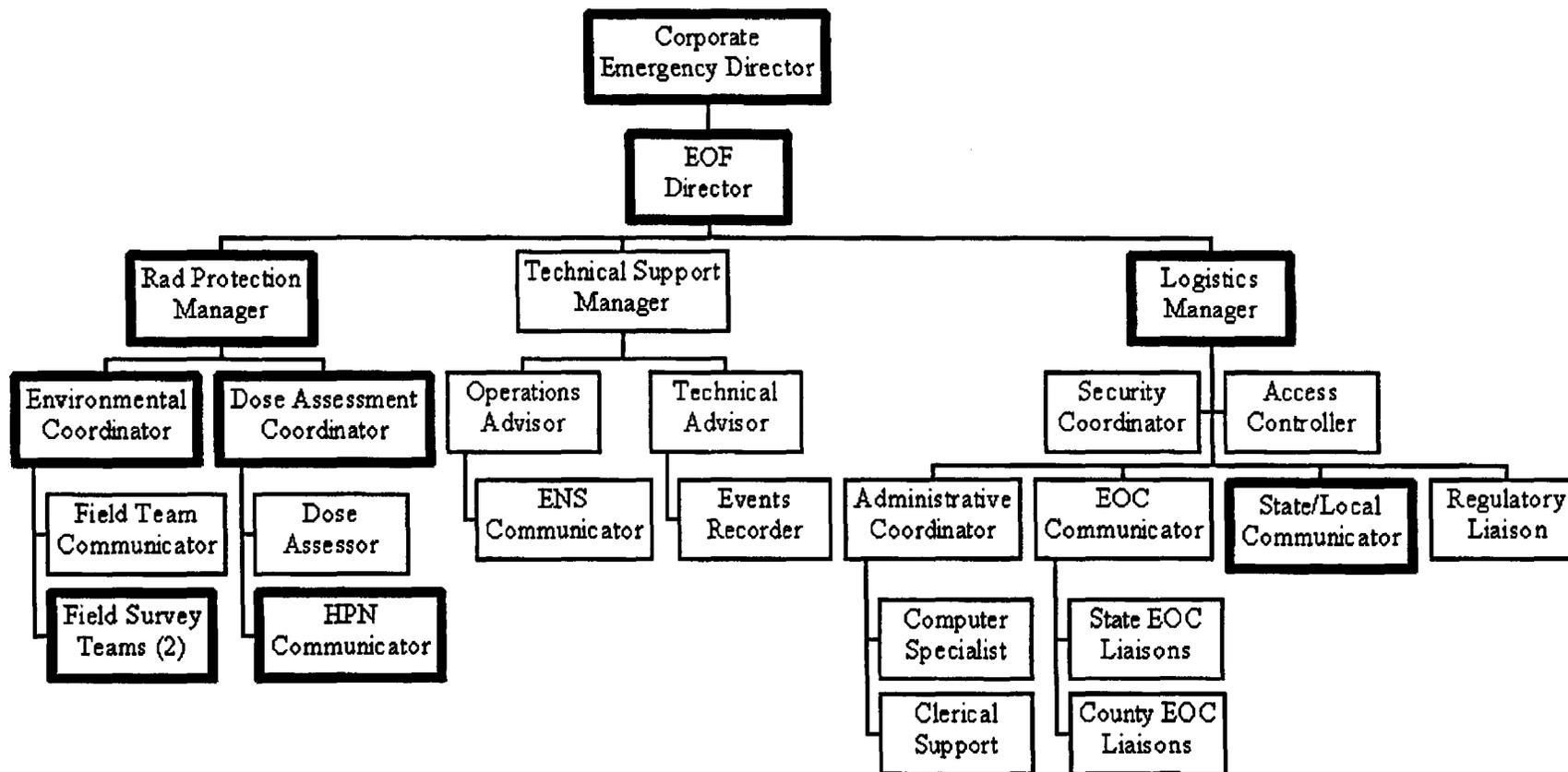


Bolded Boxes indicate minimum staffing positions.

* SAMG functions may be assigned to other qualified personnel. Minimum staffing requires 1 Decision Maker and 2 Evaluators.

** Refer to Table B-1 for required staffing levels

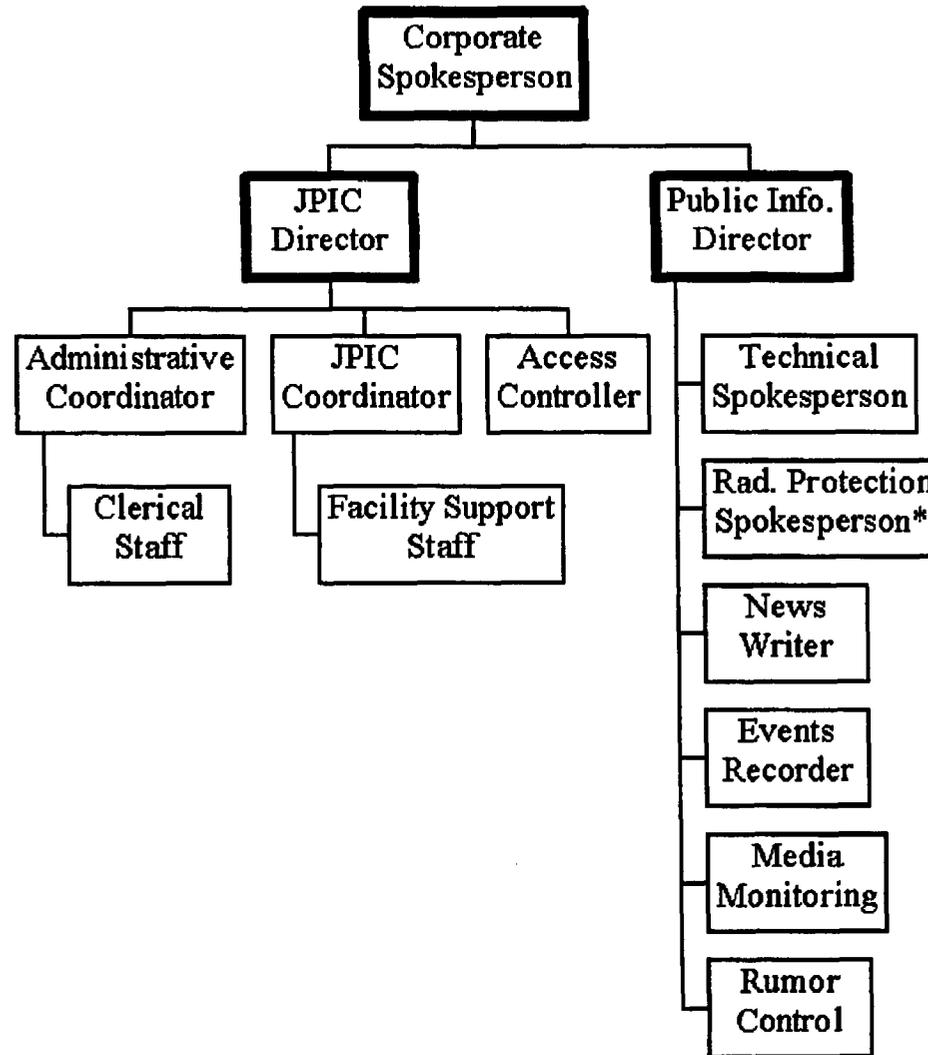
Figure PBAPS 2-3: Emergency Offsite Organization



Bolded Boxes indicate minimum staffing positions.

* EOF Security Coordinator position staffed by Corporate Security from MWROG Cantera Offices

Figure PBAPS 2-4: Emergency Public Information Organization



Bolded Boxes indicate minimum staffing positions.

* Radiation Protection Spokesperson / Advisor may be staffed by a qualified consultant.

Section 3: Classification of Emergencies

Section D of the Exelon Nuclear Standardized Radiological Emergency Plan describes five (5) Emergency Classes. The first four are the Unusual Event, Alert, Site Area Emergency and General Emergency, and are listed from least severe to most severe according to relative threat to the health and safety of the public and emergency workers. The fifth level is Recovery and is considered as a phase of the emergency. Recovery is not considered as part of the event classification logic contained in Section 3.0 of the Annex, but rather is entered by meeting criteria provided in Section M of the Exelon Nuclear Standardized Radiological Emergency Plan.

Site specific definitions are provided for terms to be used for that particular Initiating Conditions /Threshold Values and may not be applicable to other uses of that term in any other EAL, at other sites, in the Exelon Nuclear Standardized Radiological Emergency Plan or procedures. Also included are the technical bases, which were used to develop the EAL.

Classifications are based on evaluation of each Unit. All classifications are to be based upon VALID indications, reports or conditions. Indications, reports or conditions are considered VALID when they are verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel, such that doubt related to the indicator's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

When two or more Emergency Action Levels are determined, declaration will be made on the highest classification level for the Unit. When both units are affected, the highest classification for the Station will be used for notification purposes and both units' classification levels will be noted.

3.1 Emergency Action Levels (EALs)

Emergency Action Levels are the measurable, observable detailed conditions that must be met in order to classify the event. Classification shall not be made without referencing, comparing and satisfying the threshold values specified in the Emergency Action Levels. Mode Applicability provides the unit conditions when the Emergency Action Levels represent a threat. The Basis provides definitions of terms, explanations and justification for including the Initiating Condition and Emergency Action Level. Definitions are provided for terms having specific meaning as they relate to this procedure.

Unusual Event, Alert, Site Area Emergency, and General Emergency classifications are entered by meeting designated Emergency Action Levels (EALs) Threshold Values. These values are based on the criteria established under Revision 2 to NUMARC/NESP-007, "Methodology for Development of Emergency Action Levels" (dated January 1992), and are labeled based on the four Recognition Categories outlined in NUMARC/NESP-007:

- Abnormal Radiological Levels / Effluents
- Fission Product Barrier Degradation
- System Malfunctions
- Hazards and Other Conditions

EAL Threshold Values are sorted under common Initiating Conditions (ICs). These ICs can be Symptom- or Event-based, and applicable to all or only designated Operational Conditions / Modes OPCONS. The Initiating Conditions (IC) and associated EAL Threshold Values are summarized in the EAL Matrix (Table PBAPS 3-1) according to Recognition Categories.

To aid user in identifying applicable ICs, they are further sorted under the following Event Sub-Categories, and appropriate Mode designator provided:

- ***Abnormal Radiological Levels / Effluents (“R”)***
 - Radiological Effluents
 - Abnormal Radiation Levels
 - Coolant Activity
- ***Fission Product Barrier Degradation (“F”)***
 - Fuel Clad
 - Reactor Coolant System, referred to as “RCS”
 - Primary Containment, referred to as “Containment”
- ***System Malfunctions (“M”)***
 - Loss of AC Power
 - Loss of DC Power
 - Failure of Reactor Protection System
 - Decay Heat Removal
 - Loss of Annunciators
 - RCS Leakage / RPV Draindown
 - MSL Break (with Isolation)
 - Loss of Communications
 - Technical Specifications
 - Irradiated Fuel Accidents
- ***Hazards and Other Conditions (“H”)***
 - Security Events
 - Control Room Evacuation
 - Natural or Man-Made Events
 - Fire / Explosion
 - Toxic or Flammable Gases
 - Discretionary

An emergency is classified by assessing plant conditions and comparing abnormal conditions to ICs and Threshold Values for each EAL, based on the designated Operational Condition (MODE). Modes 1 through 5 are defined in the Technical Specifications for Units 2 and 3 based on Reactor Mode Switch Position specific plant conditions. “Defueled” Mode was established for classification purposes under NUMARC/NESP-007 to reflect conditions where all fuel has been removed from the Reactor Pressure Vessel.

<u>MODE</u>	<u>TITLE</u>
1	Power Operation
2	Start-up
3	Hot Shutdown
4	Cold Shutdown
5	Refueling
D	Defueled

The EAL Matrix is designed to provide an evaluation of the Initiating Conditions from the worst conditions (General Emergencies) on the left to the relatively less severe conditions on the right (Unusual Events). Evaluating conditions from left to right will reduce the possibility that an event will be under classified. All Recognition Categories should be reviewed for applicability prior to classification.

An appropriate EAL numbering system is provided as a user aid. ICs are coded with a two letter and one number code. For example: **HA1**

The first letter is the Recognition Category designator. In this case, **H** stands for "Hazards and Other Conditions". The second letter is the Classification Level: "**U**" for Unusual Event, "**A**" for Alert, "**S**" for Site Area Emergency, and "**G**" for General Emergency. The number is a sequential number for that Recognition Category series. All Initiating Conditions, which are describing the severity of a common condition (series), will have the same number (e.g. HA1, HA2, etc.).

A Fission Product Barrier (FPB) Table is provided as a subset to the Recognition Category "F" (FPB Degradation) of the EAL Matrix. This table is used to determine the integrity of the Fuel Clad, RCS and Containment Barriers based on EAL Threshold values established in accordance with NUMARC/NESP-007 (e.g., Intact, LOSS, or POTENTIAL LOSS).

3.2 EAL Technical Basis

Table PBAPS 3-2 serves as the Technical Basis for the EAL Matrix. The table consists of the following sections for each Initiating Condition (IC), sorted by Recognition Category:

- Initiating Condition
- Threshold Value
- Mode Applicability
- Basis (includes deviations from NUMARC/NESP-007 as appropriate)

Table PBAPS 3-2 provides the EAL user with the background and justification behind the EAL Threshold Values identified using the guidance set forth in NUMARC/NESP-007.

For a radiological liquid release, the emergency action level is based on calculated off-site dose from a chemistry sample. Shift Supervision utilizes emergency response procedures to notify risk counties and to obtain river water samples.

3.3 General EAL Implementation Philosophy

A broad spectrum of discretion in classifying events is provided in the "Discretionary" category under Hazards and Other Conditions and the Fission Product Barrier Matrix in Table PBAPS 3-1. In using the "Discretionary" category and in classifying emergencies under circumstances which are not a straight-forward use of the EAL's, ERO members should be mindful that an approach is needed which is conservative with respect to public, plant, and personnel safety and with respect to ensuring the adequacy of personnel and technical support. Conservative decisions must be made if the ED has any doubt regarding the health and safety of the public.

Declaring an Unusual Event provides the Company and off-site agencies the opportunity for early information regarding the event and for early activation of resources and may be considered a "no consequence decision." Conversely, not declaring an Unusual Event when there are credible (but, not clear) bases for doing so, would appear to be less than open or candid and could have serious adverse consequences. Although the consequences of declaring an Unusual Event are limited, inappropriate classifications do not accurately indicate the significance of the event to the public and emergency responders and should be avoided.

At the Alert, Site Area and General Emergency levels, clearly the threat to the plant and to the public is at a heightened level. Rapid application of resources and preparation for providing for the public health and safety are appropriate. Because of the magnitude of resource mobilization and the potential disruption of normal public activities, an overly conservative or an inappropriately early declaration of these levels is not advisable.

Events that meet the Emergency Action Level criteria for event declaration, but which are terminated before they are identified and declared, should still be classified and reported, but not declared to implement the Emergency Plan.

All EALs may not consider trends, rates of change, or status changes in equipment availability. In the event of rapidly changing parameters trending toward an increased emergency classification, it may be appropriate to decide that the higher level EAL will be exceeded and escalate the classification early. In the event of trends toward a decreased emergency classification, parameter values must be below the EALs to de-escalate.

In the event of a "spike" which rapidly exceeds and then exits an EAL condition, entry into the Emergency Plan or escalation to the higher classification "in retrospect" is not appropriate unless the "spike" is indicative of continuing degrading conditions which will lead to an escalated emergency classification level. This statement does not apply if the EAL includes a "spike". Spurious alarms or parameters, which are known to be invalid indicators of actual plant conditions or of the emergency classification, should not be used to declare emergency classifications.

TABLE PBAPS 3-1: Emergency Action Level (EAL) Matrix

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT		
ABNORMAL RAD LEVELS / EFFLUENTS								
Radiological Effluents	RG1 Actual or Projected Site Boundary MODES: ALL Dose Using Actual Meteorology: > 1000 mRem TEDE OR > 5000 mRem CDE Thyroid EAL Threshold Value: 1. Radiological release in excess of Table R1 "General Emergency" threshold AND Releases CANNOT be determined in < 15 minutes (from the time Table R1 threshold was exceeded) to be below Table R2 Dose Assessment "General Emergency" thresholds OR 2. Radiological releases exceed ANY Table R2 column "General Emergency" threshold.	RS1 Actual or Projected Site Boundary MODES: ALL Using Dose Actual Meteorology: > 100 mRem TEDE OR > 500 mRem CDE Thyroid EAL Threshold Value: 1. Radiological release in excess of Table R1 "Site Area Emergency" threshold AND Releases CANNOT be determined in < 15 minutes (from the time Table R1 threshold was exceeded) to be below Table R2 Dose Assessment "Site Area Emergency" thresholds OR 2. Radiological releases exceed ANY Table R2 column "Site Area Emergency" threshold.	RA1 Release > 200 X ODCM Limit for MODES: ALL ≥ 15 minutes EAL Threshold Value: 1. Unplanned radiological release lasting ≥ 15 minutes in excess of Table R1 "Alert" threshold AND Releases CANNOT be determined in < 15 minutes (from the time Table R1 threshold was exceeded) to be below Table R2 Dose Assessment "Alert" thresholds OR 2. Unplanned radiological releases lasting ≥ 15 minutes in excess of ANY Table R2 column "Alert" threshold	RU1 Release > 2 X ODCM Limit for MODES: ALL ≥ 60 minutes EAL Threshold Value: 1. Unplanned radiological release lasting ≥ 60 minutes in excess of Table R1 "Unusual Event" threshold AND Releases CANNOT be determined in < 60 minutes (from the time Table R1 threshold was exceeded) to be below Table R2 Dose Assessment "Unusual Event" thresholds OR 2. Unplanned radiological releases lasting ≥ 60 minutes in excess of ANY Table R2 column "Unusual Event" threshold	Radiological Effluents			
	Not Applicable	Not Applicable	RA2 In-Plant Radiation Levels Impede Plant MODES: ALL Operations EAL Threshold Value: 1. Radiation readings > 15 mR/hr in EITHER of the following: • Main Control Room OR • Central Alarm Station AND Increase is NOT due to an anticipated temporary increase from a planned event. OR 2. In-plant radiation reading > 5 R/hr AND Increase is NOT due to an anticipated temporary increase from a planned event. AND Access is required to affected area(s) per SE-1 or SE-10	RU2 Rise In Plant Radiation Levels by a MODES: ALL Factor of 1000 EAL Threshold Value: 1. Radiation readings indicate an unplanned rise by a factor of 1000 over normal levels. RU3 High MSL or Off-gas Radiation Levels MODES: 1,2,3 EAL Threshold Value: 1. SIAE Discharge Radiation > 2.5E+3 mR/hr OR 2. Main Steam Line Hi-Hi radiation Alarm (10xNFPB)				
Not Applicable	Not Applicable	Not Applicable	RU4 High coolant activity MODES: ALL EAL Threshold Value: 1. Reactor coolant activity > 4 µCi/gm I-131 dose equivalent	Coolant Activity				

Table R1 -- Effluent Monitor Thresholds

	General Emergency	Site Area Emergency	Alert	Unusual Event
Main Stack	> 3.23E+10 µCi/sec	> 3.23E+9 µCi/sec	> 200X Hi-Hi alarm	> 2X Hi-Hi alarm
	(RI-0-17-050A/B)			
Vent Stack	> 2.02E+8 µCi/sec	> 2.02E+7 µCi/sec	> 200X Hi-Hi alarm	> 2X Hi-Hi alarm
	(RI-2979A/B Unit 2 or RI-3979A/B Unit 3)			
Torus Vent	≥ 1.0E+7 cps (OSH)	Not Applicable	Not Applicable	Not Applicable
	(RIS-80291 Unit 2 or RIS-90291 Unit 3)			
Service Water	Not Applicable	Not Applicable	> 200X Hi-Hi alarm	> 2X Hi-Hi alarm
Radwaste Discharge	Not Applicable	Not Applicable	> 200X Hi-Hi alarm	> 2X Hi-Hi alarm

Table R2 Dose Assessment Thresholds

* Refers to dose/dose rates at or beyond the Site Boundary, based on a 1 hour release duration

Method	General Emergency	Site Area Emergency	Alert	Unusual Event
Sample Analysis	Not Applicable	Not Applicable	> 200 X ODCM limits	> 2 X ODCM Limits
Field Team Monitoring*	> 1000 mRem/yr Whole Body OR > 5000 mRem CDE Thyroid	> 100 mRem TEDE OR > 500 mRem CDE Thyroid	> 3 mRem/yr Whole Body OR > 9 mRem CDE Thyroid	Not Applicable
Dose Assessment*	> 1000 mRem TEDE OR > 5000 mRem CDE Thyroid	> 100 mRem TEDE OR > 500 mRem CDE Thyroid	> 2.8 mRem/yr TEDE OR > 8.5 mRem CDE Thyroid	> 0.114 mRem/yr TEDE OR > 0.342 mRem CDE Thyroid

TABLE PBAPS 3-1: Emergency Action Level (EAL) Matrix (Cont'd)

FISSION PRODUCT BARRIER MATRIX (Applicability: Modes 1, 2 & 3 ONLY) MODES: 1,2,3																	
FISSION PRODUCT BARRIER STATUS		FG1: GENERAL EMERGENCY				FS1: SITE AREA EMERGENCY						FA1: ALERT		FU1: UNUSUAL EVENT			
Fuel Clad - LOSS		X	X	X	X	X		X	X	X				X			
Fuel Clad - POTENTIAL LOSS				X			X		X		X			X			
Reactor Coolant System - LOSS		X	X	X		X			X				X				
Reactor Coolant System - POTENTIAL LOSS					X		X	X								X	
Primary Containment - LOSS		X		X	X					X	X	X	X				X
Primary Containment - POTENTIAL LOSS			X														X
	1. FUEL CLAD BARRIER				2. REACTOR COOLANT SYSTEM BARRIER				3. PRIMARY CONTAINMENT BARRIER								
	LOSS		POTENTIAL LOSS		LOSS		POTENTIAL LOSS		LOSS		POTENTIAL LOSS						
a. Reactor Pressure Vessel (RPV) Water Level	1. RPV water level < -195 inches		2. RPV water level < -172 inches		1. RPV water Level < -172 inches		2. RPV water level CANNOT be determined		Not Applicable		1. ANY of the following direct entry into SAMP-1 and SAMP-2: • T-111 • T-116 • T-117						
b. Drywell (DW) High Range Rad Monitor	1. DW high range rad monitor reading > 7.8E+4 R/hr		Not Applicable		1. DW high range rad monitor reading > 15R/hr		Not Applicable		Not Applicable		1. DW high range rad monitor reading > 6.0E+5 R/hr						
c. Drywell (DW) Pressure	Not Applicable		Not Applicable		1. Drywell pressure > 2.0 psig AND Indication of RCS leak inside Drywell		Not Applicable		1. Rapid, unexplained drop in DW pressure following an initial rise OR 2. DW pressure response not consistent with LOCA conditions indicating a Containment breach		3. DW pressure > 49 PSIG						
d. Breached / Bypassed	1. Coolant activity > 300 uCi/gm I-131 dose equivalent OR 2. Core damage calculations indicate > 2.6% fuel clad damage		Not Applicable		1. Unisolable MSL Break indicated by the failure of BOTH MSIVs in ANY one line to close AND EITHER of the following: • High MSL Flow and High Steam Tunnel Temperature OR • Direct report of steam release [NOTE: Refer to MA8 for ISOLABLE MSL Break] OR 2. SRV is stuck open or cycling AND Indication of a LOSS of the Fuel Clad Barrier per the Fission Product Barrier Matrix		3. RCS Leakage > 50 gpm OR 4. Unisolable primary system leakage outside of CNTMT that results in: a. Exceeding EITHER of the following T-103 Action Levels: • Table SC/T-3 (Temperature) OR • Table SC/R-1 (Radiation) OR b. SCRAM initiated per T-103 due to temperature or radiation levels		1. Failure of ALL automatic isolation valves in ANY one line penetrating Primary Containment to close resulting from an isolation actuation signal AND Downstream pathway exists to environment OR 2. Intentional venting per T-200 is required OR 3. Unisolable primary system leakage outside of CNTMT that results in: a. Exceeding EITHER of the following T-103 Action Levels: • Table SC/T-3 (Temperature) OR • Table SC/R-1 (Radiation) OR b. SCRAM initiated per T-103 due to temperature or radiation levels		Not Applicable						
e. Drywell Hydrogen Concentration	Not Applicable		Not Applicable		Not Applicable		Not Applicable		Not Applicable		1. Drywell H ₂ > 6% AND Drywell O ₂ > 5%						
f. Discretionary	1. ANY condition that indicates a LOSS of the Fuel Clad Barrier		2. ANY condition that indicates a POTENTIAL LOSS of the Fuel Clad Barrier		1. ANY condition that indicates a LOSS of the Reactor Coolant System Barrier		2. ANY condition that indicates a POTENTIAL LOSS of the Reactor Coolant System Barrier		1. ANY condition that indicates a LOSS or of the Primary Containment Barrier		2. ANY condition that indicates a LOSS or of the POTENTIAL Primary Containment Barrier						

TABLE PBAPS 3-1: Emergency Action Level (EAL) Matrix (Cont'd)

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT		
SYSTEM MALFUNCTIONS								
Loss of AC Power	<p>MG1 Prolonged Loss of ALL Offsite AC Power AND Prolonged Loss of ALL Onsite AC Power EAL Threshold Value:</p> <p>1. Loss of offsite power to ALL 4 KV Safeguard Busses AND ALL four of the 4 KV Safeguards Busses are de-energized for > 15 minutes AND ANY of the following:</p> <ul style="list-style-type: none"> Restoration of at least one 4KV emergency bus in ≤ 2 hours is NOT likely OR Reactor water level CANNOT be maintained > -172 inches OR Torus temperature CANNOT be maintained on the "SAFE" side of the HCTL Curve (T-102, T/T-1) <p>MODES: 1,2,3</p>	<p>MS1 Loss of ALL Offsite AC Power AND Loss of ALL Onsite AC Power to Essential Busses EAL Threshold Value:</p> <p>1. Loss of offsite power to ALL 4 KV Safeguard Busses AND ALL four of the 4 KV Safeguards Busses are de-energized for > 15 minutes</p> <p>MODES: 1,2,3</p>	<p>MA1 AC Power to Essential Buses Reduced to a Single Source for > 15 minutes EAL Threshold Value:</p> <p>1. Loss of offsite power to ALL 4 KV Safeguard Busses AND Three of four of the 4 KV Safeguards Busses are de-energized for > 15 minutes</p> <p>MODES: 1,2,3</p>	<p>MU1 Loss of ALL Offsite AC Power for > 15 minutes to Essential Busses EAL Threshold Value:</p> <p>1. Loss of offsite power to ALL 4 KV Safeguard Busses for > 15 minutes</p> <p>MODES: ALL</p>	Loss of AC Power			
	<p>MA2 Loss of ALL Offsite AC Power AND Loss of ALL Onsite AC Power to Essential Busses EAL Threshold Value:</p> <p>1. Loss of offsite power to ALL 4 KV Safeguard Busses AND ALL four of the 4 KV Safeguards Busses are de-energized for > 15 minutes</p> <p>MODES: 4,5,D</p>							
Loss of DC Power	Not Applicable	<p>MS3 Loss of ALL Required T.S. Safety-Related 125 VDC Power Sources EAL Threshold Value:</p> <p>1. Loss of ALL required T.S. safety related 125 VDC power sources for > 15 minutes as indicated by < 107.5 VDC on Panels 2(3)0D21, 22, 23, 24</p> <p>MODES: 1,2,3</p>	Not Applicable	<p>MU3 Loss of ALL Required T.S. Safety-Related 125 VDC Power Sources EAL Threshold Value:</p> <p>1. Loss of ALL required T.S. safety related 125 VDC power sources for > 15 minutes as indicated by < 107.5 VDC on Panels 2(3)0D21, 22, 23, 24</p> <p>MODES: 4,5</p>	Loss of DC Power			
Failure of Reactor Protection System	<p>MG4 Auto and Manual SCRAM NOT Successful, AND Loss of Core Cooling or Heat Sink EAL Threshold Value:</p> <p>1. Failure of automatic RPS, ARI AND Manual SCRAM/ARI to shutdown the reactor as defined by EITHER of the following criteria:</p> <ul style="list-style-type: none"> Reactor Power > 4% OR Torus temperature greater than 110°F AND boron injection is required <p>AND EITHER of the following criteria are met:</p> <ul style="list-style-type: none"> Torus temperature CANNOT be maintained on the "SAFE" side of the HCTL Curve (T-102, T/T-1) OR Reactor water level < -195 inches <p>MODES: 1,2</p>	<p>MS4 Auto and Manual SCRAM NOT Successful EAL Threshold Value:</p> <p>1. Failure of automatic RPS, ARI AND Manual SCRAM/ARI to shutdown the reactor as defined by EITHER of the following criteria:</p> <ul style="list-style-type: none"> Reactor power > 4% OR Torus temperature greater than 110°F AND boron injection is required <p>MODES: 1,2</p>	<p>MA4 Auto SCRAM NOT Successful EAL Threshold Value:</p> <p>1. RPS set point has been exceeded for an automatic SCRAM AND Failure of automatic RPS to achieve a state in which the reactor is shutdown under all conditions without boron</p> <p>MODES: 1,2</p>	Not Applicable	Failure of Reactor Protection System			
Decay Heat Removal	Not Applicable	<p>MS5 Complete Loss of Functions Needed to Achieve AND Maintain Hot Shutdown EAL Threshold Value:</p> <p>1. Loss of functions required for hot shutdown as evidenced by T-102 T/T leg directing a T-112 Emergency Blowdown</p> <p>MODES: 1,2,3</p>	<p>MA5 Inability to Maintain Plant in Cold Shutdown EAL Threshold Value:</p> <p>1. Unplanned loss of ALL T.S. required decay heat removal systems AND EITHER of the following:</p> <ul style="list-style-type: none"> RCS temperature exceeding 212 °F for ≥ 15 minutes with a heat removal function restored OR Uncontrolled RCS temperature rise approaching 212 °F with NO heat removal function restored <p>MODES: 4,5</p>	Not Applicable	Decay Heat Removal			

TABLE PBAPS 3-1: Emergency Action Level (EAL) Matrix (Cont'd)

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT	
SYSTEM MALFUNCTIONS (cont.)							
Loss of Annunciators	Not Applicable	<p>MS6 Inability to Monitor a Significant Transient In Progress MODES: 1,2,3</p> <p><u>EAL Threshold Value:</u></p> <p>1. A significant transient is in progress (Table M-1) AND ALL of the following are lost:</p> <ul style="list-style-type: none"> Safety system annunciators (Table M-2) Safety function indicators (Table M-3) Plant Monitoring System 	<p>MA6 Loss of Annunciators or Indicators Requiring Increased Surveillance MODES: 1,2,3</p> <p><u>EAL Threshold Value:</u></p> <p>1. Unplanned loss for > 15 minutes of MOST (NOTE 1) or ALL of EITHER:</p> <ul style="list-style-type: none"> Safety system annunciators (Table M-2) OR Safety function indicators (Table M-3) <p>AND Increased surveillance is required to safely operate the unit(s) AND EITHER of the following:</p> <ul style="list-style-type: none"> A significant plant transient is in progress (Table M-1) OR Plant Monitoring System is unavailable 	<p>MU6 Unplanned Loss of Annunciators OR Indicators for > 15 minutes MODES: 1,2,3</p> <p><u>EAL Threshold Value:</u></p> <p>1. Unplanned loss for > 15 minutes of MOST (NOTE 1) or ALL of EITHER:</p> <ul style="list-style-type: none"> Safety system annunciators (Table M-2) OR Safety function indicators (Table M-3) <p>AND Increased surveillance is required to safely operate the unit(s)</p>	Loss of Annunciators		
RCS Leakage / RPV Drainsdown	Not Applicable	<p>MS7 Loss of Water Level in the Reactor Vessel That Has or Will Uncover Fuel in the Reactor Vessel MODES: 4,5</p> <p><u>EAL Threshold Value:</u></p> <p>1. RPV water level < -172 inches</p>	Not Applicable	<p>MU7 Reactor Coolant System Leakage MODES: 1,2,3</p> <p><u>EAL Threshold Value:</u></p> <p>1. Unidentified primary system leakage > 10 gpm into the Drywell OR</p> <p>2. Identified primary system leakage > 25 gpm into the Drywell</p>	RCS Leakage / RPV Drainsdown		
MSL Break (with Isolation)	Not Applicable	Not Applicable	<p>MA8 Main Steam Line Break MODES: 1,2,3</p> <p><u>EAL Threshold Value:</u></p> <p>1. MSL Break indicated by EITHER of the following:</p> <ul style="list-style-type: none"> High MSL Flow and High Steam Tunnel Temperature annunciators OR Direct report of MSL steam release. <p>AND MSL break is successfully isolated.</p> <p>NOTE: REFER to Fission Product Barrier Matrix (2.d.1) for possible event escalation if break is unisocable.</p>	Not Applicable	MSL Break (with Isolation)		
Loss of Communications	Not Applicable	Not Applicable	Not Applicable	<p>MU9 Unplanned Loss of ALL Onsite OR Offsite Communications Capabilities MODES: ALL</p> <p><u>EAL Threshold Value:</u></p> <p>1. ALL onsite communications equipment lost (Table M-4) OR</p> <p>2. ALL offsite communications equipment lost (Table M-5)</p>	Loss of Communications		
Technical Specs	Not Applicable	Not Applicable	Not Applicable	<p>MU10 Inability to Reach Required Operating Mode Within Technical Specification Time Limits MODES: 1,2,3</p> <p><u>EAL Threshold Value:</u></p> <p>1. inability to reach required operating mode within Tech. Spec. LCO action completion time</p>	Technical Specs		

<p>Table M-1: Significant Plant Transients</p> <ul style="list-style-type: none"> SCRAM Recirc Runback (> 25% thermal power change) Sustained Power Oscillations (25% peak to peak) Stuck Open Relief Valves ECCS Injection 	<p>Table M-2: Safety System Annunciators</p> <ul style="list-style-type: none"> ECCS Containment Isolation Reactor Trip Process Radiation Monitoring 	<p>Table M-3: Safety Function Indicators</p> <ul style="list-style-type: none"> Reactor Power Decay Heat Removal Containment Safety Functions 	<p>Table M-4: Onsite Communications Equipment</p> <ul style="list-style-type: none"> Site Phones (GTE System) OMNI System Plant Public Address (PA) Station Radio 	<p>Table M-5: Offsite Communications Equipment</p> <ul style="list-style-type: none"> Site Phones (GTE System) OMNI System NRC (ENS) PA State Radio Load Dispatcher Radio 	<p>NOTE 1</p> <p>"MOST" refers to a loss of ~75% or a significant risk that a degraded plant condition could go undetected. Use is not intended to require a detailed count of annunciators/indicators.</p>
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TABLE PBAPS 3-1: Emergency Action Level (EAL) Matrix (Cont'd)

GENERAL EMERGENCY		SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
SYSTEM MALFUNCTIONS (cont.)				
Irradiated Fuel Accidents	Not Applicable	Not Applicable	MA11 Major Damage OR Uncovering of Spent Fuel MODES: ALL EAL Threshold Value: 1. Unplanned general area radiation > 500 mR/hr on the Refuel Floor (Table M-6) OR 2. Report or visual observation that irradiated fuel is uncovered OR 3. Water level < 232 ft 3 inches plant elevation for the Spent Fuel Pool that will result in irradiated fuel uncovering	MU11 Potential Damage OR Uncovering of Spent Fuel MODES: ALL EAL Threshold Value: 1. Uncontrolled water level drop in Spent Fuel Pool that cannot be quickly terminated with ALL irradiated fuel assemblies remaining covered by water
	Not Applicable	Not Applicable	MA12 Loss of Water Level That Has OR Will Uncover Irradiated Fuel MODE: S* EAL Threshold Value: (* With the Rx Refueling Cavity Flooded) 1. Water level < 458 inches above RPV instrument zero for the Reactor Refueling Cavity AND Loss of water level will result in irradiated fuel uncovering	MU12 Uncontrolled Water Level Decrease in Reactor Refueling Cavity MODES: ALL EAL Threshold Value: 1. Unexpected Skimmer Surge Tank low level alarm AND Visual observation of an uncontrolled drop in water level below the fuel pool skimmer surge tank inlet that cannot be quickly terminated
	Not Applicable	Not Applicable	Not Applicable	MU13 Independent Spent Fuel Storage Installation (ISFSI) MODES: ALL EAL Threshold Value: 1. EITHER of the following criteria is met for dry storage of spent fuel: • > 600 mR/hr, 1 ft. away OR • > 1200 mR/hr at the external surface
HAZARDS AND OTHER CONDITIONS				
Security Events	HG1 Security Event Resulting in Loss of Ability to Reach AND Maintain Cold Shutdown MODES: ALL EAL Threshold Value: 1. Loss of physical control of the Control Room due to a security event OR 2. Loss of physical control of the remote shutdown capability due to a security event	HS1 Confirmed Security Event in a Vital Area. MODES: ALL EAL Threshold Value: 1. Intrusion into plant Vital Area by a hostile force OR 2. Confirmed bomb, sabotage or sabotage device discovered in a Vital Area	HAI Confirmed Security Event in a Plant Protected Area MODES: ALL EAL Threshold Value: 1. Intrusion into a Protected Area or ISFSI by a hostile force OR 2. Confirmed bomb, sabotage or sabotage device discovered in a Protected Area or ISFSI	HU1 Confirmed Security Event That Indicates a Potential Degradation in Level of Plant Safety MODES: ALL EAL Threshold Value: 1. A credible threat to the station reported by the NRC. OR 2. BOTH of the following criteria met for a credible threat reported by any other outside agency as determined per SY-AA-101-132, "Threat Assessment": • Is specifically directed towards the station. • Is imminent (≤ 2 hours) OR 3. Attempted intrusion and attack on a Protected Area or ISFSI OR 4. Attempted sabotage discovered within a Protected Area or ISFSI OR 5. Hostage/Extortion situation that threatens normal plant operations

Table M-6: Refuel Floor ARMs	
• 3-7 (7-9), Steam Separator Pool	• 3-9 (7-11), Fuel Pool
• 3-8 (7-10), Refuel Slot	• 3-10 (7-12), Refueling Bridge

TABLE PBAPS 3-1: Emergency Action Level (EAL) Matrix (Cont'd)

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT	
HAZARDS AND OTHER CONDITIONS (cont.)							
Control Room Evacuation	Not Applicable	<p>HS2 Control Room Evacuation Initiated MODES: ALL AND Plant Control CANNOT be re-established in ≤ 15 minutes <u>EAL Threshold Value:</u> 1. Control Room evacuation initiated AND Control of the plant CANNOT be re-established in ≤ 15 minutes per SE-1 or SE-10</p>	<p>HA2 Control Room Evacuation Initiated <u>EAL Threshold Value:</u> 1. Entry into SE-1 or SE-10 for Control Room evacuation</p>	Not Applicable	Control Room Evacuation	Not Applicable	
	Natural or Man-Made Events	Not Applicable	Not Applicable	<p>HA3 Natural OR Destructive Phenomena MODES: ALL Affecting a Vital Area <u>EAL Threshold Value:</u> 1. Earthquake > 0.05 g (Operating Basis Earthquake, OBE) as determined by procedure SO 67.7A OR 2. Tornado or wind speeds > 75 mph causing damage to Plant Vital Structures (Table H-1) OR 3. Report of visible structural damage to ANY Plant Vital Structure (Table H-1) OR 4. Vehicle crash affecting a plant vital function contained in a Plant Vital Structure (Table H-1) OR 5. Turbine failure generated missiles result in visible structural damage or penetration to ANY Plant Vital Structures (Table H-1) OR 6. Abnormal river level, as indicated by EITHER: • > 116 ft. (high level) OR • < 92.5 ft. (low level) 7. Flooding in 2 or more areas designated in T-103, Table SC/L-2 requiring a plant shutdown.</p>		<p>HU3 Natural OR Destructive Phenomena MODES: ALL Affecting the Protected Area <u>EAL Threshold Value:</u> 1. Earthquake > 0.01 g as determined by procedure SO 67.7A OR 2. Report by plant personnel of a tornado strike within Protected Area OR 3. Wind speeds > 75 mph as indicated on Site Meteorological instrumentation for > 15 minutes OR 4. Vehicle crash within the Protected Area Boundary that may potentially damage plant functions required for safe shutdown of the plant OR 5. Report of turbine failure resulting in casing penetration or damage to generator seals OR 6. Assessment by Control Room that a natural or destructive phenomena has occurred affecting the Protected Area OR 7. Abnormal river level, as indicated by EITHER: • > 112 ft. (high level) OR • < 98.3 ft. (low level)</p>	Natural or Man-Made Events

Table H-1: Plant Vital Structures
<ul style="list-style-type: none"> • Power Block • Diesel Generator Building • Emergency Pump Structure • Inner Screen Structure • Emergency Cooling Tower

TABLE PBAPS 3-1: Emergency Action Level (EAL) Matrix (Cont'd)

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT	UNUSUAL EVENT	
HAZARDS AND OTHER CONDITIONS (cont.)						
HAZARDS AND OTHER CONDITIONS (cont.)	Fire / Explosion	Not Applicable	Not Applicable	<p>HA4 Fire OR Explosion Affecting Operability of Safety Systems Required for Safe Shutdown MODES: ALL</p> <p>EAL Threshold Value:</p> <p>1. ANY of the following are made potentially inoperable due to a fire or explosion:</p> <ul style="list-style-type: none"> • 2 or more Safe Shutdown Systems (Table H-2) • 2 or more subsystems of a Safe Shutdown System (Table H-2) as defined by Tech. Specs. • 1 or more Plant Vital Structures containing Safe Shutdown Equipment (Table H-1) <p>AND</p> <p>Safe Shutdown System or Plant Vital Structure is required for the present Operational Condition</p>	<p>HU4 Fire Within the Protected Area Boundary NOT Extinguished in ≤ 15 minutes of Detection MODES: ALL</p> <p>EAL Threshold Value:</p> <p>1. Fire within or impacting a Plant Vital Structure (Table H-1) AND</p> <p>Fire is NOT extinguished in ≤ 15 minutes of EITHER:</p> <ul style="list-style-type: none"> • Control Room notification • Verification of alarm <p>OR</p> <p>2. Report by plant personnel of an explosion within the Protected Area Boundary resulting in visible damage to a permanent structure or equipment</p>	Fire / Explosion
	Toxic or Flammable Gases	Not Applicable	Not Applicable	<p>HA5 Release of Toxic OR Flammable Gases Within a Facility Structure Which Jeopardizes Operation of Systems Required to Maintain Safe Operation OR to Establish or Maintain Cold Shutdown MODES: ALL</p> <p>EAL Threshold Value:</p> <p>1. Report or detection of toxic gases within Plant Vital Structures (Table H-1) in concentrations that will be life threatening to plant personnel</p> <p>OR</p> <p>2. Report or detection of flammable gases within Plant Vital Structures (Table H-1) in concentrations affecting the safe operation of the plant</p>	<p>HU5 Release of Toxic OR Flammable Gases Deemed Detrimental to Safe Operation of the Plant MODES: ALL</p> <p>EAL Threshold Value:</p> <p>1. Report or detection of toxic or flammable gases that could enter within the site area in amounts that can affect normal operation of the plant</p> <p>OR</p> <p>2. Report by Local, County or State officials for potential evacuation of site personnel based on an offsite event.</p>	Toxic or Flammable Gases
	Discretionary	<p>HG6 Conditions Indicate Imminent Core Damage OR Release Affecting the Public MODES: ALL</p> <p>EAL Threshold Value:</p> <p>1. Actual or imminent core degradation and potential loss of containment</p> <p>OR</p> <p>2. Potential uncontrolled radionuclide release, which can reasonably be expected to exceed 1 Rem TEDE or 5 Rem CDE Thyroid plume exposure levels at the Site Boundary</p>	<p>HS6 Conditions Indicate Actual OR Likely Failure of Plant Functions Needed for Public Protection MODES: ALL</p> <p>EAL Threshold Value:</p> <p>1. Other conditions exist which in the judgment of the Emergency Director indicate actual or likely major failures of plant functions needed for protection of the public</p>	<p>HA6 Conditions Indicate Actual OR Potential Substantial Degradation of the Level of Plant Safety MODES: ALL</p> <p>EAL Threshold Value:</p> <p>1. Other conditions exist which in the judgment of the Emergency Director indicate that plant safety systems may be degraded and that increased monitoring of plant functions is warranted.</p>	<p>HU6 Conditions Indicate a Potential Degradation in the Level of Plant Safety MODES: ALL</p> <p>EAL Threshold Value:</p> <p>1. ANY of the following occur, which in the judgment of the Emergency Director indicate a potential degradation in the level of safety of the plant:</p> <ul style="list-style-type: none"> • Aircraft crash on-site • Train derailment on-site • Near-site explosion, which may adversely affect normal site activities <p>OR</p> <p>2. Other conditions exist which in the judgment of the Emergency Director indicate a potential degradation in the level of safety of the plant.</p>	Discretionary

Table H-1: Plant Vital Structures

- Power Block
- Diesel Generator Building
- Emergency Pump Structure
- Inner Screen Structure
- Emergency Cooling Tower

Table H-2: Safe Shutdown Systems

- | | |
|--|---|
| <ul style="list-style-type: none"> • Diesel Generators • HPCI • Core Spray • SBT • PCIS (Primary CNTMT Isolation System) • 4 KV Safeguards Buses • RCIC | <ul style="list-style-type: none"> • HPSW • ECW • Control Room Emergency Ventilation • ADS • RHR (all modes) • ESW • CAC / CAD |
|--|---|

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TAB "R" – ABNORMAL RADIATION LEVELS / EFFLUENTS (Category "R")

1. Radiological Effluents

RG1 (Modes: ALL)	PBAPS 3-15
RS1 (Modes: ALL)	PBAPS 3-18
RA1 (Modes: ALL)	PBAPS 3-20
RU1 (Modes: ALL)	PBAPS 3-23

2. Abnormal Radiation Levels

RA2 (Modes: ALL)	PBAPS 3-26
RU2 (Modes: ALL)	PBAPS 3-28
RU3 (Modes: 1, 2 & 3)	PBAPS 3-29

3. Coolant Activity

RU4 (Modes: ALL)	PBAPS 3-30
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TAB "F" – FISSION PRODUCT BARRIER DEGRADATION

FG1 (Modes: 1, 2 & 3)	LGS 3-31
FS1 (Modes: 1, 2 & 3)	LGS 3-33
FA1 (Modes: 1, 2 & 3)	LGS 3-34
FU1 (Modes: 1, 2 & 3)	LGS 3-35

1. Fuel Clad Barrier

Reactor Pressure Vessel Water Level (1.a)	PBAPS 3-36
Drywell Radiation (1.b)	PBAPS 3-37
Drywell Pressure (1.c)	PBAPS 3-38
Breached / Bypassed (1.d)	PBAPS 3-39
Drywell Hydrogen Concentration (1.e)	PBAPS 3-41
Discretionary (1.f)	PBAPS 3-42

2. Reactor Coolant System Barrier

Reactor Pressure Vessel Water Level (2.a)	PBAPS 3-43
Drywell Radiation (2.b)	PBAPS 3-44
Drywell Pressure (2.c)	PBAPS 3-45
Breached / Bypassed (2.d)	PBAPS 3-46
Drywell Hydrogen Concentration (2.e)	PBAPS 3-49
Discretionary (2.f)	PBAPS 3-50

3. Primary Containment Barrier

Reactor Pressure Vessel Water Level (3.a)	PBAPS 3-51
Drywell Radiation (3.b)	PBAPS 3-52
Drywell Pressure (3.c)	PBAPS 3-53
Breached / Bypassed (3.d)	PBAPS 3-54
Drywell Hydrogen Concentration (3.e)	PBAPS 3-56
Discretionary (3.f)	PBAPS 3-57

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1. Loss of AC Power (Operating)	
MG1 (Modes: 1, 2 & 3).....	PBAPS 3-58
MS1 (Modes: 1, 2 & 3).....	PBAPS 3-60
MA1 (Modes: 1, 2 & 3).....	PBAPS 3-61
MU1 (Modes: ALL).....	PBAPS 3-62
2. Loss of AC Power (Shutdown)	
MA2 (Modes: 4, 5 & Defuel).....	PBAPS 3-63
3. Loss of DC Power	
MS3 (Modes: 1, 2 & 3).....	PBAPS 3-64
MU3 (Modes: 4 & 5).....	PBAPS 3-65
4. Failure of Reactor Protection System	
MG4 (Modes: 1 & 2).....	PBAPS 3-66
MS4 (Modes: 1 & 2).....	PBAPS 3-68
MA4 (Modes: 1 & 2).....	PBAPS 3-70
5. Decay Heat Removal	
MS5 (Modes: 1, 2 & 3).....	PBAPS 3-72
MA5 (Modes: 4 & 5).....	PBAPS 3-73
6. Loss of Annunciators	
MS6 (Modes: 1, 2 & 3).....	PBAPS 3-75
MA6 (Modes: 1, 2 & 3).....	PBAPS 3-76
MU6 (Modes: 1, 2 & 3).....	PBAPS 3-78
7. RCS Leakage / RPV Draindown	
MS7 (Modes: 4 & 5).....	PBAPS 3-79
MU7 (Modes: 1, 2, 3 & 4).....	PBAPS 3-81
8. Main Steam Line Break (with isolation)	
MA8 (Modes: 1, 2 & 3).....	PBAPS 3-83
9. Loss of Communications	
MU9 (Modes: ALL).....	PBAPS 3-84
10. Technical Specifications	
MU10 (Modes: 1, 2 & 3).....	PBAPS 3-85
11. Irradiated Fuel Accidents (Spent Fuel Pool)	
MA11 (Modes: ALL).....	PBAPS 3-86
MU11 (Modes: ALL).....	PBAPS 3-88
12. Irradiated Fuel Accidents (Reactor Refuel Cavity)	
MA12 (Modes: 5 – With the Rx Refueling Cavity Flooded)...	PBAPS 3-89
MU12 (Modes: ALL).....	PBAPS 3-91
13. Irradiated Fuel Accidents (Dry Spent Fuel Storage Facility)	
MU13 (Modes: ALL).....	PBAPS 3-92

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TAB "H" – HAZARDS AND OTHER CONDITIONS

1. Security Events

HG1 (Modes: ALL)	PBAPS 3-94
HS1 (Modes: ALL)	PBAPS 3-95
HA1 (Modes: ALL)	PBAPS 3-96
HU1 (Modes: ALL)	PBAPS 3-97

2. Control Room Evacuation

HS2 (Modes: ALL)	PBAPS 3-98
HA2 (Modes: ALL)	PBAPS 3-99

3. Natural or Man-Made Events

HA3 (Modes: ALL)	PBAPS 3-100
HU3 (Modes: ALL)	PBAPS 3-103

4. Fire / Explosion

HA4 (Modes: ALL)	PBAPS 3-106
HU4 (Modes: ALL)	PBAPS 3-108

5. Toxic or Flammable Gases

HA5 (Modes: ALL)	PBAPS 3-110
HU5 (Modes: ALL)	PBAPS 3-112

6. Discretionary

HG6 (Modes: ALL)	PBAPS 3-113
HS6 (Modes: ALL)	PBAPS 3-114
HA6 (Modes: ALL)	PBAPS 3-115
HU6 (Modes: ALL)	PBAPS 3-116

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS**

RG1

INITIATING CONDITION

Actual or Projected Site Boundary Dose Using Actual Meteorology:

- > 1000 mRem TEDE
- OR**
- > 5000 mRem CDE Thyroid

EAL THRESHOLD VALUES

1. Radiological release in excess of Table R1 "General Emergency" threshold
AND
Release **CANNOT** be determined in < 15 minutes (from the time Table R1 threshold was exceeded) to be below Table R2 Dose Assessment "General Emergency" thresholds
OR
2. Radiological releases exceed ANY Table R2 column "General Emergency" threshold.

Table R1: Effluent Monitor Thresholds	
	General Emergency
Main Stack	> 3.23E+10 µCi/sec (RI-0-17-050A/B)
Vent Stacks	> 2.02E+8 µCi/sec (RI-2979A/B Unit 2 or RI-3979A/B Unit 3)
Torus Vents	≥ 1.0E+7 cpm (Off-Scale High) (RIS-80291 Unit 2 or RIS-90291 Unit 3)

Table R2: Dose Assessment Thresholds	
Method	General Emergency
Sample	N/A
Field Team Monitoring*	> 1000 mRem/hr Whole Body OR > 5000 mRem CDE Thyroid
Dose Projection*	> 1000 mRem TEDE OR > 5000 mRem CDE Thyroid
* At or beyond Site Boundary based on a 1 hour release duration	

MODE APPLICABILITY:

ALL

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS**

RG1 – Cont’d

BASIS: (References)

Site Boundary - For classification and dose projection purposes, the Site Boundary is the Exclusion Area Boundary, a 2700 foot radius around the plant. The actual boundary is specified in the ODCM.

Total Effective Dose Equivalent (TEDE) The sum of the deep dose equivalent (for external exposure) and the committed effective dose equivalent (for internal exposure) and 4 days of deposition exposure.

Committed Dose Equivalent (CDE) The Dose Equivalent to organs or tissues of reference that will be received from an intake of radioactive material by an individual during the 50-year period following the intake. Thyroid values are taken from EPA-400, Table 5-4 to be consistent with the NRC RASCAL dose assessment program used by the Pennsylvania Emergency Management Agency (PEMA) / Bureau of Radiation Protection (BRP). Actual meteorology is used, since it gives the most accurate dose projection.

Table R1:

Effluent Monitors - Classification is based on the instantaneous release rate value if NO dose projections can be performed or verified within 15 minutes of meeting or exceeding the specified Release Rate value.

For a gaseous release from the Torus Vents, if a valid effluent monitor reading (Unit 2: RIS-80291 or Unit 3: RIS-90291) indicates “off-scale high” ($\geq 1.0E+7$ cpm) AND field monitoring teams are not available to immediately confirm actual offsite dose below Table R-2 thresholds, then **DECLARE** a General Emergency classification. Since effluent monitor is “off-scale high”, Table R-2 projected offsite dose thresholds cannot be confirmed using DAPAR for the Torus Vents.

NOTE: (For calculation basis purposes) The threshold value for the Torus Vent was calculated at $6.95E+9$ cpm, which is “Off-Scale High” ($\geq 1.0E+7$ cpm).

Monitor indications are calculated using the computerized dose model with UFSAR (gap release) source terms applicable to each monitored pathway in conjunction with annual average meteorology per NUMARC/NESP-007 (Revision 2). Calculations assume:

	<u>Main Stack</u>	<u>Vent Stack</u>	<u>Torus Vent</u>
Time After Shutdown (TAS)	0 hours	0 hours	0 hours
Release Duration	1 hour	1 hour	1 hour
Core Damage	10%	10%	10%
Flow Rate	33,000 cfm	474,000 cfm (U2) 450,000 cfm (U3)	9570 cfm (U2) 9570 cfm (U3)
Highest Annual Average X/Q (per ODCM)	$9.97E-8 \text{ sec/m}^3$	$5.33E-7 \text{ sec/m}^3$	$5.33E-7 \text{ sec/m}^3$
Process Reduction Factors (per NUREG-1228)			
• CNMT Hold Up / Spray OFF	< 2 hours	< 2 hours	< 2 hours
• Reactor Bldg. Hold Up	< 2 hours	< 2 hours	N/A
• Standby Gas Treatment Filters	YES	N/A	N/A

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS**

RG1 – Cont'd

BASIS: (References)

Table R2:

Field Team Monitoring – The values are for surveys or iodine air samples taken at or beyond the **SITE BOUNDARY** and are the most accurate indicator of the condition. Field data are independent of release elevation and meteorology. The assumed release duration is 1 hour. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption media followed by field analysis are used for determining the iodine value.

Dose Projection – Any calculated dose projection of 1 Rem TEDE or 5 Rem CDE Thyroid is classified based on U.S. Environmental Protective Action (EPA) guidelines established under EPA-400-R-92-001 (May 1992). Source term, release elevation and release duration inputs are options and should reflect actual release conditions. Actual meteorology should also be used to reflect actual release conditions.

Since effluent monitor is “off-scale high”, Table R-2 projected offsite dose thresholds cannot be confirmed using DAPAR for the Torus Vents.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS**

RS1

INITIATING CONDITION

Actual or Projected Site Boundary Dose Using Actual Meteorology:

>100 mRem TEDE

OR

>500 mRem CDE Thyroid

EAL THRESHOLD VALUES

1. Radiological release in excess of Table R1 "Site Area Emergency" threshold

AND

Releases **CANNOT** be determined in < 15 minutes (from the time Table R1 threshold was exceeded) to be below Table R2 Dose Assessment "Site Area Emergency" thresholds

OR

2. Radiological releases exceed ANY Table R2 column "Site Area Emergency" threshold.

Table R1: Effluent Monitor Thresholds	
	Site Area Emergency
Main Stack	> 3.23E+9 μ Ci/sec (RI-0-17-050A/B)
Vent Stacks	> 2.02E+7 μ Ci/sec (RI-2979A/B Unit 2 or RI-3979A/B Unit 3)
Torus Vents	Not Applicable

Table R2: Dose Assessment Thresholds	
Method	Site Area Emergency
Sample	N/A
Field Team Monitoring*	> 100 mRem/hr Whole Body OR > 500 mRem CDE Thyroid
Dose Projection*	> 100 mRem TEDE OR > 500 mRem CDE Thyroid
* At or beyond Site Boundary based on a 1 hour release duration	

MODE APPLICABILITY:

ALL

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS**

RS1 – Cont'd

BASIS: (References)

Table R1:

Effluent Monitors - Classification is based on the instantaneous release rate value if no dose projections can be performed or verified within 15 minutes of meeting or exceeding the specified Release Rate value.

For a gaseous release from the Torus Vents, if a valid effluent monitor reading (Unit 2: RIS-80291 or Unit 3: RIS-90291) indicates “off-scale high” ($\geq 1.0E+7$ cpm) AND field monitoring teams are not available to immediately confirm actual offsite dose below Table R-2 thresholds, then REFER to RG1 for evaluation of a General Emergency classification. Since effluent monitor is “off-scale high”, Table R-2 projected offsite dose thresholds cannot be confirmed using DAPAR for the Torus Vents.

NOTE: (For calculation basis purposes) The threshold value for the Torus Vent was calculated at $6.95E+8$ cpm, which is “Off-Scale High” ($\geq 1.0E+7$ cpm). As such, user shall default to RG1 (General Emergency) based on effluent monitor reading for the Torus Vent.

Monitor indications are calculated using the computerized dose model with UFSAR (gap release) source terms applicable to each monitored pathway in conjunction with annual average meteorology per NUMARC/NESP-007 (Revision 2). Calculations assume:

	<u>Main Stack</u>	<u>Vent Stack</u>	<u>Torus Vent</u>
Time After Shutdown (TAS)	0 hours	0 hours	0 hours
Release Duration	1 hour	1 hour	1 hour
Core Damage	10%	10%	10%
Flow Rate	33,000 cfm	474,000 cfm (U2)	9570 cfm (U2)
		450,000 cfm (U3)	9570 cfm (U3)
Highest Annual Average X/Q (per ODCM)	$9.97E-8 \text{ sec/m}^3$	$5.33E-7 \text{ sec/m}^3$	$5.33E-7 \text{ sec/m}^3$
Process Reduction Factors (per NUREG-1228)			
• CNMT Hold Up / Spray OFF	< 2 hours	< 2 hours	< 2 hours
• Reactor Bldg. Hold Up	< 2 hours	< 2 hours	N/A
• Standby Gas Treatment Filters	YES	N/A	N/A

Table R2:

Field Team Monitoring – The values are for surveys or iodine air samples taken at or beyond the SITE BOUNDARY and are the most accurate indicator of the condition. Field data are independent of release elevation and meteorology. The assumed release duration is 1 hour. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption media followed by field analysis are used for determining the iodine value.

Dose Projection – Any calculated dose projection of 100 mRem TEDE or 500 mRem CDE Thyroid is classified based on 10% of the guidelines established under EPA-400-R-92-001 (May 1992). Source term, release elevation and release duration inputs are options and should reflect actual release conditions. Actual meteorology should also be used to reflect actual release conditions.

Since effluent monitor is “off-scale high”, Table R-2 projected offsite dose thresholds cannot be confirmed using DAPAR for the Torus Vents.

This event will be escalated to a General Emergency when actual or projected doses exceed EPA-400-R-92-001 Protective Action Guidelines per IC RG1.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS**

RA1

INITIATING CONDITION

Release > 200 X ODCM Limit for ≥ 15 minutes

EAL THRESHOLD VALUES

1. Unplanned radiological release lasting ≥ 15 minutes in excess of Table R1 “Alert” thresholds
AND
 Releases **CANNOT** be determined in < 15 minutes (from the time Table R1 threshold was exceeded) to be below Table R2 Dose Assessment “Alert” thresholds
OR
2. Unplanned radiological releases lasting ≥ 15 minutes in excess of ANY Table R2 column “Alert” threshold

Table R1: Effluent Monitor Thresholds	
<ul style="list-style-type: none"> • Main Stack (RI-0-17-050A/B) • Vent Stack (RI-2779A/B Unit 2 or RI-3979A/B Unit 3) • Radwaste Discharge • Service Water 	Alert
	> 200 X Hi Hi alarm set point

Table R2: Dose Assessment Thresholds	
Method	Alert
Sample	> 200 X ODCM limits
Field Team Monitoring*	> 3 mRem/hr Whole Body OR > 9 mRem CDE Thyroid
Dose Projection*	> 2.8 mRem/hr TEDE OR > 8.5 mRem CDE Thyroid
* At or beyond Site Boundary based on a 1 hour release duration	

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS**

RA1 – Cont'd

MODE APPLICABILITY

ALL

BASIS (References)

Unplanned - Any release for which a radioactive discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm set points, etc.) on the applicable permit

It is not intended that the release be averaged over 15 minutes. A release of this greater magnitude that cannot be terminated in 15 minutes represents an uncontrolled situation that is an actual or potential substantial degradation of the level of safety of the plant. The degradation in plant control implied by the fact that the release cannot be terminated in 15 minutes is the primary concern.

Further, the Emergency Director should not wait until 15 minutes has elapsed, but should declare the event as soon as it is determined that the release duration has or will likely exceed 15 minutes, unless release rate confirmation (sample, field survey or dose projection) is likely within this 15 minute period.

Table R1:

Effluent Monitors - EAL thresholds are based on 200 times the ODCM limits. For event classification purposes, the HI-HI Radiation alarms for the Main Stack and Vent Stacks are used to represent the ODCM limit. These alarm set points are using the calculation methodology as outlined in Sections 2.2 of the ODCM, which uses the highest annual average X/Q value for the designated sectors in accordance with NUMARC/NESP-007 (AA1). The HI Radiation alarm set points are also set conservatively to indicate when a release may approach ODCM limits assuming multiple release points.

Table R2:

It is intended that the event be declared as soon as it is determined that the release will exceed two hundred times ODCM for greater than 15 minutes.

Samples - Grab samples are used to determine release concentrations or rates to confirm effluent monitor readings or when the effluent monitors are out of services.

Field Team Monitoring - The values are for surveys or iodine air samples taken at or beyond the SITE BOUNDARY and are the most accurate indicator of the condition. Field data are independent of release elevation and meteorology. The assumed release duration is 1 hour. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption media followed by field analysis are used for determining the iodine value.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS**

RA1 – Cont'd

BASIS (References) – Cont'd

Readings are based on equivalent dose model triggers representing 200X ODCM limit. Values are rounded up to the next highest unit based on conservatism of dose projections and to allow reading on survey meter.

Dose Projection – This EAL includes a 15-minute average for the dose projection with the release point radiation monitor above two hundred times the Hi Hi alarm set point value for the entire 15 minutes. It is not intended that the release be averaged over 15 minutes, but exceed threshold for 15 minutes.

TEDE and CDE Thyroid thresholds used represent offsite dose triggers built into the dose model to conservatively reflect 200X ODCM limit.

Releases in excess of 200 times the ODCM limits that continue for > 15 minutes represent an uncontrolled situation and hence a potential degradation in the level of safety. The primary concern is the final integrated dose [100 times greater than the Unusual Event] and the degradation in plant control implied by the fact that the release was not isolated within 15 minutes.

This event will be escalated to a Site Area Emergency when actual or projected doses are determined to exceed 10CFR20 annual average population exposure limits per IC RS1.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS**

RUI

INITIATING CONDITION

Release > 2 X ODCM Limit for ≥ 60 minutes

EAL THRESHOLD VALUE

1. Unplanned radiological release lasting ≥ 60 minutes in excess of Table R1 “Unusual Event” threshold

Releases **CANNOT** be determined in < 60 minutes from the time Table R1 threshold was exceeded) to be below Table R2 Dose Assessment “Unusual Event” thresholds

OR

2. Unplanned radiological releases lasting ≥ 60 minutes in excess of ANY Table R2 column “Unusual Event” threshold

Table R1: Effluent Monitor Thresholds	
	Unusual Event
<ul style="list-style-type: none"> • Main Stack (RI-0-17-050A/B) • Vent Stack (RI-2779A/B Unit 2 or RI-3979A/B Unit 3) • Radwaste Discharge • Service Water 	> 2 X Hi Hi alarm set point

Table R2: Dose Assessment Thresholds	
Method	Unusual Event
Sample	> 2 X ODCM limits
Field Team Monitoring*	N/A
Dose Projection*	> 0.114 mRem/hr TEDE OR > 0.342 mRem CDE Thyroid
* At or beyond Site Boundary based on a 1 hour release duration	

Table PBAPS 3-2: EAL Technical Basis**RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS****RU1 – Cont'd****MODE APPLICABILITY**

ALL

BASIS (References)

Unplanned - Any release for which a radioactive discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm set points, etc.) on the applicable permit

Unplanned releases in excess of two times the site ODCM that continue for 60 minutes or longer represent an uncontrolled situation and hence, a potential degradation in the level of safety. The final integrated dose (which is very low in the Unusual Event emergency class) is not the primary concern here; it is the degradation in plant control implied by the fact that the release was not isolated within 60 minutes. Therefore, it is NOT intended that the release be averaged over 60 minutes. For example, a release of 4 times ODCM limits for 30 minutes does not exceed this EAL. Further, the Emergency Director should NOT wait until 60 minutes has elapsed, but should declare the event as soon as it is determined that the release duration has or will likely exceed 60 minutes, if it is unlikely that an ODCM calculation can be performed within 60 minutes of exceeding the EAL threshold.

Table R1:

Effluent Monitors - EAL thresholds are based on two times the ODCM limits. For event classification purposes, the HI-HI Radiation alarms for the Main Stack and Vent Stacks are used to represent the ODCM limit. These alarm set points are using the calculation methodology as outlined in Sections 2.2 of the which uses the highest annual average X/Q value for the designated sectors in accordance with NUMARC/NESP-007 (AU1). The HI Radiation alarm set points are also set conservatively to indicate when a release may approach ODCM limits assuming multiple release points.

Table R2:

It is intended that the event be declared as soon as it is determined that the release will exceed two times ODCM for greater than 60 minutes.

Samples - Grab samples are used to determine release concentrations or rates to confirm effluent monitor readings or when the effluent monitors are out of services.

Dose Projection – This EAL includes a 60-minute average for the dose projection with the release point radiation monitor above two times the Hi Hi alarm set point value for the entire 60 minutes. It is not intended that the release be averaged over 60 minutes, but exceed threshold for 60 minutes.

TEDE and CDE Thyroid thresholds used represent offsite dose triggers built into the dose model to conservatively reflect 2X ODCM limit.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS**

RU1 – Cont'd

BASIS (References)

Releases in excess of 2 times the ODCM limits that continue for > 60 minutes represent an uncontrolled situation and hence a potential degradation in the level of safety. The final integrated dose is very low and is not the primary concern. Rather it is the degradation in plant control implied by the fact that the release was not isolated within 60 minutes.

This event will be escalated to an Alert when release is determined to be >200 x ODCM Limit for greater than or equal to 15 minutes per IC RA1.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS**

RA2

INITIATING CONDITION

In-Plant Radiation Levels Impede Plant Operations

EAL THRESHOLD VALUES

1. Radiation readings > 15 mR/hr in **EITHER** of the following:
 - Main Control Room

OR

 - Central Alarm Station

AND

Increase is **NOT** due to an anticipated temporary increase from a planned event.

OR
 2. In-plant radiation readings > 5 R/hr
- AND**
- Increase is **NOT** due to an anticipated temporary increase from a planned event.
- AND**
- Access is required to affected area(s) per SE-1 or SE-10

MODE APPLICABILITY

ALL

BASIS (References)

This EAL addresses elevated radiation levels that impede necessary access to operator stations, or other areas containing equipment that must be operated manually in order to maintain safe operation or to perform a safe shutdown. The concern of the EAL is a loss of control of radioactive material causing high radiation levels. As such, this EAL is not intended to apply to anticipated temporary increases in radiation levels due to planned events (e.g., incore detector movement, radwaste container movement, depleted resin transfers, controlled movement of radiological sources, or expected increases in area radiation levels due to normal operation of plant systems / components, etc.).

The impaired ability to operate the plant is to be considered as the actual or potential substantial degradation of the level of safety of the plant. The cause of the rise in radiation levels is not the major concern of this EAL. For example, a dose rate of 15 mR/hr in the control room or hi radiation monitor readings may also be indicative of high dose rates in the containment due to a LOCA. In this latter case, the fission product barrier table may indicate a SAE or GE. This EAL could result in declaration of an Alert at one unit due to a radioactivity release or radiation shine resulting from a major accident at the other unit.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS**

RA2 – Cont'd

BASIS (References) – Cont'd

Threshold Value 1 - The value of 15 mRem/hr is derived from the general design criteria (GDC) value of 5 REM in 30 days with adjustment for expected occupancy times. Although Section III.D.3 of NUREG-0737 "Clarification of TMI Action Plan Requirements" provides that the 15 mRem/hr value can be averaged over the 30 days, the value is used here without averaging, as a 30 day duration implies an event potentially more significant than an ALERT.

Plant normal and emergency procedures may be implemented without requiring access to any areas except the Control Room and Central Alarm Station to be continuously occupied. The Radwaste Control Room is not required to be continuously occupied in order to maintain plant safety functions since inputs to radwaste will be isolated with a secondary containment isolation and releases can only be performed manually.

Threshold Value 2 - Areas requiring infrequent access and dose rate values are based on those specified in procedures SE-1 or SE-10. EAL is applicable only when procedures SE-1 or SE-10 direct access, in other words, when you are in those procedures. Therefore, if you were in procedures SE-1 or SE-10 and you needed to direct access to a particular area and at the time radiation levels were > 5 R/hr, classification under this EAL is appropriate. Just having radiation levels > 5 R/hr in those areas defined in SE-1 or SE-10, when access is not directed per procedure, does not warrant classification under this EAL.

The single value of 5 R/hr was selected because it is based on radiation levels which result in exposure control measures intended to maintain doses within normal occupational exposure guidelines and limits (i.e., 10 CFR 20), and in doing so, will impede necessary access. Stay times for levels up to that value are, generally several minutes, enough time to enter an area and manually operate the equipment. Dose rates > 5 R/hr will impede necessary access.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS**

RU2

INITIATING CONDITION

Rise in Plant Radiation Levels By a Factor of 1000

EAL THRESHOLD VALUE

1. Radiation readings indicate an unplanned rise by a factor of 1000 over normal levels

MODE APPLICABILITY

ALL

BASIS (References)

Unplanned - Not the result of an intended evolution and requiring corrective or mitigative actions.

Normal Levels – Normal radiation levels can be considered as the highest reading in the past 24-hour period, excluding the current peak value, as determined by recorder charts, surveys, logs, etc.

Classification of an UNUSUAL EVENT is warranted as a precursor to more serious events. The concern of this EAL is the loss of control of radioactive material representing a potential degradation of the level of safety of the plant. The Threshold Value tends to have a long lead-time relative to a radiological release and thus the threat to public health and safety is very low. In light of the elevated dose rates the Emergency Director should evaluate how these conditions will affect the other unit.

This event will be escalated to an Alert when in-plant radiation levels impede plant operations per IC RA2.

Table PBAPS 3-2: EAL Technical Basis**RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS****RU3****INITIATING CONDITION**

High Main Steam Line (MSL) OR Off-gas Radiation Levels

EAL THRESHOLD VALUES

1. SJAЕ Discharge Radiation > 2.5E+3 mRem/hr
OR
2. Main Steam Line Hi-Hi Radiation Alarm (10xNFPB)

MODE APPLICABILITY:

1, 2, 3

BASIS: (References)

Threshold Value 1: The steam jet air ejector discharge (Off-Gas) radiation monitor in the Control Room would be one of the first indicators of a degrading core. This instrument takes a sample before the recombiner. This indicator of elevated activity is equivalent to Technical Specification limit and is considered to be a precursor of more serious problems.

Threshold Value 2: Main Steam Line (MSL) Hi-Hi Radiation alarm > 10 times normal full power background (NFPB), may be indicative of minor fuel cladding degradation. The MSL Hi-Hi radiation condition requires a manual Main Steam Isolation Valve (MSIV) closure and a reactor scram. This transient may result in the introduction of fission product gases (previously contained in the gap area) to be suddenly released into the coolant due to the rapid down power transient and subsequent collapse of voids in the coolant.

This level of steam line activity is indicative of the release of gap activity to the coolant, rather than a major failure of the fuel clad. However, the mechanics that caused MSL radiation to rise to this level indicate there are a degradation of Fuel Clad integrity.

This EAL is NOT intended to apply to cases caused by resin intrusion or other known factors that are not directly indicative of fuel cladding degradation, but rather coolant chemistry issues.

This event will escalate to a Site Area Emergency based on a MSL break per EITHER the Fission Product Barrier Matrix (2.d.1 & 3.d.1) for an unisolable break, OR an Alert based on MA8 for an isolable MSL break scenario.

DEVIATION: The MODE applicability [1,2,3] is a deviation from NUMARC [all] in that, the SJAЕ Radiation Monitor and Main Steam Line Radiation Monitors will only be a valid indication of Fuel Clad Degradation in those Modes. There are no other monitors, which can be used as an indicator of Fuel Clad Degradation.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS**

RU4

INITIATING CONDITION

High Coolant Activity

EAL THRESHOLD VALUES

Reactor coolant activity > 4 $\mu\text{Ci/gm}$ I-131 dose equivalent

MODE APPLICABILITY:

ALL

BASIS: (References)

Coolant activity in excess of Technical Specifications (> 4 $\mu\text{Ci/gm}$) is considered to be a precursor of more serious problems. The Technical Specification limit reflects a degrading or degraded core condition. This level is chosen to be above any possible short duration spikes under normal conditions.

An Unusual Event is only warranted when actual fuel clad damage is the cause of the elevated coolant sample (as determined by laboratory confirmation). However, fuel clad damage should be assumed to be the cause of elevated Reactor Coolant activity unless another cause is known, e.g., Reactor Coolant System chemical decontamination evolution (during shutdown) is ongoing with resulting high activity levels.

This event will be escalated to an Alert when Reactor Coolant activity exceeds 300 $\mu\text{Ci/gm}$ Dose Equivalent Iodine 131 per Fission Product Barrier Matrix 1.d.1.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

FG1

INITIATING CONDITION

LOSS of 2 Fission Product Barriers and POTENTIAL LOSS of the Third Barrier

EAL THRESHOLD VALUE

Comparison of conditions / values with those listed in Fission Product Barrier Matrix indicates:

LOSS of ANY Two Barriers

AND

POTENTIAL LOSS of Third Barrier

MODE APPLICABILITY

1, 2, 3

BASIS (References)

Conditions / events required to cause the loss of 2 Fission Product Barriers with the potential loss of the third could reasonably be expected to cause a release beyond the immediate site area exceeding EPA Protective Action Guidelines.

Guidance for development of this EAL was taken from Recognition Category F in the NUMARC/NEI Methodology for Development of Emergency Action Levels.

A barrier LOSS shall also constitute a POTENTIAL LOSS for classification purposes.

NOTES:

1. Although the logic used for these initiating conditions appears overly complex, it is necessary to reflect the following considerations:
 - The Fuel Clad barrier and the RCS barrier are weighted more heavily than the Primary Containment barrier. Unusual Event Initiating Conditions (ICs) associated with RCS and Fuel Clad barriers are addressed under the other plant condition EALs.
 - At the Site Area Emergency level, there must be some ability to dynamically assess how far present conditions are from General Emergency. For example, if the Fuel Clad barrier and RCS barrier "Loss" EALs existed, this would indicate to the Emergency Director that, in addition to offsite dose assessments, the ED must focus on continual assessments of radioactive inventory and containment integrity. If, on the other hand, both Fuel Clad barrier and RCS barrier "Potential Loss" EALs existed, the Emergency Director would have more assurance that there was no immediate need to escalate to a General Emergency.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

FG1 – Cont'd

BASIS (References) – Cont'd

- The ability to escalate to higher emergency classes as an event gets worse must be maintained. For example, RCS leakage steadily rising would represent an increasing risk to public health and safety.
- 2. Fission Product Barrier ICs must be capable of addressing event dynamics. An IMMEDIATE (i.e., within 1 to 2 hours) Loss or Potential Loss should result in a classification as if the affected threshold(s) are already exceeded, particularly for the higher emergency classes.
- 3. The Fuel Clad barrier is the cladding tubes that contain the fuel pellets.
- 4. The RCS Barrier is the reactor coolant system pressure boundary and includes the reactor vessel and all reactor coolant system piping up to the isolation valves.
- 5. The Primary Containment Barrier includes the drywell, the torus, their respective interconnecting paths, and other connections up to and including the outermost containment isolation valves.
- 6. If a "Loss" condition is satisfied, the "Potential Loss" category can be considered satisfied. This is also applicable to conditions where there is a "Loss" indication with no corresponding "Potential Loss" condition.
- 7. For all conditions listed in Fission Product Barrier Table, the barrier failure column is only satisfied if it fails when called upon to mitigate an accident. For example, failure of both containment isolation valves to isolate with a downstream pathway to the environment is only a concern during an accident. If this condition exists during normal power operations, it will be an active Technical Specification Action Statement. However, during accident conditions, this will represent a breach of Primary Containment.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

FS1

INITIATING CONDITION / EAL THRESHOLD VALUE

LOSS of BOTH Fuel Clad and RCS Barriers

OR

POTENTIAL LOSS of BOTH Fuel Clad and RCS Barriers

OR

POTENTIAL LOSS of EITHER the Fuel Clad or RCS Barrier, AND a LOSS of ANY Additional Barrier

MODE APPLICABILITY

1, 2, 3

BASIS (References)

Loss of 2 Fission Product Barriers would be a major failure of plant systems needed for protection of the public.

Guidance for development of this EAL was taken from Recognition Category F in the NUMARC/NEI Methodology for Development of Emergency Action Levels.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

FA1

INITIATING CONDITION

ANY LOSS or ANY POTENTIAL LOSS of EITHER the Fuel Cladding or Reactor Coolant System

EAL THRESHOLD VALUE

Comparison of conditions / values with those listed in Fission Product Barrier Matrix indicates:

LOSS or POTENTIAL LOSS of the Fuel Cladding Barrier

OR

LOSS or POTENTIAL LOSS of the Reactor Coolant System Barrier

MODE APPLICABILITY

1, 2, 3

BASIS (References)

The Fuel Cladding and the Reactor Coolant System are weighted more heavily than the Containment Barrier.

A LOSS or POTENTIAL LOSS of either the Fuel Cladding or the Reactor Coolant System would be a substantial degradation in the level of plant safety.

Guidance for development of this EAL was taken from Recognition Category F in the NUMARC/NEI Methodology for Development of Emergency Action Levels.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

FU1

INITIATING CONDITION

ANY LOSS or ANY POTENTIAL LOSS of Containment

EAL THRESHOLD VALUE

Comparison of conditions / values with those listed in Fission Product Barrier Matrix indicates:

LOSS of the Containment Barrier

OR

POTENTIAL LOSS of the Containment Barrier

MODE APPLICABILITY

1, 2, 3

BASIS (References)

The Fuel Cladding and the Reactor Coolant System are weighted more heavily than the Containment Barrier.

Loss of the Containment would be a potential degradation in the level of plant safety.

Guidance for development of this EAL was taken from Recognition Category F in the NUMARC/NEI Methodology for Development of Emergency Action Levels.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

FUEL CLAD 1.a

INITIATING CONDITION

Reactor Pressure Vessel (RPV) Water Level

THRESHOLD VALUE

LOSS:1. RPV water level < -195 inches

POTENTIAL LOSS:2. RPV water Level < -172 inches

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS - [Threshold Value #1] Value of -195 inches corresponds to the level, which is used in the TRIP guidance to indicate challenge of core cooling. This is the Minimum Steam Cooling RPV Water Level, and as such, is the lowest RPV level at which the submerged portion of the core will generate sufficient steam to prevent any clad in the uncovered portion of the core from exceeding 1500°F. This RPV level is utilized to preclude fuel damage when RPV level is below the Top of Active Fuel (TAF).

Core submergence is the preferred method of core cooling and as such, the failure to re-establish RPV water level above the top of active fuel for an extended period of time could lead to significant fuel damage. RPV level < -195" could be indicative of a large break Loss Of Coolant Accident (LOCA) where ECCS Systems are designed to maintain level at 2/3 core height, or a small LOCA with the inability of emergency core cooling systems to reflood the RPV.

POTENTIAL LOSS - [Threshold Value #2] Core submergence is the preferred method of core cooling, and as such, the failure to re-establish RPV water level above TAF for an extended period of time could lead to significant fuel damage.

A level of < -172 inches also corresponds to the EAL for a RCS Barrier LOSS (IC RCS 2.a.1). Thus, this EAL indicates a LOSS of RCS barrier and a POTENTIAL LOSS of the Fuel Clad Barrier.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

FUEL CLAD 1.b

INITIATING CONDITION

Drywell (DW) High Range Rad Monitor

THRESHOLD VALUE

LOSS:..... 1. DW high range rad monitor reading > 7.8E+4 R/hr

POTENTIAL LOSS: NONE

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS - The intent is not to verify criteria used in calculation (e.g., release of reactor coolant into drywell), but rather to classify once EAL threshold value is reached or exceeded. Reactor coolant concentrations of this magnitude are several times larger than the maximum concentrations (including iodine spiking) allowed within technical specifications and are therefore indicative of fuel damage. This value is higher than that specified for RCS barrier under RCS 2.b.1. Thus, this EAL indicates a loss of both Fuel Clad barrier and RCS barrier.

[Calculation Basis] The 7.8E+4 R/hr reading on a drywell high range gamma radiation monitor RI-8(9)103A,B,C,D is a value which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the drywell. The reading was calculated assuming an instantaneous release and dispersal of the Reactor Coolant noble gas and iodine inventory into the Primary Containment (direct reading not shine) at a coolant concentration of 300 µCi/gm Dose Equivalent Iodine 131.

This calculation is as follows:

Using Curve 3 [1%] of Figure 4-1 of the Peach Bottom Annex "Containment Radiation Monitor Dose Rate Curves":

Time after Shutdown = 1 hour (more conservative due to lower value for EAL)

1% fuel clad damage: dose rate = 30,000 R/hr

Extrapolating to 2.6%: (30,000 R/hr/1%)(2.6) = 78,000 R/hr

2.6% clad damage is based upon NUREG-1228 core damage analysis, and by virtue of its release into containment, the loss of the Reactor Coolant barrier (detailed calculations are contained in the Basis for Fission Product Barrier IC FC 1.d.1).

POTENTIAL LOSS - NONE

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

FUEL CLAD 1.c

INITIATING CONDITION

Drywell (DW) Pressure

THRESHOLD VALUE

Not Applicable

MODE APPLICABILITY

Not Applicable

BASIS: (References)

Not applicable

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

FUEL CLAD 1.d

INITIATING CONDITION

Breached / Bypassed

THRESHOLD VALUE

LOSS: 1. Coolant Activity > 300 μCi/gm I-131 dose equivalent

OR

2. Core damage calculations indicate > 2.6% fuel clad damage

POTENTIAL LOSS: NONE

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS - A reactor coolant sample activity of greater than > 300 μCi/gm was determined to indicate significant clad heating and is indicative of the loss of the fuel clad barrier. This concentration is well above that expected for Iodine spikes and corresponds to 2.6% clad damage. 2.6% fuel clad damage is based upon NUREG-1228 core damage analysis.

Calculation of 300 μCi/cc equivalence to percent fuel clad damage is as follows: (For purposes of this calculation, cc and gm are considered equivalent.)

<u>Iodine Isotope</u>	<u>Dose Factors (Reg Guide 1.109)</u>	<u>Ci/MWe Values (Time After Shutdown = 0) (NUREG-1228)</u>
I-131	4.39E-3	85000
I-132	5.23E-5	120000
I-133	1.04E-3	170000
I-134	1.37E-5	190000
I-135	2.14E-4	150000

Time After Shutdown (T = 0) Ratios

$$R_{132} = 120000/85000(I-131) = 1.41(I-131)$$

$$R_{133} = 170000/85000(I-131) = 2.00(I-131)$$

$$R_{134} = 190000/85000(I-131) = 2.24(I-131)$$

$$R_{135} = 150000/85000(I-131) = 1.76(I-131)$$

Equation for Dose Equivalent Iodine (DEI₁₃₁)

$$DEI_{131} = \frac{A_{131} DF_{131} + (R_{132}) A_{131} DF_{132} + (R_{133}) A_{131} DF_{133} + (R_{134}) A_{131} DF_{134} + (R_{135}) A_{131} DF_{135}}{DF_{131}}$$

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FUEL CLAD 1.d (Cont'd)

BASIS: (References) – Cont'd

$$300 = \frac{A_{131}4.39E-3 + 1.41 A_{131}5.23E-5 + 2.00 A_{131}1.04E-3 + 2.24 A_{131}1.37E-5 + 1.76 A_{131}2.14E-4}{4.39E-3}$$

$$300 = \frac{6.95E-3 A_{131}}{4.39E-3}$$

Solve for A_{131} assuming $DEI_{131} = 300 \mu\text{Ci/cc}$

Therefore: $A_{131} = 189 \mu\text{Ci/cc I-131}$

Clad damage fraction (NUREG-1228, Table 4.1) = .02

Full Power = 1150 MWe

Clad Activity I-131 = (Ci/MWe) (MWe) (Clad Damage Fraction)
 = (85000Ci/MWe) (1150MWe) (.02)
 = 1.96E6 Ci

Reactor Water Volume = 2.67E8 cc (ERP-C-1410)

Total Coolant Activity I-131 = (A_{131}) (Rx Water Volume) (Ci/ μCi)
 = (189 $\mu\text{Ci/cc}$) (2.67E8cc) (1.0E-6Ci/ μCi)
 = 5.05E4Ci

Percent Clad Damage = Total Coolant Activity/Clad Activity I-131
 = (5.05E4) / (1.96E6)
 = 2.6%

POTENTIAL LOSS - NONE

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

FUEL CLAD 1.e

INITIATING CONDITION

Drywell Hydrogen Concentration

THRESHOLD VALUE

Not Applicable

MODE APPLICABILITY

Not Applicable

BASIS: (References)

Not applicable

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

FUEL CLAD 1.f

INITIATING CONDITION

Discretionary

THRESHOLD VALUE

- LOSS:**..... 1. Any condition in the judgment of the Emergency Director that indicates a **LOSS** of the Fuel Clad barrier
- POTENTIAL LOSS:** 2. Any condition in the judgment of the Emergency Director that indicates a **POTENTIAL LOSS** of the Fuel Clad barrier

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

This EAL addresses any other factors that are to be used by the Emergency Director in determining whether the Fuel Clad barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this EAL, as a factor in Emergency Director judgment, that the barrier may be considered lost or potentially lost. (See also IC, MG1, "Prolonged Loss of ALL Offsite AC Power AND Prolonged Loss of ALL Onsite AC Power", for additional information.)

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

RCS 2.a

INITIATING CONDITION

Reactor Pressure Vessel (RPV) Water Level

THRESHOLD VALUE

LOSS:..... 1. Reactor water level < -172 inches

POTENTIAL LOSS: 2. Reactor water level **CANNOT** be determined

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS – Core submergence is the preferred method of core cooling, and as such, the failure to re-establish RPV water level above TAF for an extended period of time could lead to significant fuel damage.

A level of < -172 inches also corresponds to the EAL for a Fuel Clad Barrier **POTENTIAL LOSS** (IC FC 1.a.2). Thus, this EAL indicates a **LOSS** of RCS barrier and a **POTENTIAL LOSS** of the Fuel Clad Barrier.

POTENTIAL LOSS - Inability to determine Reactor Pressure Vessel (RPV) level prevents assurance of adequate core cooling by methods that rely on being able to determine RPV water level (i.e., submergence or Minimum Steam Cooling RPV Water Level). TRIP procedures will provide criteria and strategies when RPV level **CANNOT** be determined.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

RCS 2.b

INITIATING CONDITION

Drywell (DW) High Range Rad Monitor

THRESHOLD VALUE

LOSS:1. DW high range rad monitor reading > 15 R/hr

POTENTIAL LOSS:NONE

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS - The intent is not to verify criteria used in calculation (e.g., RCS breach), but rather to classify once EAL threshold value is reached or exceeded. This reading is less than that specified for a Fuel Clad Barrier LOSS (under IC Fuel Clad 1.b.1). Thus, this EAL would be indicative of a RCS leak only. If the radiation monitor reading rises to that value specified under IC Fuel Clad 1.b.1, Fuel Clad damage would also be indicated.

[Calculation Basis] The 15 R/hr reading is a value, which indicates the release of reactor coolant to the drywell. The value assumes an instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with concentrations corresponding to 0.001% Total Isotopic Distribution (TID) into the drywell atmosphere.

Using Curve 3 [1%] of Figure 4-1 of the Peach Bottom Annex "Containment Radiation Monitor Dose Rate Curves":

Time after Shutdown = 0.1 hour

0.001% TID = 17 R/hr

This is rounded to 15 R/hr for human factors considerations

POTENTIAL LOSS - NONE

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

RCS 2.c

INITIATING CONDITION

Drywell (DW) Pressure

THRESHOLD VALUE

LOSS:..... 1. Drywell pressure > 2.0 psig
AND
Indication of RCS leak inside Drywell

POTENTIAL LOSS: NONE

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS - The 2.0 psig drywell pressure is based on the drywell high pressure alarm set point and indicates a LOCA. If drywell pressure exceeds 2.0 psig, there is indication that a leak of sufficient magnitude exists that prevents drywell pressure stabilization.

Cycling of safety relief valves to reduce primary system overpressure when no fuel damage is indicated, is NOT considered reactor coolant leakage.

Primary containment pressure rises due solely to loss of containment heat removal capability are also NOT considered to exceed this threshold.

POTENTIAL LOSS- NONE

DEVIATION: The EAL, as stated in NUMARC/NESP-007, contains only the drywell pressure. A qualifier was added as a human factor reminder to the Emergency Director that use of this EAL is for accident scenarios only:

"AND
Indication of a RCS leak inside drywell"

Thus, a Drywell Pressure rise due to the loss of Drywell Cooling will not require an emergency classification.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

RCS 2.d

INITIATING CONDITION

Breached / Bypassed

THRESHOLD VALUE

LOSS:.....1. Unisolable Main Steam Line (MSL) break as indicated by the failure of BOTH MSIVs in ANY one line to close
AND
EITHER of the following:

- High MSL Flow and High Steam Tunnel Temperature annunciators

OR

- Direct report of steam release

OR

2. SRV is stuck open or cycling

AND

Indication of a LOSS of the Fuel Clad Barrier per the Fission Product Barrier Matrix

POTENTIAL LOSS:3. RCS leakage > 50 gpm

OR

4. Unisolable primary system leakage outside Containment that results in:

a. Exceeding EITHER of the following T-103 Action Levels:

- Table SC/T-3 (Temperature)

OR

- Table SC/R-1 (Radiation)

OR

b. SCRAM initiated per T-103 due to temperature or radiation levels.

MODE APPLICABILITY

1, 2, 3

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

RCS 2.d (Cont'd)

BASIS:(References)

LOSS – [Threshold Value #1] Hi Steam Flow and Hi Steam Tunnel Temperature Annunciators are both indicators of a Main Steam Line Break. Both parameters will cause an isolation of the MSIV's. Should both valves in any one line fail to isolate, this event would be also considered a LOSS of Primary Containment (per IC 3.d.1) and appropriately classified as a Site Area Emergency.

Direct report of steam release is meant to provide an alternate means of classification if the Hi Steam Flow Annunciator or the Hi Steam Tunnel Temperature Annunciator fails to operate and the visual observation of conditions indicates a Main Steam Line Break in the judgment of the Emergency Director. This is not meant to cause a declaration based on leaks such as valve packing leaks where the consequences offsite would be negligible.

Refer to MA8 for classification of an Alert due to an isolable Main Steam Line Break.

Design basis accident analyses of a Main Steam Line Break outside of secondary containment shows that even if MSIV closure occurs within design limits, dose consequences offsite from a "puff" release would be in excess of 10 mRem.

LOSS – [Threshold Value #2] Loss of the RCS Barrier based on an open safety relief valve (SRV) is dependent on other events. If an SRV is stuck open or cycling and no other emergency condition exists, an emergency declaration is not appropriate. However, if the fuel is damaged and the relief valve is allowing the fission products to escape into the Drywell (Containment), a LOSS of the RCS Barrier has occurred.

POTENTIAL LOSS – [Threshold Value #3] The potential loss of RCS based on leakage >50 gpm is set at a level indicative of a small breach of the RCS but which is well within the makeup capability of normal and emergency high pressure systems. Core uncover is not a significant concern for a 50 gpm leak; however, a break propagation leading to a significantly larger loss of inventory is possible. RCS leakage is measured by the normal primary system leakage monitoring system and is leakage into the drywell. Under certain conditions, this system may be isolated due to elevated drywell pressure caused by the leak. In that case, a LOSS of RCS will be indicated and this "potential loss" of RCS would not impact the classification.

Inventory loss events, such as a stuck open SRV, should not be considered when referring to "RCS leakage" because they are not indications of a break, which could propagate.

POTENTIAL LOSS - [Threshold Value #4] Potential loss of RCS based on primary system leakage outside Containment is determined from site-specific area temperatures or radiation levels per T-103, which indicate a direct path from the RCS to areas outside primary containment. Initiation of a SCRAM per T-103 prior to reaching the Action Levels for area temperature and radiation meets the intent of EAL.

T-103 Action Levels based on area water level (Table SC/L-2) are evaluated separately for an Alert classification under IC HA3 (Natural or Destructive Phenomena Affecting a Vital Area).

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

RCS 2.d (Cont'd)

BASIS:(References) – Cont'd

Terms:

- **Unisolable** - Refers to a leak that cannot be isolated from the Control Room. When evaluating this EAL for unisolable primary system leakage, it is appropriate to attempt isolation from the Control Room prior to classification.
- **Primary System** - The pipes, valves and other equipment which connect directly to the RPV such that a reduction in RPV pressure will cause a drop in the flowrate of steam or water being discharged through a break in the system.
- **Primary System Leakage** - In general, multiple indications should be used to determine if a primary system is discharging outside Primary Containment. For example, a high area radiation condition does not necessarily indicate that a primary system is discharging into the Reactor Building since this may be caused by radiation shine from nearby steam lines or the movement of radioactive materials. Conversely, a high area radiation condition in conjunction with other indications (e.g. room flooding, high area temperatures, reports of steam in the Reactor Building, an unexpected rise in Feedwater flowrate, or unexpected Main Turbine Control Valve closure) may indicate that a primary system is discharging into the Reactor Building.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

RCS 2.e

INITIATING CONDITION

Drywell Hydrogen Concentration

THRESHOLD VALUE

Not Applicable

MODE APPLICABILITY

Not Applicable

BASIS: (References)

Not applicable

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

RCS 2.f

INITIATING CONDITION

Discretionary

THRESHOLD VALUE

- LOSS:** 1. Any condition in the judgment of the Emergency Director that indicates a **LOSS** of the Reactor Coolant System barrier
- POTENTIAL LOSS:** 2. Any condition in the judgment of the Emergency Director that indicates a **POTENTIAL LOSS** of the Reactor Coolant System barrier

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

This EAL addresses any other factors that are to be used by the Emergency Director in determining whether the RCS barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this EAL as a factor in Emergency Director judgment that the barrier may be considered lost or potentially lost. (See also IC, MG1, "Prolonged Loss of ALL Offsite AC Power AND Prolonged Loss of ALL Onsite AC Power" for additional information.)

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

CONTAINMENT 3.a

INITIATING CONDITION

Reactor Pressure Vessel (RPV) Water Level

THRESHOLD VALUE

LOSS: NONE

POTENTIAL LOSS: 1. ANY of the following direct entry into SAMP-1 and SAMP-2:

- T-111
- T-116
- T-117

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS- NONE

POTENTIAL LOSS - The entry into SAMP-1 (RPV and Primary Containment Flooding) and SAMP-2 (Containment and Radioactivity Release Control) indicates that the reactor core cannot be adequately cooled and the Primary Containment is required to be flooded to submerge the core and preserve Primary Containment integrity. Concurrent entry and execution of SAMP-2 with SAMP-1 properly coordinates Primary Containment control functions with RPV and Primary Containment injection.

Entry into Severe Accident Management Procedures (SAMP) is directed by the TRIP procedures when adequate core cooling requirements cannot be satisfied and core damage has or may occur.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

CONTAINMENT 3.b

INITIATING CONDITION

Drywell (DW) High Range Rad Monitor

THRESHOLD VALUE

LOSS:NONE

POTENTIAL LOSS:1. Drywell high range rad monitor reading > 6.0E+5 R/hr

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS - NONE

POTENTIAL LOSS – The intent is not to verify criteria used in calculation, but rather to classify once EAL threshold value is reached or exceeded.

[Calculation Basis] A drywell high range gamma radiation monitor RI-8(9)103A,B,C,D reading > 6.0E+5 R/hr indicates significant fuel damage, well in excess of that required for the loss of the RCS and Fuel Clad. As stated in Section 3.8 of NUMARC/NESP-007, a major release of radioactivity requiring offsite protective actions from core damage is not possible unless a major failure of fuel cladding allows radioactive material to be released from the core into the reactor coolant. Regardless of whether containment is challenged, this amount of activity in containment, if released, could have such severe consequences that it is prudent to treat this as a potential loss of containment, such that a General Emergency declaration is warranted. NUREG-1228, "Source Estimations During Incident Response to Severe Nuclear Power Plant Accidents," indicates that such conditions do not exist when the amount of clad damage is less than 20%.

The reading was calculated assuming an instantaneous release of the Reactor Coolant volume into the Primary Containment (direct reading not shine) where the value corresponds to a release of approximately 20% of the gap region. This calculation is as follows:

Using Curve 3 [1%] of Figure 4-1 of the Peach Bottom Annex "Containment Radiation Monitor Dose Rate Curves":

- Time after Shutdown = 1 hour (more conservative due to lower value for EAL)
- 1% fuel clad damage: dose rate = 30,000 R/hr
- Extrapolating to 20%: (30,000 R/hr/1%)(20) = 600,000 R/hr

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

CONTAINMENT 3.c

INITIATING CONDITION

Drywell (DW) Pressure

THRESHOLD VALUE

LOSS:..... 1. Rapid, unexplained drop in DW pressure following an initial rise

OR

2. DW pressure response not consistent with LOCA conditions indicating a Containment breach

POTENTIAL LOSS: 3. DW pressure > 49 psig

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS – [Threshold Value #1] A rapid unexplained loss of Drywell pressure not due to use of containment sprays following an initial pressure rise indicates a loss of containment integrity.

LOSS – [Threshold Value #2] Drywell pressure should rise as a result of mass and energy release into the containment from a Loss of Coolant Accident (LOCA). Thus, Drywell pressure NOT rising under these conditions indicates a breach of containment integrity.

POTENTIAL LOSS - [Threshold Value #3] A Drywell pressure 49 psig is equal to the peak pressure expected from a Design Basis Accident (DBA) LOCA and is based on the containment/drywell design pressure. If the containment design pressure is exceeded this represents a challenge to the containment structure because assumptions used in the accident analysis are no longer valid and an unanalyzed condition exists. This constitutes a potential loss of the containment barrier even if a breach has NOT occurred.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

CONTAINMENT 3.d

INITIATING CONDITION

Breached / Bypassed

THRESHOLD VALUE

- LOSS:** 1. Failure of ALL automatic isolation valves in ANY one line penetrating Primary Containment to close resulting from an isolation actuation signal
- AND**
- Downstream pathway exists to the environment
- OR**
2. Intentional venting per T-200 is required
- OR**
3. Unisolable primary system leakage outside of Containment that results in:
- a. Exceeding EITHER of the following T-103 Action Levels:
- Table SC/T-3 (Temperature)
- OR**
- Table SC/R-1 (Radiation)
- OR**
- b. SCRAM initiated per T-103 due to temperature or radiation levels.

POTENTIAL LOSS:.....NONE

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS – [Threshold #1] A failure of all Primary Containment isolation valves in any one line indicates a breach of the primary containment integrity as described in the primary containment Limiting Conditions for Operation. Failure of containment isolation valves to isolate with a downstream pathway to the environment is only a concern during an accident. If this condition exists during normal power operations, it will be addressed by a Technical Specification Action Statement. However, during accident conditions, this will represent a breach of Primary Containment. The criteria “from an automatic isolation actuation signal” is used to define that accident conditions are present and that isolation is required.

Table PBAPS 3-2: EAL Technical BasisRECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CONTAINMENT 3.d (Cont'd)

BASIS: (REFERENCES) – Cont'd

The breach is NOT isolable from the Control Room OR an attempt for isolation from the Control Room has been made and was unsuccessful. An attempt for isolation from the Control Room should be made prior to the accident classification. If Operator actions from the Control Room are successful, then this IC is not applicable and REFER to IC MA8. Credit is NOT given for Operator actions taken in-plant (outside the Control Room) to isolate the leak.

This EAL is intended to cover containment isolation failures allowing a direct flow path to the environment such as failure of both MSIVs to close with open valves downstream to the turbine or to the condenser, even if these systems are not breached.

LOSS – [Threshold #2] Intentional venting of the primary containment per T-200 procedures to the secondary containment and/or the environment is considered to be a breach of the primary containment for the purposes of accident classification.

LOSS – [Threshold #3] Loss of Primary Containment Barrier based on primary system leakage outside Containment is determined from site-specific area temperatures or radiation levels per T-103, which indicate a direct path from the RCS to areas outside primary containment. Initiation of a SCRAM per T-103 prior to reaching the Action Levels for area temperature and radiation meets the intent of the EAL.

T-103 Action Levels based on area water level (Table SC/L-2) are evaluated separately for an Alert classification under IC HA3 (Natural or Destructive Phenomena Affecting a Vital Area).

POTENTIAL LOSS - NONE

Terms:

- **Unisolable** - A leak that cannot be isolated from the Control Room. When evaluating this EAL for unisolable primary system leakage, it is appropriate to attempt isolation from the Control Room prior to classification.
- **Primary System** - The pipes, valves and other equipment which connect directly to the RPV such that a reduction in RPV pressure will cause a drop in the flowrate of steam or water being discharged through a break in the system.
- **Containment Bypassed** – The unintentional opening of, or leakage through, penetration isolations (e.g., equipment / personnel access hatches / airlocks, dampers / valves, etc.), such that a path to the environment exists.
- **Primary System Leakage** - In general, multiple indications should be used to determine if a primary system is discharging outside Primary Containment. For example, a high area radiation condition does not necessarily indicate that a primary system is discharging into the Reactor Building since this may be caused by radiation shine from nearby steam lines or the movement of radioactive materials. Conversely, a high area radiation condition in conjunction with other indications (e.g. room flooding, high area temperatures, reports of steam in the Reactor Building, an unexpected rise in Feedwater flowrate, or unexpected Main Turbine Control Valve closure) may indicate that a primary system is discharging into the Reactor Building.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

CONTAINMENT 3.e

INITIATING CONDITION

Drywell Hydrogen Concentration

THRESHOLD VALUE

LOSS:.....NONE

**POTENTIAL LOSS:1. Drywell Hydrogen (H₂) > 6%
AND
Drywell Oxygen (O₂) > 5%**

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS - NONE

POTENTIAL LOSS - The specified value of 6% hydrogen and 5% oxygen concentration is the minimum, which can support a deflagration. Combustion of hydrogen in the deflagration concentration range creates a traveling flame causing a rapid rise in primary containment pressure. A deflagration may result in a peak primary containment pressure high enough to rupture the primary containment or damage the Drywell-to-Torus boundary.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION**

CONTAINMENT 3.f

INITIATING CONDITION

Discretionary

THRESHOLD VALUE

- LOSS:** 1. Any condition in the judgment of the Emergency Director that indicates a **LOSS** of the Primary Containment barrier
- POTENTIAL LOSS:** 2. Any condition in the judgment of the Emergency Director that indicates a **POTENTIAL LOSS** of the Primary Containment barrier

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

This EAL addresses any other factors that are to be used by the Emergency Director in determining whether the Primary Containment Barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this EAL as a factor in the Emergency Director's judgment that the barrier may be considered lost or potentially lost. See also IC, MG1, "Prolonged Loss of ALL Offsite AC Power AND Prolonged Loss of ALL Onsite AC Power" for additional information.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MG1

INITIATING CONDITION

Prolonged Loss of ALL Offsite AC Power AND Prolonged Loss of ALL Onsite AC Power

EAL THRESHOLD VALUES

1. Loss of offsite power to ALL 4 KV Safeguard Busses

AND

ALL four of the 4 KV Safeguard Busses are de-energized for > 15 minutes

AND

ANY of the following:

- **Restoration of at least one 4 KV emergency bus in ≤ 2 hours is NOT likely**

OR

- **Reactor water level CANNOT be maintained > -172 inches**

OR

- **Torus temperature CANNOT be maintained on the "SAFE" side of the Heat Capacity Temperature Limit (HCTL) Curve (T-102, T/T-1)**

MODE APPLICABILITY

1, 2, 3

BASIS (References)

When evaluating this EAL for Torus level outside of the Heat Capacity Temperature Limit Curve, High or Low, it is appropriate to consider the operation to be on the "UNSAFE" side.

Loss of all AC power compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all AC power will lead to loss of fuel clad, RCS, and containment. The two hours to restore AC power is based on the site blackout coping analysis as described below. Although this IC may be viewed as redundant to the Fission Product Barrier Degradation IC, its inclusion is necessary to better assure timely recognition and emergency response.

10 CFR 50.2 defines Station Blackout (SBO) as complete loss of AC power to essential and non-essential buses. SBO does not include loss of AC Power to busses fed by station batteries through inverters, nor does it assume a concurrent single failure or design basis accident.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MG1 – Cont'd

BASIS (References) – Cont'd

Successful extended SBO coping depends on ability to keep HPCI/RCIC available for injection, and ability to maintain RPV depressurized for low pressure injection should HPCI and RCIC become unavailable. 125V DC provides control power for HPCI, RCIC and SRVs.

The criteria for “Restoration of at least one 4 KV emergency bus in ≤ 2 hours” is based on Peach Bottom Calculation PE-017. From the Peach Bottom DBD, “The 125/250 VDC system battery capacity requirements are based on supplying DC power with the batteries as the sole source for two (2) hours following a LOOP / LOCA.” PE-017 also identifies that the LOOP / LOCA battery loads are worst case and bound the SBO battery loads for these first 2 hours.

The significance of a station blackout relative to the loss of fission product release barriers is that all three barriers will eventually be lost due to the inability to remove heat from the fuel and the containment. Although the RCS will be intact the longest, eventually SRVs will operate in the relief mode due to RPV over-pressurization and if the containment has already failed then there is a direct bypass of the RCS boundary.

Implementation of this EAL is based on the number of powered 4 KV buses per unit.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MS1

INITIATING CONDITION

Loss of ALL Offsite AC Power AND Loss of ALL Onsite AC Power to Essential Busses

EAL THRESHOLD VALUES

1. Loss of offsite power to ALL 4 KV Safeguard Busses

AND

ALL four of the 4 KV Safeguard Busses are de-energized for > 15 minutes

MODE APPLICABILITY

1, 2, 3

BASIS (References)

Control Room annunciators would indicate that all offsite and onsite AC power feeds have been lost. Loss of all AC power compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal, Spent Fuel Heat Removal, High Pressure Service Water, and Emergency Service Water. Although instrumentation (supplied through instrument inverters) and DC power systems would be available, their operability would be limited to the amount of stored energy contained in their respective batteries. Instrumentation, communication equipment, and in-plant lighting and ventilation will be significantly hampered by the loss of all AC power.

Fifteen (15) minutes has been selected to allow adequate time to cross tie or address diesel generator failures and to exclude transient or momentary power losses. It is not necessary to wait for 15 minutes if it can be determined in less than 15 minutes that the power loss is not transient or momentary.

Implementation of this EAL is based on the number of powered 4 KV buses per unit.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MA1

INITIATING CONDITION

AC Power to Essential Busses Reduced to a Single Source for > 15 minutes

EAL THRESHOLD VALUE

1. Loss of offsite power to ALL 4 KV Safeguard Busses
AND
Three of four of the 4 KV Safeguard Busses are de-energized for > 15 minutes

MODE APPLICABILITY

1, 2, 3

BASIS (References)

The reduction of available reliable power sources to a condition where ANY additional single failure will result in a station blackout is a substantial degradation in the level of safety of the plant. That is, the Unit is down to its last source of AC power. Loss of the single power supply would escalate to a SITE AREA EMERGENCY via IC MS1.

This EAL is intended to provide an escalation from "Loss of offsite Power for greater than 15 minutes." This condition is a degradation of the offsite and onsite power systems such that any additional failure would result in a station blackout. Fifteen (15) minutes has been selected to allow adequate time to cross tie or address diesel generator failures and to exclude transient or momentary power losses. However, an Alert should be declared in less than 15 minutes if it can be determined in less than 15 minutes that the power loss is not transient or momentary.

Depending on the 4 KV AC bus that remains energized there is a disparity in the systems that may be available. The ability to remove heat from the containment via Torus cooling may be lost due to the need to operate the remaining available RHR pump in other than Torus cooling (e.g., LPCI). As such there is a decrease in the systems available to remove heat transferred to the containment and there is an ongoing release of energy from the reactor to the containment (via SRVs, HPCI and/or RCIC operation). The ability to cool the nuclear fuel, remove decay heat, and control containment parameters is severely limited. Should equipment be unavailable prior to the loss of power, functions necessary to maintain the plant in a cold shutdown condition may be threatened.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MU1

INITIATING CONDITION

Loss of ALL Offsite AC Power for > 15 minutes to Essential Busses

EAL THRESHOLD VALUE

1. Loss of offsite power to ALL 4 KV Safeguard Busses for >15 minutes

MODE APPLICABILITY

ALL

BASIS (References)

Unplanned – Not the result of an intended evolution and requiring corrective or mitigative actions

This EAL addresses the loss of offsite AC power supplying the station. Offsite power is fed through 2 and 3 Startup and Emergency Aux. Transformers and 343 Startup Transformer. Loss of offsite power will cause a reactor scram and a containment isolation. All four (4) emergency Diesel Generators will be available to carry the essential loads for each unit (the four Diesel Generators are shared between each unit). Balance of Plant systems that would assist in plant operations (i.e., condensate pumps, etc.) may be unavailable due the loss of power.

Prolonged loss of AC power reduces required redundancy and potentially degrades the level of safety of the plant by rendering the plant more vulnerable to a complete Loss of AC Power (Station Blackout). Fifteen minutes was selected as a threshold to allow adequate time to cross tie or address diesel generator failures and to exclude transient or momentary power losses.

The Emergency Director must also consider the impact to the unaffected unit due to the loss of power to balance of plant equipment on common or shared systems.

Escalation of this event to an Alert would be based on having a loss of all offsite AC power coincident with onsite AC power being reduced to a single power source in Modes 1, 2, and 3 or having a loss of all offsite and onsite AC power in Modes 4 or 5.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MA2

INITIATING CONDITION

Loss of ALL Offsite AC Power AND Loss of ALL Onsite AC Power to Essential Busses

EAL THRESHOLD VALUES

1. Loss of offsite power to ALL 4 KV Safeguard Busses
AND
ALL four of the 4 KV Safeguard Busses are de-energized for > 15 minutes

MODE APPLICABILITY

4, 5, Defueled

BASIS (References)

Loss of all AC power compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal, Spent Fuel Heat Removal and the Ultimate Heat Sink. When in cold shutdown, refueling, or defueled mode, the event can be classified as an Alert, because of the significantly reduced decay heat, lower temperature and pressure, raising the time to restore one of the emergency busses, relative to that specified for the Site Area Emergency EAL.

Fifteen (15) minutes has been selected to allow adequate time to cross tie or address diesel generator failures and to exclude transient or momentary power losses. However, an Alert should be declared in less than 15 minutes if it can be determined in less than 15 minutes that the power loss is not transient or momentary.

Implementation of this EAL is based on the number of powered 4 KV buses per unit.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MS3

INITIATING CONDITION

Loss of **ALL** Required T.S. Safety-Related 125 VDC Power Sources

EAL THRESHOLD VALUE

1. Loss of **ALL** required T.S. safety related 125 VDC power sources for > 15 minutes as indicated by < 107.5 VDC on Panels 2(3)0D21, 22, 23, 24.

MODE APPLICABILITY

1, 2, 3

BASIS (References)

A loss of all DC power compromises the ability to monitor and control plant functions. 125 Volt DC system provides control power to engineered safety features valve actuation, diesel generator auxiliaries, plant alarm and indication circuits as well as the control power for the associated load group. If 125 Volt DC power is lost for an extended period of time (greater than 15 minutes) critical plant functions required to maintain safe plant conditions may not operate and core uncover with subsequent reactor coolant system and primary containment failure might occur. Refer to SE-13, "Loss of a 125 or 250 VDC Safety-Related Bus".

107.45 VDC bus voltage is based on the minimum bus voltage necessary for the operation of safety related equipment. This EAL uses 107.5 VDC for human factors concerns. This voltage value incorporates a margin of at least 15 minutes of operation before the onset of inability to operate those loads.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MU3

INITIATING CONDITION

Loss of **ALL Required** T.S. Safety-Related 125 VDC Power Sources

EAL THRESHOLD VALUE

1. Loss of **ALL required** T.S. safety-related 125 VDC power sources for > 15 minutes as indicated by < 107.5 VDC on DC Panels 2(3)0D21, 22, 23, 24.

MODE APPLICABILITY

4, 5

BASIS (References)

The purpose of this EAL is to recognize a loss of DC power compromising the ability to monitor and control the removal of decay heat during Cold Shutdown or Refueling operations. This EAL is intended to be anticipatory in as much as the operating crew may not have necessary indication and control of equipment needed to respond to the loss.

107.45 VDC bus voltage is based on the minimum bus voltage necessary for the operation of safety related equipment. The value of 107.5 VDC will be used for human factors concerns. This voltage value incorporates a margin of at least 15 minutes of operation before the onset of inability to operate those loads.

Unplanned is included in this IC and EAL to preclude the declaration of an emergency as a result of planned maintenance activities. Routinely, plants will perform maintenance on a Train related basis during shutdown periods. It is intended that the loss of a required train be considered. If this loss results in the inability to maintain cold shutdown, the escalation to an Alert will occur.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MG4

INITIATING CONDITION

Auto and Manual SCRAM NOT Successful, AND Loss of Core Cooling or Heat Sink

EAL THRESHOLD VALUES

1. Failure of automatic RPS, ARI and Manual SCRAM/ARI to shutdown the reactor as defined by **EITHER** of the following criteria:

- Reactor Power > 4%

OR

- Torus temperature is greater than 110°F **AND** boron injection is required

AND

EITHER of the following criteria are met:

- Torus Temperature **CANNOT** be maintained on the "SAFE" side of the Heat Capacity Temperature Limit (HCTL) curve (T-102, T/T-1)

OR

- Reactor water level < -195 inches

MODE APPLICABILITY:

1, 2

BASIS: (References)

Manual SCRAM - Any set of actions by the reactor operators at the reactor control console which causes control rods to be insert sufficiently to reduce reactor power to a condition where it will remain shutdown under all conditions without the use of boron injection (i.e., mode switch to shutdown, using the manual scram pushbuttons, or manual ARI initiation).

Automatic actuation of the ARI system is a backup to the **MANUAL SCRAM** and, as a result, does not constitute a successful **MANUAL SCRAM**.

Boron Injection Initiation Temperature (BIIT) is defined as 110°F Torus temperature per the T-101 Basis for "RPV Control".

This EAL is not applicable if a manual scram is initiated and no RPS set points are exceeded. Taking the mode switch to shutdown is considered a manual scram action. Note that although placing the Mode Switch in "shutdown" is a manual scram action, when the Mode Switch passes through the "startup / hot standby" position the Nuclear Instrumentation Scram Setpoint is lowered. If reactor power is greater than the setpoint, an automatic scram will be initiated. If the RPS then fails to initiate a scram, then this should be evaluated as an automatic RPS set point being exceeded and a failure of the automatic scram.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MG4 – Cont'd

BASIS: (References) – Cont'd

A valid automatic and/or manual scram signal is present as indicated by control room indications and/or alarms. Nuclear instrumentation (APRM) indications or other reactor parameters (steam flow, reactor pressure, Torus temperature trend) can be used to determine if reactor power is greater than 4% power.

The Reactor Protection System (RPS) is designed to function to shut down the reactor (either manually or automatically). The RPS system is "fail safe," that is, it de-energizes to function. An Anticipated Transient Without Scram (ATWS) event can be caused by either a failure of RPS (electrical ATWS) or the Control Rod Drive system to insert the control rods (hydraulic ATWS).

The TRIP procedures establish 4% power (APRM downscals) as a power level sufficient to challenge Primary Containment heat removal capabilities should this energy be directed to the Primary Containment. If APRM downscale setpoint is achieved, but Torus temperature is greater than Boron Injection Temperature, a precursor exists for a threat to Primary Containment.

In addition, control room instrumentation indicates that operation is on the "UNSAFE" side of the HCTL Curve (T-102, T/T-1) or RPV level is < -195 inches. When Torus level is outside of the Heat Capacity Temperature Limit (HCTL) Curve (High or Low), it is appropriate to consider operation to be on the "UNSAFE" side. Failure of all automatic and manual trip functions coincident with a high Torus temperature will place the plant in a condition where reactivity control capability is jeopardized and heat removal capability is severely limited. RPV level less than -195 inches corresponds to the level, which is used in the TRIP procedures to indicate a challenge to adequate core cooling.

Table PBAPS 3-2: EAL Technical Basis**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS****MS4****INITIATING CONDITION**

Auto and Manual SCRAM NOT Successful

EAL THRESHOLD VALUE

1. Failure of RPS, ARI and Manual SCRAM/ARI to shutdown the reactor as defined by **EITHER** of the following criteria:
 - Reactor Power > 4%

OR

 - Torus temperature is greater than 110°F **AND** boron injection is required

MODE APPLICABILITY:

1, 2

BASIS: (References)

Manual SCRAM - Any set of actions by the reactor operator(s) at the reactor control console which causes control rods to insert sufficiently to reduce reactor power to a condition where it will remain shutdown under all conditions without the use of boron injection (i.e., mode switch to shutdown, manual scram push buttons, or manual ARI initiation).

Automatic actuation of the ARI system is a backup to the MANUAL SCRAM and, as a result, does not constitute a successful MANUAL SCRAM.

Boron Injection Initiation Temperature (BIIT) is defined as 110°F Torus temperature per the T-101 Basis for "RPV Control".

This EAL is not applicable if a manual scram is initiated and no RPS set points are exceeded. Taking the mode switch to shutdown is considered a manual scram action. Note that although placing the Mode Switch in "shutdown" is a manual scram action, when the Mode Switch passes through the "startup / hot standby" position the Nuclear Instrumentation Scram Setpoint is lowered. If reactor power is greater than the setpoint, an automatic scram will be initiated. If the RPS then fails to initiate a scram, then this should be evaluated as an automatic RPS set point being exceeded and a failure of the automatic scram.

A valid automatic and/or manual scram signal is present as indicated by control room indications and/or alarms. Nuclear instrumentation (APRM) indications or other reactor parameters (steam flow, reactor pressure, Torus temperature trend) can be used to determine if reactor power is greater than 4% power.

The Reactor Protection System (RPS) is designed to function to shut down the reactor (either manually or automatically). The RPS system is "fail safe," that is, it de-energizes to function. An Anticipated Transient Without Scram (ATWS) event can be caused by either a failure of RPS (electrical ATWS) or the Control Rod Drive system to insert the control rods (hydraulic ATWS).

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MS4 – Cont'd

BASIS: (References) – Cont'd

The TRIP procedures establish 4% power (APRM downscapes) as a power level sufficient to challenge Primary Containment heat removal capabilities should this energy be directed to the Primary Containment. If APRM downscale setpoint is achieved, but Torus temperature is greater than Boron Injection Temperature, a precursor exists for a threat to Primary Containment and thus a Site Area Emergency is warranted.

This event escalation is based on rising Torus temperature or lowering RPV water level that would result in the loss of containment integrity and the inability to remove the heat generated from the fuel per MG4.

Table PBAPS 3-2: EAL Technical Basis**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS****MA4****INITIATING CONDITION**

Auto SCRAM NOT Successful

EAL THRESHOLD VALUE

1. RPS set point has been exceeded for an automatic SCRAM

AND

Failure of automatic RPS to achieve a state in which the reactor is shutdown under all conditions without boron

MODE APPLICABILITY

1, 2

BASIS (References)

This EAL is not applicable if a manual scram is initiated and no RPS set points are exceeded. Taking the mode switch to shutdown is considered a manual scram action. Note that although placing the Mode Switch in "shutdown" is a manual scram action, when the Mode Switch passes through the "startup / hot standby" position the Nuclear Instrumentation Scram Setpoint is lowered. If reactor power is greater than the setpoint, an automatic scram will be initiated. If the RPS then fails to initiate a scram, then this should be evaluated as an automatic RPS set point being exceeded and a failure of the automatic scram.

Entry into this EAL is based on a reactor parameter actually exceeding a RPS set point and the reactor is not brought to a state in which the reactor is shutdown under all conditions without boron injection and maintained at that state with automatic RPS functions. The parameter must exceed the RPS set point by a significant margin eliminating minor set point drifts, which are accounted for in the Technical Specification Margin of Safety. Subsequent manual scram actions were successful in bringing the reactor to a state in which the reactor is shutdown under all conditions without boron injection. Confirmation indications include control room annunciators, APRM/WRNM power level, Reactor Period, and Control rod position indication.

When partial control rod insertion occurs following a scram signal (either manual or automatic) judgment should be applied as to whether the Reactor will remain "Shutdown Under All Conditions Without Boron" and if classification should occur. Multiple control rods failing to insert beyond the Maximum Subcritical Banked Withdraw Position (MSBWP) may require actions to fully insert the control rods. TRIP guidance will govern the insertion of these control rods.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MA4 – Cont'd

BASIS (References) – Cont'd

This condition is more than a potential degradation of a safety system in that a front line automatic protection system does not function in response to a plant transient and thus the plant safety has been compromised, and design limits of the fuel may have been exceeded. An Alert is indicated because conditions exist that lead to potential loss of the Fuel Clad or RCS Barriers.

A scram is considered unsuccessful if it does not result in achieving a state in which the reactor will remain shutdown under all conditions without boron injection.

This EAL would be escalated to a Site Area Emergency with a failure of both manual and automatic scram signals and either Reactor power > 4% (APRM downscals) or Torus temperature greater than Boron Injection Temperature.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MS5

INITIATING CONDITION

Complete Loss of Functions Needed to Achieve AND Maintain Hot Shutdown

EAL THRESHOLD VALUES

1. Loss of functions required for Hot Shutdown as evidenced by T-102 T/T leg, directing a T-112 Emergency Blowdown

MODE APPLICABILITY:

1, 2, 3

BASIS: (References)

This EAL addresses complete loss of functions, including ultimate heat sink, required for hot shutdown with the reactor at pressure and temperature. Reactivity control is addressed in other EALs. The loss of heat removal function is indicated by T-102 T/T leg requiring an Emergency Blowdown, which is directed when the Heat Capacity Temperature Limit (HCTL) curve is exceeded.

The EAL is concerned with Torus temperature. It is not appropriate to make a Site Area Emergency classification for the condition where the T-102 Torus Level (T/L) leg alone directs a T-112 Emergency Blowdown since the Emergency Blowdown is performed PRIOR to those Torus levels which may cause a loss of containment capability due to uncovering downcomers or excessive SRV tailpipe stresses.

Under these conditions, there is an actual major failure of a system intended for protection of the public. Thus, declaration of a Site Area Emergency is warranted. Escalation to General Emergency would be via Effluent Release/In-Plant Radiation, Emergency Director Judgment, or Fission Product Barrier Degradation ICs.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MA5

INITIATING CONDITION

Inability to Maintain Plant in Cold Shutdown

EAL THRESHOLD VALUE

1. Unplanned loss of ALL T.S. required decay heat removal systems
AND
EITHER of the following:
 - RCS temperature exceeding 212 °F for ≥ 15 minutes with a heat removal function restored
 - OR
 - Uncontrolled RCS temperature rise approaching 212 °F with NO heat removal function restored

MODE APPLICABILITY

4, 5

BASIS (References)

Uncontrolled - A temperature rise that is not the result of a planned evolution

This EAL addresses complete loss of functions required for core cooling during refueling and cold shutdown modes. A loss of Technical Specifications components is paired with exceeding temperature limits to acknowledge additional plant capabilities to maintain plant cooling. Escalation to Site Area Emergency or General Emergency would be via Effluent Release/In-Plant Radiation or Emergency Director Judgment ICs.

The statement "Temporary Loss of ALL Tech Spec Required Decay Heat Removal Systems" is intended to represent a complete loss of functions available, or an inadequate ability, to provide core cooling during the Cold Shutdown and Refueling Modes, including alternate decay heat removal methods. This EAL allows for actions taken in ON-125, "Loss of Shutdown Cooling - Procedure," to reestablish RHR in the Shutdown Cooling Mode or provide for alternate methods of decay heat removal, with the intent of maintaining RCS temperature below 212° F.

For loss of an in-service Decay Heat Removal system with other decay heat removal methods available, actions taken to provide for restoration of a decay heat removal function may require time to implement. If the event results in RCS temperature "momentarily" (for less than 15 minutes) rising above 212°F with heat removal capability restored, Emergency Director/Shift Management judgment will be required to determine whether heat removal systems are adequate to prevent boiling in the core and restoration of RCS temperature control.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MA5 – Cont'd

BASIS (References) – Cont'd

Momentary (not to exceed 15 minutes) unplanned excursions above 212° F, when alternate decay heat removal capabilities exist, should not be classified under this EAL.

The EAL guidance related to uncontrolled temperature rise is necessary to preserve the anticipatory philosophy of NUREG-0654 for events starting from temperatures much lower than the cold shutdown temperature limit.

This EAL is concerned with the ability to keep the reactor core temperature less than 212 °F. The criteria of uncontrolled Reactor Coolant temperature rise > 212 °F is met as soon as it becomes known that sufficient cooling cannot be restored in time to maintain the temperature < 212 °F, regardless of the current temperature. The inability to establish alternate methods of decay heat removal indicates that either alternate methods are unavailable to cool the core in the RPV or when the steam is transferred to the Torus, Torus cooling is unavailable. Loss of Torus cooling will result in a continuing, uncontrolled rise in reactor coolant temperature.

Special Test Exception 3.10.8 allows for temperature to rise above 212 °F during hydrostatic testing. The limit of 212 °F in this EAL does not apply under those conditions as that is not an "Uncontrolled Temperature rise."

Escalation to the Site Area Emergency is by EAL MS7, "Loss of Water Level in the Reactor Vessel that has or will uncover Fuel in the Reactor Vessel," or by Effluent Release/In-Plant Radiation RS1.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MS6

INITIATING CONDITION

Inability to Monitor a Significant Transient in Progress

EAL THRESHOLD VALUE

1. A significant plant transient is in progress (Table M-1)

AND

ALL of the following are lost:

- Safety system annunciators (Table M-2)
- Safety function indicators (Table M-3)
- Plant Monitoring System

<u>Table M-1</u> Significant Plant Transients	<u>Table M-2</u> Safety System Annunciators	<u>Table M-3</u> Safety Function Indicators
<ul style="list-style-type: none"> • SCRAM • Recirc Runbacks (> 25% thermal power change) • Sustained Power Oscillations (25% peak to peak) • Stuck open relief valves • ECCS Injection 	<ul style="list-style-type: none"> • ECCS • Containment Isolation • Reactor Trip • Process Radiation Monitoring 	<ul style="list-style-type: none"> • Reactor Power • Decay Heat Removal • Containment Safety Functions

MODE APPLICABILITY:

1, 2, 3

BASIS: (References)

This EAL recognizes the difficulty associated in monitoring conditions without normal annunciators. In the opinion of the Shift Supervisor, this loss of annunciators requires increased surveillance to safely operate the plant. This EAL represents an increase in severity above MA6 in that the Plant Monitoring System can not provide compensatory indication, and that a significant transient is in progress.

Planned maintenance or testing activities are included in this EAL due to the significance of this event. Control Room panels with annunciators and the restoration is included in ON-123, Loss of Control Room Annunciators.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MA6

INITIATING CONDITION

Loss of Annunciators OR Indicators Requiring Increased Surveillance

EAL THRESHOLD VALUES

1. Unplanned loss for > 15 minutes of **MOST** or **ALL** of **EITHER**:

- Safety system annunciators (Table M-2)
- OR**
- Safety function indicators (Table M-3) for > 15 minutes

AND

Increased surveillance is required to safely operate the unit(s)

AND

EITHER of the following:

- A significant plant transient is in progress (Table M-1)
- OR**
- Plant Monitoring System is unavailable

<u>Table M-1</u> Significant Plant Transients	<u>Table M-2</u> Safety System Annunciators	<u>Table M-3</u> Safety Function Indicators
<ul style="list-style-type: none"> • SCRAM • Recirc Runbacks (> 25% thermal power change) • Sustained Power Oscillations (25% peak to peak) • Stuck open relief valves • ECCS Injection 	<ul style="list-style-type: none"> • ECCS • Containment Isolation • Reactor Trip • Process Radiation Monitoring 	<ul style="list-style-type: none"> • Reactor Power • Decay Heat Removal • Containment Safety Functions

MODE APPLICABILITY:

1, 2, 3

BASIS: (References)

MOST - 75% of safety system annunciators or indicators are lost or a significant risk that a degraded plant condition could go undetected exists. The use and definition of MOST is not intended to require a detailed count of lost annunciators or indicators but should be used as a guide to assess the ability to monitor the operation of the plant.

UNPLANNED - Loss of annunciators or indicators is not the result of scheduled maintenance or testing.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MA6 – Cont'd

BASIS: (References) – Cont'd

This EAL recognizes the difficulty associated in monitoring conditions without normal annunciators. It is not intended that a detailed count of instrumentation be performed, but by the use of the judgment of the Shift Supervisor as the threshold for determining the severity of the plant conditions. This judgment is supported by the specific opinion of the Shift Supervisor that additional operating personnel will be required to provide increased monitoring of systems needed to safely operate the plant.

This EAL represents an increase in severity above MU6 in that the Plant Monitoring System (PMS) cannot provide compensatory indication, or that a significant transient is in progress.

Fifteen minutes is used as a threshold to exclude transient or momentary power losses. Control Room panels with annunciators and direction for restoration is included in ON-123, Loss of Control Room Annunciators.

This EAL is not applicable in cold shutdown or refueling modes due to the limited number of safety systems required for operation.

This event will be escalated to a Site Area Emergency if a transient is in progress, the Plant Monitoring System is unavailable, and a loss of annunciators occurs.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MU6

INITIATING CONDITION

Unplanned Loss of Annunciators **OR** Indicators for > 15 minutes

EAL THRESHOLD VALUE

1. Unplanned loss for > 15 minutes of **MOST** or **ALL** of **EITHER**:

- Safety system annunciators (Table M-2)

OR

- Safety function indicators (Table M-3)

AND

Increased surveillance is required to safely operate the unit(s)

Table M-2 Safety System Annunciators	Table M-3 Safety Function Indicators
<ul style="list-style-type: none"> • ECCS • Containment Isolation • Reactor Trip • Process Radiation Monitoring 	<ul style="list-style-type: none"> • Reactor Power • Decay Heat Removal • Containment Safety Functions

MODE APPLICABILITY:

1, 2, 3

BASIS: (References)

MOST - 75% of safety system annunciators or indicators are lost **OR** a significant risk that a degraded plant condition could go undetected exists. The use and definition of **MOST** is not intended to require a detailed count of lost annunciators or indicators but should be used as a guide to assess the ability to monitor the operation of the plant.

UNPLANNED - Loss of annunciators or indicators is **NOT** the result of scheduled maintenance or testing.

This EAL recognizes the difficulty associated in monitoring conditions without normal annunciators. It is not intended that a detailed count of instrumentation be performed, but by the use of the judgment of the Shift Supervisor as the threshold for determining the severity of the plant conditions. This judgment is supported by the specific opinion of the Shift Supervisor that additional operating personnel will be required to provide increased monitoring of systems needed to safely operate the plant. The Plant Monitoring System (PMS) is available to provide compensatory indication. Fifteen minutes is used as a threshold to exclude transient or momentary power losses. Unplanned loss of annunciators excludes scheduled maintenance and testing activities. Control Room panels with annunciators and direction for response are included in ON-122, Loss of Main Control Room Annunciators.

This EAL is not applicable in cold shutdown or refueling modes due to the limited number of safety systems required for operation.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MS7

INITIATING CONDITION

Loss of Water Level in the Reactor Vessel That Has OR Will Uncover Fuel in the Reactor Vessel

EAL THRESHOLD VALUES

1. Reactor water level < -172 inches

MODE APPLICABILITY

4, 5

BASIS (References)

The indicator for "core is or will be uncovered" is Reactor Pressure Vessel Water level below the Top of Active Fuel (TAF), -172 inches as indicated on RPV Fuel Zone Level Instruments LI-2(3)-02-3-091 or LI-2(3)-02-3-113. Core submergence ensures adequate core cooling. When RPV level drops below the top of active fuel, the ability to remove the decay heat generated from the nuclear fuel becomes suspect and the Fuel Clad Fission Product barrier can no longer be considered intact. Sustained partial or total core uncovering can result in the release of a significant amount of fission products to the reactor coolant.

Under the conditions specified by this IC, severe core damage can occur and reactor coolant system pressure boundary integrity may not be assured. It is intended to address concerns raised by NRC Office for Analysis and Evaluation of Operational Data (AEOD) report AEOD/EG09, "BWR Operating Experience Involving Inadvertent Draining of the Reactor Vessel," dated August 8, 1986. This report states:

In broadest terms, the dominant causes of inadvertent reactor vessel draining are related to the operational and design problems associated with the residual heat removal system when it is entering into or exiting from the shutdown cooling mode. During this transitional period, water is drawn from the reactor vessel, cooled by the residual heat removal system heat exchangers (from the cooling provided by the service water system), and returned to the reactor vessel. First, there are piping and valves in the residual heat removal system, which are common to both the shutdown cooling mode and other modes of operation such as low pressure coolant injection and Torus cooling. These valves, when improperly positioned, provide a drain path for reactor coolant to flow from the reactor vessel to the Torus or the radwaste system. Second, there is no comprehensive valve interlock arrangement for all shutdown cooling. Collectively, these factors have contributed to the inadvertent draining of the reactor vessel.

Thus, declaration of a Site Area Emergency is warranted under the conditions specified by the IC. Escalation to a General Emergency is via effluent release EAL.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MS7 – Cont'd

BASIS (References) – Cont'd

DEVIATION: During EAL review and approval process, it was determined that the condition stated in NUMARC NESP-007, SS5, 1.a "Loss of all decay heat removal cooling as determined by (site-specific) procedure" is not necessary to conclude that the plant condition warrants a Site Area Emergency. Therefore, that sample NUMARC EAL was not included in this EAL.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MU7

INITIATING CONDITION

Reactor Coolant System leakage

EAL THRESHOLD VALUES

1. Unidentified primary system leakage > 10 gpm into the Drywell
- OR
2. Identified primary system leakage > 25 gpm into the Drywell

MODE APPLICABILITY

1, 2, 3

BASIS (References)

Utilizing the leak before break methodology, it is anticipated that there will be indication(s) of minor reactor coolant system boundary integrity loss prior to this fault escalating to a major leak or rupture. Detection of low levels of leakage while pressurized is utilized to monitor for the potential of catastrophic failures. Leakage not associated with catastrophic failure potential such as SRV leakage, should not be considered in this EAL.

Identified and unidentified Primary System Leakage is measured by the normal primary system leakage monitoring system and is leakage into the drywell.

This EAL is included as an Unusual Event because it may be a precursor of more serious conditions and, as a result, it is considered to be a potential degradation of the level of safety of the plant. The value of 10 gpm unidentified leakage is significantly higher than the expected pressurized leak rate from the reactor coolant system. The 10 gpm value for the unidentified pressure boundary leakage was selected as it is twice the Technical Specification value, indicating an increase beyond that assumed in Safety Analysis. It also is observable with normal control room indications. The EAL for identified leakage is set at a higher value (25 gpm) due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage.

Technical Specification LCO required actions would necessitate a plant shutdown and subsequent depressurization, unless the source of the leak can be isolated, identified, and/or stopped. Actions initiated by plant staff would include close monitoring of the calculated break size such that any sudden or gradual rise in leak rate would be identified. A slow power reduction and gradual depressurization would be necessitated due to the possibility that a sudden power and/or pressure surge could potentially worsen the break or cause a catastrophic failure.

The leak rate of 10 gpm may cause a high drywell pressure indication. Other indications of a leak of this magnitude would include a rise in drywell temperature or radiation.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MU7 – Cont'd

BASIS (References) – Cont'd

This event will escalate to an Alert based upon high Drywell pressure per Fission Product Barrier Matrix 2.c.1.

DEVIATION: NUMARC/NESP-007 Example EAL SU5.1.a identifies pressure boundary leakage. There is no Peach Bottom EAL listed for pressure boundary leakage specifically since it is a subset of unidentified leakage. Peach Bottom Tech. Specs. require a shutdown if any pressure boundary leakage is found.

Table PBAPS 3-2: EAL Technical Basis**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS****MA8****INITIATING CONDITION**

Main Steam Line Break

EAL THRESHOLD VALUES

1. MSL Break indicated by **EITHER** of the following:
 - High MSL Flow and High Steam Tunnel Temperature annunciators**OR**
 - Direct report of steam release**AND**
MSL break is successfully isolated.

MODE APPLICABILITY

1, 2, 3

BASIS (References)

Design basis accident analyses of a Main Steam Line Break outside of secondary containment shows that even if MSIV closure occurs within design limits, dose consequences offsite from a "puff" release would be in excess of 10 mRem.

Hi Steam Flow Annunciator and Hi Steam Tunnel Temperature Annunciator are both indicators of a Main Steam Line Break. Both parameters will cause an isolation of the MSIV's. Should both valves in any one line fail to isolate, this event would be also considered a LOSS of Primary Containment (per IC 3.d.1) and as loss of RCS (per IC 2.d.1). This would then appropriately be classified as a Site Area Emergency.

Direct report of steam release is meant to provide an alternate means of classification if the Hi Steam Flow Annunciator or the Hi Steam Tunnel Temperature Annunciator fails to operate and the visual observation of conditions indicates a Main Steam Line Break in the judgment of the Emergency Director. This is not meant to cause a declaration based on leaks such as valve packing leaks where the consequences offsite would be negligible.

Loss of the RCS Barrier due to an unisolable MSL break is covered under Fission Product Barrier Matrix (IC 2.d.1).

DEVIATION: NUMARC/NESP-007, Table 3 (RC Example EAL #1) EAL placed as a separate Alert threshold under previous NRC submittal to cover an isolable MSL break outside secondary containment. If the Main Steam Line (MSL) isolates as designed, this condition does not constitute a loss of RCS barrier. However, this condition was included as an event-based EAL due to the potential dose consequences associated with this event. This is consistent with the recommendations provided in the Industry-developed Questions and Answers on NUMARC/NESP-007 guidance, which was endorsed by the NRC in a letter dated June 10, 1993.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MU9

INITIATING CONDITION

Unplanned loss of ALL onsite OR offsite communications capabilities

EAL THRESHOLD VALUES

1. ALL onsite communications equipment lost (Table M-4)
OR
2. ALL offsite communications capability lost (Table M-5)

<u>Table M-4</u> Onsite Communications Equipment	<u>Table M-5</u> Offsite Communications Equipment
<ul style="list-style-type: none"> • Station Phones • OMNI System • Plant Public Address (PA) • Station Radio 	<ul style="list-style-type: none"> • Station Phones • OMNI System • NRC (ENS) • PA State Radio • Load Dispatcher Radio

MODE APPLICABILITY

ALL

BASIS (References)

Unplanned - The loss of communication is not a result of planned maintenance or surveillance activities

This EAL recognizes a loss of communication ability that significantly degrades the plant operations staff's ability to perform tasks necessary for plant operations or the ability to communicate with offsite authorities. This EAL is separated into two groups of communications, Onsite and Offsite. A complete loss of either group is so severe, that the Unusual Event declaration is warranted.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MU10

INITIATING CONDITION

Inability to reach required operating mode within Technical Specification time limits

EAL THRESHOLD VALUE

1. Inability to reach required operating mode within Tech. Spec. LCO action completion time

MODE APPLICABILITY

1, 2, 3

BASIS (References)

Limiting Conditions of Operation (LCOs) require the plant to be brought to a required operating mode when the Technical Specification required configuration cannot be restored. Depending on the circumstances, this may or may not be an emergency or precursor to a more severe condition. The plant is within its safety envelope when being shut down within the allowable action statement time in the Technical Specifications. An immediate Notification of an Unusual Event is required when it is determined that there is an inability to bring the plant to the required operating mode within the allowable action statement time in the Technical Specifications. Declaration of an Unusual Event is based on the time at which the LCO-specified action statement time period elapses under the site Technical Specifications and is not related to how long a condition may have existed. Other various ICs address other required Technical Specification shutdowns that involve precursors to more serious events.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MA11

INITIATING CONDITION

Major Damage OR Uncovering of Spent Fuel

EAL THRESHOLD VALUES

1. Unplanned general area radiation > 500 mR/hr on the Refuel Floor (Table M-6)
OR
2. Report or visual observation that irradiated fuel is uncovered
OR
3. Water level < 232 ft. 3 inches Plant elevation for the Spent Fuel Pool that will result in irradiated fuel uncovering

Table M-6 Refuel Floor ARMs
<ul style="list-style-type: none"> • 3-7 (7-9), Steam Separator Pool • 3-8 (7-10), Refuel Slot • 3-9 (7-11), Fuel Pool • 3-10 (7-12), Refueling Bridge

MODE APPLICABILITY

ALL

BASIS: (References)

Offsite doses during these accidents would be well below the EPA Protective Action Guidelines and the classification as an Alert is therefore appropriate. This radiation level could also be caused by an inadvertent criticality and is included even though the probability of this event occurring is low. Radiation levels rise above 500 mR/hr, which were expected during a planned evolution, should not cause an Alert to be declared. Additionally, surveys, which identify "hot spots" greater than 500 mR/hr should not cause an Alert to be declared.

This IC applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage, which is discussed in NUMARC/NESP-007 IC AU2, "Unexpected Rise in Plant Radiation or Airborne Concentration."

NUREG-0818, "Emergency Action Levels for Light Water Reactors," forms the basis for this EAL. The areas where irradiated fuel is located forms the basis for Table M-6. Unexpected radiation levels, which are at least 100 times higher than the normal background will generally indicate a fuel handling accident or loss of water covering the irradiated fuel. Readings may be from refuel floor Area Radiation Monitors or taken during a qualified radiological survey.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MA11 – Cont'd

BASIS: (References) – Cont'd

The value 232 feet and 3 inches plant elevation is the Tech. Spec. Limit and an uncontrolled level drop that would uncover irradiated fuel is an indicator of a lowering in the level of safety of the plant.

There is time available to take corrective actions, and there is little potential for substantial fuel damage. In addition, NUREG/CR-4982, "Severe Accident in Spent Fuel Pools in Support of Generic Safety Issue 82," July 1987, indicates that even if corrective actions are not taken, no prompt fatalities are predicted, and that risk of injury is low. In addition, NRC Information Notice No. 90-08, "Kr-85 Hazards from Decayed Fuel" presents the following in its discussion:

In the event of a serious accident involving decayed spent fuel, protective actions would be needed for personnel on site, while offsite doses (assuming an exclusion area radius of one mile from the plant site) would be well below the Environmental Protection Agency's Protective Action Guides. Accordingly, it is important to be able to properly survey and monitor for Kr-85 in the event of an accident with decayed spent fuel.

Licensees may wish to reevaluate whether Emergency Action Levels specified in the emergency plan and procedures governing decayed fuel-handling activities appropriately focus on concern for onsite workers and Kr-85 releases in areas where decayed spent fuel accidents could occur, for example, the spent fuel pool working floor. Furthermore, licensees may wish to determine if emergency plans and corresponding exposures of onsite personnel who are in other areas of the plant. Among other things, moving onsite personnel away from the plume and shutting off building air intakes downwind from the source may be appropriate.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MU11

INITIATING CONDITION

Potential Damage OR Uncovering of Spent Fuel

EAL THRESHOLD VALUE

1. Uncontrolled water level drop in the Spent Fuel Pool that cannot be quickly terminated with ALL irradiated fuel assemblies remaining covered by water

MODE APPLICABILITY

ALL

BASIS: (References)

Uncontrolled - An unexplained level drop that cannot be quickly terminated and is not the result of a planned evolution. The event should not be considered terminated if continuous make up is required and should not preclude classification of the Unusual Event.

Threshold 1: This event tends to have a long lead time relative to potential for radiological release outside the site boundary, thus impact to public health and safety is very low.

In light of Reactor Cavity Seal failure incidents at two different PWRs and loss of water in the Spent Fuel Pit/Fuel Transfer Canal at a BWR all occurring since 1984, explicit coverage of these types of events via this EAL is appropriate given their potential for elevated doses to plant staff. Classification as an Unusual Event is warranted as a precursor to a more serious event.

This event will be escalated to an Alert as a result of uncovering of a fuel assembly and/or indication of high radiation levels on the refueling floor.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MA12

INITIATING CONDITION

Loss of Water Level That Has OR Will Uncover Irradiated Fuel

EAL THRESHOLD VALUES

1. **Water level < 458 inches above RPV instrument zero for the Reactor Refueling Cavity
AND
Loss of water level will result in irradiated fuel uncovering**

MODE APPLICABILITY

5 (with Reactor Refueling Cavity flooded)

BASIS: (References)

This IC applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage, which is discussed in NUMARC/NESP-007 IC AU2, "Unexpected Rise in Plant Radiation or Airborne Concentration."

NUREG-0818, "Emergency Action Levels for Light Water Reactors," forms the basis for this EAL.

There is time available to take corrective actions, and there is little potential for substantial fuel damage. In addition, NUREG/CR-4982, "Severe Accident in Spent Fuel Pools in Support of Generic Safety Issue 82," July 1987, indicates that even if corrective actions are not taken, no prompt fatalities are predicted, and that risk of injury is low. In addition, NRC Information Notice No. 90-08, "Kr-85 Hazards from Decayed Fuel" presents the following in its discussion:

In the event of a serious accident involving decayed spent fuel, protective actions would be needed for personnel on site, while offsite doses (assuming an exclusion area radius of one mile from the plant site) would be well below the Environmental Protection Agency's Protective Action Guides. Accordingly, it is important to be able to properly survey and monitor for Kr-85 in the event of an accident with decayed spent fuel.

Licensees may wish to reevaluate whether Emergency Action Levels specified in the emergency plan and procedures governing decayed fuel-handling activities appropriately focus on concern for onsite workers and Kr-85 releases in areas where decayed spent fuel accidents could occur, for example, the spent fuel pool working floor. Furthermore, licensees may wish to determine if emergency plans and corresponding exposures of onsite personnel who are in other areas of the plant. Among other things, moving onsite personnel away from the plume and shutting off building air intakes downwind from the source may be appropriate.

The value 458 inches above RPV instrument zero is the Tech. Spec. Limit and an uncontrolled level drop that would uncover irradiated fuel is an indicator of a lowering in the level of safety of the plant. Escalation would occur via Effluent Release, In-plant radiation, or Emergency Director Judgment.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MA12 – Cont'd

BASIS: (References) – Cont'd

The MODE applicability [5 With Reactor Refueling Cavity Flooded] is a deviation from NUMARC [all] in that the EAL is only applicable in that plant condition. This adds clarity to the EAL to ensure that it will not be applied under plant conditions where a classification is not warranted.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MU12

INITIATING CONDITION

Uncontrolled Water Level Decrease in Reactor Refueling Cavity

EAL THRESHOLD VALUE

1. Unexpected Skimmer Surge Tank low level alarm

AND

Visual observation of an uncontrolled drop in water level below the fuel pool skimmer surge tank inlet that cannot be quickly terminated

MODE APPLICABILITY

ALL

BASIS (References)

Unexpected - An alarm that is not a result of a planned evolution

Uncontrolled - An unexplained level drop that cannot be quickly terminated and is not the result of a planned evolution. The event should not be considered terminated if continuous make up is required and should not preclude classification of the Unusual Event.

A drop in the Spent Fuel Pool level or the RPV [when in refueling and flooded up with the gates removed] will result in a control room annunciator Fuel Pool and Cleanup System Trouble Alarm. This Control Room alarm directs an operator to be dispatched to a local alarm panel, which will identify the Skimmer Surge Tank low level alarm. This alarm is validated with visual observation of a lowering Spent Fuel Pool level. If the spent fuel pool level drops below the inlet to the skimmer surge tank, without a planned event such as removing a large piece of equipment, there must be a leak in the spent fuel pool or the RPV. This event has a long lead time relative to potential for radiological release outside the site boundary, thus the impact to public health and safety is very low. Classification as an Unusual Event is warranted as a precursor to a more serious event.

In light of Reactor Cavity Seal failure incidents at two different PWRs and loss of water in the Spent Fuel Pit/Fuel Transfer Canal at a BWR all occurring since 1984, explicit coverage of these types of events via this EAL is appropriate given their potential for elevated doses to plant staff. Classification as an Unusual Event is warranted as a precursor to a more serious event.

This event will be escalated to an Alert as a result of uncovering of a fuel assembly and/or indication of high radiation levels on the refueling floor.

Table PBAPS 3-2: EAL Technical Basis**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS****MU13****INITIATING CONDITION**

Independent Spent Fuel Storage Installation (ISFSI)

EAL THRESHOLD VALUE

1. EITHER of the following criteria is met for the dry storage of spent fuel:

- > 600 mR/hr at 1 ft. away

OR

- > 1200 mR/hr at external surface

MODE APPLICABILITY

ALL

BASIS: (References)

Threshold 1: This EAL applies to potential emergency conditions, which might develop during use of the Independent Spent Fuel Storage Installation and dry cask storage system. This EAL provides for an Unusual Event classification, which may be entered in the event that conditions occur which have the potential for damaging or degrading the fuel, but no releases of radioactive material requiring offsite response or monitoring are expected. Consistent with the NUMARC guidance, escalations above the Unusual Event are not warranted.

Accidents associated with the dry cask storage system include natural and man-made events that are postulated to affect the storage system. The limiting impacts to the system include loss of shielding capability and loss of confinement. The loss of shielding results in higher direct radiation to the environment from the cask while the loss of confinement results in a release of materials from within the cask to the environment at a postulated leak rate.

Loss of confinement for the dry storage system is evaluated in TN-68, Safety Analysis Report, Section 7. Two scenarios are considered, one for off-normal conditions and one for hypothetical accident conditions. Dose calculations are included in section 7.3.2.1. In the extremely unlikely event that one of these scenarios did occur, the event would be addressed by the EALs under Category R, "Abnormal Radiological Levels / Effluents".

Loss of shielding for the dry storage system is evaluated in TN-68, Safety Analysis Report, Section 5. Dose calculations are included in Table 5.1-2 for both normal and accident conditions. The value of 600 mR/hr one foot away OR 1200 mR/hr at the external surface is determined for several reasons. According to the TN-68, Safety Analysis Report, Table 5.1-2, Summary of Average Dose Rates, the maximum expected surface dose rates will be 529.5 mR/hr (see note 2). Consequently, the value of 1200 mR/hr is sufficiently above normal conditions as to preclude inappropriate classifications.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS**

MU13 – Cont'd

BASIS: (References) – Cont'd

Also, the value of 1200 mR/hr is sufficiently below the 1467 mR/hr found in Table 5.1-2 for the cask surface radiological reading for accident conditions. Therefore, 1200 mR/hr from a loss of shielding accident would trigger an Unusual Event classification.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HG1

INITIATING CONDITION

Security Event Resulting in Loss of Ability to Reach AND Maintain Cold Shutdown

EAL THRESHOLD VALUES

1. Loss of physical control of the Control Room due to a security event.
OR
2. Loss of physical control of the remote shutdown capability due to a security event.

MODE APPLICABILITY

ALL

BASIS (References)

This class of security event represents conditions under which a hostile force has taken physical control of areas required to reach and maintain cold shutdown. Loss of Remote Shutdown Capability would occur if the control function of the Remote Shutdown Panels were lost.

Security events, which meet the threshold for declaration of a General Emergency, are physical loss of the Control Room or the Remote and Alternate Shutdown Panels.

This situation leaves the plant in a very unstable condition with a high potential of multiple barrier failures.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HS1

INITIATING CONDITION

Confirmed Security Event in a Vital Area

EAL THRESHOLD VALUES

1. Intrusion into plant Vital Area by a hostile force.
OR
2. Confirmed bomb, sabotage or sabotage device discovered in a Vital Area

MODE APPLICABILITY

ALL

BASIS (References)

This class of security event represents an escalated threat to plant safety above that contained in an Alert in that a hostile intrusion or attack has progressed from the Protected Area to a Vital Area. The Vital Areas are within the Protected Area and are generally controlled by key card readers. These areas contain vital equipment, which includes any equipment, system, device or material, the failure, destruction or release of could directly or indirectly endanger the public health and safety by exposure to radiation. Equipment or systems, which would be required to function to protect health and safety following such failure, destruction or release, are also considered vital.

Identification of Vital Areas can be accomplished through discussions with security.

This event will be escalated to a General Emergency based upon the loss of physical control of the Control Room or Remote Shutdown Capability

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HA1

INITIATING CONDITION

Confirmed Security Event in a Plant Protected Area

EAL THRESHOLD VALUES

1. Intrusion into a Protected Area or ISFSI by a hostile force.
OR
2. Confirmed bomb, sabotage or sabotage device discovered in a Protected Area or ISFSI

MODE APPLICABILITY

ALL

BASIS (References)

EALs #1 and #2 are applicable to ANY Protected Area as defined under the Station Nuclear Security Plan, including the on-site Independent Spent Fuel Storage Installation (ISFSI).

This class of security event represents an escalated threat to the level of safety of the plant. This event is satisfied if physical evidence supporting the hostile intrusion or attack exists. The Emergency Director will declare an Alert subsequent after consulting with the on-shift Security representative to determine the validity of the entry conditions.

This event will be escalated to a Site Area Emergency based upon a hostile intrusion or act in-plant Vital Areas.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HU1

INITIATING CONDITION

Confirmed Security Event That Indicates a Potential Degradation in the Level of Plant Safety

EAL THRESHOLD VALUES

1. A credible threat to the station reported by the NRC.
OR
2. **BOTH** of the following criteria are met for a credible threat reported by any other outside agency as determined per SY-AA-101-132, "Threat Assessment":
 - Is specifically directed towards the station.
 - Is imminent (≤ 2 hours).OR
3. Attempted intrusion and attack on a Protected Area or ISFSI
OR
4. Attempted sabotage discovered within a Protected Area or ISFSI
OR
5. Hostage/Extortion situation that threatens normal plant operations

MODE APPLICABILITY

ALL

BASIS (References)

EALs #3 and #4 are applicable to ANY Protected Area as defined under the Station Nuclear Security Plan, including the on-site Independent Spent Fuel Storage Installation (ISFSI).

A security threat that is identified as being directed towards the station and represents a potential degradation in the level of safety of the plant. A security threat is satisfied if physical evidence supporting the threat exists, if information independent from the actual threat exists, or if a specific group claims responsibility for the threat. The Shift Management will declare an Unusual Event subsequent to consulting with the on shift Security representative to determine the credibility of the security event per SY-AA-101-132 and the Physical Security Plan.

Security events which do not represent a potential degradation in the level of safety of the plant are reported under 10 CFR 73.71 or 10 CFR 50.72 and will not cause an Unusual Event to be declared.

This event will be escalated to an Alert based upon a hostile intrusion or act within the Protected Area.

DEVIATION: A bomb device discovered within Plant Protected Area and outside the Plant Vital Areas is an Alert declaration as determined per the site Safeguards Contingency Plan and therefore is not included as an Unusual Event in the EAL scheme.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HS2

INITIATING CONDITION

Control Room Evacuation Initiated AND Plant Control CANNOT be re-established in ≤ 15 minutes

EAL THRESHOLD VALUES

Control Room evacuation initiated

AND

Control of the plant CANNOT be re-established in ≤ 15 minutes per SE-1 or SE-10

MODE APPLICABILITY:

All

BASIS: (References)

The 15-minute time period starts when physical control of the plant is lost requiring Control Room evacuation OR when the required Control Room personnel have evacuated the Control Room.

Control - Placing all local control switches in local control necessary for operation from remote panels and the Shift Manager has determined that the systems for controlling reactivity, core cooling and heat sink functions are established.

Transfer of safety system control has not been performed in an expeditious manner but it is unknown if any damage has occurred to the fission product barriers. The 15 minute time limit for transfer of control is based on a reasonable time period for personnel to leave the control room, arrive at the remote shutdown area, and re-establish plant control to preclude core uncover and/or core damage. During this transitional period the function of monitoring and/or controlling parameters necessary for plant safety may not be occurring and as a result there may be a threat to plant safety.

This event will be escalated based upon system malfunctions or damage consequences.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HA2

INITIATING CONDITION

Control Room Evacuation Initiated

EAL THRESHOLD VALUE

1. Entry into SE-1 or SE-10 for Control Room evacuation

MODE APPLICABILITY

All

BASIS (References)

Control Room evacuation requires establishment of plant control from outside the control room (e.g., local control and remote shutdown panel) and support from the Technical Support Center and/or other emergency facilities as necessary. Control Room evacuation represents a serious plant situation since the level of control is not as complete as it would be without evacuation. The establishment of system control outside of the Control Room will bypass many protective trips and interlocks. In addition, many of the instruments and assessment tools available in the Control Room will not be available.

This event will be escalated to a Site Area Emergency if control cannot be re-established within fifteen minutes.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HA3

INITIATING CONDITION

Natural OR Destructive Phenomena Affecting a Vital Area

EAL THRESHOLD VALUE

1. Earthquake > 0.05g (Operating Basis Earthquake, OBE) as determined by procedure SO 67.7.A
OR
2. Tornado or wind speeds > 75 mph causing damage to Plant Vital Structures (Table H-1)
OR
3. Report of visible structural damage to ANY Plant Vital Structure (Table H-1)
OR
4. Vehicle crash affecting a plant vital function contained in a Plant Vital Structure (Table H-1)
OR
5. Turbine failure generated missiles result in visible structural damage to or penetration of ANY Plant Vital Structures (Table H-1)
OR
6. Abnormal River level, as indicated by EITHER:
 - >116 ft. (high level)
 - OR
 - < 92.5 ft. (low level)
 OR
7. Flooding in 2 or more areas designated in T-103, Table SC/L-2 requiring a plant shutdown.

Table H-1 Plant Vital Structures
<ul style="list-style-type: none"> • Power Block • Diesel Generator Building • Emergency Pump Structure • Inner Screen Structure • Emergency Cooling Tower

MODE APPLICABILITY

ALL

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HA3 – Cont'd

BASIS (References)

Each of these EALs is intended to address events that may have resulted in a plant vital area being subjected to forces beyond design limits, and thus damage may be assumed to have occurred to plant safety systems. The "initial" report should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of the damage.

Threshold Value 1 – This EAL addresses an earthquake that exceeds the Operating Basis Earthquake level of .05 g and is beyond design basis limits. An earthquake of this magnitude may be sufficient to cause damage to safety related systems and functions. The Max Credible Earthquake for PBAPS is 0.12 g per UFSAR Section 1.6; therefore, this EAL is conservative and warrants an Alert classification.

Confirmed – As used in this EAL, a call to the National Earthquake Center is the primary confirmation source. Other confirmation includes reports from television or radio stations, or reports from university monitoring stations.

Threshold Value 2 – This EAL is based on FSAR design basis. Wind loads of this magnitude can cause damage to safety functions. This EAL addresses events where a Plant Vital Structure has been struck with high winds, and thus damage may have occurred to safe shutdown systems.

Threshold Value 3 – Structural damage should be of sufficient force, that in the Emergency Director's judgment, the potential exists to affect the operation of systems and functions required for safe shutdown of the plant. This EAL specifies a Plant Vital Structure, which contain systems and functions required for safe shutdown of the plant.

Threshold Value 4 – The intent is to address such items as aircraft, train, barge or large motor vehicles (e.g. cranes, etc.). Automobiles, trucks and forklifts are also vehicles within the context of this EAL; however, the key is whether or not the vehicle can potentially affect a plant vital function, located within a designated Plant Vital Structure.

Threshold Value 5 – Missile impacts including rotating equipment or turbine failure causing casing penetration.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HA3 – Cont'd

BASIS (References) – Cont'd

Threshold Value 6 – High River level > 116 feet is indication of the river being in flood. This level is capable of causing flooding that can affect Plant Vital Structures. General grade at the site of Units 2 & 3 has been established at a nominal 115 feet elevation in the area surrounding the Turbine Hall and other structures on the river side of the plant. Top of ground floor of the structures in this area is at 116 feet elevation. No attempt should be made to determine the magnitude of flooding. This is a long lead time event but this level is ground elevation of the reactor building and intake pump structure so classification as an Alert Event is appropriate. The evidence of flooding is sufficient for declaration.

Low River level < 92.5 feet is indication of a potential loss of Conowingo Pond and subsequent loss of the main condenser circulating water pumps if water level continues to drop.

Threshold Value 7 – Flooding in vital areas that affect operability of safety-related systems or components. The source of the flooding need not be known.

This event will be escalated to a higher emergency classification based upon damage consequences covered under other various EAL Sections.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HU3

INITIATING CONDITION

Natural OR Destructive Phenomena Affecting the Protected Area

EAL THRESHOLD VALUE

1. Earthquake > 0.01g as determined by procedure SO 67.7.A
OR
2. Report by plant personnel of a tornado strike within the Protected Area
OR
3. Wind speeds > 75 mph as indicated on Site Meteorological instrumentation for > 15 minutes
OR
4. Vehicle crash within the Protected Area Boundary that may potentially damage plant structures containing functions required for safe shutdown of the plant.
OR
5. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.
OR
6. Control Room assessment indicates that a phenomena has occurred affecting the Protected Areas
OR
7. Abnormal River level, as indicated by EITHER:
 - >112 ft. (high level)
 - OR
 - < 98.5 ft. (low level)

MODE APPLICABILITY:

ALL

BASIS: (References)

This EAL is consistent with the definition of an Unusual Event while maintaining the anticipatory nature desired and recognizing the risk to non-safety related equipment. Escalation of the emergency classification is based on potential damage done by missiles generated by the failure or by the radiological releases and would be classified under the Fission Product Barrier Matrix or Event Category R "Abnormal Radiological Conditions/Effluents".

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HU3 – Cont'd

BASIS: (References) – Cont'd

The Emergency Director should consider how these Threshold Values may affect both units due to the affects of common or shared plant systems.

Threshold Value 1 - This EAL addresses a sensed earthquake. The magnitude of .01g is the lowest detectable earthquake measured on PBAPS seismic instrumentation per procedure SO 67.7.A. An earthquake of this magnitude may be sufficient to cause minor damage to plant structures or equipment within the Protected Area. Damage is considered to be minor, as it would not affect physical or structural integrity. This event is not expected to affect the capabilities of plant safety functions. This event will be escalated to an Alert if the earthquake reaches an Operating Basis Earthquake (OBE).

Threshold Values 2 & 3 - A tornado touching down within the Protected Area or wind speeds > 75 mph within the Owner Controlled Area are of sufficient velocity to have the potential to cause damage to Plant Vital Structures. The value of 75 mph was selected to maintain consistency with plant value and to coincide with the Beaufort Scale for Hurricane wind speed winds of 73-136 mph. These criteria are indicative of unstable weather conditions and represent a potential degradation in the level of safety of the plant. Verification of a tomado will be by direct observation and reporting by station personnel. Verification of wind speeds > 75 mph will be via meteorological data in the control room. This event will be escalated to an Alert if the tornado or high wind speeds strike a Plant Vital Structure.

Threshold Value 4 - This criterion is intended to address such items as plane, helicopter, train or other "vehicle" crashes that may potentially damage plant structures containing functions required for safe shutdown of the plant. Automobiles, trucks and forklifts are also vehicles within the context of this EAL; however, the key is whether or not the vehicle can potentially cause significant damage to plant structures. If the crash is confirmed to affect a plant vital function contained in a designated Plant Vital Structure, the event may be escalated to an Alert classification.

Threshold Value 5 - This criterion is intended to address main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Of major concern is the potential for leakage of combustible fluids (e.g., lubricating oils) and gases (e.g., hydrogen) to the plant environs. Actual fires and flammable gas build up are appropriately classified via other EALs. Turbine failure of sufficient magnitude to cause observable damage to the turbine casing or seals of the turbine generator raises the potential for leakage of combustible fluids and gases (Hydrogen cooling) to the Turbine Building. The damage should be readily observable and should not require equipment disassembly to locate.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HU3 – Cont'd

BASIS: (References) – Cont'd

Threshold Value 6 – This criterion allows for the control room to determine that an event has occurred and take appropriate action based on personal assessment as opposed to verification (e.g., an earthquake is felt but does not register on any plant-specific instrumentation, etc.)

Threshold Value 7 – Cooling water is pumped from the normal heat sink (Conowingo Pond) via the pump structure. An alternate suction supply and discharge path (from the emergency heat sink – which consists of an induced draft cooling tower with an integral storage reservoir) is available in the unlikely event of a Conowingo Dam failure.

High River level of greater than 112 feet: At this level open grating in the operating floor of the Circulating Water Pump Structure will allow water from the circulating water bays to rise into the structure during postulated external flooding conditions. Per the UFSAR, “The configuration of the circulating water system would likely trip at a flood elevation of about 113 feet. Therefore, a river elevation of 11 feet was chosen as the elevation at which a flood-related shutdown is initiated.” The use of a threshold of 112 feet for the Unusual Event would represent a condition above T.S., but prior to the postulated loss of circulating water.

Low River level of less than 98.5 feet: This is the plant low water design level and consistent with T.S. 3.7.2 (Minimum Water Level in Pump Bay). Per the UFSAR, with the river level is 104 feet when an uncontrolled release of about 350,000 cfs is passed through the Conowingo Dam and there is no in flow into pond, it will require about 1-1/2 hours to drop level to 98.5 feet.

This event will be escalated to an Alert classification based continuation of the river situation.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HA4

INITIATING CONDITION

Fire OR Explosion Affecting Operability of Safety Systems Required for Safe Shutdown

EAL THRESHOLD VALUES

1. ANY of the following are made potentially inoperable by a fire or explosion:
 - 2 or more Safe Shutdown Systems (Table H-2)
 - 2 or more subsystems, as defined by Tech. Specs., of a Safe Shutdown System (Table H-2).
 - 1 or more Plant Vital Structures containing Safe Shutdown Equipment (Table H-1)

AND

Safe Shutdown System or Plant Vital Structure is required for the present Operational Condition

<u>Table H-1</u> Plant Vital Structures
<ul style="list-style-type: none"> • Power Block • Diesel Generator Building • Emergency Pump Structure • Inner Screen Structure • Emergency Cooling Tower

<u>Table H-2: Safe Shutdown Systems</u>		
<ul style="list-style-type: none"> • Diesel Generators • HPCI • Core Spray • SBT • PCIS (Primary CNTMT Isolation System) 	<ul style="list-style-type: none"> • 4 KV Safeguard Busses • RCIC • HPSW • ECW • Control Room Emergency Ventilation 	<ul style="list-style-type: none"> • ADS • RHR (all modes) • ESW • CAC / CAD

MODE APPLICABILITY:

ALL

BASIS: (References)

Explosion - A rapid, violent, unconfined combustion, or a catastrophic failure of pressurized equipment, that potentially imparts significant energy to nearby structures or equipment.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HA4 – Cont'd

BASIS: (References) – Cont'd

Fire - combustion characterized by the generation of heat and smoke. Sources of smoke such as overheated electrical equipment and slipping drive belts, for example, do not constitute fires. Observation of a flame is preferred, but is NOT required if large quantities of smoke and heat are observed.

The primary concern of this EAL is the magnitude of the fire and the effects on Safe Shutdown Systems required for the present Operational Condition. A Safe Shutdown System is defined as any system required to maintain safe operation or to establish or maintain Cold Shutdown. A system being "inoperable" means that it is incapable of performing the design function. For example, the LPCI System is intended to maintain adequate core cooling by covering the core to at least 2/3 core height following a DBA LOCA. In order for the system to be unable to maintain its intended function, multiple loops would need to be disabled by the fire. In addition to indication of degraded system performance, potential inoperability may be determined by visual observation and other control room indications such as loss of indicating lights.

Safe Shutdown Analysis is consulted to determine systems required for the applicable mode.

Two examples of applying this methodology are as follows:

- **Diesel Generators and 4 KV Safeguard Buses:** The fire disables multiple Diesel Generators or 4 KV Safeguard Buses so that the number of emergency power systems available would be lowered to below what would be required to mitigate an accident under the current operating conditions. For 100% power, this could be conservatively interpreted as at least two Diesel Generators or 4 KV Buses disabled.
- **RHR - LPCI Mode:** The fire disables multiple loops of LPCI so that adequate core submergence could not be assured following a DBA LOCA. For 100% power, this could also be conservatively interpreted as at least two loops disabled.

The EAL includes the condition that the fire must make "TWO OR MORE" subsystems (as defined by Tec. Specs.) or "TWO OR MORE" systems inoperable. In those cases where it is believed that the fire may have caused damage to *Safety Systems*, then an Alert declaration is warranted, since the full extent of the damage may not be known. For Plant Vital Structure damage, classification is required under this EAL if the structure houses or otherwise supports *Safety Systems* required for the present Operational Condition.

Degraded system performance or observation of damage that could degrade system performance is used as the indicator that the safe shutdown system was actually affected or made inoperable. A report of damage should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of damage. The occurrence of the fire or explosion with reports of damage (e.g., deformation, scorching) is sufficient for declaration.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HU4

INITIATING CONDITION

Fire Within Protected Area Boundary **NOT** Extinguished in ≤ 15 minutes of Detection

EAL THRESHOLD VALUE

1. Fire within or impacting a plant Vital Structure (Table H-1)

AND

Fire is **NOT** extinguished in ≤ 15 minutes of **EITHER**:

- Control Room notification

OR

- Verification of alarm

OR

2. Report by plant personnel of an explosion within the Protected Area Boundary resulting in visible damage to a permanent structure or equipment

<u>Table H-1</u> Plant Vital Structures
<ul style="list-style-type: none">• Power Block• Diesel Generator Building• Emergency Pump Structure• Inner Screen Structure• Emergency Cooling Tower

MODE APPLICABILITY

ALL

BASIS (References)

Verification - Determination is made that the fire alarm is not spurious.

Explosion - A rapid, violent, unconfined combustion, or a catastrophic failure of pressurized equipment, that potentially imparts significant energy to nearby structures or equipment.

The purpose of this IC is to address the magnitude and extent of fires that may be potentially significant precursors to damage to safety systems. This excludes such items as fires within administration buildings, wastebasket fires, and other small fires of no safety consequence. This IC applies to buildings and areas contiguous to plant vital areas or other significant buildings or areas. The intent of this IC is not to include buildings (e.g., warehouses) or areas that are not contiguous or immediately adjacent to plant vital areas.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HU4 – Cont'd

BASIS (References) – Cont'd

Verification of the alarm in this context means those actions taken in the control room to determine that the control room alarm is not spurious.

This EAL addresses fires in Plant Vital Structures that house safety systems. These fires may be precursors to damage to safety systems contained in these structures. There are no areas/buildings contiguous to Plant Vital Structures, which could affect a safety system in one of the listed Plant Vital Structures except for those already on the list. Therefore, no additional areas/buildings are considered for this EAL.

Verification that a fire exists is by operator actions to confirm that fire alarms received in the Control Room are not spurious or by any verbal notification by plant personnel. Fifteen minutes has been established to allow plant staff to respond and control small fires or to verify that no fire exists.

This event will be escalated to an Alert if the fire damages redundant trains of plant safety systems required for the current operating condition.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HA5

INITIATING CONDITION

Release of Toxic OR Flammable Gases Within a Facility Structure Which Jeopardizes Operation of Systems Required to Maintain Safe Operation OR to Establish or Maintain Cold Shutdown

EAL THRESHOLD VALUE

1. Report or detection of toxic gases within Plant Vital Structures (Table H-1) in concentrations that will be life threatening to plant personnel.

OR

2. Report or detection of flammable gases within Plant Vital Structures (Table H-1) in concentrations affecting the safe operation of the plant

<u>Table H-1</u> Plant Vital Structures
<ul style="list-style-type: none">• Power Block• Diesel Generator Building• Emergency Pump Structure• Inner Screen Structure• Emergency Cooling Tower

MODE APPLICABILITY

ALL

BASIS (References)

Gases within the site boundary that are above life-threatening or flammable concentrations, and have exceeded those concentrations within a Plant Vital Structure (as defined under Table H-1), should be declared as an Alert.

This IC is based on gases that have entered a plant structure affecting the safe operation of the plant. This IC applies to buildings and areas contiguous to plant Vital Areas or other significant buildings or areas. The intent of this IC is not to include buildings (e.g., warehouses) or other areas that are not contiguous or immediately adjacent to Plant Vital Areas. It is appropriate that increased monitoring be done to ascertain whether consequential damage has occurred.

Concentrations above life-threatening or flammable concentrations that result from planned maintenance or repair activities on-site, where planned contingency measures are identified to monitor and control gas(es), do not require classification.

Threshold #1: Toxic gas concentration results in an atmosphere that is immediately harmful to unprotected personnel, and would preclude access to any such affected area. However, access into the affected area does not have to be required for classification purposes.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HA5 – Cont'd

BASIS (References) – Cont'd

Threshold #2: Flammable gas, such as hydrogen and acetylene, are routinely used to maintain plant systems or to repair equipment / components. This EAL addresses concentrations at which gases can ignite or support combustion. An uncontrolled release of flammable gases within a facility structure has the potential to affect safe operation of the plant by limiting either operator or equipment operations due to the potential for ignition and resulting equipment damage / personnel injury.

This event will be escalated to higher classifications based on damage consequences covered under other various EAL Sections. Multi-unit stations with shared safety functions should further consider how this IC may affect more than one unit and how this may be a factor in escalating the emergency class.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HU5

INITIATING CONDITION

Release of Toxic OR Flammable Gases Deemed Detrimental to Safe Operation of the Plant

EAL THRESHOLD VALUES

1. Report or detection of toxic or flammable gases that could enter within the site area boundary in amounts that can affect normal operation of the plant.

OR

2. Report by Local, County or State officials for potential evacuation of site personnel based on an offsite event.

MODE APPLICABILITY

ALL

BASIS: (References)

Gases within the site boundary that are above life-threatening or flammable concentrations, and have not exceeded those concentrations within a Plant Vital Structure (as defined under Table H-1 in IC HA1), should be declared as an Unusual Event.

A toxic/flammable gas is considered to be any substance that is dangerous to life or limb by reason of inhalation or skin contact. It should not be construed to include confined spaces that must be ventilated prior to entry.

This IC is based on releases in concentrations within the site boundary that will affect the health of plant personnel or the safe operation of the plant with the plant being within the evacuation area of an offsite event (e.g., tanker truck accident releasing toxic gases, etc.). The evacuation area is determined from the DOT Evacuation Tables for Selected Hazardous Materials in the DOT Emergency Response Guide for Hazardous Materials.

Concentrations above life-threatening or flammable concentrations that result from planned maintenance or repair activities on-site, where planned contingency measures are identified to monitor and control gas(es), do not require classification.

Multi-unit stations with shared safety functions should further consider how this IC may affect more than one unit and how this may be a factor in escalating the emergency class.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HG6

INITIATING CONDITION

Conditions Indicate Imminent Core Damage OR Release Affecting the Public

EAL THRESHOLD VALUES

1. Actual or imminent core degradation with potential loss of containment.
OR
2. Potential uncontrolled radionuclide release, which can reasonably be expected to exceed 1 Rem TEDE, or 5 Rem CDE Thyroid plume exposure levels at the Site Boundary

MODE APPLICABILITY

ALL

BASIS (References)

General Emergency - Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Imminent - Mitigation actions have been ineffective and trended information indicates that the event or condition will occur within 2 hours.

Potential - Mitigation actions are not effective and trended information indicates that the parameters are outside desirable bands and not stable or improving.

This EAL allows the Emergency Director to declare a General Emergency upon the determination of an actual or imminent substantial core degradation or melting with the potential for loss of containment integrity, but is not explicitly addressed by other EALs.

Releases may exceed the EPA Protective Action Guidelines for more than the immediate site area and will be classified under Event Category R, "Abnormal Radiological Levels/Effluents".

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HS6

INITIATING CONDITION

Conditions Indicate Actual OR Likely Failure of Plant Functions Needed for Public Protection

EAL THRESHOLD VALUE

1. Other conditions exist which in the judgment of the Emergency Director indicate actual or likely major failures of plant functions needed for protection of the public.

MODE APPLICABILITY

ALL

BASIS (References)

Site Area Emergency – Events are in process or have occurred which involve actual or likely failure of plant functions needed for protection of the public. Any releases are not expected to result in exposure levels, which exceed EPA Protective Action Guideline exposure levels except near the site boundary.

This EAL allows the Emergency Director to declare a Site Area Emergency upon the determination of an actual or likely major failure of plant functions needed for protection of the public, but is not explicitly addressed by other EALs.

Releases are not expected to result in exposure levels, which exceed the EPA Protective Action Guidelines except within the site boundary and will be classified under Event Category R, “Abnormal Radiological Levels/Effluents”.

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HA6

INITIATING CONDITION

Conditions Indicate Actual **OR** Potential Substantial Degradation of the Level of Plant Safety

EAL THRESHOLD VALUE

1. Other conditions, exist which in the judgment of the Emergency Director indicate that plant safety systems may be degraded and that increased monitoring of plant functions is warranted.

MODE APPLICABILITY

ALL

BASIS (References)

Alert - Events are in process 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.

This EAL allows the Emergency Director to declare an Alert upon the determination that the level of safety of the plant has substantially degraded but is not explicitly addressed by other EALs. This includes a determination by Shift Management that the TSC and OSC should be activated and command and control functions should be transferred for the event to be effectively mitigated. Transfer of command and control functions is used as an initiator since an event significant to warrant transfer is a substantial reduction in the level of safety of the plant. Other examples are:

Internal flooding affects the operability of plant safety systems required to establish or maintain cold shutdown.

Releases that are expected will be limited to a small fraction of the EPA Protective Action Guidelines and will be classified under Event Category R, "Abnormal Radiological Levels/Effluents".

Table PBAPS 3-2: EAL Technical Basis

**RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS**

HU6

INITIATING CONDITION

Conditions Indicate a Potential Degradation in the Level of Plant Safety

EAL THRESHOLD VALUE

1. ANY of the following occur, which in the judgment of the Emergency Director indicate a potential degradation in the level of safety of the plant:
 - Aircraft crash on-site
 - Train derailment on-site
 - Near-site explosion, which may adversely affect normal site activities

OR

2. Other conditions exist which in the judgment of the Emergency Director indicate a potential degradation in the level of safety of the plant

MODE APPLICABILITY

ALL

BASIS (References)

This EAL is intended to address unanticipated conditions not addressed explicitly elsewhere but warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the Unusual Event emergency class.

Unusual Event – Events are in process 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.

From a broad perspective, one area that may warrant Emergency Director judgment is related to likely or actual breakdown of site-specific event mitigating actions. Examples to consider include inadequate emergency response procedures, transient response either unexpected or not understood, failure or unavailability of emergency systems during an accident in excess of that assumed in accident analysis, or insufficient availability of equipment and/or support.

It is also intended that the Emergency Director's judgment not be limited by any list of events as defined here or as augmented by the site. This list is provided solely as examples for consideration and it is recognized that actual events may not always follow a pre-conceived description

Section 4: Emergency Measures**4.1 Notification of the Emergency Organization**

Notifications for the Peach Bottom Atomic Power Station are made to the following additional State and local agencies in accordance with Section E.3 of the Exelon Nuclear Standardized Radiological Emergency Plan:

- Maryland Emergency Management Agency (MEMA)
- Pennsylvania Emergency Management Agency (PEMA)
- Cecil County Emergency Management & Civil Defense Agency
- Chester County Department of Emergency Services
- Harford County Division of Emergency Operations
- Lancaster County Emergency Management Agency
- York County Emergency Services

Notification of PEMA and the risk counties will be directed by the Emergency Director within 15 minutes of initial event classification, reclassification, or a change in a protective action recommendation (PAR) due to plant conditions or meteorological changes per Section E.3 of the Exelon Nuclear Standardized Radiological Emergency Plan. In addition, once the EOF is activated, the Corporate Emergency Director will contact the Senior Pennsylvania State Official as designated by PEMA following the decision to recommend a protective action for the general public.

Upon notification of an emergency at Peach Bottom Atomic Power Station, the Pennsylvania Bureau of Radiation Protection (BRP) and Maryland Department of the Environment (MDE) will contact the appropriate station to verify that an emergency exists and to obtain technical information, and then makes recommendations to PEMA and MEMA respectively, regarding protective actions for the public. The BRP/ MDE Support Plan For Fixed Nuclear Facility Incidents utilizes the Protective Action Guidelines in the U.S. Environmental Protection Agency (EPA) 400-R-92-001, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents".

Exelon Nuclear will provide follow-up information to the BRP/MDE or other off-site authorities. The follow-up information will keep these authorities apprised of existing or potential radiological releases, meteorological conditions, projected doses and contamination levels, licensee actions, recommend protective actions and other information pertinent to the authorities responsibilities. The information may be provided over open communication paths or in person to BRP/MDE personnel.

4.2 Assessment Actions

The effluent radiation monitoring system provides indications of gross releases of gaseous and liquid radioactivity. By applying calibration factors, meteorological data, or river flow, the gross indications are used to calculate approximate release rates in $\mu\text{Ci}/\text{sec}$ and dose rates at specific distances along the release pathways. Particulate and iodine analysis depends on collecting installed filter papers and charcoal cartridges for analysis in the counting room. Similar calculation procedures are applied to approximate release rates and dose rates due to iodine.

Detectors are strategically located throughout the plant. These detectors indicate and alarm locally and in the Control Room. They serve the purpose of indicating current dose rates in those areas and are used for local evacuation action levels and re-entry operations.

Certain plant operating systems contain radiation monitors. These systems are described in the PBAPS UFSAR.

Portable monitoring instruments and sampling equipment consist of such items that are utilized and maintained on-site by the Chemistry and Health Physics sections for normal day-to-day plant operations and are thus available for emergency operations.

4.2.1 Assessment Without Instrumentation

Should the effluent radiation monitors be off-scale or otherwise inoperable, assessment of releases and off-site exposure would be made using the containment monitor readings, point of release grab samples, and pathway samples.

- a. **Containment Monitors** -- These Containment Radiation Monitor Dose Rate Curves have been developed to indicate the quantity of airborne activity released from the fuel and from the primary coolant system to the containment in a design basis accident (DBA), like a loss of coolant accident (LOCA). This activity is theoretically available for leakage or release to the environment. The theoretical curves of gross gamma dose rate vs. time for seven potential source terms are provided in Figures PBAPS 4-1a&b.

These figures correlate the containment high range radiation monitor readings (R/hr) to the percent of fuel inventory released to the containment atmosphere as a function of time after plant shutdown (Figure PBAPS 4-1a&b). The percentage of fuel inventory released can be converted to radioactivity (Curies) available for release by multiplying by a noble gas isotopic spectrum determined by the Post-Accident Sampling System (PASS). For periods when the PASS isotopic spectrum is not available, and for other than noble gas isotopes, a default core activity spectrum can be used. Isotopic releases distributions can be entered into Dose Assessment and Protective Action Recommendation (DAPAR) dose model to project doses.

The set points on this monitor could be used to indicate to the operator that the Emergency Action Levels (EALs) were reached under the Fission Product Barrier loss matrix provided in Section 3.

- b. **Grab Samples** -- Particulate, iodine, and noble gas grab samples can be obtained from the effluent monitors located at the release points. Analyses of the samples are performed in the counting room facilities to determine isotopic breakdown release rates. The data can be entered into the DAPAR dose model to determine off-site doses.
- c. **Point of Release Samples** -- Point of release samples (i.e., top of stacks or at vent) are obtained using available equipment and procedures. Analyses of the samples are performed at the counting room facilities, and release rates can be determined. Release rates are then used to calculate off-site dose projections.
- d. **Pathway Samples** -- Off-site samples in the plume pathway are obtained by using available equipment and procedures. Analysis data can be back-calculated to the point of release, and projected dose rates at locations of interest can be evaluated.

4.3 Protective Actions for the Offsite Public

For incidents at PBAPS, PEMA coordinates with MEMA and contacts York, Lancaster and Chester County Emergency Management Agencies to assure that local plans have been implemented. MEMA likewise contacts Cecil and Harford Counties in the event of emergency at PBAPS to assure that all plans have been implemented. County and local governments have primary responsibilities for implementing protective measures for the public following a nuclear incident.

The BRP and MDE serve as lead State agency, in Pennsylvania and Maryland respectively, for technical assistance to other state agencies, county, and local governments regarding radiological health and accident assessment. In the absence of communications with the state, recommendations for protective actions shall be made directly to county emergency operations centers from the station.

4.3.1 Alert and Notification System (ANS) Sirens

Annex E of the Commonwealth of Pennsylvania Emergency Operations Plan and Annex Q of the Maryland Radiological Emergency Plan address notification to the general public and others regarding protective actions. An Alert Notification System, which is intended for use by the counties, in conjunction with the Emergency Alert System (EAS) to provide notification to the general public, has been installed.

Alerting of the EPZ population is provided by a siren system that was installed and is maintained by Exelon Nuclear. The system consists of high-powered rotating electro-mechanical sirens mounted on Class 1 utility poles throughout the Plume Exposure Pathway (10-Mile EPZ). Personnel at the risk county communication centers operate the sirens. The Pennsylvania Emergency Management Agency (PEMA), in conjunction with Maryland and the risk counties, coordinates the activation of the siren system for Peach Bottom Atomic Power Station.

The siren system meets or exceeds the acoustic coverage requirements outlined in NUREG-0654/FEMA-REP-1 and FEMA-REP-10. The location of each siren site was determined by a computer-based sound propagation model.

The sirens are controlled by digitally encoded radio signals transmitted by a transceiver at the station. Each risk county has control of the sirens that are physically located in that county. The sirens can be activated on an individual, municipal, county, or EPZ-wide basis. A controller located at the station serves as a backup to the county controllers. After the system is activated, each siren reports the result of its activation back to the respective county controller and the controller at the station. The siren system is tested regularly to ensure its operability.

Annex E (to the PA Emergency Operations Plan) and Annex Q (to the Maryland REP) delineate risk counties as responsible to:

- Develop a system for rapid notification (in priority order) of county and local government heads, key staff, emergency forces, volunteer organizations, schools, hospitals, nursing homes, business, and industry;
- Ensure that the alert and notification system is operable on an around-the-clock basis;
- Prepare and disseminate public information material on protective actions to provide clear instructions to the population at risk;
- Prepare and maintain material current for dissemination through the EAS; and
- Include provisions in the alert plan for notification of transients.

PEMA/MEMA will notify other states within the Ingestion Pathway EPZ should such action be necessary.

Annex E (to the PA Emergency Operations Plan) and Annex Q (to the Maryland REP) also call for each risk county to promptly activate their alert notification system, when appropriate. EAS radio stations will be activated and instructed as to which prepared message to use. Detailed messages with specific instructions to the public will be provided to the EAS stations by state and county public information officers on a timely basis. Various state agencies will assist the counties in assuring notifications of transients.

4.3.2 Evacuation Time Estimates

The evacuation time estimates (ETE) were developed in coordination with the Commonwealth of Pennsylvania and State of Maryland to assess the relative feasibility of an evacuation of the 10-Mile EPZ for the Peach Bottom Atomic Power Station. The evacuation times are based on a detailed consideration of the EPZ roadway network and population distribution. The ETE Study, maintained separately by Emergency Preparedness, presents representative evacuation times for daytime and nighttime scenarios under various weather conditions for the evacuation of various areas around the Peach Bottom Atomic Power Station, once a decision has been made to evacuate.

4.3.3 Potassium Iodide (KI)

The Department of Health, Commonwealth of Pennsylvania, is responsible for providing advice to PEMA on the planning for the use, stockpiling and distribution of Potassium Iodide (KI) or other thyroid blocking agents and such other radiological health materials as may be required for the protection of the general public. Their decision shall also be based on U.S. FDA guidance.

The use of KI in the State of Maryland will be in accordance with state health laws and under the direction of State and County Medical Officials.

Based on agreement with the Maryland Department of the Environment (MDE), the PBAPS will recommend to Maryland government officials that the general public be notified to take KI at a General Emergency classification in those sectors where an evacuation has been recommended. This notification will be approved by the Emergency Director in Command and Control of PAR decision-making and off-site notifications, and performed as part of the State / local notifications described under Sections II.B.4 and II.E.3 of the Exelon Nuclear Standardized Radiological Emergency Plan.

4.3.4 Public Information**a. Publications**

Public information on protective actions is prepared and disseminated annually to provide clear instructions to the population-at-risk. Exelon Nuclear assists PEMA/MEMA and risk counties in the preparation and distribution of their respective public information.

Pamphlets outlining public education response actions are readily available for transients in the 10-Mile EPZ. In addition, emergency information is provided to the operators of other recreational areas in the 10-Mile EPZ.

These public information publications (including telephone book emergency information, etc.) instruct the public to go indoor and turn on their radios when they hear the ANS sirens operating. These publications identify the local radio stations to which the public should tune in for information related to the emergency. Additional materials (e.g., such as rumor control numbers, evacuation routes, information on inadvertent siren soundings, etc.) may also be included in these publications based on agreements with responsible State and risk county agencies.

b. News Media Education

Information kits are available to news media personnel. These kits include information on a variety of nuclear power plant related subjects.

4.3.5 Protective Action Recommendations (PARs) for the General Public

Figure PBAPS 4-2, "PAR Flowchart", illustrates affected downwind sectors based on wind direction, using the generic plant-based event logic as outlined in Figure J-1 of the Exelon Nuclear Standardized Radiological Emergency Plan.

4.4 Protective Actions for Onsite Personnel**4.4.1 Plant Evacuation**

Exelon Nuclear personnel and contractors filling emergency response organization positions are considered essential personnel. As such, they will report to their emergency response locations. They will not evacuate unless specifically directed by the Emergency Director. All other personnel are considered non-essential.

In-plant evacuation is initiated primarily by area radiation monitor alarms and continuous air monitor alarms, but is also applicable for fire alarms, explosions, toxic material conditions, as well as radiation, contamination, and airborne radioactivity surveys which indicate conditions above applicable limits. Notification for personnel to proceed with in-plant evacuation will be via a local alarm or an announcement on the plant PA system. The affected area and evacuation assembly areas (if appropriate) will be announced. The immediate response by individuals in the vicinity of such an alarm or announcement is evacuation to an unaffected area or designed assembly area.

In the absence of readily available radiological survey information or other logical assessment of conditions, evacuation will be, at least, to a point where other area radiation monitors, continuous air monitors, or observation of local conditions show that the area is not affected.

Assigned plant personnel report to the scene to evaluate conditions, to provide information to the Control Room, and to perform other emergency functions such as personnel accountability, decontamination, medical assistance, and control of the hazard.

Notification of a Site Evacuation is accomplished by activating the Evacuation Alarm System followed by an announcement over the plant PA system. The evacuation assembly area(s) are announced. Evacuation assembly areas are illustrated in Figure PBAPS 4-3. Non-essential personnel will exit via the security exit points and will proceed to the parking lot for transportation. Evacuees are expected to use their personal vehicles in evacuating to the designated evacuation assembly area(s). Designated evacuation assembly areas are located outside the protected area. Plant access roads are maintained clear during the winter months, travel on these roads is expected to be possible at all times.

Plant visitors who have not completed the required training program are escorted at all times. This ensures proper response under emergency conditions. Visitors at the station shall follow the lead of their escorts to the assembly areas.

4.4.2 Personnel Accountability

The Security personnel shall follow security procedures for personnel accountability. For evacuations, information from evacuees is an important means of accounting for plant personnel. For Site Evacuations, non-essential personnel and those ERO members whose facility is located outside the Protected Area are accounted for at the security exit point. Emergency response personnel responding to the OSC within the Protected Area are accounted for by badging into designated card readers.

4.4.3 Monitoring of Evacuees

Evacuees are checked for contamination. Necessary personnel and vehicle decontamination efforts are initiated at the evacuation assembly area using in-plant equipment or emergency kit supplies. Priority for decontamination shall be given to personnel found to have the highest levels of contamination. Any personnel suspected, or known, to have ingested or inhaled radioactive material shall be given a whole body count, as soon as conditions permit, to assess their internal exposure.

4.5 Severe Accident Management

Accident management consists of those actions taken during the course of an accident, by the Emergency Response Organization (ERO), specifically: plant operations, technical support, and plant management staff in order to:

- Prevent the accident from progressing to core damage;
- Terminate core damage once it begins;
- Maintain the capability of the containment as long as possible; and
- Minimize on-site and off-site releases and their effects.

The later three actions constitute a subset of accident management, referred to as Severe Accident Management (SAM) or severe accident mitigation. The Severe Accident Management Plan (SAMP) procedures provide sound technical strategies for maximizing the effectiveness of equipment and personnel in preventing, mitigating and terminating severe accidents.

Implementation of SAMP procedures is a collaborative effort between the Shift Manager and the Station Emergency Director in the TSC (once activated). The Station Emergency Director maintains ultimate responsibility for direction of mitigating strategies. Designated TSC Technical and Operations Support personnel are also trained to assist with decision-making by evaluating plant conditions using the SAM Technical Support Guidelines (TSG).

Figure PBAPS 4-1: Containment Radiation Monitor Dose Rate Curves

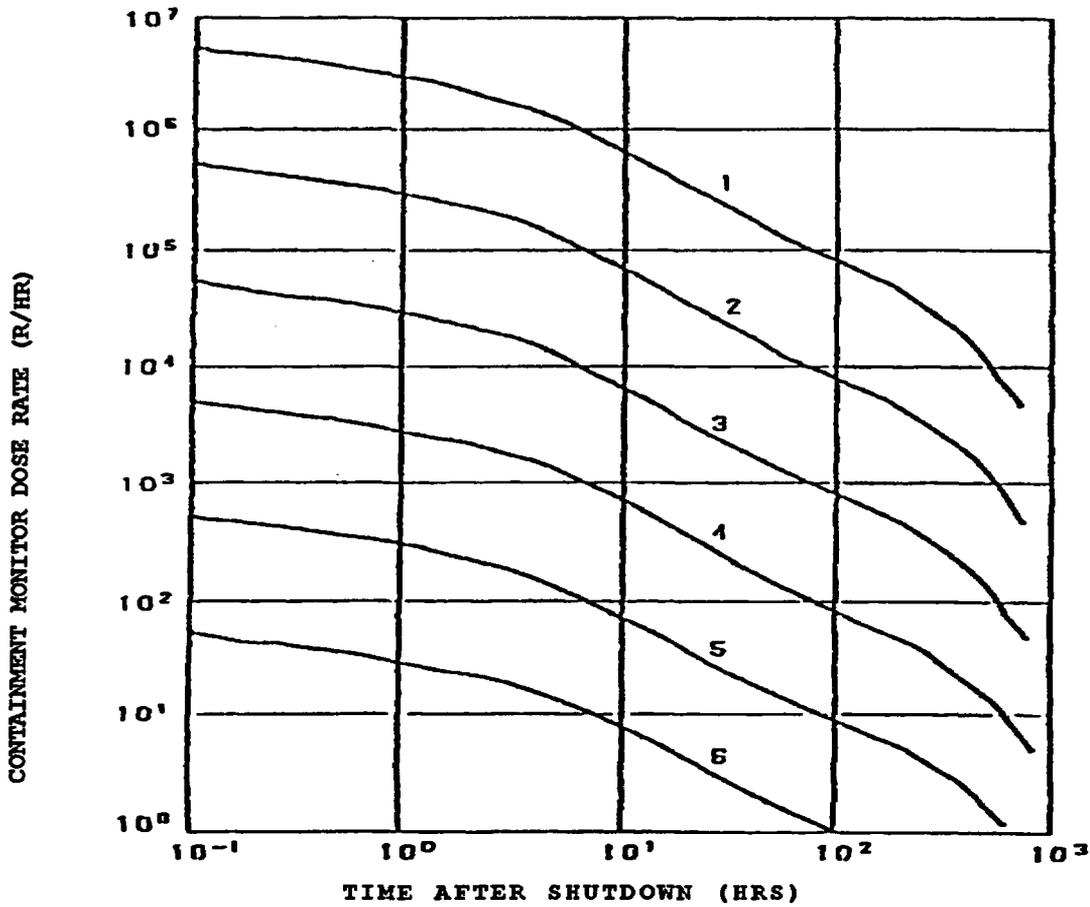
- NOTES (1) These curves account for the finite containment volume and shield wall seen by the detector but do not account for any monitor physical or shielding characteristics or calibration uncertainties.
- (2) The curves assume that both airborne noble gases and iodines are significant. Sprays (if used) would make the iodine and particulate contribution (presently about 50%) insignificant. However, particulate plate out on the monitor casing and direct shine doses from components may make the readings unreliable.
- (3) Curve uncertainties are on the order of a factor of 5 to 10.

**Percent of Fuel Inventory Airborne in the Containment
vs. Approximate Source and Damage Estimate**

<u>Curve No.</u>	<u>% Fuel Inventory Released</u>	<u>Approximate Source and Damage Estimate</u>
1	100. 50.	100% TID-14844, 100% fuel damage, potential core melt. 50% TID noble gases, TMI source.
2	10. 3.	10% TID, 100% NRC gap activity, total clad failure, partial core uncovered. 3% TID, 10% WASH-1400 gap activity, major clad failure.
3	1.	1% TID, 10% NRC gap, Max. 10% clad failure.
4	0.1	0.1% TID, 10% NRC gap, 1% clad failure, local heating of 5-10 fuel assemblies.
5	0.01	0.01% TID, 0.1% NRC gap, clad failure of 3/4 of a fuel assembly (36 rods).
6	10 ⁻³ 10 ⁻⁴	0.01% NRC gap, clad failure of a few rods 100% coolant release with spiking.
7	5X10 ⁻⁶ 10 ⁻⁶	100% coolant inventory release. Upper range of normal airborne noble gas activity in containment.

* 100% Fuel Inventory = 100% Noble Gases +25% Iodine + 1% particulates.

PEACH BOTTOM CONTAINMENT RADIATION MONITOR CURVES

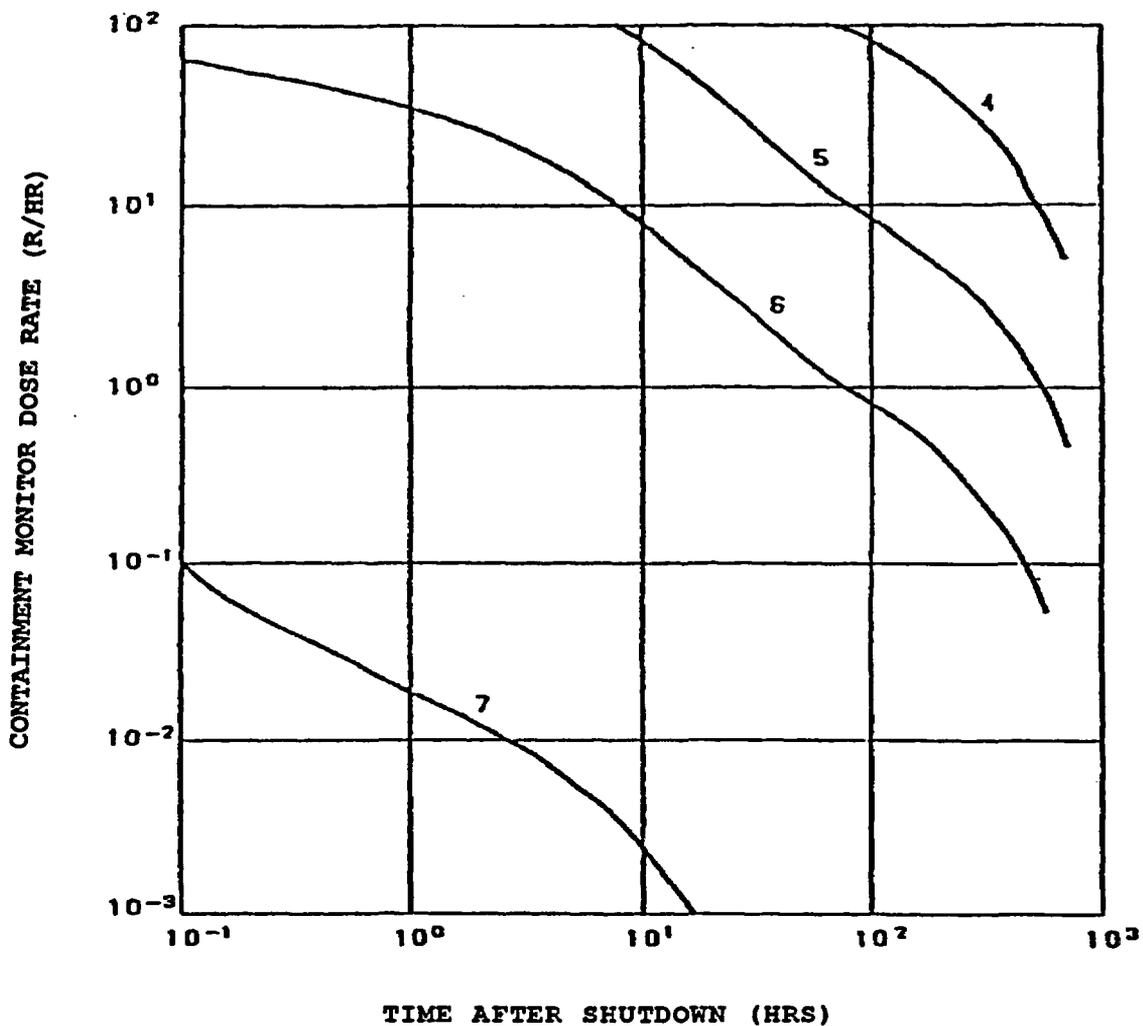


PEACH BOTTOM MONITOR RESPONSE CURVES
FOR
PRIMARY CONTAINMENT LOW RANGE MONITORS

CURVE INDEX		
1.	100%	FUEL INVENTORY (100% TID-14844)
2.	10%	FUEL INVENTORY (100% GAP ACTIVITY/R.G. 1.25)
3.	1%	FUEL INVENTORY (10% NRC GAP-CLAD FAILURE)
4.	0.1%	FUEL INVENTORY
5.	0.01%	FUEL INVENTORY
6.	0.001%	FUEL INVENTORY

Figure PBAPS 4-1a: Containment Radiation Monitor Dose Rate Curves

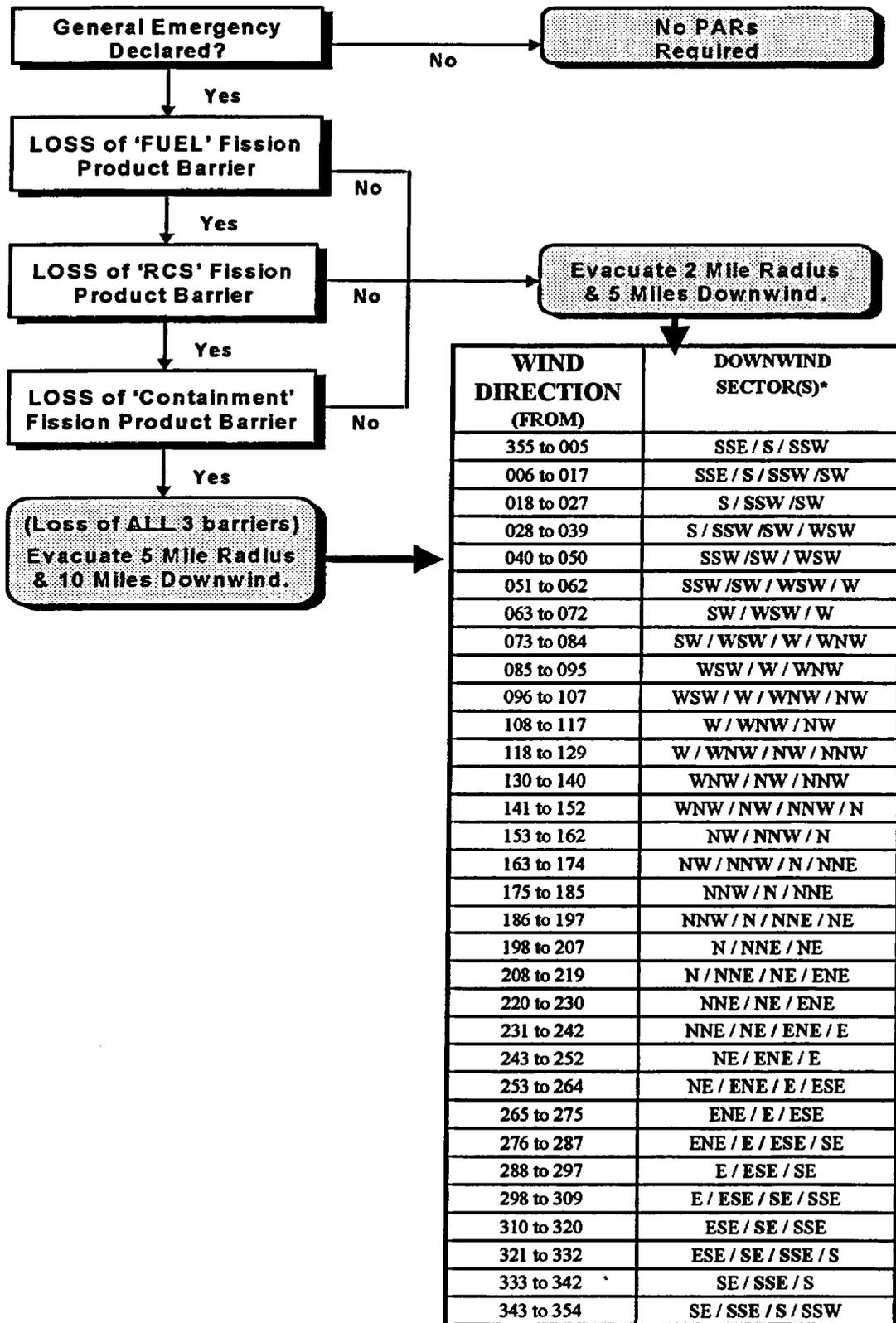
PEACH BOTTOM CONTAINMENT RADIATION MONITOR CURVES



PEACH BOTTOM MONITOR RESPONSE CURVES FOR PRIMARY CONTAINMENT LOW RANGE MONITORS	
CURVE INDEX	
4 -	0.1% FUEL INVENTORY
5 -	.01% FUEL INVENTORY
6 -	.001% FUEL INVENTORY
7 -	100% COOLANT ACTIVITY

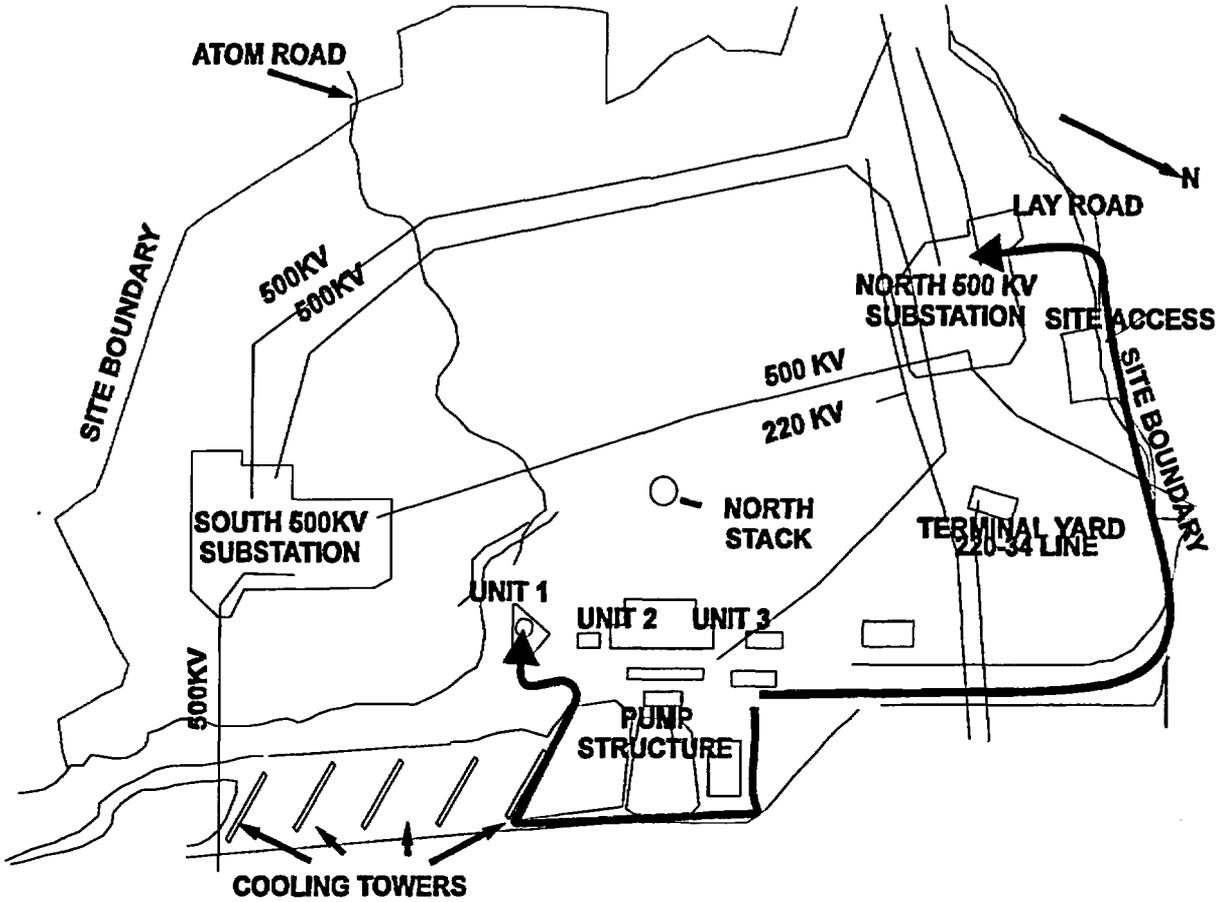
Figure PBAPS 4-1b: Containment Radiation Monitor Dose Rate Curves

Figure PBAPS 4-2: Protective Action Recommendation (PAR) Flowchart



*BOLD refers to affected sector(s)

Figure PBAPS 4-3: Off-Site Assembly Location



TYPE OF EVACUATION
LOCAL EVACUATION
SITE EVACUATION

EVACUATION ASSEMBLY AREAS
Announced on PA System
Peach Bottom Atomic Power Station
Unit 1, North Sub-Station

Section 5: Emergency Facilities and Equipment

5.1 Emergency Response Facilities

5.1.1 Station Control Room

The Peach Bottom Atomic Power Station Control Room shall be the initial onsite center of emergency control. The Control Room is located on the 165' elevation of the Turbine Building (Control Structure). The ventilation system, shielding, and structural integrity are designed and built to permit continuous occupancy during the postulated design basis accident.

5.1.2 Technical Support Center (TSC)

Peach Bottom Atomic Power Station has established a Technical Support Center (TSC) located on the 3rd floor of the Training Center. The TSC fully meets the requirements of Section H.1.b of the Exelon Nuclear Standardized Radiological Emergency Plan and conforms to Section 8.2.1 of Supp. 1, NUREG-0737.

5.1.3 Operational Support Center (OSC)

Peach Bottom Atomic Power Station has designated an Operational Support Center (OSC). The OSC is located in a 2nd floor conference room at the Site Administrative Building. The OSC conforms to the requirements of Section H.1.c of the Exelon Nuclear Standardized Radiological Emergency Plan, and is the location to which operations support personnel will report during an emergency and from which they will be dispatched for assignments in support of emergency operations.

In the event the OSC is not habitable, personnel report to backup facilities that can be designated based upon specific event conditions.

5.1.4 Emergency Operations Facility (EOF)

The dedicated Emergency Operations Facility (EOF) is located on Exelon property at 175 North Caln Road, Coatesville, PA. The EOF supports both Peach Bottom and Limerick, and is located approximately 31 miles from Peach Bottom Atomic Power Station. Separate offices are provided for Exelon Nuclear, NRC, Maryland and Pennsylvania representatives and other emergency personnel.

Plant Monitoring System data is available through the Emergency Preparedness Data System (EPDS) at the EOF. The EOF equipment includes:

- a. Supplies and equipment for EOF personnel, and
- b. Sanitary and food preparation facilities.

5.1.5 Joint Public Information Center (JPIC)

The Joint Public Information Center (JPIC) is the facility in which media personnel gather to receive information related to the emergency event. The JPIC is co-located with the EOF at 175 North Caln Road, Coatesville, Pennsylvania.

5.2 Assessment Resources

5.2.1 Geophysical Monitors

a. Onsite Meteorological Monitoring Program

The Onsite Meteorological Monitoring Program is covered in the contractor specification and vendor procedures of the meteorological monitoring contractor. These data are used to generate wind roses and to provide estimates of airborne concentrations of gaseous effluents. Meteorological data is provided to the station Control Room from Meteorological Towers. Data include wind speed, wind direction, and temperature. Meteorological monitoring is described in the PBAPS UFSAR.

b. Seismic Monitoring

Seismic instrumentation includes time-history strong motion pressure triaxial seismic monitor accelerographs located in secondary containment. Peak recording accelerographs, and seismic switches are discussed in the PBAPS UFSAR.

5.2.2 Radiation Monitoring Equipment

For radiological assessments, instrumentation includes area radiation monitors (ARMs), ventilation effluent radiation monitors, liquid effluent radiation monitors, stack effluent monitors, primary containment radiation monitors and miscellaneous process radiation monitors (Refer to PBAPS UFSAR Section 7 for additional information). Data from these sources would be augmented by plant and field surveys for radiation and airborne levels.

a. Post-Accident Sampling Capability

The Post Accident Sampling System (PASS) is designed to obtain representative liquid and gas samples from within the primary containment for radiological analysis in the event of a loss-of-coolant accident. PASS gaseous samples are analyzed for noble gas only.

Post-accident monitoring equipment includes noble gas effluent monitors and iodine and particulate filters on the Main Stack for Peach Bottom. The equipment is located to permit access for retrieval of samples under accident conditions. High range radiation monitors are provided in the primary containment. This equipment is more fully described in the PBAPS UFSAR.

b. Radiological Effluent Gaseous Monitoring

PBAPS has five points of release of radioactive material to the atmosphere. These are the Main Off-Gas Stack, Units 2 and 3 Roof Vents and Torus Hardened Vents. Sample systems are installed for three pathways, Main Stack and two Roof Vents. The sample systems consist of isokinetic sample lines containing particulate/iodine filters, and separate sample lines to shielded gas chambers. Detector outputs associated with the gas chambers are recorded in the Control Room. Roof Vent and Main Stack flow rates are also recorded in the Control Room.

The roof vent radiation monitoring system continuously monitors the noble gas being discharged from the Peach Bottom Unit 2 and Unit 3 roof vents. Each unit has two independent monitoring stations. The monitoring stations use scintillation detectors, which read out digitally in the Control Room.

A representative sample of the Torus Hardened Vent (THV) effluent can be obtained by utilizing the Post Accident Sampling System (PASS). The PASS is capable of sampling containment atmosphere prior to and during the use of the Torus Hardened Vent. The THV radiation monitoring system consists of GM type radiation detectors. One monitor is externally mounted to the vent. Both monitors readout in cpm, and are displayed on a digital monitor in the Control Room.

The refuel floor exhaust is combined with other building exhaust streams and is monitored by the Ventilation Stack Radiation Monitoring system for each unit. All alarm functions and readouts are in the Main Control Room. There are also several Area Radiation Monitors on the refuel floors that provide both local and Main Control Room alarm and readout.

Peach Bottoms' gas chamber detector recorder readouts are converted to uCi/sec of noble gas using calibration data and effluent flow rates for each point of release. The uCi/sec Iodine and particulates are determined from the filter and charcoal cartridge samples. The dose projection system then relates meteorological and radiological data to project dose rates along the plume pathway for selected distances. Appropriate atmospheric distribution coefficients are selected for distances of interest from the point of release. Dose rates at these distances are calculated using this data.

c. Radiological Effluent Liquid Monitoring

Liquid releases are made on a batch basis from waste sample tanks. The contents of these tanks are circulated prior to sampling and analysis and release in the discharge canal. Release forms are prepared to authorize releases to the discharge canal. Potentially, plant system leaks could cause discharge to the canal directly. Radiation monitors are located on certain process water systems that indicate abnormal radioactivity levels. A point of release sampling system is located at the end of the discharge canal.

d. Laboratory Facilities

Chemical laboratories are in the Plant Entrance and Radiochemistry Laboratory (PEARL) at PBAPS. A radiochemistry section is provided. The laboratories are adjacent to the counting room for convenience in transporting prepared samples for counting.

5.2.3 Data Acquisition Methods**a. Plant Monitoring System (PMS)**

The PBAPS Main Control Room (MCR) and Technical Support Center (TSC) use an emergency facility data system to aid in assessing plant response and status during emergencies. PMS is a computer-based real-time data acquisition and display system, which gathers and records, selected plant parameters for display.

The system displays are designed to aid the Control Room operator in the performance of emergency response procedures. These displays provide information pertinent to reactor core cooling, reactor coolant system integrity, reactivity control, containment integrity, and power system status. These displays are also available to personnel in the TSC.

PMS also provides concise displays of parameters selected for post-accident monitoring. These displays are designed to aid TSC personnel in assessing plant conditions and in assisting Main Control Room personnel in recovering from abnormal or accident conditions and in mitigating their consequences. The displays include parameter versus time and parameter versus parameter trending.

PMS utilizes high-speed data recording, long-term data storage and a transient analysis program package to aid the Technical Support Center staff in reconstructing the accident sequence as well as tracking the plant steady state and dynamic behavior prior to and through the course of an event. PMS displays are available in the Main Control Room and TSC, and EOF through EPDS interactive color graphic display consoles. Hardcopy output devices are available at each location. Provisions have been made to share data with State Liaisons located in the EOF.

b. Emergency Preparedness Data System (EPDS)

The Emergency Preparedness Data System (EPDS) is an emergency facility data system to aid in assessing plant response and status during emergencies. EPDS is a computer based real-time data acquisition and display system, which acquires, stores and re-packages data from PMS for display in the Technical Support Center and Emergency Operations Facility.

5.2.4 Onsite Fire Detection Instrumentation

PBAPS is afforded fire protection from various systems, selected for their applicability in coping with the several possible types of fires. These systems include an extensive fire water system, carbon dioxide system, air foam system, dry chemical system, heat and smoke detectors as well as portable fire extinguishers located throughout the plant. These systems have alarm outputs located in the Control Room. Fire protection systems are described in the PBAPS UFSAR.

5.2.5 Facilities and Equipment for Offsite Monitoring

Off-site Radiological Environmental Monitoring Program is described in the Offsite Dose Calculations Manual (ODCM). Installed radiological monitoring equipment and facilities, including process, area, and effluent, are described in the PBAPS UFSAR. Sets of instruments are available for emergency use by field survey teams. The field survey teams perform field surveys to locate and track the plume and to determine depositing of activity on the ground.

Emergency kits contain radiation survey equipment, which enables the Field Survey Teams to obtain dose rates, surface contamination, and airborne contamination including radioiodine measurements to supplement calculations based on effluent data. These emergency kits are located at facilities outside the plant for ready accessibility. The equipment in these kits is dedicated for emergency use only.

Concurrent field sampling and analysis for radioiodine provides the capability to detect 10^{-7} $\mu\text{Ci/cc}$ I-131, per NUREG-0654, FEMA-REP-1.

The services of Normandeau Associates Inc. (NAI) are contracted to provide for the collection of environmental media samples (e.g., water, grass vegetation, etc.) under emergency conditions and their transport to an offsite laboratory for analysis.

5.2.6 Site Hydrological Characteristics

A list of downstream users is maintained to ensure that they are notified. Should contamination of site drinking water sources be suspected, water samples shall be analyzed.

There are river water level indicators in the PBAPS Control Room. These level indicators continuously indicate river levels, which are also input to the process computer for periodic logging, and high and low level alarms. In addition to the river water indicators in the PBAPS Control Room, river levels at Conowingo Dam (downstream) and Muddy Run Pump Storage Station (upstream) are recorded in the Conowingo Control Room. Conowingo Station engineers receive upstream river stages and weather information, which are used to predict river levels and flow rates up to four days in advance. This information is available to the PBAPS Control Room personnel.

5.3 Protective Facilities and Equipment

a. **Emergency Supplies**

Refer to Table PBAPS 5-1 for a listing of Emergency Supplies and Equipment.

b. **Maintenance Equipment**

Maintenance equipment consists of normal and special purpose tools and devices utilized in the course of maintenance functions throughout the station. Maintenance and Radiation Protection personnel responding to the OSC are cognizant of the locations of equipment, which may normally be required in an emergency condition. The Maintenance supervision has access to keys for tool storage, shops, and other locations where maintenance equipment may be stored.

5.4 First Aid and Medical Facilities

EMT kits are located in designated areas and are checked and replenished as necessary. Stretchers are also provided at designated locations.

5.4.1 Decontamination and Medical Response

On-site personnel decontamination facilities for emergency conditions include showers and sinks, which drain to the liquid radioactive, waste processing system, at the primary health physics decontamination area in the plant. Special decontamination materials and personnel decontamination procedures are available in the area for use under the direction of health physics supervision. Provisions are made for medical decontamination when personnel are transported to hospitals.

5.4.2 Emergency Medical Assistance Program (EMAP)

An Emergency Medical Assistance Program plan has been established to provide for consultation and definitive care for radiation accident victims. The EMAP distinguishes three levels of medical care:

1. First aid, decontamination, and preliminary patient evaluation at the site
2. Emergency care and patient stabilization in a supporting hospital
3. When necessary, definitive evaluation and treatment.

The EMAP provides for a Radiation Emergency Medical Team (REM Team) to respond to accident 24 hours per day. The team consists of experienced physicians, board certified health physicists, and technicians. It has portable medical and health physics equipment to render emergency treatment at accident sites and conduct the initial evaluation of the radiation status of patients as well as the environment.

For on-site medical assistance, REM Team capabilities include:

1. Consultation and actual assistance to site medical response personnel and the attending Physician
2. Assistance in personnel decontamination

The Emergency Medical Assistance Program (EMAP) consultant has access to extensive laboratory facilities, which provide the capability for radiochemical analysis of plant and environmental samples.

Bioassay including whole body counting, gamma spectroscopy and personnel dosimetry processing are among the capabilities of EMAP.

5.4.3 Medical Transportation

Transportation of injured personnel, who may or may not be radioactively contaminated, to medical treatment facilities is provided by local ambulance services. (Refer to Section 2.4 of the Peach Bottom Annex.)

5.5 Communications

Refer to Section F.1 of the Exelon Nuclear Standardized Radiological Emergency Plan for a description of dedicated communications lines to support both offsite and inter-facility communications.

5.5.1 Intra-Plant Public Address (PA) System

Peach Bottom utilizes a 3-channel system powered from two separate emergency busses through automatic transfer switches permitting simultaneous use of one page line and two party lines. Loudspeakers powered by individual amplifiers are located throughout the plant and in remote structures.

The Peach Bottom Public Address system has also been equipped with an advanced page line control system for the enhancement of page announcements throughout the site. This control system provides improved sound quality for emergency announcements made to and from the main control room. It is also capable of screening out page announcements that do not originate from designated page announcement control points such as the control room, TSC, OSC, security locations, etc.

Local area PA announcements can still be conducted by the use of the emergency page button, and the entire system can be reverted back to allow announcements from all locations as required during emergency conditions. The primary purpose of the screening function is to reduce the number of locations where site wide page announcements can originate.

The Peach Bottom PA stations in the plant can only make pages (loudspeaker announcements) to key/central locations (Main Control Room, security station and TSC). General PA announcements over all the plant speakers can only be made from the Main Control Room, Security CAS & SAS stations, OSC, and TSC areas. This system of controlling the PA page announcements dedicates the PA system to reporting emergencies and communications to the Main Control Room.

Capability exists to warn individuals in the vicinity of the river through the river warning system utilizing the plant PA system.

Peach Bottom's Main Control Room has priority page abilities that allow the MCR announcements to override normal plant page announcements.

5.5.2 Private Branch Exchange (PBX) Telephone System

The PBAPS main commercial telephone system (PBX) provides telephone communications capabilities throughout the plant, remote structures, and with off-site parties. Extensions are located in the Main Control Room, the TSC, and the OSC. The power supply for this system consists of one on-site source with an 8-hour battery backup.

The PECO Energy Main Office and Exelon Nuclear headquarters are also served by separate commercial telephone systems (PBX's). All PECO Energy and Exelon Nuclear's PBX's are networked together to create a fully-integrated voice network, providing call management and network redundancy.

5.5.3 Dedicated Emergency PBX Telephone System

The PBAPS dedicated emergency PBX telephone system provides rapid and reliable communications in the event of an emergency. It is independent of the main PBX switch. The dedicated emergency PBX allows rapid dialing and conferencing of emergency response personnel. Extensions are located in the Control Room, the TSC, the OSC, the EOF, and the JPIC. Tie line access capability is provided both through the Peach Bottom main PBX switch and the Limerick dedicated emergency PBX switch. Exhibit 5-1, "Emergency Communications Links", provides a simplified diagram of conference capabilities. The system is powered by the Conowingo underwater line and has a battery backup.

Dedicated lines are provided between the PBAPS Control Room, PBAPS substations, and Exelon Nuclear System Operations located at the Corporate Headquarters.

5.5.4 Intra-Plant Maintenance Telephone System

The intra-plant maintenance telephone system is a part of the PBX system and consists of telephone jacks into which telephone sets may be plugged. The telephone jacks are in various plant locations (predominantly in areas of high maintenance activity) and have the effect of expanding the PBX capability.

5.5.5 EOF/JPIC Private Branch Exchange (PBX)

A dedicated PBX is installed at the Coatesville EOF/JPIC. This switch will control telephone communications in and between the facility, other Exelon locations, and non-Exelon locations. In the event of a PBX failure, outside dial capability is available through trunk lines from the Coatesville Service Building. The EOF/JPIC PBX switch is powered by a source that is backed by a 4-hour uninterruptible power supply and an emergency diesel generator. The UPS is designed to allow sufficient time to bridge any power interruption caused by switching to diesel-supplied power.

5.5.6 Data and Facsimile Transmission Lines

Various data lines are provided to interface computer systems and facsimile machines located at Peach Bottom, Limerick, EOF/JPIC.

5.5.7 Trunk Lines

Incoming and outgoing central office trunk lines are provided from the local telephone company. These lines are used to access the Public Switched Telephone Network.

5.5.8 Tie Lines

Two-way tie lines are provided between LGSS, PBAPS, Corporate Main Office, Exelon Nuclear, and the EOF. Communication lines are maintained between PBAPS and Conowingo Dam. These can be used if conditions warrant securing of the plant in the event of a flood or failure at Conowingo Dam.

The tie lines are available to emergency personnel to allow communications between the sites and Exelon Nuclear locations supporting the emergency.

Company tie lines are utilized to route NRC communications (e.g., ENS, HPN and counterpart circuits) from between Exelon Nuclear emergency response facilities for Peach Bottom Atomic Power Station.

5.5.9 Emergency PBX T-1 Circuit Lines

Two dedicated T-1 circuits between the Limerick Generating Station and Peach Bottom Atomic Power Station emergency PBX telephone systems are provided for calls within and outside the Exelon voice network. This linkage also allows the continuation of 2-way commercial telephone service in the event that one of the two main commercial telephone system PBX's becomes inoperable or unavailable.

5.5.10 Microwave Tie Lines

Dedicated microwave tie lines exist between LGS, PBAPS, Main Office, Exelon Nuclear, and the EOF/JPIC. The microwave system is backed up by eight hours of battery. In addition, communication lines exist between LGS, PBAPS, Main Office, the Nuclear Group Headquarters, and the EOF/JPIC.

5.5.11 Radio Equipment

A fixed base radio system with multiple channels provides primary/backup outside communication capability as shown in Figure PBAPS 5-1, "Emergency Radio Links."

A separate group of fixed radio channels provides primary/backup communications between in-plant user groups. These channels function through a distributed antenna system located on-site to ensure proper coverage of the area.

The fixed base radio repeaters, antenna system, and radio consoles are powered from a variety of emergency AC buses (diesel backup) and dedicated alternate battery supplies.

A supplementary radio communication system at PBAPS operating on the "ACS/Fire" channel is installed at the six alternate shutdown control stations in the plant. This system is battery backed up for a minimum of 16 hours. The radio channels for this system are designed to survive an automatic isolation on any line faults produced by a Control Room fire.

5.5.12 Evacuation Alarm System

The Evacuation Alarm System consists of a siren tone generator, PA system speakers, a roof siren, and evacuation alarm beacons. The siren tone generator injects an audible evacuation alarm in the PA system, which is broadcast over the PA system speakers. The evacuation alarm beacons provide an audible and visual alarm through two mechanical sirens and flashing red beacon on each beacon unit. The evacuation alarm beacons are installed in all high noise areas of the plant and in areas not covered by the PA system. A selector switch in the Control Room manually initiates the evacuation alarm.

5.6 Independent Spent Fuel Storage (ISFS)

Accidents associated with dry cask storage system include natural and man-made events that are postulated to affect the storage system. The limiting impacts to the system include: (1) loss of shielding capability, and (2) loss of confinement to the system. The loss of shielding results in higher direct radiation from the cask to the environment, while the loss of confinement results in a release of materials from within the cask to the environment at a postulated leak rate.

Monitoring of the fuel storage system would provide the means to detect the accident condition and initiate corrective actions. Continued assessment would be provided to the Emergency Director by in-field radiological monitoring. Emergency response procedures include guidance for performing dose projections and may be supplemented by data obtained from ERO dose assessment and environmental monitoring personnel.

Table PBAPS 5-1: Emergency Supplies and Equipment

The following is a listing of typical equipment available for use during emergencies. While specific equipment designations and items may be subject to change, equivalent emergency activity capabilities will be maintained. Procedures define the specific locations, types, and amounts of equipment for emergency use and define requirements for applicable surveillance, testing, maintenance, and inventory activities to ensure that the equipment is in a state of readiness.

1.0	<u>PROTECTIVE</u>	<u>LOCATIONS STORED OR AVAIL</u>
	Anti-C Clothing	2, 7, 8, 10
	Dosimetry	2, 4, 9, 10
	Respirator/Filters	2, 4, 10, 13
	Self Contained Breathing Apparatus	1, 2, 10, 13
	Radiation signs, rope and tape	2, 7, 8, 13
	Potassium Iodide	2, 7, 8, 10
2.0	<u>RADIATION MONITORING</u>	<u>LOCATIONS STORED OR AVAIL</u>
	Air Sampler	2, 4, 7, 8, 10, 13
	Geiger Counter	1, 2, 4, 7, 8, 10, 13
	Ion Chamber	1, 2, 4, 7, 8, 10, 13
	Frisker	3
	Radiation Survey Forms	2, 7, 8, 10, 13
	Smears	2, 7, 8, 10, 13
	Swipes	2, 7, 8, 10, 13
3.0	<u>SEARCH AND RESCUE</u>	<u>LOCATIONS STORED OR AVAIL</u>
	Flashlight	3
	Blanket	3
	Stretcher	3
	Rope	3
4.0	<u>DECISION AIDS</u>	<u>LOCATIONS STORED OR AVAIL</u>
	Nuclear Emergency Plan	1, 2, 4, 5, 13, 15
	PBAPS EP Procedures	1, 2, 4, 5, 6, 7, 8, 13, 14, 15
	Maps	2, 4, 5, 7
	Prints (Aperture Cards)	1, 4
	Drawings (Aperture Cards)	1, 4

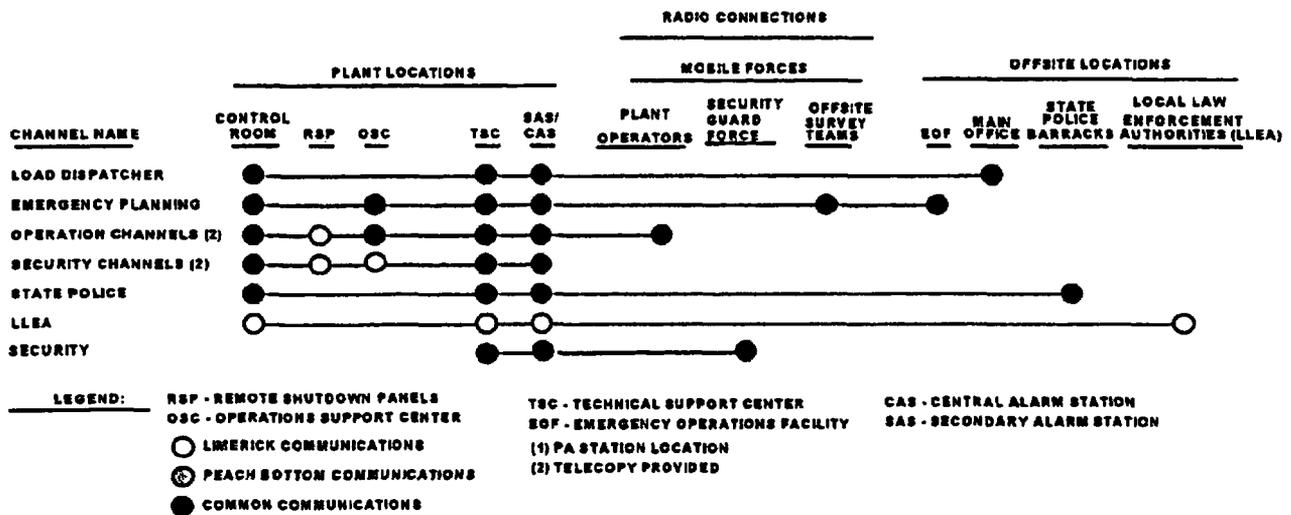
Table PBAPS 5-1: Emergency Supplies and Equipment (Cont'd)

5.0	<u>COMMUNICATIONS</u>	<u>LOCATIONS STORED OR AVAIL</u>
	Base Stations	1, 2, 4, 5, 14
	Mobile Radios	1, 2, 5, 7, 14
6.0	<u>DECONTAMINATION</u>	<u>LOCATIONS STORED OR AVAIL</u>
	Soap	8, 16
	Detergent	8, 16
	Hose	8
	Brushes	8, 16
	Sponges	8, 16
	Buckets	8

LOCATION KEY

- 1 Control Room Area
- 2 Operations Support Center
- 3 Strategically located throughout Station
- 4 Technical Support Center
- 5 Emergency Operations Facility
- 6 Alternate Chemistry Laboratory
- 7 Field Monitoring Kits
- 8 Evacuation Assembly Area Kits
- 9 Personnel Dosimetry Office
- 10 Peach Bottom Unit 1
- 13 Health Physics
- 14 Security Building
- 15 Joint Public Information Center
- 16 Decontamination Room

Figure PBAPS 5-1: Emergency Radio Links



APPENDIX 1: NUREG-0654 CROSS-REFERENCE

<u>Annex Section</u>	<u>NUREG-0654</u>
1.0	Part I, Section A
1.1	Part I, Section B
1.2	Part I, Section D
1.3	Part I, Section F
Table PBAPS 1-1	Part I, Section F
Figure PBAPS 1-1	Part II, Section J.10
Figure PBAPS 1-2	Part II, Section J.11
2.0	Part II, Section B.1
2.1	Part II, Section B.5
2.2	Part II, Section A.3
2.3	Part II, Section C.3
2.4	Part II, Section C.3
3.0	Part II, Section D
4.1	Part II, Section E.1 & J.7
4.2	Part II, Section I.2 & 3
4.3	Part II, Section J.10.f
4.3.1	Part II, Section E.6
4.3.2	Part II, Section J.8
4.3.3	Part II, Section J.6.c
4.3.4a	Part II, Section G.1 & 2
4.3.4b	Part II, Section G.5
4.3.5	Part II, Section J.7
4.4.1	Part II, Section J.4
4.4.2	Part II, Section J.5
4.4.3	Part II, Section J.3
Figure PBAPS 4-1	Part II, Section I.2 & 3.a
Figure PBAPS 4-2	Part II, Section J.10.1 & Appendix 4
Figure PBAPS 4-3	Part II, Section J.7
Figure PBAPS 4-4	Part II, Section J.4
5.1	Part II, Section H.1-2, & G.3.a
5.2.1	Part II, Section H.5.a & 8
5.2.2	Part II, Section H.5.b, H.6.c & I.2
5.2.3	Part II, Section H.5.c
5.2.4	Part II, Section H.5.d
5.2.5	Part II, Section H.6.b & 7, I.9-10
5.2.6	Part II, Section H.5.a & 6.a
5.3	Part II, Section H.9-10
5.4	Part II, Section L.1 & 2
5.5	Part II, Section F.1
Table PBAPS 5-1	Part II, Section H.11
Figure PBAPS 5-1	Part II, Section F.1.d
Appendix 1	Part II, Section P.8
Appendix 2	Part II, Section J.8

APPENDIX 2: SITE-SPECIFIC LETTERS OF AGREEMENT

The following is a listing of letters of agreement and contracts specific to emergency response activities in support of Peach Bottom Atomic Power Station. Letters of agreement and contracts common to the multiple Exelon Nuclear stations are listed under Appendix 3 to the Exelon Nuclear Standardized Radiological Emergency Plan.

- Chester County Department of Emergency Services (Letter on File)
- Lancaster County Emergency Management Agency (Letter on File)
- York County Emergency Management Agency (Letter on File)
- Pennsylvania Emergency Management Agency (Letter on File)
- Pennsylvania Department of Environmental Resources / Bureau of Radiation Protection (Letter on File)
- Pennsylvania State Police#
- Memo of Understanding (Letter on File) with Maryland Emergency Management Agency (MEMA), which includes the following support agencies:
 - Maryland Department of the Environment / Radiological Health Program,
 - Harford County Division of Emergency Operations, and
 - Cecil County Emergency Management Agency
- Porter Consultants, Inc. (P.O.)
- Delta-Cardiff Volunteer Fire / Ambulance Company (Letter on File)
- Harford Memorial Hospital (Letter on File)
- York Hospital (Letter on File)

Agreements with State and local law enforcement agencies maintained by Station Security under the Nuclear Station Security Plan.

ENCLOSURE 2

PEACH BOTTOM POWER STATION, UNITS 2 & 3

**Docket Nos. 50-277
50-278**

**License Nos. DPR-44
DPR-56**

EMERGENCY PROCEDURES

REPORT INDEX

PROCEDURE INDEX REPORT:

FAC	DOC TYPE	PROC TYPE	PROCEDURE NUMBER	CURR REV NBR	TITLE	EFFECTIVE DATE	RESP GROUP	SYSTEM NBR
PB	PROC	EP	EP-AA-1	0000	EMERGENCY PREPAREDNESS	10/20/00	PWE	
PB	PROC	EP	EP-AA-1000	0014	STANDARIZED RADIOLOGICAL EMERGENCY PLAN	02/20/03	PWE	
PB	PROC	EP	EP-AA-1007	0007	RADIOLOGICAL EMERGENCY PLAN ANNEX FOR PEACH BOTTOM ATOMIC POWER STATION	06/30/03	PWE	
PB	PROC	EP	EP-AA-1101	0001	EP FUNDAMENTALS	12/20/02	PWE	
PB	PROC	EP	EP-AA-1102	0000	ERO FUNDAMENTALS	12/20/02	PWE	
PB	PROC	EP	EP-AA-110	0004	ASSESSMENT OF EMERGENCIES	02/20/03	PWE	
PB	PROC	EP	EP-AA-110-301	0000	CORE DAMAGE ASSESSMENT (BWR)	08/30/02	PWE	
PB	PROC	EP	EP-AA-110-302	0001	CORE DAMAGE ASSESSMENT (PWR)	12/17/02	PWE	
PB	PROC	EP	EP-AA-111	0006	EMERGENCY CLASSIFICATION AND PROTECTIVE ACTION RECOMMENDATIONS	05/23/03	PWE	
PB	PROC	EP	EP-AA-112	0008	EMERGENCY RESPONSE ORGANIZATION (ERO)/EMERGENCY RESPONSE FACILITY (ERF) ACTIVATION AND OPERATION	05/23/03	PWE	
PB	PROC	EP	EP-AA-112-100	0005	CONTROL ROOM OPERATIONS	02/20/03	PWE	
PB	PROC	EP	EP-AA-112-200	0004	TSC ACTIVATION AND OPERATION	02/20/03	PWE	
PB	PROC	EP	EP-AA-112-201	0001	TSC COMMAND AND CONTROL	02/20/03	PWE	
PB	PROC	EP	EP-AA-112-202	0001	TSC FACILITY SUPPORT GROUP	02/20/03	PWE	
PB	PROC	EP	EP-AA-112-203	0001	TSC OPERATION GROUP	02/20/03	PWE	
PB	PROC	EP	EP-AA-112-204	0001	TSC TECHNICAL SUPPORT GROUP	02/20/03	PWE	
PB	PROC	EP	EP-AA-112-205	0001	TSC MAINTENANCE GROUP	02/20/03	PWE	
PB	PROC	EP	EP-AA-112-206	0001	TSC RADIATION PROTECTION/CHEMISTRY GROUP	02/20/03	PWE	
PB	PROC	EP	EP-AA-112-300	0004	OPERATIONS SUPPORT CENTER ACTIVATION AND OPERATION	02/20/03	PWE	
PB	PROC	EP	EP-AA-112-400	0004	EMERGENCY OPERATIONS FACILITY ACTIVATION AND OPERATION	02/20/03	PWE	
PB	PROC	EP	EP-AA-112-401	0001	NUCLEAR DUTY OFFICER (NDO)	02/20/03	PWE	
PB	PROC	EP	EP-AA-112-402	0001	EOF COMMAND AND CONTROL	02/20/03	PWE	
PB	PROC	EP	EP-AA-112-403	0001	EOF LOGISTICS SUPPORT GROUP	02/20/03	PWE	
PB	PROC	EP	EP-AA-112-404	0001	EOF TECHNICAL SUPPORT GROUP	02/20/03	PWE	
PB	PROC	EP	EP-AA-112-405	0001	EOF PROTECTIVE MEASURES GROUP	02/20/03	PWE	
PB	PROC	EP	EP-AA-112-500	0005	EMERGENCY ENVIRONMENTAL MONITORING	02/20/03	PWE	
PB	PROC	EP	EP-AA-112-600	0006	PUBLIC INFORMATION ORGANIZATION ACTIVATION AND OPERATIONS	05/23/03	PWE	
PB	PROC	EP	EP-AA-112-601	0001	EMERGENCY NEWS CENTER (ENC) OPERATIONS	02/20/03	PWE	
PB	PROC	EP	EP-AA-112-602	0002	JPIC ACTIVATION AND OPERATION	05/23/03	PWE	
PB	PROC	EP	EP-AA-113	0004	PERSONNEL PROTECTIVE ACTIONS	08/30/02	PWE	
PB	PROC	EP	EP-AA-114	0004	NOTIFICATIONS	02/20/03	PWE	
PB	PROC	EP	EP-AA-115	0001	RECOVERY FROM A CLASSIFIED EVENT	08/30/02	PWE	
PB	PROC	EP	EP-AA-120	0003	EMERGENCY PLAN ADMINISTRATION	12/20/02	PWE	
PB	PROC	EP	EP-AA-120-1001	0003	10 CFR 50.54(Q) CHANGE EVALUATION	04/30/03	PWE	
PB	PROC	EP	EP-AA-120-1002	0000	STORM/EVENT RESTORATION	10/18/02	PWE	
PB	PROC	EP	EP-AA-121	0003	EMERGENCY RESPONSE FACILITIES AND EQUIPMENT READINESS	12/20/02	PWE	
PB	PROC	EP	EP-AA-121-1001	0003	AUTOMATED CALL-OUT SYSTEM MAINTENANCE	04/30/03	PWE	
PB	PROC	EP	EP-AA-122	0003	DRILLS AND EXERCISES	12/20/02	PWE	
PB	PROC	EP	EP-AA-122-1001	0002	DRILL DEVELOPMENT, CONDUCT AND EVALUATION	12/20/02	PWE	
PB	PROC	EP	EP-AA-122-1002	0002	EXERCISE DEVELOPMENT, CONDUCT AND EVALUATION	12/20/02	PWE	
PB	PROC	EP	EP-AA-122-1003	0002	SCHEDULING OF DRILLS AND EXERCISES	12/20/02	PWE	
PB	PROC	EP	EP-AA-122-1004	0001	DEMONSTRATION CRITERIA	10/18/02	PWE	
PB	PROC	EP	EP-AA-123	0002	COMPUTER PROGRAMS	11/12/02	PWE	
PB	PROC	EP	EP-AA-124	0004	INVENTORIES AND SURVEILLANCES	12/20/02	PWE	
PB	PROC	EP	EP-AA-125	0002	EMERGENCY PREPAREDNESS SELF EVALUATION PROCESS	12/20/02	PWE	
PB	PROC	EP	EP-AA-125-1001	0002	EP PERFORMANCE INDICATOR GUIDANCE	12/20/02	PWE	
PB	PROC	EP	EP-AA-125-1002	0002	ERO PERFORMANCE - PERFORMANCE INDICATORS GUIDANCE	12/20/02	PWE	
PB	PROC	EP	EP-AA-125-1003	0002	ERP READINESS - PERFORMANCE INDICATORS GUIDANCE	12/20/02	PWE	

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FAC	DOC TYPE	PROC TYPE	PROCEDURE NUMBER	CURR REV NBR	TITLE	EFFECTIVE DATE	RESP GROUP	SYSTEM NBR
PB	PROC	EP	EP-AA-125-1004	0002	EMERGENCY RESPONSE FACILITIES & EQUIPMENT PERFORMANCE INDICATORS GUIDANCE	12/20/02	PWE	
PB	PROC	EP	EP-AA-125-1005	0000	PROBLEM IDENTIFICATION & RESOLUTION PERFORMANCE INDICATOR GUIDANCE	12/20/02	PWE	
PB	PROC	EP	EP-C-2	0008	EMERGENCY PREPAREDNESS CORRECTIVE ACTION PROCESS - CANCELLED REPLACED BY LS-AA-125	07/24/01	PWE	
PB	PROC	EP	EP-C-2-1	0001	IFA FOR ACTION ITEM TRACKING SYSTEM - CANCELLED - NO REPLACEMENT	03/10/97	PWE	
PB	PROC	EP	EP-C-2-2	0001	ACTION/REQUEST EVALUATION NUMBERS AND TREND CODES CANCELLED - NO REPLACEMENT	12/18/98	PWE	
PB	PROC	EP	EP-C-3-1 EXH	0000	DEVELOPMENT AND MAINTENANCE OF THE EMERGENCY RESPONSE FACILITIES AND EQUIPMENT (ERF/E) PROGRAM - CANCELLED - NO REPLACEMENT	04/17/95	PWE	
PB	PROC	EP	EP-C-4-1	0000	FLOWCHART OF DESIGNATION, TRAINING AND MAINTENANCE OF NUCLEAR ERO CANCELLED - NO REPLACEMENT	03/10/97	PWE	
PB	PROC	EP	EP-C-5-1	0000	INTERFACE AGREEMENT FOR OFFSITE ORGANIZATION MATRIX REVIEW - CANCELLED - NO REPLACEMENT	03/10/97	PWE	
PB	PROC	EP	EP-C-5-2	0000	INTERFACE AGREEMENT MATRIX FOR OFFSITE ORGANIZATIONS CANCELLED - NO REPLACEMENT CANCELLED - NO REPLACEMENT	04/10/00	PWE	
PB	PROC	EP	EP-C-6	0004	PREPARATION, CONDUCT, AND EVALUATION OF EMERGENCY RESPONSE DRILLS AND EXERCISES CANCELLED - REPLACED BY EP-MA-122	02/21/02	PWE	
PB	PROC	EP	EP-C-6-1	0000	DRILL OBJECTIVES - CANCELLED - NO REPLACEMENT	03/10/97	PWE	
PB	PROC	EP	EP-C-6-2	0000	ANNUAL EXERCISE SCENARIO SUBMITTAL GUIDELINES - CANCELLED - NO REPLACEMENT	03/10/97	PWE	
PB	PROC	EP	EP-C-6-3	0000	SCENARIO MANUAL FORMAT - CANCELLED - NO REPLACEMENT	03/10/97	PWE	
PB	PROC	EP	EP-C-6-4	0000	DRILL ACTIVITY CHECKLIST - CANCELLED - NO REPLACEMENT	03/10/97	PWE	
PB	PROC	EP	EP-C-6-5	0000	DRILL REPORT FORMAT - CANCELLED - NO REPLACEMENT	03/10/97	PWE	
PB	PROC	EP	EP-C-7-1	0000	IFA FOR ROUTINE ADMINISTRATION & TESTING CANCELLED - NO REPLACEMENT	03/10/97	PWE	
PB	PROC	EP	EP-C-7-2	0000	IFA FOR EMERGENCY SIREN MAINTENANCE CANCELLED - NO REPLACEMENT	03/10/97	PWE	
PB	PROC	EP	EP-MA-110-100	0002	ERO COMPUTER APPLICATIONS	07/01/03	PWE	
PB	PROC	EP	EP-MA-110-200	0002	DOSE ASSESSMENT	02/20/03	PWE	
PB	PROC	EP	EP-MA-112-406	0001	MAROG OFFSITE LIASONS	02/20/03	PWE	
PB	PROC	EP	EP-MA-113-100	0001	ASSEMBLY AND SITE EVACUATION	02/20/03	PWE	
PB	PROC	EP	EP-MA-114-100	0004	MAROG NOTIFICATIONS	07/01/03	PWE	
PB	PROC	EP	EP-MA-121-1002	0000	ALERT NOTIFICATION SYSTEM (ANS) DESCRIPTION, TESTING, MAINTENANCE AND PERFORMANCE TRENDING PROGRAM	12/20/02	PWE	
PB	PROC	EP	EP-MA-121-1004	0000	EMERGENCY PREPAREDNESS ALERT NOTIFICATION SYSTEM (ANS) CONTROL OF EQUIPMENT & OUTAGES	12/20/02	PWE	
PB	PROC	EP	EP-MA-122	0000	EXERCISE AND DRILLS - CANCELLED REPLACED BY EP-AA-122	10/18/02	PWE	
PB	PROC	EP	EP-MA-122-1001	0002	DRILL DEVELOPMENT, CONDUCT AND EVALUATION - CANCELLED REPLACED BY EP-AA-122-1001	10/18/02	PWE	
PB	PROC	EP	EP-MA-122-1002	0002	EXERCISE DEVELOPMENT, CONDUCT AND EVALUATION - CANCELLED REPLACED BY EP-AA-122-1002	10/18/02	PWE	
PB	PROC	EP	EP-MA-122-1003	0000	SCHEDULING OF DRILLS AND EXERCISES - CANCELLED REPLACED BY EP-AA-122-1003	10/18/02	PWE	
PB	PROC	EP	EP-MA-122-1004	0000	DEMONSTRATION CRITERIA - CANCELLED REPLACED BY EP-AA-122-1004	10/18/02	PWE	
PB	PROC	EP	EP-MA-123-1001	0000	KI ASSESSMENT SPREADSHEET TECHNICAL BASIS	07/01/03	PWE	
PB	PROC	EP	EP-MA-124-1001	0002	FACILITY INVENTORIES AND EQUIPMENT TESTS	07/01/03	PWE	
PB	PROC	EP	EP-MA-125-1002	0000	COLLECTION AND EVALUATION OF DATA FOR INDICATOR E EP.01 "DRILL EXERCISE PERFORMANCE" CANCELLED - EP-AA-125-1002	12/20/02	PWE	
PB	PROC	EP	EP-MA-125-1003	0001	COLLECTION AND EVALUATION OF DATA FOR INDICATOR R.EP.02,	12/20/02	PWE	

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PB	PROC	EP	EP-MA-125-1003	0001	"EMERGENCY RESPONSE ORGANIZATION PARTICIPATION" CANCELLED - REPLACED BY EP-AA-125-1003	12/20/02	PWE	
PB	PROC	EP	EP-MA-125-1004	0000	COLLECTION AND EVALUATION OF DATA FOR INDIATOR R.EP.03 ALERT & NOTIFICATION SYSTEM RELIABILITY CANCELLED - REPLACED BY EP-AA-125-1004	12/20/02	PWE	
PB	PROC	EP	EP-UG-01	0005	CONTROL OF EP GUIDELINES	12/07/98		
PB	PROC	EP	EP-UG-05	0004	EMERGENCY PREPAREDNESS STAFF ORIENTATION	12/07/98		
PB	PROC	EP	EP-UG-05-1	0004	CHECKLIST FOR EMERGENCY PREPAREDNESS STAFF ORIENTATION	03/13/00		

** END OF REPORT **