Exelon Generation®

4300 Winfield Road
Warrenville, IL 60555
630 657 2000 Office

10 CFR 50, Appendix E
10 CFR 50.4
72.44(f)

RS-13-188

July 18, 2013

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Braidwood Station, Units 1 and 2
Facility Operating License Nos. NPF-72 and NPF-77
NRC Docket Nos. STN 50-456, 50-457 and 72-73

Byron Station, Units 1 and 2
Facility Operating License Nos. NPF-37 and NPF-66
NRC Docket Nos. 50-454, 50-455 and 72-68

Clinton Power Station, Unit 1
Facility Operating License No. NPF-62
NRC Docket No. 50-461

Dresden Nuclear Power Station, Units 1, 2, and 3
Facility Operating License No. DPR-2
Renewed Facility Operating License Nos. DPR-19 and DPR-25
NRC Docket Nos. 50-010, 50-237, 50-249 and 72-37

LaSalle County Station, Units 1 and 2
Facility Operating License Nos. NPF-11 and NPF-18
NRC Docket Nos. 50-373, 50-374 and 72-70

Limerick Generating Station, Units 1 and 2
Facility Operating License Nos. NPF-39 and NPF-85
NRC Docket Nos. 50-352, 50-353 and 72-65

Oyster Creek Generating Station
Renewed Facility Operating License No. DPR-16
NRC Docket Nos. 50-219 and 72-15

Peach Bottom Atomic Power Station, Units 1, 2, and 3
Facility Operating License No. DPR-12
Renewed Facility Operating License Nos. DPR-44, and DPR-56
NRC Docket Nos. 50-171, 50-277, 50-278 and 72-29

Quad Cities Nuclear Power Station, Units 1 and 2
Renewed Facility Operating License Nos. DPR-29 and DPR-30
NRC Docket Nos. 50-254, 50-265 and 72-53

Three Mile Island Station, Unit 1
Renewed Facility Operating License No. DPR-50
NRC Docket No. 50-289

Three Mile Island Station, Unit 2
Facility Possession-Only License No. DPR-73
NRC Docket No. 50-320

Subject: Exelon Nuclear Standardized Radiological Emergency Plan Implementing Procedure Revisions

In accordance with 10 CFR 50, Appendix E, Section V, "Implementing Procedures," and 10 CFR 72.44 "License conditions," paragraph (f), Exelon Generation Company, LLC (Exelon) is submitting the attached revisions to the Emergency Plan (EP) Implementing Procedures identified below:

Procedure No.	Revision	Title
EP-AA-1000	24	Exelon Nuclear Standardized Radiological Emergency Plan
EP-AA-1001	31	Exelon Nuclear Radiological Emergency Plan Annex for Braidwood Station
EP-AA-1002	32	Exelon Nuclear Radiological Emergency Plan Annex for Byron Station
EP-AA-1003	23	Exelon Nuclear Radiological Emergency Plan Annex for Clinton Station
EP-AA-1004	33	Exelon Nuclear Radiological Emergency Plan Annex for Dresden Station
EP-AA-1005	36	Exelon Nuclear Radiological Emergency Plan Annex for LaSalle Station
EP-AA-1006	35	Exelon Nuclear Radiological Emergency Plan Annex for Quad Cities Station
EP-AA-1007	27	Exelon Nuclear Radiological Emergency Plan Annex for Peach Bottom Atomic Power Station
EP-AA-1008	26	Exelon Nuclear Radiological Emergency Plan Annex for Limerick Generating Station
EP-AA-1009	21	Exelon Nuclear Radiological Emergency Plan Annex for Three Mile Island (TMI) Station
EP-AA-1010	7	Exelon Nuclear Radiological Emergency Plan Annex for Oyster Creek Station

The changes were evaluated under the requirements of 10 CFR 50.54(q) and were determined not to result in a reduction in effectiveness of the applicable sites' Emergency Plans. This notification is being submitted within 30 days of implementation of the changes as required by 10 CFR 50, Appendix E. These procedures continue to meet the applicable planning standards established in 10 CFR 50.47(b) and 10 CFR 50, Appendix E.

In addition, as required by 10 CFR 50.54(q)(5), this submittal includes a summary of the analysis of the changes to the implementing procedures. Copies of the revised procedures are included in the attachments to this letter.

There are no regulatory commitments in this submittal.

If you have any questions or require additional information, please contact Amy Hambly at (630) 657-2808.

Respectfully,

David M. Gullott
Manager – Licensing

Attachments:

1. 10 CFR 50.54(q)(5), Summary of Analysis
2. EP-AA-1000, Revision 24, Exelon Nuclear Standardized Radiological Emergency Plan
3. EP-AA-1001, Revision 31, Exelon Nuclear Radiological Emergency Plan Annex for Braidwood Station
4. EP-AA-1002, Revision 32, Exelon Nuclear Radiological Emergency Plan Annex for Byron Station
5. EP-AA-1003, Revision 23, Exelon Nuclear Radiological Emergency Plan Annex for Clinton Station
6. EP-AA-1004, Revision 33, Exelon Nuclear Radiological Emergency Plan Annex for Dresden Station
7. EP-AA-1005, Revision 36, Exelon Nuclear Radiological Emergency Plan Annex for LaSalle Station
8. EP-AA-1006, Revision 35, Exelon Nuclear Radiological Emergency Plan Annex for Quad Cities Station
9. EP-AA-1007, Revision 27, Exelon Nuclear Radiological Emergency Plan Annex for Peach Bottom Atomic Power Station
10. EP-AA-1008, Revision 26, Exelon Nuclear Radiological Emergency Plan Annex for Limerick Generating Station

11. EP-AA-1009, Revision 21, Exelon Nuclear Radiological Emergency Plan Annex for Three Mile Island (TMI) Station
12. EP-AA-1010, Revision 7, Exelon Nuclear Radiological Emergency Plan Annex for Oyster Creek Station

cc: NRC Regional Administrator – NRC Region I
NRC Regional Administrator – NRC Region III
NRC Senior Resident Inspector, NRR – Braidwood Station
NRC Senior Resident Inspector, NRR – Byron Station
NRC Senior Resident Inspector, NRR – Clinton Power Station
NRC Senior Resident Inspector, NRR – Dresden Nuclear Power Station
NRC Senior Resident Inspector, NRR – LaSalle County Station
NRC Senior Resident Inspector, NRR – Quad Cities Nuclear Power Station
NRC Senior Resident Inspector, NRR – Limerick Generating Station
NRC Senior Resident Inspector, NRR – Oyster Creek Nuclear Generating Station
NRC Senior Resident Inspector, NRR – Peach Bottom Atomic Power Station
NRC Senior Resident Inspector, NRR – Three Mile Island Nuclear Station
Director - NRC Division of Spent Fuel Storage and Transportation, NMSS (Attachment 1 only)

ATTACHMENT 1

10 CFR 50.54(q)(5) Summary of Analysis

10 CFR 50.54(q)(5) Summary of Analysis

Procedure Title

EP-AA-1000, Revision 24, Exelon Nuclear Standardized Radiological Emergency Plan
EP-AA-1001, Revision 31, Exelon Nuclear Radiological Emergency Plan Annex for Braidwood Station
EP-AA-1002, Revision 32, Exelon Nuclear Radiological Emergency Plan Annex for Byron Station
EP-AA-1003, Revision 23, Exelon Nuclear Radiological Emergency Plan Annex for Clinton Station
EP-AA-1004, Revision 33, Exelon Nuclear Radiological Emergency Plan Annex for Dresden Station
EP-AA-1005, Revision 36, Exelon Nuclear Radiological Emergency Plan Annex for LaSalle Station
EP-AA-1006, Revision 35, Exelon Nuclear Radiological Emergency Plan Annex for Quad Cities Station
EP-AA-1007, Revision 27, Exelon Nuclear Radiological Emergency Plan Annex for Peach Bottom Atomic Power Station
EP-AA-1008, Revision 26, Exelon Nuclear Radiological Emergency Plan Annex for Limerick Generating Station
EP-AA-1009, Revision 21, Exelon Nuclear Radiological Emergency Plan Annex for Three Mile Island (TMI) Station
EP-AA-1010, Revision 7, Exelon Nuclear Radiological Emergency Plan Annex for Oyster Creek Station

Description of Change and Description of how the Change still complies with Regulations

Revisions to the Standard Emergency Plan and Station Annexes contain descriptive changes made to reflect the Rule Making changes contained in NUREG-0654 and Appendix E of 10CFR50. These changes consisted of the following:

- Letters of Agreement were updated. NUREG-0654 requires each licensee to specify the contractor and private organizations who may be requested to provide technical assistance to and augmentation of the emergency organization. Appendix E requires a description of the local offsite services to be provided in support of the licensee's emergency organization. Changes continue to meet the requirements of NURG-0654 and Appendix E. The changes were made to update provider titles and to specify which sites the agreements are applicable. Changes did not alter or change the services provided therefore these changes would not reduce the effectiveness of the Emergency Plan.
- Added description of the FEMA approved backup for ANS Alerting system. Appendix E Section IV. Content of Emergency Plans states in D.3 that *"The alerting and notification capability shall additionally include administrative and physical means for a backup method of public alerting and notification capable of being used in the event the primary method of alerting and notification is unavailable during an emergency to alert or notify all or portions of the plume exposure pathway EPZ population. The backup method shall have the capability to alert and notify the public within the plume exposure pathway EPZ, but does not need to meet the 15-minute design objective for the primary prompt public alert and notification system."* Section E of the Standard Emergency Plan was revised to include a description of the "backup" method as required by Appendix E. This description did not alter or change the approved backup methods for the sites.
- Added description and location of the Alternate Facility required by Appendix E to stage ERO responders during Hostile Action events. The Alternate Facility meets all the requirements of Appendix E. NSIR/DPR-ISG-01 states the following guidance supplements

existing guidance in BL-05-02 regarding the use of alternative facilities when primary ERFs are unavailable because of hostile action. NUREG-0654, Section II.H, ″Emergency Facilities and Equipment″ addresses provisions for adequate ERFs and equipment in general. A future update of NUREG-0654 will incorporate the following guidance without replacing or superseding any existing guidance in Section II.H.

Hostile action warrants the timely activation of the ERO. The ERO is expected to be staged in a manner that supports rapid response to mitigate site damage as soon as the site is deemed accessible. To accomplish this, licensees must identify an alternative facility (or collectively multiple facilities) that would be accessible even if the site is under threat of or experiencing hostile action, to support response functions when ERFs are not accessible because of hostile action.

Section IV.E.8d of Appendix E to 10 CFR Part 50 states that, ″*For nuclear power reactor licensees, an alternative facility (or facilities) that would be accessible even if the site is under threat of or experiencing hostile action, to function as a staging area for augmentation of emergency response staff*.″

- Change describes the inclusion of the ETE Study as an addendum to the Annex. Section IV.3-7 of Appendix E to 10 CFR Part 50 requires each station to provide an analysis of the time required to evacuate various sectors and distances within the plume exposure pathway EPZ for transient and permanent populations, using the most recent U.S. Census Bureau data. NUREG/CR-7002, ″Criteria for Development of Evacuation Time Estimate Studies,″ Revision 0 provides the guidance for development of the ETE studies. The ETE studies are being attached as an addendum to the station annex to satisfy 10 CFR 50, Appendix E which provides direction that the content of the Emergency Plan contain the ETEs. Change did not alter the performance of ETEs or the content of the studies.
- Change was made to reference the new requirements defining the drill cycle. The changes under Rule Making revised the time associated with prescribed drill frequency. The drill cycle is a six-year period of time until the performance of the first evaluated Hostile Action based exercise. Following performance of the Hostile Action based exercise, the cycle duration time will change from a six-year period to an eight-year period. The Emergency Plan was updated to reflect this new requirement.
- A revision was made to the definition of PAR to remove reference to ″Evacuate″ since the Exelon Emergency Plan recognizes that sheltering may be an option under certain conditions. This change corrects an oversight and adds consistency with the Emergency Plan and implementing procedures,
- Additional administrative revisions to the Emergency Plan which include Exelon Management Title Changes and removal of superseded references to NRC Bulletin 2005-02. The changes did not revise responsibilities or commitments made under the Emergency Plan.

Description of why the Change is not an RIE

These changes did not alter or change the implementation of the Emergency Plan but were made to align with the new regulatory codified wording contained in NUREG-0654 and Appendix E of 10CFR50. Changes described how regulatory compliance is maintained.

ATTACHMENT 2

EP-AA-1000, Revision 24

Exelon Nuclear Standardized Radiological Emergency Plan

EXELON NUCLEAR

STANDARDIZED
RADIOLOGICAL EMERGENCY PLAN

Table of Contents

Section **Page**

Table of Contents

Section **Page**

Table of Contents

Section **Page**

Table of Contents

Section **Page**

Table of Contents

Section **Page**

Part III: APPENDICES

LIST OF STATION ANNEXES

The Station Annexes subject to the requirements of this plan are as follows:

EP-AA-1001: Radiological Emergency Plan Annex for Braidwood Station

EP-AA-1002: Radiological Emergency Plan Annex for Byron Station

EP-AA-1003: Radiological Emergency Plan Annex for Clinton Station

EP-AA-1004: Radiological Emergency Plan Annex for Dresden Station

EP-AA-1005: Radiological Emergency Plan Annex for LaSalle Station

EP-AA-1006: Radiological Emergency Plan Annex for Quad Cities Station

EP-AA-1007: Radiological Emergency Plan Annex for Peach Bottom Station

EP-AA-1008: Radiological Emergency Plan Annex for Limerick Station

EP-AA-1009: Radiological Emergency Plan Annex for Three Mile Island

EP-AA-1010: Radiological Emergency Plan Annex for Oyster Creek Station

REVISION HISTORY

REVISION	EFFECTIVE DATE
7	March 1991
7A	July 15 1992
7B	September 15 1993
7C	January 1 1994
7D	June 24 1994
7E	September 22 1994
7F	January 25 1995
7G	March 17 1995
7H	September 15 1995
7I	February 16 1996
7J	March 3 1997
7K	January 5, 1998
7L	October 16, 1998
8	May 13, 1999
9	March 31, 2000
10	January 8, 2001
11	October 8, 2001
12	March 22, 2002
13	August 30, 2002
14	February 20, 2003
15	February 13, 2004
16	December 22, 2004
17	May 25, 2006
18	October, 2007
19	November 2007
20	March, 2010
21	June 2012
22	November 2012
23	December 2012
24	June 2013

Section A: Purpose

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. This document describes the Exelon Nuclear Plant Emergency Preparedness Program. The philosophy that guides the development and maintenance of this program is the protection of the health and safety of the general public in the communities around the nuclear power stations and the personnel who work at the plant.

The Exelon Nuclear Standardized Radiological Emergency Plan (E-Plan) establishes the concepts, evaluation and assessment criteria, and protective actions that are necessary in order to limit and mitigate the consequences of potential or actual radiological emergencies. It has been prepared to establish the procedures and practices for management control over unplanned or emergency events that may occur at an Exelon Nuclear Station. It also provides the necessary pre-arrangements, directions and organization so that all nuclear emergencies can be effectively and efficiently resolved.

The Exelon Emergency Preparedness Program consists of the E-Plan, Station Annexes, emergency plan implementing procedures, and associated program administrative documents. The Exelon E-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 E-Plan. This document is not intended to be used as a procedure.

The Station Annexes contain information and guidance that is unique to the station. The annexes address site-specific criteria, including:

- Emergency Action Levels (EALs),
- Deviations from the E-Plan (such as station specific on-shift staffing, unique aspects of ERO augmentation, and so forth).
- Facility geography and location for a full understanding and representation of the station's emergency response capabilities.
- Plant specific facilities and equipment associated with the Emergency Preparedness Program.

The Station Annex becomes a part of the plan and is subject to the same review and audit requirements as the plan. In the areas where a Station Annex deviates from the general requirements of the E-Plan, the Station Annex shall serve as the controlling document.

Detailed E-Plan implementing procedures are maintained separately and are used to guide those responsible for implementing emergency actions.

Section B: Background

In the context of this E-Plan, the Station Annexes, and implementing procedures, Exelon Nuclear manages the operations of the NRC licensed facilities designated as Braidwood, Byron, Clinton, Dresden, LaSalle, Limerick, Peach Bottom, Quad Cities, Three Mile Island (TMI), and Oyster Creek Stations.

The primary hazard consideration at the nuclear power stations is the potential unplanned release of radioactive material resulting from an accident. The probability of such a release is considered very low due to plant design and strict operational guidelines enforced by the NRC. Not withstanding, federal regulations require that a solid emergency preparedness program exist for each commercial nuclear power station. A detailed description of each station is given in the Updated Final Safety Analysis Reports (UFSAR).

In order to minimize the number of ad-hoc decisions made during an emergency and to ensure that necessary equipment, supplies, and essential services are available to meet the needs of an emergency, Exelon Nuclear has developed this E-Plan. The E-Plan is applicable to all generating stations operated by Exelon Nuclear listed above and considers the consequences of radiological emergencies, as required by 10 CFR 50, Paragraph 50.47 and Appendix E.

Additionally, the E-Plan addresses guidance and adheres to the intent of the criteria established and provided within NUREG-0654. The E-Plan also considers the consequences of non-radiological emergencies.

Section C: Scope

This document describes actions to be taken in the event of a radiological accident at the Exelon nuclear stations that may impact the health and safety of the general public or station employees. It also serves to limit the damage to facilities and property, and provide for the restoration of such facilities in the event of an emergency. If such an accident were to occur, the Emergency Response Organization (ERO) would be put in place and maintained until such time where the plant is returned to a stable condition and the threat to the general public or station personnel no longer exists. This plan describes the functions and operation of the ERO, including assignments of authority and responsibility. It does not, nor is it intended to, provide guidance for actual plant equipment manipulations. These instructions are contained in site-specific normal and emergency operating procedures as required by Technical Specifications and other regulatory guidance. The E-Plan provides for: identification and evaluation of emergency situations, protective measures, communications, coordination and notification of governmental authorities, document review and control, emergency preparedness assessment, and training of all emergency personnel. An emergency recovery phase is also described in this E-Plan.

Section D: Planning Basis

The E-Plan, in conjunction with the Station Annexes and implementing and administrative procedures, documents the methods by which the Exelon Emergency Preparedness Program meets the planning standards set forth in 10 CFR 50.47(b) and the requirements of 10 CFR 50 Appendix E. Development of the E-Plan was based on NUREG-0654/FEMA-REP-1, Revision 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants".

Acceptable alternate methods, which deviate from NUREG-0654, are allowed under Regulatory Guide 1.101, “Emergency Planning and Preparedness for Nuclear Power Reactors.” However, deviations will be documented in the respective Station Annexes and evaluated as continuing to meet the Planning Standards of 10 CFR 50.47(b) and Appendix E to 10 CFR 50 under the 10 CFR 50.54(q) process to ensure the continued effectiveness of the E-Plan and respective Station Annexes.

Other applicable regulations, publications, and guidance were used (see Appendix 1, "References") along with site-specific documents to ensure consistency in the planning effort.

Section E: Contiguous-Jurisdiction Governmental Emergency Planning

The E-Plan recognizes the state, in cooperation with the local EPZ communities, as the overall authority responsible for protective action directives in order to protect the health and safety of the general public.

Section F: Integrated Emergency Planning

State and local (county level) emergency response plans were utilized in the development of this plan to ensure a consistent and integrated response to a classified event.

Section G: Funding and Technical Assistance

Exelon Nuclear is dedicated to providing the level of support necessary, as dictated by federal regulation, to ensure appropriate integration of the state, county, and utility radiological emergency programs.

Section H: Emergency Response Organization

Exelon Nuclear acknowledges its primary responsibility for planning and implementing emergency measures within the site boundary and for overall plant accident assessment. These emergency measures include corrective actions, protective measures, and aid for personnel onsite. To accomplish these responsibilities, advance arrangements have been made with offsite organizations for special emergency assistance such as ambulance, medical, hospital, fire, and police services.

Section I: Federal Response

Provisions are made within the E-Plan for the integration of appropriate elements of the federal assistance activities. Arrangements have been made to accommodate a federal response organization presence the Exelon Nuclear emergency response facilities as well as support communications between utility and federal emergency facilities. NRC response as described in NUREG-1471, "Concept of Operations: NRC Incident Response", was used in the development of the E-Plan as guidance to ensure coordination between Exelon Nuclear and NRC EROs.

Section J: Form and Content of Plan

As required by federal regulations, the E-Plan is governed by and contained (or referenced) in the Station UFSARs. The E-Plan is administratively maintained as a separate document. The E-Plan has been formatted similar to NUREG-0654/FEMA-REP-1, Revision 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants." The use of this format lends itself to uncomplicated comparison with the criteria set forth in NUREG-0654/FEMA-REP-1.

Appendix 2, "Procedure Cross-Reference to NUREG-0654", provides a cross-reference between the NUREG-0654 evaluation criteria and the E-Plan implementing procedures and applicable administrative documents.

Required Content of the Station Annexes

Information that is in the plan need not be restated in the Annex. The Annex shall address what means, methods, and resources are used to satisfy the requirements and responsibilities set forth in the E-Plan.

Annex Format and Specific Content: As a minimum, station Annexes shall address the areas described as follows:

1. Section 1: Introduction

   The station and surrounding area are described by the inclusion of maps, drawings and/or diagrams. A summary statement describes the Annex's interface with the E-Plan.

2. Section 2: Organizational Control of Emergencies

   The agencies with which the station has independent agreements for support during an emergency are provided. Station specific differences from the E-Plan, such as on-shift staffing or ERO augmentation, shall be outlined. The justification for differences shall be provided as required under 50.54(q) documentation.

3. Section 3: Classification of Emergencies

   Site Specific EALs are included for all emergency classes for the purpose of event classification.

4. Section 4: Emergency Measures

   Maps indicating the location of Assembly Areas, site evacuation routes, and centers for the monitoring of evacuated nonessential personnel are included. Roadway/traffic control measures of roads under control of the station are addressed.

5. Section 5: Emergency Facilities and Equipment

   - Descriptions of the station Control Room, Technical Support Center and Operational Support Center are provided.
   - A description of the specific equipment is provided.
   - A description of the capability and resources available to categorize accidents.

Section A: Assignment of Responsibility

This section describes the primary responsibilities and organizational control of Exelon, federal, state, county, and other emergency response organizations within the Plume Exposure Pathway and the Ingestion Pathway Emergency Planning Zones (EPZs). Various supporting organizations are also described as well as staffing for initial and continuous response.

1. Concept of Operations

The relationships and the concept of operations for the organizations and agencies who are a part of the overall ERO are as follows:

a. Identified below are federal, state, and county organizations that are involved in a response to an emergency at an Exelon nuclear power station.

1) Federal Agencies: The National Response Framework (NRF), Nuclear/Radiological Incident Annex outlines the statutory and regulatory responsibilities. The primary federal response for supporting an emergency at an Exelon station include:

a) Nuclear Regulatory Commission (NRC): The NRC is responsible for licensing and regulating nuclear facilities and materials and for conducting research in support of the licensing and regulatory process. These responsibilities include protecting the public health and safety, protecting the environment, protecting and safeguarding materials and plants in the interest of national security and assuring conformity with antitrust laws.

The NRC Regional Office has the responsibility for auditing of nuclear power stations. It is responsible for ensuring that such activities are conducted in accordance with the terms and conditions of such NRC licenses and that as a result of such operations, there is no undue risk to the health and safety of the public.

The NRC Office of Nuclear Reactor Regulation, established by the Energy Reorganization Act of 1974, as amended, performs licensing functions associated with the construction and operation of nuclear reactors and with the receipt, possession, ownership, and use of special nuclear and byproduct materials used at reactor facilities.

With regard to emergency preparedness, the NRC shall:

- Assess licensee emergency plans for adequacy;
- Review the Federal Emergency Management Agency findings and determinations on the adequacy and capability of implementation of state and local plans; and
- Make decisions with regard to the overall state of emergency preparedness and issuance of operating licenses.

The NRC shall respond to incidents at licensed facilities or vehicular accidents involving licensed materials, including radionuclides, in transit. The NRC shall act as the lead Federal agency with regard to technical matters during a nuclear incident including radiological assistance. The NRC shall be prepared to recommend appropriate protective actions for the public and technical actions to the licensee. FEMA shall act as the lead Federal agency for offsite, non-technical concerns.

During an incident, the Chairman of the Commission is the senior NRC authority for all aspects of a response. The Chairman shall transfer control of emergency response activities to the Director of Site Operations when deemed appropriate by the Chairman.

All NRC Regions as well as Headquarters are prepared to respond to potential emergencies. All Regions and Headquarters have developed plans and procedures for responding to radiological incidents involving NRC licensees. Headquarters has developed the NRC Incident Response Plans and Implementing Procedures. Each NRC Region has developed Regional Supplements that detail how the Region will fulfill all of the responsibilities assigned in the NRC Incident Response Plan. All NRC organizations are responsible for maintaining an effective state of preparedness through periodic training, drills and exercises.

Each Region and Headquarters has established and maintains an Incident Response Center designed to centralize and coordinate the emergency response function. Adequate communications are established to link the licensee, Headquarters and the Region. The NRC has established lines of communications with local government, state government, other Federal agencies, Congress and the White House. Public information will be disseminated in a timely manner and periodically.

Each Region is prepared to send a team of qualified specialists to the scene expediently. All of the necessary supplies and equipment needed for emergency response will be provided and maintained by the NRC.

The NRC Incident Response Plan objectives are to provide for protection of the public health and safety, property, and the environment, from the effects of radiological incidents that may occur at licensed facilities or which involve licensed materials, including radio-nuclides in transit.

The objectives of the agency plan set forth the organizational and management concepts and responsibilities needed to assure that NRC has an effective emergency response program.

The plan is intended to ensure NRC preparedness:

- To receive and evaluate notification information of incidents, accidents and unusual events and determine the extent of NRC response necessary to meet NRC responsibilities for mitigating the consequences of these events;

- To determine the cause of incidents, accidents, and unusual events in order to ensure that appropriate corrective actions are taken by the licensee to minimize the consequences of these events;

- To provide onsite expertise in a timely manner, to evaluate the nature and extent of the incident, ascertain plant status (for reactors and fuel facilities), monitor licensee activities, determine compliance, make recommendations, and, if necessary, issue orders relative to the event;

- To inform the public and others of plant status and technical details concerning the incident;

- To recommend adequate protective actions to the responsible local and/or state agencies;

- To provide technical assistance;

- To ensure the plant is returned to a safe condition; and

- To return the NRC Headquarters and Regional office to normal operations.

b) Federal Emergency Management Agency (FEMA): Per the National Response Framework (NRF), FEMA is responsible for the overall coordination of a multi-agency Federal response to a significant radiological incident. The primary role of FEMA is to support the state by coordinating the delivery of Federal non-technical assistance. FEMA coordinates state requests for Federal assistance, identifying which Federal agency can best address specific needs. If deemed necessary by FEMA, it will establish a Federal Response Center from which it will manage its assistance activities.

c) Federal Radiological Preparedness Coordinating Committee (FRPCC): The FRPCC consists of the Federal Emergency Management Agency, which chairs the Committee, the Nuclear Regulatory Commission, the Environmental Protection Agency, the Department of Health and Human Services, the Department of Energy, the Department of Transportation, the Department of Defense, the Department of Agriculture, the Department of Commerce, and where appropriate and on an ad hoc basis, other Federal departments and agencies. The FRPCC shall assist FEMA in providing policy direction for the program of Federal assistance to state and local governments in their radiological emergency planning and preparedness activities.

d) U.S. Department of Energy (DOE): The Department of Energy (DOE) has extensive radiological monitoring equipment and personnel resources that it can assemble and dispatch to the scene of a radiological incident. The Department of Energy (DOE) local operations office can assist Exelon Nuclear following a radiological incident as outlined in the Federal Radiological Monitoring and Assessment Plan (FRMAP). If Exelon Nuclear, the NRC or the affected states deem that assistance from DOE is necessary or desirable, the affected state(s) would notify the appropriate DOE operations office.

e) Environmental Protection Agency (EPA): Assists with field radiological monitoring/sampling and non-plant related recovery and reentry guidance.

f) The U.S. Coast Guard (USCG): The USCG patrols and ensures the safety of navigable waterways in the United States. The USCG is promptly notified of any oil or hazardous substance discharges into rivers or lakes or radioactive contamination of rivers or lakes under its jurisdiction at levels requiring assistance to effect protective actions. The USCG is contacted by the appropriate state agencies in the event of an incident at an applicable nuclear power plant. The USCG is responsible for officially closing the waterways to all commercial traffic [Refer to the appropriate State Plan].

g) U.S. Army Corps of Engineers: The U.S. Army Corps of Engineers control barge and boat traffic at locks and dams on navigable waterways in the United States. The Corps of Engineers will be contacted by the appropriate state agencies in the event of an incident at an applicable nuclear power plant. The Corps will be responsible for closing their locks and dams to all waterway traffic leading to the affected area, allowing only traffic leaving the area [Refer to the appropriate State Plan].

h) Federal Bureau of Investigation (FBI): Support from the FBI is available through its statutory responsibility based in Public Law and the US code, and through a memorandum of understanding for cooperation with the NRC. Notification to the FBI of emergencies in which they would have an interest will be through provisions of the Nuclear Station's Security Plan, or by the NRC.

i) National Weather Service (NWS): Provides meteorological information during emergency situations, if required. Data available will include existing and forecasted wind directions, wind speed, and ambient air temperature.

2) State Agencies

a) The State of Illinois: The State of Illinois has the statutory responsibility and authority for protecting the health and safety of the public in Illinois. The State of Illinois has developed an "Illinois Plan for Radiological Accidents" (IPRA). This plan was developed in accordance with the guidance suggested by NUREG-0396 and NUREG 0654/FEMA-REP-1, Rev. 1. The IPRA has received 44 CFR 350 unconditional approvals from FEMA for all Exelon Nuclear's generating stations in the state of Illinois. Basic descriptions for the Illinois state agencies responsible for actions in the event of a nuclear power station are as follows:

- Governor of the State of Illinois: The Governor of the State of Illinois has overall command authority for both the radiological and non-radiological aspects of a nuclear incident. The Governor shall make the final recommendation for protective actions and shall serve as the state's primary spokesperson.

- Illinois Emergency Management Agency (IEMA): IEMA coordinates the operational response and recovery functions of all State agencies. IEMA proposes Protective Action Recommendations (PARs) to the Governor. IEMA also coordinates the implementation of the Governor's PARs.

  IEMA has the responsibility to inform the State of Indiana State Emergency Management Agency (SEMA) with respect to an emergency event at Dresden or Braidwood Nuclear Power Station and the State of Wisconsin Department of Emergency Government (WDEG) with respect to an emergency event at Byron Nuclear Power Station that impacts the 50-mile Ingestion Pathway Zone.

  IEMA Technical has both the command authority for radiological aspects of a nuclear incident and the responsibility for performing various radiological functions. These functions include milk, water and food control, radiation exposure control for state emergency workers, and confirmatory accident assessment. During an emergency situation, IEMA Technical shall make protective action recommendations to the Governor.

  For events that impact the 50-mile ingestion pathway for Braidwood or Dresden Nuclear Power Station, IEMA Technical will coordinate technical information with the State of Indiana. For Byron Nuclear Power Station, IEMA Technical will coordinate technical information with the State of Wisconsin.

  The IEMA Technical response to a nuclear incident utilizes two functional subgroups. They are the Radiological Emergency Assessment Center (REAC) and the Radiological Assessment Field Team (RAFT).

- Radiological Emergency Assessment Center (REAC): IEMA has established REAC in Springfield Illinois. REAC will serve as the command location for all (State related) radiological aspects of a nuclear incident. The Manager of the Office of Nuclear Facility Safety, or his/her designated alternate, is in command of REAC.

- Radiological Assessment Field Team (RAFT): RAFT has been organized to perform the field radiological functions of confirmatory accident assessments during a nuclear emergency. RAFT includes a Mobile Command Center, a Mobile Nuclear Laboratory, and monitoring and sampling teams.

b) The State of Iowa: Much of the Emergency Planning Zone for the Quad Cities Nuclear Station lies within the State of Iowa. The State of Iowa has developed an "Iowa Emergency Plan". This section provides a summary of the essential elements of the Iowa Emergency Plan, specifically outlining the specific responsibilities of certain "key" Iowa State Agency players in a response operational mode. Basic descriptions for the Iowa state agencies responsible for actions in the event of a nuclear power station are as follows:

- Iowa Emergency Management Division (IEMD): IEMD coordinates all activities of State agencies and departments, all local governments, and the utility in support of emergency response activities. These activities are coordinated from the Iowa State EOC in Des Moines.

- The Iowa Commissioner of Public Health, or his/her designee, from the Iowa Department of Public Health: The Iowa Department of Public Health shall alert the State Hygienic Lab when emergency action conditions are reported by a commercial nuclear power reactor, which impacts upon the public health and safety in Iowa, and when emergency team response has been determined to be necessary or imminent. They shall perform necessary calculations and evaluate the impact of existing and projected radioactivity releases in terms of public health risk. They shall translate the evaluation of existing and projected environmental contamination and resulting dose into terms of alternative protective actions. They shall recommend appropriate protective actions to the Governor's Office, the Iowa Emergency Management Division and other State agencies as appropriate.

- University Hygienic Lab (UHL): The UHL, located in Iowa City, Iowa, conducts and coordinates all field surveillance and monitoring activities directed toward measuring radiation exposure and radioactivity contamination in the environment resulting from an accident at a commercial nuclear power reactor. They also communicate all relevant data and protective action recommendations to the State Department of Public Health, provide radiological laboratory support for environmental samples analysis, and provide recommendations for decontamination of contaminated area.

c) The State of Wisconsin: A portion of the 50-mile Ingestion Pathway Emergency Planning Zone for Byron Nuclear Power Station lies within the State of Wisconsin. The State of Wisconsin has developed a "State of Wisconsin Peacetime Radiological Emergency Response Plan." This section provides a summary of the essential elements of the Wisconsin emergency plan.

Initially, responsibility for responding to a radiological emergency, including evacuation, rests with local governments and their emergency services. Notification, by either local authorities or legal possessors of uncontrolled materials, to the Wisconsin Emergency Management (WEM) that a radiological emergency exists will bring in the resources of the Department of Health and Family Services, Radiation Protection Unit to assess and evaluate the situation and determine protective action. State agency notification for assistance and coordination of response operations of the state agencies in support of local government will be performed by the WEM as determined by the Governor.

- Wisconsin Emergency Management (WEM): WEM is to provide the principal support response to emergencies in the State of Wisconsin, coordinate the responses of other state agencies, brief the Governor of emergency situations and activate the State Emergency Operating Center in Madison, if necessary.

- Department of Health and Family Services (DHFS), Radiation Protection Unit: For peacetime radiological emergencies, the DHFS has designated the Chief of the Radiation Protection Unit as the State Radiological Coordinator (SRC) for the State Radiological Response (RAD RESP) Team. Team members are personnel of the section, as designated by the SRC, augmented by selected personnel from WEM and other state and local agencies trained specifically for radiological incidents.

  Environmental sampling conducted by the State of Wisconsin following a serious radiological emergency will be coordinated from the Madison EOC by the SRC or his/her designated alternate.

The State of Wisconsin utilizes guidance promulgated by the EPA and the U.S. Department of Health and Human Services as the basis for determining what protective actions are necessary during a radiological incident.

d) The State of Indiana: Portions of the 50-mile Ingestion Pathway Emergency Planning Zones for Braidwood and Dresden Nuclear Power Stations lie within the State of Indiana. The State of Indiana has developed an emergency response plan. Appendix 1 – Ingestion Pathway, to Annex L – Radiological Protection of the plan provides the essential elements of Indiana's response to an event affecting the station's Ingestion Pathway Emergency Planning Zones. IEMA will coordinate technical information as necessary with the State of Indiana.

e) The Commonwealth of Pennsylvania: The Commonwealth organizations having prime responsibility in matters of radiation hazards are the Pennsylvania Emergency Management Agency and the Bureau of Radiation Protection (BRP) of the Pennsylvania Department of Environmental Protection.

- Pennsylvania Emergency Management Agency: Responsibilities of PEMA are outlined in Annex E, "Radiological Emergency Response to Nuclear Power Plant Incidents" of the Commonwealth of Pennsylvania Emergency Operations Plan. PEMA is the primary State agency to interface with FEMA. Any BRP requests for non-technical assistance from FEMA are coordinated through PEMA.

- 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.

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

f) The State of Maryland: Maryland state organizations having prime responsibility in matters of radiation hazards are the Maryland Emergency Management Agency and the Emergency Operations and Technical Support Program of the Maryland Department of the Environment. County and local governments are responsible for the protection of public health and safety within their jurisdiction.

- Maryland Emergency Management Agency (MEMA): MEMA responsibilities are outlined in Annex Q, " Radiological Emergency Plan."

- 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, "Radiological Emergency Plan."

- Maryland State Police: Responsibilities of the State Police are set forth in Annex Q, "Radiological Emergency Plan."

g) State of Delaware: The State of Delaware border is located within the 50-mile Ingestion Pathway Zone for Limerick and Peach Bottom Stations. The State would be notified if protective actions were required within that area. No direct support is provided to Limerick or Peach Bottom.

h) State of New Jersey: The state of New Jersey, through the various state, county and local agencies, is responsible for offsite emergency response. In order to fulfill this responsibility, the state relies on OCGS to provide necessary information on plant status and radiation releases. Recognizing the joint nature of their responsibilities, OCGS and the relevant governmental agencies have coordinated their emergency planning and have provided for adequate and redundant communication systems to coordinate their response during an emergency event.

The New Jersey State Police, Office of Emergency Management, is responsible to coordinate emergency services in the State of New Jersey.

- New Jersey Office of Emergency Management: The New Jersey Office of Emergency Management (OEM) has been assigned the responsibility for developing a statewide radiation emergency response plan. Annex B to the State of New Jersey Radiological Emergency Response Plan serves as a reference document incorporating the policy, the concept of operation, the rationale for chosen guidelines, and the relevant statutory documents.

  The OEM is the lead agency and coordinates the efforts of all state support agencies, including actions and operations involving public response and furnishes resources required to support decisions affecting exposure control.

  This agency initiates communications with county and municipal authorities through the County Emergency Management Coordinator. Ocean County and each municipality have contingency plans indicating actions to be taken upon notification of an emergency condition by the OEM.

  Primary contact with state authorities is through the New Jersey State Police OEM and the Headquarters Communications Bureau. This office is responsible for notifying other State and federal agencies and for providing assistance to state and local authorities in implementing emergency actions.

The Emergency Operations Center (EOC) for the New Jersey State Police is located at the State Police Division Headquarters in West Trenton, NJ.

- New Jersey Department of Environmental Protection, Bureau of Nuclear Engineering: The Bureau of Nuclear Engineering (BNE) is responsible for responding to a radiation incident within state boundaries. They will assess the radiological hazard and provide technical guidance and recommendations concerning the execution of protective actions for the general public.

  The BNE maintains personnel, facilities and equipment to assist in assessing the hazard and provide technical guidance and recommendations regarding the implementation of protective actions for the general public. The BNE perform both routine and emergency environmental monitoring.

The State of New Jersey's border is located within the 50-mile Ingestion Pathway Zone for Limerick, and Peach Bottom Stations. The State will be notified if protective actions are required within that area. No direct support is provided to Limerick or Peach Bottom Stations.

3) County Government Agencies

Exelon and the surrounding communities that comprise the Plume Exposure Pathway EPZs have developed integrated emergency response programs that call upon the resources of their community. The community organizations are responsible for implementing and coordinating the community response to an emergency.

The County Emergency Operations Centers (EOCs) serve as the primary coordinating center for local government response within the county's jurisdiction and for coordination between counties.

b. During an event classified as an Alert, Site Area Emergency, or General Emergency, the Exelon Nuclear ERO replaces the normal plant organization. The Exelon Nuclear ERO consists of three major response sub-organizations:

1) The Station Organization, directed by the Station Emergency Director, provides for:

- Control and operation of the plant.
- Mitigation of the emergency condition.
- Protection of station personnel.
- Emergency event classification.

- Notification of the appropriate individuals and agencies prior to EOF taking Command and Control.

- Emergency support for operations, engineering, maintenance, fire fighting, material acquisition, security, and first aid.

2) The Corporate Organization, directed by the Corporate Emergency Director, provides for:

- Emergency notifications to Federal, state and local agencies.

- Offsite radiological accident assessment and Protective Action Recommendations to offsite authorities.

- The primary interface between Exelon Nuclear and outside organizations responsible for the protection of the public.

3) The Public Information Organization, directed by the Corporate Spokesperson, coordinates with public information officers from other organizations to provide information to the public through the news media.

c. Interrelationships between major Exelon Nuclear organizations and sub-organizations in the total response effort are illustrated in a block diagram in Figures A-1 and A-2. For a more detailed diagram of the Exelon Nuclear ERO, see Figures B-1a to B-1d.

d. The Corporate Emergency Director is a senior Exelon employee with overall responsibility for coordinating emergency response actions in support of the affected Exelon Nuclear station, Emergency Public Information Organization, and affected state(s) and local agencies.

e. Procedures for training and maintenance of the emergency organization are in place to ensure 24-hour per day staffing for emergency response, including established communication links.

2. State and County Functions and Responsibilities

The state and counties have emergency response plans that specify the responsibilities and functions for the major agencies, departments, and key individuals of their emergency response organizations. This information is located in their respective plans.

3. Agreements in Planning Effort

Written agreements establishing the concept of operations developed between Exelon Nuclear and other support organizations having an emergency response role within the EPZs have been developed. These agreements identify the emergency measures to be provided, the mutually accepted criteria for implementation, and the arrangements for exchange of information. Agreement letters are not necessary with Federal Agencies who are legally required to respond based on Federal law; however, agreements are necessary if the agency was expected to provide assistance not required by law. Letters of Agreement with private contractors and others who provide services in support of a specific nuclear station shall be obtained by the respective nuclear station. Letters of Agreement are referenced in the Station Annexes and the actual letters are maintained on file at each station respectively. Letters of Agreement, as a minimum, state that the cooperating organization will provide their normal services in support of an emergency at the affected station. A contract/purchase order with a private contractor is considered acceptable in lieu of a Letter of Agreement for the specified duration of the contract.

4. Continuous Coverage

Exelon Nuclear maintains 24-hour emergency response capability at each station. The normal on-shift complement provides the initial response to an emergency. This group is trained to handle emergency situations (e.g. initiate implementation of the E-Plan, make initial accident assessment, emergency classification, notifications, communications, and protective action recommendations) until the augmented ERO arrives. The ERO is composed of a broad spectrum of personnel with specialties in operations, maintenance, engineering, radiochemistry, health physics, material control, fire protection, security, and emergency planning and are available and trained to augment on-shift personnel in an emergency. Procedures for training and maintenance of the emergency organization are in place to provide the capability of continuous (24-hour) operations.

The Corporate Emergency Director, located in the EOF, has the authority and responsibility for assuring continuity of resources (technical, administrative, and material) in the event of the activation of the ERO.

Figure A-1: Exelon Emergency Response Organization Interrelationships

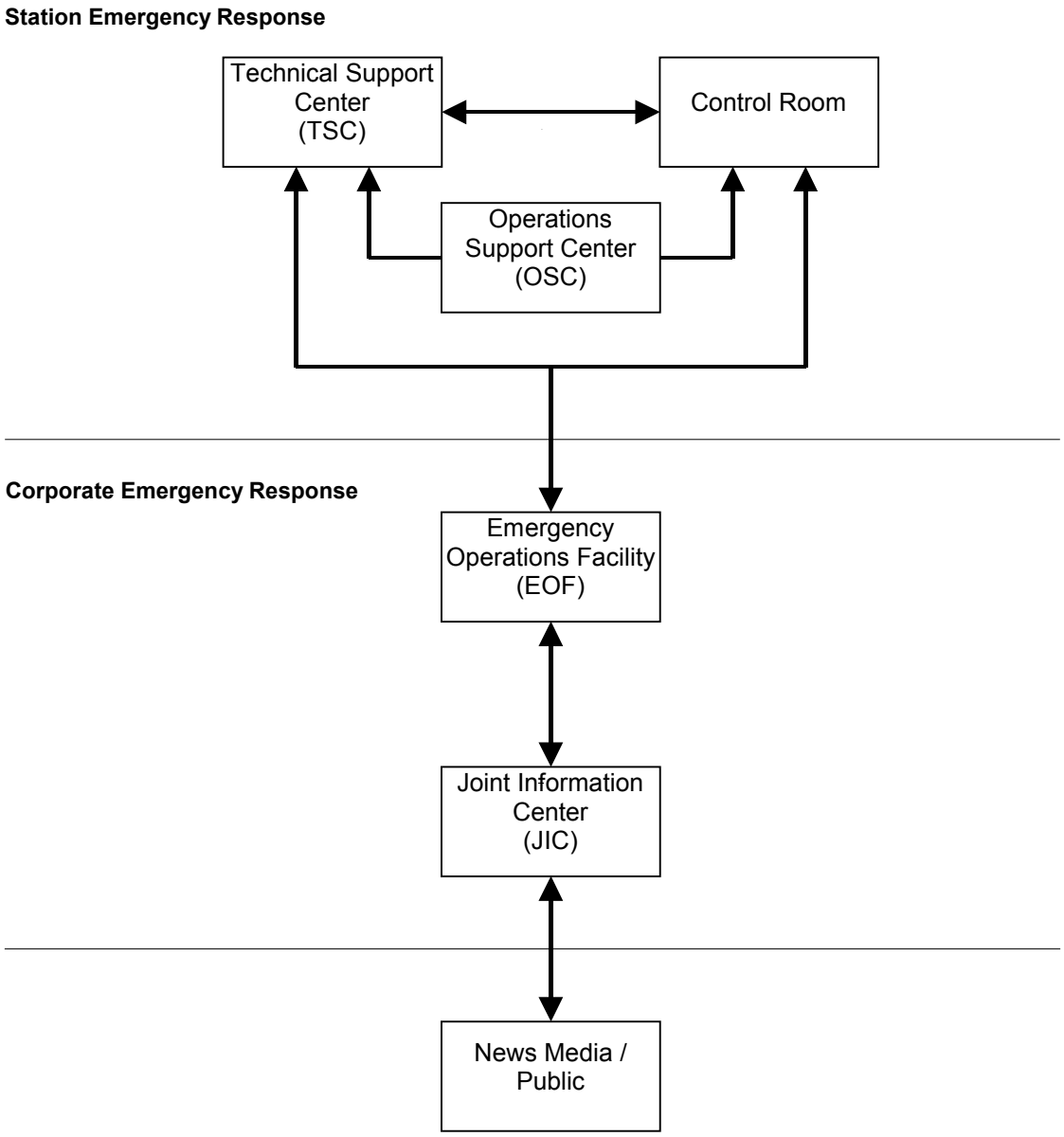
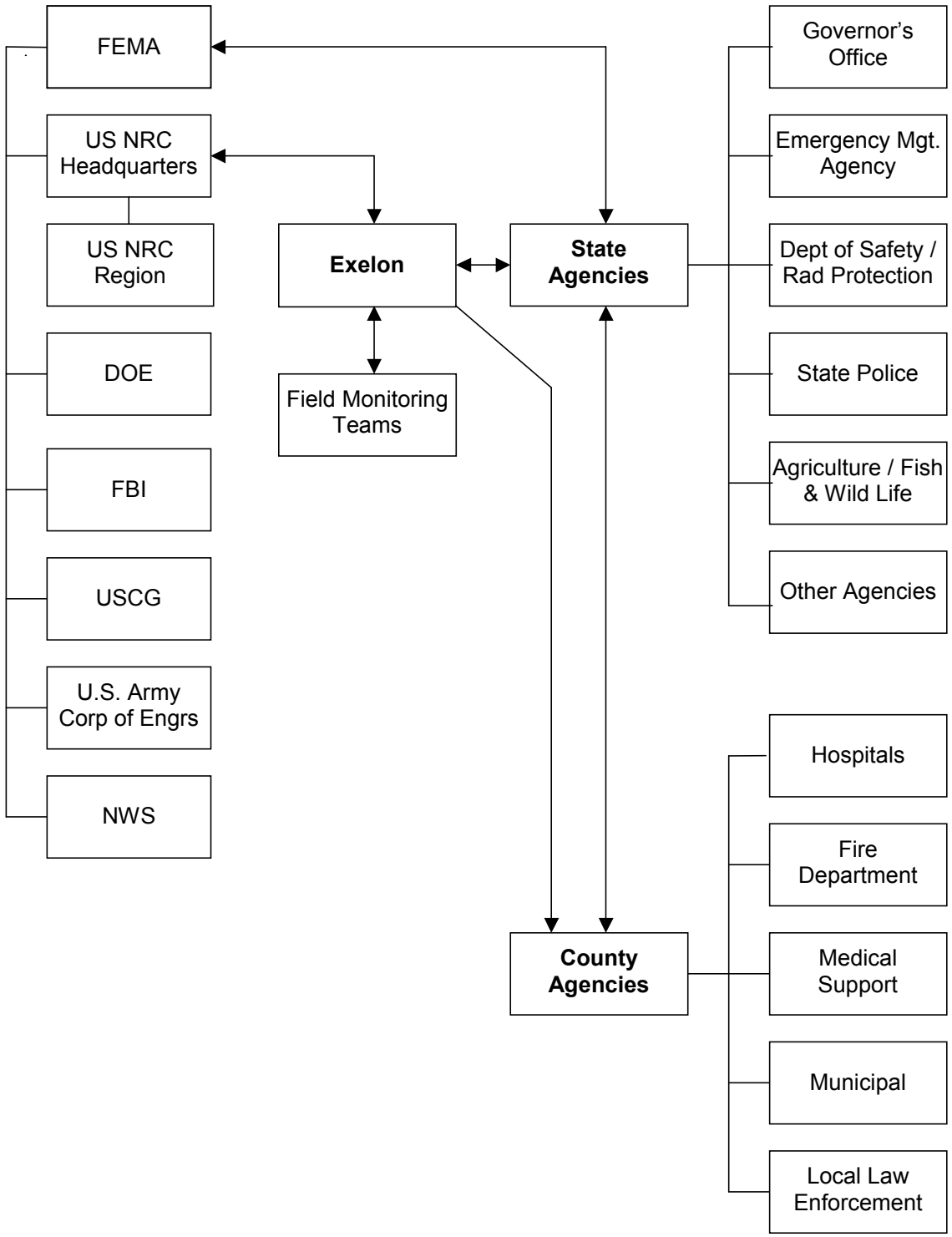


Figure A-2: Agency Response Organization Interrelationships



Section B: Exelon Nuclear Emergency Response Organization

This section describes the Exelon Nuclear Emergency Response Organization (ERO), its key positions and associated responsibilities. It outlines the staffing requirements which provide initial emergency response actions and provisions for timely augmentation of on-shift personnel when required. It also describes interfaces among Exelon Nuclear emergency response personnel and specifies the offsite support available to respond to the nuclear generating stations.

1. On-Shift Emergency Response Organization Assignments

The normal plant personnel complement is established with the Station Vice President having overall authority for station operations. The Station Vice President directs the site organization in the management of the various departments while the Shift Manager retains the responsibility for actual operation of plant systems. Emergency Preparedness must consider the capabilities of the normal plant organization, the Station and Corporate Emergency Response Organizations of Exelon Nuclear, and the non-Exelon Nuclear Emergency Response agencies. The initial phases of an emergency situation at a nuclear station will most likely involve a relatively small number of individuals. These individuals must be capable of (1) determining that an emergency exists; (2) providing initial classification and assessment; and (3) promptly notifying other groups and individuals in the emergency organization. The subsequent phases of the emergency situation may require an increasing augmentation of the emergency organization.

All Exelon Nuclear Stations have personnel on shift at all times that can provide an initial response to an emergency event. ERO staffing tables, contained within the station specific Annex, outlines the plant on-shift emergency organization and its relation to the normal staff complement. Members of the on-shift organization are trained on their responsibilities and duties in the event of an emergency and are capable of performing all response actions in an Unusual Event or the initial actions of higher classifications.

On Shift Personnel

All Exelon Nuclear stations have the capability at all times to perform detection, mitigation, classification, and notification functions required in the early phases of an emergency. Shift augmentation and further ERO involvement will be determined by the extent and magnitude of the event. When a transition to Severe Accident Management Guidelines (SAMG) is initiated, the shift crew assumes the duties and responsibilities of the SAMG Implementers.

Shift Manager: While acting as Shift Emergency Director, will take immediate action during an emergency and will activate the Station ERO, as appropriate. In the Shift Manager's absence or incapacitation, the line of succession is defined by each Station's procedures.

Shift Technical Advisor (STA): During normal plant operations, the Senior Reactor Operators report to the Shift Manager and directly supervise the licensed Reactor Operators and all activities in the Control Room. During an abnormal condition, the Shift Manager assumes direct supervision of personnel and all activities in the Control Room while a qualified individual steps back and assumes an overview role as an STA with the specific responsibility of monitoring the maintenance of core cooling and containment integrity. An individual assigned the duty as the STA shall be available to the Control Room at all times.

Radiation Protection: The Station Radiation Protection personnel are responsible for the handling and monitoring of radioactive materials. Included in this organization are Health Physicists, Radiation Protection Supervisors and Technicians.

Chemistry: The Station Chemistry personnel are responsible for sampling of system effluents, and the chemical and radio-analytical analysis of those samples. Included in this organization are Chemists, Chemistry Supervisors and Technicians.

Security: The Station Security personnel are responsible for the physical security of the site. Included in this organization are Security Supervisors and Security Guards.

2. Authority Over the Emergency Response Organization

The Emergency Director in Command and Control is the designated Exelon Nuclear individual who has overall authority and responsibility, management ability, and technical knowledge for coordinating all emergency response activities at the nuclear power station.

- Control Room: Shift Emergency Director (Shift Manager)
- TSC: Station Emergency Director
- EOF: Corporate Emergency Director

3. Criteria for Assuming Command and Control (Succession)

Emergency personnel assume responsibility for their positions upon receiving notification to activate. The responsibility for initial assessment of and response to an emergency rests with the Shift Manager. The Shift Manager is the Shift Emergency Director and has the Station Emergency Director's responsibilities and authority until relieved by a qualified Station Emergency Director. The Station Emergency Director, once having relieved the Shift Manager of the Emergency Director responsibilities, is responsible for continued assessment of the severity of the emergency and for the necessary functions as described in the E-Plan, the Station Annex, and the emergency implementing procedures. Final succession is achieved when the Corporate Emergency Director assumes overall Command and Control, and directs Exelon Nuclear's Emergency Response activities.

The Shift Emergency Director is relieved of Command and Control as soon as possible after the declaration of an Alert (or higher classification if Alert not declared). Command and Control may be transferred directly to the Corporate Emergency Director, or transferred to the Station Emergency Director on an interim basis. Command and Control does not transfer until the following criteria have been met:

- Adequate staff levels are present in support of the non-delegable responsibilities.
- The staff has been fully briefed as to the status of the event and the currently proposed plan of action.
- A turnover between the Emergency Director relinquishing Command and Control and the Emergency Director assuming Command and Control has been made.

Although Exelon Nuclear's ERO fulfills all regulatory requirements for emergency response, it may be altered by the Emergency Director. This type of alteration will be based upon identified needs within the ERO, event dependent criteria, and identified needs of the company as a whole.

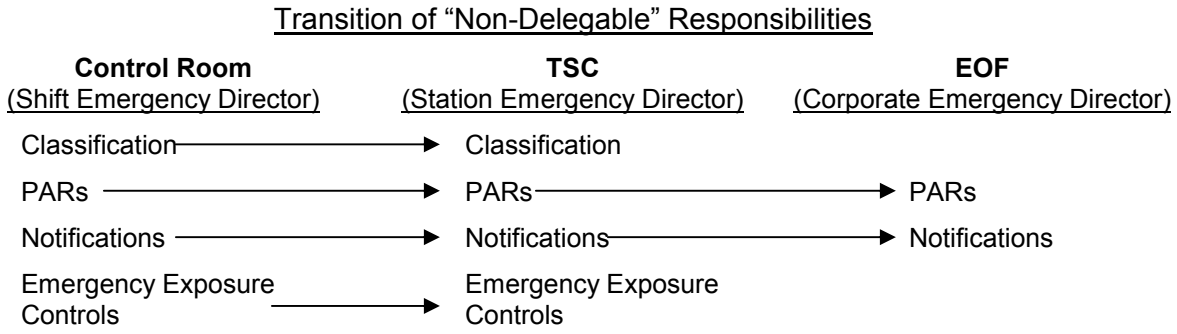
4. Non-Delegable Responsibilities

Non-delegable responsibilities include the following functions:

- Event classification.
- Protective Action Recommendations (PARs) for the general public.
- Notification of offsite authorities (approval of state/local and NRC notifications).
- Authorization of emergency exposure controls in excess of 5 Rem TEDE and the issuance of potassium iodide (KI), for Exelon Nuclear emergency workers per EPA-400.

The Shift Manager is responsible for the initial classification of an event and assumes the position as Shift Emergency Director. In this capacity, the Shift Manager has responsibility for performing the non-delegable responsibilities until relieved.

The Station Emergency Director will assume overall authority and responsibility for performing all of the non-delegable duties from the Shift Manager. The Corporate Emergency Director (EOF) will subsequently relieve the Station Emergency Director (TSC) of overall Command and Control and assume the non-delegable responsibilities for PAR determination and notifications to offsite authorities.



5. Emergency Response Organization Positional Responsibilities

ERO staffing tables contained within the station specific Annex, outlines ERO positions required to meet minimum staffing and full augmentation of the on-shift complement at an Alert or higher classification, and the major tasks assigned to each position. The full augmentation staffing levels are used as a planning basis to cover a wide range of possible events. For extended events (one which lasts for more than 24 hours), actual staffing will be established by the Emergency Director based on the event and personnel availability. However, additional staffing or reduced staffing will only occur after discussion concerning the impact on plant operations and emergency response.

In addition to maintaining adequate documentation of the event, responsibilities for each position are as follows:

a. Station Emergency Response Organization: The Station ERO is the onsite group that is activated during an emergency. It functions under the Station Emergency Director, who is responsible for organizing and coordinating the emergency efforts at and within the immediate vicinity of the station (including carrying out all onsite emergency efforts and the initial offsite environs monitoring efforts necessary to assess plant releases).

   The Station ERO consists of station personnel who are involved with emergency response efforts necessary to control the plant during an incident. This organization operates out of the Control Room, the Technical Support Center (TSC) and the Operations Support Center (OSC). Collectively, members of the Station ERO provide for the following activities during an emergency:

   - Plant systems operations
   - Radiological survey and monitoring (including Environs Monitoring)
   - Firefighting
   - Rescue operations and First Aid
   - Decontamination
   - Security of plant and access control
   - Repair and damage control
   - Personnel protection including Assembly, Accountability and Evacuation

- Communications
- Initial Liaison responsibilities with Federal, state and local authorities

When plant conditions warrant entry into the Severe Accident Management Guidelines (SAMGs), the Station Emergency Director or other qualified individual (e.g., Operations Manager) assumes the role of Decision-Maker. The Technical Manager and/or another qualified individual(s) assumes the role of Evaluator (at least 2 are required), and the Control Room staff assumes the role of Implementers. Control Room personnel will perform mitigating actions for severe accidents per EOPs prior to TSC activation.

All Station ERO personnel shall have the authority to perform assigned duties in a manner consistent with the objectives of this plan.

1) Shift Manager (Shift Emergency Director) Control Room

A Shift Manager is on duty 24 hours a day and is the Shift Emergency Director in a declared emergency until relieved of this function. While serving in this capacity the Shift Manager is responsible for:

- Activating the ERO (as deemed appropriate or as procedurally required).
- Performing those duties outlined in Section B.5.a.2 for the Station Emergency Director. The responsibilities described for the Station Emergency Director applies to either the Shift Emergency Director or the Station Emergency Director depending on which individual is in Command and Control.

The on-duty Shift Manager directs the activities of the operating crew and is responsible for the safe operation of the plant in compliance with the station NRC operating license and the station operating procedures. The Shift Manager, after relinquishing Command and Control, functionally reports to the Operations Manager in the TSC.

The Shift Manager's responsibilities, when not in Command and Control, are described below:

- The authority and responsibility to shutdown the reactor when determined that the safety of the reactor is in jeopardy or when operating parameters exceed any of the reactor protection circuit set-points and automatic shutdown does not occur;
- To ensure a review has been completed to determine the circumstance, cause, and limits under which operations can safely proceed before the reactor is returned to power following a trip or an unscheduled or unexplained power reduction;

- The responsibility to be present at the plant and to provide direction for returning the reactor to power following a trip or an unscheduled or unexplained power reduction;

- The responsibility to adhere to the station Technical Specifications and to review routine operating data to assure safe operation;

- The responsibility to identify applicable EALs and emergency classifications; and

- The responsibility to adhere to plant operating procedures and the requirements for their use. During an emergency, operations personnel may depart from approved procedures where necessary to prevent injury to personnel, including the public, or damage to the facility consistent with the requirements of 10 CFR 50.54(x) and (y).

- Supervise the activities of the Control Room Crew, Operations Communicator and Damage Control Communicator in the Control Room.

2) Station Emergency Director TSC

The Station Emergency Director reports to the Corporate Emergency Director and supervises and directs the Station ERO. The Station Emergency Director's responsibilities include organizing and coordinating the onsite emergency efforts. Additionally, the Station Emergency Director has the requisite authority, plant operating experience and qualifications to implement in-plant recovery operations.

a) Station Emergency Director Responsibilities while in Command and Control:

- Perform all non-delegable responsibilities as the Emergency Director in Command and Control until relieved by the EOF.

- Conduct personnel assembly/accountability and evacuation of non-essential personnel at Site Area Emergency, General Emergency or as conditions warrant.

- If the emergency involves a hazardous substance and/or oil discharges, ensure that appropriate notifications and responses have been made.

- Determine if the OSC is to remain activated at the Alert Classification.

b) Station Emergency Director Responsibilities while not in Command and Control:

- Event classification.

- Emergency exposure controls.

- Protective actions for all onsite personnel.
- Supervision of the Station ERO.
- Inform the Corporate Emergency Director and onsite NRC as to the status of the plant.
- Assist the Corporate Emergency Director in the acquisition of information for the state/local notifications, NRC notifications and offsite agency updates.
- Provide information and recommendations to the Corporate Emergency Director.
- Implement plans, procedures and schedules to meet emergency response objectives as directed by the Corporate Emergency Director.
- Request from the Corporate ERO any additional material, personnel resources or equipment needed to implement response plans and operations.
- Assume the duties and responsibilities of Decision-Maker when a transition to Severe Accident Management Guidelines (SAMGs) is initiated. This responsibility can be delegated to the Operations Manager if qualified.

3) TSC Director TSC

The TSC Director reports to the Station Emergency Director and is responsible for the content of information transmitted from the TSC to other agencies (or facilities) and for documenting information received at the TSC in coordination with the Station Emergency Director. Responsibilities include:

- Verify that qualified individuals are filling Communicator positions in the Control Room, TSC and OSC.
- Supervise the activities of the Logistics Coordinator and state/local Communicator.
- Ensure that communications are established with appropriate parties as directed by the Station Emergency Director.
- Ensure that all required notifications to offsite governmental agencies (state/local and NRC) are timely and accurate.
- Act as the Exelon Nuclear Liaison to any NRC Site Team Representatives.
- Ensure that the NRC Site Team Representatives are directed to their appropriate counterparts.

- Assist the Corporate Emergency Director in the acquisition of information for off-site agency updates.

- Record and relay inquiries to the Station Emergency Director. In addition, record responses to such inquiries prior to transmission.

- Assist the Station Emergency Director in maintaining proper records.

4) Communicators CR/TSC/OSC

The Communicators are responsible for transmitting/receiving information to and from the TSC, OSC and Control Room. General responsibilities assigned to all Communicators include:

- Establish communications with appropriate parties as directed.

- Transmit information that has been reviewed and/or approved by the responsible Manager or Coordinator.

- Document time, date and information being transmitted or received on appropriate forms.

- Record and relay inquiries and the responses to those inquiries.

- Assist appropriate Managers and Coordinators in maintaining proper records and logs of emergency related activities.

- Gather, record and post appropriate information.

a) Specific responsibilities assigned to the State/Local Communicator include:

- Communicate and receive information via the Nuclear Accident Reporting System (NARS) circuit or commercial telephone line with appropriate agencies prior to the EOF accepting Command and Control.

- Monitor NARS communications until released by the TSC Director.

b) Specific responsibilities assigned to the Damage Control Communicator include:

- Relay requests from the Control Room and TSC for the dispatching of OSC Teams.

- Apprise the station emergency response facilities of the status of OSC Team activities.

c) Specific responsibilities assigned to the Operations Communicator include:

- Apprise the TSC and EOF staff of the overall plant condition and significant changes to system and equipment status.
- Inform the Control Room, TSC, and EOF of significant changes in event status (e.g. changes in classification, command and control, initiation of station assembly, accountability, evacuation, etc.).

d) Specific responsibilities assigned to the TSC Technical Communicator include:

- Establish and maintain contact with the EOF Technical Advisor.
- Provide EOF with updates on technical support activities and priorities.

e) Specific responsibilities assigned to the ENS Communicator include:

- Notify the NRC of changes in event classification, prior to the EOF accepting Command and Control, and assist the EOF ENS Communicator in completing the NRC Event Notification Worksheet and responding to NRC inquiries.
- Provide real time updates of significant changes to plant and system status and responses to NRC inquiries.
- Maintain continuous communications with the NRC, if requested, via the NRC ENS phone or commercial telephone line.

f) Specific responsibilities assigned to the HPN Communicator include:

- Maintain continuous communications with the NRC, if requested, via the NRC Health Physics Network (HPN) phone or commercial telephone line.
- Communicate current Health Physics information to NRC representatives, as requested.
- Coordinate the communications of radiological information to the NRC with the EOF HPN Communicator (onsite vs. environmental data).

5) Operations Manager TSC

The Operations Manager reports to the Station Emergency Director. Major functions include determining the extent of station emergencies, initiating corrective actions, and implementing protective actions for onsite personnel. In the event that the Station Emergency Director becomes incapacitated and can no longer fulfill the designated responsibilities, the Operations Manager will normally assume the responsibilities until relieved by another qualified Station Emergency Director. Responsibilities include:

- Coordinate TSC efforts in determining the nature and extent of emergencies pertaining to equipment and plant facilities in support of Control Room actions.
- Initiate immediate corrective actions to limit or contain the emergency invoking the provisions of 10 CFR 50.54(x) if appropriate, and specifically when addressing Severe Accident Management Guidelines (SAMG).
- Recommend equipment operations checks and miscellaneous actions to the Control Room in support of restoration and accident mitigation.
- Approve emergency special procedures, and implement as required under the provisions of 10 CFR 50.54(x).
- Assist the Maintenance Manager in determining the priority assigned to OSC activities.
- Organize and direct medical response efforts for injured personnel.
- Ensure adequate staffing of the Control Room and TSC subordinates.
- Ensure the Shift Manager is informed of OSC staffing utilization and activities.
- Identify steps or procedures that the Operations staff should be utilizing to properly respond to the emergency condition.
- Assist the Station Emergency Director in evaluating changes in event classification.
- Supervise the activities of the Operations Communicator and the ENS Communicator in the TSC.
- Act as the TSC liaison with the appropriate NRC Site Team Representative.
- At the direction of the Station Emergency Director, assume the duties and responsibilities of the Evaluator, or Decision-Maker if qualified, when transition to Severe Accident Management Guidelines (SAMG) is initiated.

6) Technical Manager TSC

The Technical Manager reports to the Station Emergency Director and directs a staff in performing technical assessments of station emergencies and assists in recovery planning. Responsibilities include:

- Accumulate, tabulate and evaluate data on plant conditions.
- Evaluate plant parameters during an emergency to determine the overall plant condition.
- Coordinate core damage assessment activities.
- Identify data points and control parameters that the Operations staff should monitor.
- Ensure that current and adequate technical information is depicted on status boards.
- Identify and direct staff in the development of special procedures needed to effect long-term safe shutdown or to mitigate a release.
- Supervise the total onsite technical staff effort.
- Act as the TSC liaison with state and appropriate NRC Site Team representatives.
- Assist the Radiation Protection Manager for onsite radiological/technical matters.
- Assist the Station Emergency Director in evaluating plant based PARs (prior to Corporate Emergency Director accepting command and control) and changes in event classification.
- Supervise the activities of the TSC Technical Communicator.
- Assume the duties and responsibilities of an Evaluator when transition to Severe Accident Management Guidelines (SAMG) is initiated and supervise the activities of the SAMG Evaluator Team

7) Technical Support Staff TSC

The TSC Technical Support Staff consists of the following minimum staff engineering positions:

- Electrical Engineer
- Mechanical Engineer
- Core/Thermal Hydraulic Engineer - serves as Core Damage Assessment Methodology (CDAM) Evaluator, as applicable.

In addition, station Engineering support will be augmented on an as needed basis to support accident assessment and mitigation activities.

8) Logistics Coordinator TSC

The Logistics Coordinator reports to the TSC Director and provides administrative services in support of emergency/recovery operations. Responsibilities include:

- Coordinate shift relief and continual staffing of the station.
- Arrange for clerical staff at the TSC, OSC and Control Room.
- Assist the Security Coordinator in coordinating ERO and station activities in support of on-going security contingency, accountability or site/area evacuation efforts.
- Support the processing of special procedures and interim reports during an emergency.
- Ensure that event status and priority logs are being maintained in the TSC.
- Coordinate record-keeping efforts at the station.
- Arrange for food, sleeping facilities and other necessary accommodations for onsite emergency workers.
- Arrange for specialized training of Emergency Response personnel as needed.

9) Radiation Protection Manager (RPM) TSC

The Radiation Protection Manager reports to the Station Emergency Director and supervises the activities of the Radiation Controls Coordinator and Radiation Controls Engineer. The TSC RPM directs a staff in determining the extent and nature of radiological or hazardous material problems onsite. Responsibilities include:

- Accumulate, tabulate and evaluate data on plant conditions such as meteorological and radiological monitoring readings, and other pertinent data.
- Act as the TSC liaison with the appropriate NRC Site Team representative.
- Ensure use of protective clothing, respiratory protection, and access control within the plant as deemed appropriate to control personnel exposures.

- Ensure that appropriate bioassay procedures have been implemented for onsite personnel when a radioactivity incident has occurred.
- Ensure that personnel are decontaminated, if necessary.
- Authorize personnel exposures below 5 Rem TEDE (EPA-400 lower limit).
- Assist the Station Emergency Director in determining if exposures in excess of the 5 Rem TEDE (EPA-400 lower limit) are necessary.
- Advise the Station Emergency Director of situations when the use of KI should be considered.
- Assist the Station Emergency Director in evaluating dose-based PARs (prior to Corporate Emergency Director accepting command and control) and changes in radiological event classification.
- Advise the Station Emergency Director and EOF Radiation Protection Manager of changes in radiological release status.
- Assist the Operations Manager in planning rescue operations and provide monitoring services as required, including the transfer of injured and/or contaminated personnel.
- Coordinate with the Security Coordinator to determine the routes to be used for evacuation of non-essential personnel.
- Assure additional radiation protection personnel and/or equipment is arranged for, as necessary.

10) Radiation Controls Engineer (RCE) TSC

The Radiation Controls Engineer reports to the Radiation Protection Manager and coordinates the radiological and chemistry interface between the technical support engineering efforts. Responsibilities include:

- Monitor area and process radiation monitors to identify trends and potential hazards within the station.
- Evaluate plant environmental factors regarding radiological and other hazardous material conditions.
- Evaluate radiological and hazardous material surveys and chemistry sample results as appropriate.
- Direct the performance of sampling activities through coordination with the OSC Chemistry Lead in support of operations and core damage estimates as necessary.

- Coordinate radiological and chemistry information with the Core/Thermal Hydraulic Engineer in support of core damage assessment.

11) Radiation Controls Coordinator (RCC) TSC

The Radiation Controls Coordinator reports to the Radiation Protection Manager. The RCC coordinates site and in-plant Radiation Protection response activities through the OSC Radiation Protection Lead. Responsibilities include:

- Support the OSC Radiation Protection Lead in the dispatching of OSC Teams.
- Assist the Operations Manager in planning radiological controls for personnel dispatched from the Control Room.
- Ensure the proper use of protective clothing, respiratory protection, and access controls in the plant as appropriate to control personnel exposure.
- Monitor habitability concerns impacting access to plant and site areas.
- In coordination with the OSC Radiation Protection Lead, assemble and dispatch the Field Monitoring Teams as required.
- Supervise the activities of the HPN Communicator in the TSC.
- Request additional Radiation Protection personnel and/or equipment, as necessary in support of station activities and staff relief.
- Prior to EOF Protective Measures Group staffing:
  - Perform dose assessments and provide appropriate dose-based PARs.
  - Coordinate Field Monitoring Team activities.
  - Monitor meteorological conditions and remain cognizant of forecast data.
- Following EOF Protective Measures Group staffing:
  - Transfer control of the Field Monitoring Teams to the EOF Environmental Coordinator when appropriate.
  - Transfer responsibility of dose assessment activities to the EOF Dose Assessment Coordinator.
  - Assist the EOF Environmental Coordinator in the acquisition of information for the off-site agency updates.

12) Maintenance Manager TSC

The Maintenance Manager reports to the Station Emergency Director and directs a staff in providing labor, tools, protective equipment and parts needed for emergency repair, damage control and recovery efforts to place the plant in a safe condition or return the plant to its pre-accident status. Responsibilities include:

- Direct the total onsite maintenance and equipment restoration effort.
- Request additional equipment in order to expedite recovery and restoration.
- Supervise the activities of the OSC Director and the TSC Damage Control Communicator.
- Ensure the Operations Manager is informed of OSC staffing utilization and activities.
- In coordination with the Operations Manager, determine the priority assigned to OSC activities.
- Ensure adequate staffing of the OSC.
- Assist in rescue operations.
- Identify required procedures that need to be written or implemented in support of the response efforts.

13) Security Coordinator TSC

The Security Coordinator reports to the Station Emergency Director and maintains plant security and personnel accountability at the nuclear station. Responsibilities include:

- Maintain plant security and account for all personnel within the protected area.
- Assist the Station Emergency Director in evaluating changes in security related threats and event classifications.
- Identify any non-routine security procedures and/or contingencies that are in effect or that require a response.
- Expedite ingress and egress of emergency response personnel.
- Coordinate with the Radiation Protection Manager in controlling ingress and egress to and from the Protected Area if radiological concerns are present.

- Provide for access control to the Control Room, TSC and OSC, as appropriate.
- Expedite entry into the Protected Area, as necessary, for the NRC Site Team.
- Act as the TSC liaison with the appropriate NRC Site Team representative.
- Assist the Radiation Protection Manager in determining personnel evacuation routes as necessary.
- Coordinate the evacuation of station non-essential personnel with the appropriate Local Law Enforcement Agencies (LLEAs).

14) Operations Support Center Director OSC

The OSC Director reports to the Maintenance Manager and supervises the activities of OSC personnel. Responsibilities include:

- Assign tasks to designated Leads as available:
  - Operations
  - Mechanical Maintenance
  - Electrical/I&C Maintenance
  - Radiation Protection
  - Chemistry
- Coordinate with the OSC Operations Lead in the dispatch of Operations personnel to support Control Room and OSC Team activities.
- Notify the Control Room and TSC prior to dispatch of any OSC teams into the plant.
- Maintain OSC resources including personnel, material, and equipment.
- Maintain accountability for all individuals dispatched from the OSC.
- Conduct periodic briefings on the overall plant status, emergency response activities, and station priorities.

15) Assistant Operations Support Center Director OSC

The Assistant OSC Director reports to the OSC Director and supports the OSC Director in supervising the activities of personnel reporting to the OSC. The Assistant OSC Director may be filled by an OSC Lead, normally the Radiation Protection Lead. Responsibilities include:

- Assist the OSC Director in supervising personnel assigned to the OSC.
- Assist in formation of Field Monitoring Teams as directed by the TSC.
- Assist in formation of sampling teams.
- Ensure that records of in-plant survey information and radiochemistry results are maintained.
- Ensure that accumulated exposure records for all essential onsite personnel are maintained.
- Coordinate with the OSC Leads to organize in-plant teams to support station priorities.
- Ensure that in-plant team dispatch briefings include expected activities and radiological hazards.
- Ensure that periodic facility briefings are conducted on plant radiological conditions.

16) OSC Leads OSC

OSC Leads report to the OSC Director and are assigned from the following station departments:

- Mechanical Maintenance
- Electrical / Instrument and Control
- Radiation Protection
- Chemistry
- Operations (on-shift Supervising Operator or designated Operations representative)

The OSC Lead assigned to an OSC team is responsible at all times for the safety of team personnel and to keep the OSC Director apprised of team status. Specifically, the OSC Leads are responsible for the managing and supervising OSC team personnel, including:

- Conduct of adequate pre-dispatch briefings.

- Ensuring adequate protective equipment and measures have been identified.
- Tracking of OSC team activities while dispatched.
- Debriefing of team personnel upon return to the OSC.

b. Corporate Emergency Response Organization

1) Nuclear Duty Officer (NDO)

The NDO is the Exelon Nuclear individual who acts as the initial Corporate contact for declared events. Responsibilities include:

a) Actions for all classified events:

- Contact the affected station to verify and obtain updated information concerning emergency response actions and event status.
- Notify Exelon Nuclear Executives of event.
- Provide information on the event to State Duty Officers, if requested.
- Notify the on-call Exelon Communications and Public Affairs Representative.
- Prior to EOF activation, review any news releases for accuracy.

b) Actions for Alert classifications and above:

- Complete all actions as listed above.
- Notify American Nuclear Insurers (ANI) and Institute of Nuclear Power Operations (INPO), prior to being transferred to the EOF.

2) Corporate Emergency Director EOF

a) When the Station Emergency Director has Command and Control, the ongoing responsibilities include:

- Coordinate all Exelon Nuclear activities involved with the emergency response.
- Ensure off-site agency updates are periodically communicated as required/requested.
- Coordinate Exelon Nuclear press releases with the Nuclear Duty Officer and Exelon Communications and Public Affairs.
- Request assistance from non-Exelon Nuclear emergency response organizations, as necessary.

b) Following assumption of Command and Control, the additional responsibilities assigned to the Corporate Emergency Director include:

- Assumes overall Command and Control of emergency response activities and the non-delegable responsibilities for PAR determination and the notification of offsite authorities.
- Ensure that Federal, state and local authorities and industry support agencies remain cognizant of the status of the emergency situation. If requested, dispatch informed individuals to offsite governmental Emergency Operation Centers (EOCs).
- Approve the technical content of Exelon Nuclear press releases prior to their being released to the media.

3) EOF Director EOF

The EOF Director reports to the Corporate Emergency Director and has the authority, management ability and technical knowledge to assist the Corporate Emergency Director in the management of Exelon Nuclear's offsite ERO.

In the event that the Corporate Emergency Director becomes incapacitated, the EOF Director shall assume the responsibilities of the Corporate Emergency Director until a transfer of Command and Control can be affected either back to the station or to another qualified Corporate Emergency Director. Responsibilities include:

- Direct and coordinate the activation and response efforts of the EOF staff in support of the Corporate Emergency Director.
- Evaluate the need to augment the EOF staff based on events in progress.
- Assess the effectiveness of ongoing EOF working relationships.
- Monitor information flow within the EOF to ensure that facility activities remain coordinated.
- Prepare state/local notification forms with the assistance of the EOF Radiation Protection Manager and the Technical Support Manager.
- Coordinate services as necessary to support EOF operations.
- Coordinate with the Administrative Coordinator for continual shift staffing requirements.
- Assist in the conduct of Corporate Emergency Director duties.

- Act as the designated alternate for approval of the technical content of Exelon Nuclear Press Releases and information released to the News Media.

- Act as purchasing agent in support of the TSC for contract negotiation/administration.

4) Technical Support Manager EOF

The Technical Support Manager reports to the EOF Director and directs the activities of the Technical Support Group. Responsibilities include:

- Assist the Corporate Emergency Director in monitoring changes in event classification.

- Assist the Corporate Emergency Director in determining plant-based PARs when necessary.

- Provide information to the EOF Director for completing the state/local notification form.

- Provide the Corporate Emergency Director information concerning the status of plant operations, and recommendations for mitigating the consequences of the accident.

- Coordinate the overall Exelon Nuclear engineering support from corporate staff and unaffected stations.

- Interface with Industry and contractor engineering support organizations.

- Ensure that the EOF Radiation Protection Manager is informed of changes in plant status that impacts or potentially impacts the offsite environment or PARs.

- Provide technical information on facility and system design.

- Assist in the development of post-accident recovery measures.

5) Operations Advisor EOF

The Operations Advisor reports to the Technical Support Manager, directs the ENS Communicator, and is responsible for obtaining and analyzing plant status information and ensuring that it is disseminated. Specific responsibilities include:

- Monitor the Operations Status Line to keep apprised of:

  - Control Room activities including progress on Emergency Operating Procedures.

- Significant changes in plant system/equipment status and critical parameters.
- Possible changes in event classification.

- Identify and track critical parameters for the identification and trending of current plant status information.
- Assist the station in identifying Operations resources from corporate staff or unaffected stations for direct support of plant shift operations personnel.
- Assist the ENS Communicator in the completion of the NRC Event Notification Worksheet and in responding to NRC inquiries.
- Ensure that the EOF Radiation Protection Manager is informed of changes in plant status that impact or potentially impact the offsite environment or PARs.

6) ENS Communicator EOF

The ENS Communicator reports to the Operations Advisor. Specific responsibilities include:

- Notify the NRC of changes in event classification. Generally, the TSC ENS Communicator focuses on real time plant operations and the EOF ENS Communicator focuses on notifications following changes in event classification and overall changes in event response or status.
- Establish and maintain continuous communications with the NRC, if requested, via the NRC ENS phone or commercial telephone line.
- Coordinate NRC communications with the ENS Communicator in the TSC.

7) Technical Advisor EOF

The Technical Advisor reports to the Technical Support Manager and is responsible for obtaining and analyzing technical support information, accident mitigating activities and priorities and ensuring that it is disseminated. Responsibilities include:

- Monitor the Technical Conference Line to remain aware of TSC technical support activities, strategies and priorities.
- Assist the Dose Assessment Coordinator in acquiring technical information pertaining to release pathway and core damage assessment.
- Supervise the activities of the Events Recorder.

8) Events Recorder EOF

The Events Recorder reports to the Technical Advisor. Responsibilities include:

- Gather/record approved information on status boards as requested.
- Maintain an event chronology/status log.

9) Radiation Protection Manager EOF

The Radiation Protection Manager reports to the EOF Director and directs the activities of the EOF Radiation Protection staff. Specific responsibilities include:

- Recommend changes in event classification and PARs based upon effluent releases or dose projections.
- Assist the EOF Director in the evaluation of the significance of an emergency with respect to the public.
- Notify the EOF Director of meteorological changes that may impact identification of downwind areas.
- Advise the Corporate Emergency Director of protective actions taken by the station for plant personnel.
- Assist the TSC in the planning and coordination of activities associated with the evacuation of non-essential personnel.
- Advise the Corporate Emergency Director on the need for emergency exposures or for issuance of KI to the Field Monitoring Teams or Exelon personnel required to enter the plume.
- Determine the need for and contact Occupational Health/Industrial Safety Services personnel for assistance.
- Monitor plant radiological conditions and advise the TSC Radiation Protection Manager of any adverse trends or potential release pathways that may impact existing event classification.
- Assist in the completion and review of the state/local notification form.
- Maintain cognizance of environmental sampling activities.
- Ensure state authorities are provided information pertaining to Exelon Field Monitoring Team activities and sample results.
- Assist the affected station in the following areas:

- Planning and coordination of activities associated with the evacuation of non-essential personnel.

- Acquisition of additional instrumentation, dosimetry, protective equipment and radiological support personnel.

- Assist and interface with the EOF Technical Support Group and the station in the development of plans for plant surveys, sampling, shielding, and special tools in support of waste systems processing and design modification activities.

- Upon request, provide in-plant health physics data to Emergency Public Information personnel and the HPN Communicator.

10) Environmental Coordinator EOF

The Environmental Coordinator reports to the EOF Radiation Protection Manager and directs the Field Team Communicator, Field Monitoring Teams and the State Environs Communicator. Responsibilities include:

- Coordinate the transfer of control of the Field Monitoring Teams if initially under the direction of the TSC Radiological Controls Coordinator.

- Ensure communications are established with the TSC to obtain information on the accident conditions, meteorological conditions and estimates of radioactive material releases.

- Maintain cognizance of Field Monitoring Team exposure. When warranted, ask the Dose Assessment Coordinator to initiate an evaluation of the need for administering KI to Exelon nuclear workers.

- Determine needs of the Dose Assessment Coordinator, the Dose Assessor, the HPN Communicator and the State Environs Communicator(s) for updates on Field Monitoring Team data and ensure distribution of new data to them in accordance with those needs.

- Upon request, provide environmental data to Emergency Public Information personnel.

- Evaluate and coordinate additional equipment and personnel as necessary from unaffected stations to augment and/or relieve station Field Monitoring Teams.

11) State Environs Communicator EOF

The State Environs Communicator is staffed as requested by the applicable state agencies. The State Environs Communicator reports to the Environmental Coordinator. Responsibilities include:

- As needed, obtain release and dose assessment data from the Dose Assessment Coordinator and Field Monitoring Team data from the Environmental Coordinator.
- Coordinate activities and information flow between the EOF Protective Measures Group and the affected state(s) environmental authorities, including periodic updates on meteorological conditions, Field Monitoring Team activities and survey/sample results.
- Ensure that the Environmental Coordinator is aware of state environmental activities and sample results.

12) Field Team Communicator EOF

The Field Team Communicator reports to the Environmental Coordinator. Responsibilities include:

- Establish and maintain contact with the dispatched Field Monitoring Teams.
- Document the Environmental Coordinator's instructions and then relay this information to the Field Monitoring Teams.
- Document environmental data reported by the Field Monitoring Teams.
- Periodically obtain and document information on Field Monitoring Team radiological exposure.
- Promptly report new environmental or Field Monitoring Team exposure data to the Environmental Coordinator.
- Document questions and answers directed to and received from the Field Monitoring Teams. Ensure the Environmental Coordinator is cognizant of these information requests and relay replies to these requests.

13) Dose Assessment Coordinator EOF

The Dose Assessment Coordinator reports to the EOF Radiation Protection Manager and directs the activities of the Dose Assessor and the HPN Communicator. Responsibilities include:

- Interpret radiological data and provide PARs based upon dose projections to the EOF Radiation Protection Manager.

- Advise the EOF Radiation Protection Manager of changes in event classification based on effluent releases or dose projections.
- Initiate evaluation of the need for administering KI to Exelon nuclear workers when requested by the Environmental Coordinator.
- Remain cognizant of forecast and meteorological data and ensure the status is updated periodically.
- Notify the EOF Radiation Protection Manager of meteorological changes that may impact identification of downwind areas.
- Upon request, provide release and dose assessment data to Emergency Public Information personnel, the HPN Communicator, and the State Environs Communicators.

14) Dose Assessor EOF

The Dose Assessor reports to the Dose Assessment Coordinator. Responsibilities include:

- Perform dose projections using the Dose Assessment computer models as directed by the Dose Assessment Coordinator.
- Monitor meteorological and plant effluent conditions.
- Notify the Dose Assessment Coordinator of meteorological changes that may impact identification of downwind areas.
- Evaluate the need for administering KI to Exelon nuclear workers when requested by the Dose Assessment Coordinator.

15) HPN Communicator EOF

The HPN Communicator reports to the Environmental Coordinator. Responsibilities include:

- Provide updates and respond to inquiries from the NRC on offsite environmental data, release status, dose projections and changes to PARs for the general public.
- Obtain release and dose assessment data from the Dose Assessment Coordinator and Field Monitoring Team data from the Environmental Coordinator.
- Maintain continuous communications with the NRC, if requested, via the NRC HPN phone or commercial telephone line.
- Communicate current Health Physics information to NRC representatives, as requested.

16) Logistics Manager EOF

The Logistics Manager reports to the EOF Director and directs the activities of the administrative, security and liaison personnel. Responsibilities include:

- Ensure contact is made and communications are maintained with appropriate Non-Exelon Nuclear personnel whose assistance may be required to terminate the emergency conditions and to expedite the recovery.
- Advise the EOF Director concerning the status of activities relating to governmental interfaces.
- Obtain support from Human Resources, the Comptroller's Office, the Legal Department, Accounting Department and others as required.
- Coordinate with the Nuclear Duty Officer to maintain communications with ANI and INPO.
- Ensure that access to the EOF is limited to Emergency Responders and authorize admittance to non-Exelon personnel.
- Implement the Exelon Nuclear Fitness for Duty Program.
- Ensure that NRC Site Team Representatives are directed to the Regulatory Liaison upon arrival at the EOF.
- Ensure that updates and information are provided to the EOC Liaisons and to offsite officials present in the EOF.
- Assist in obtaining and coordinating additional equipment/materials and /or technical expertise to support station requests, including Exelon Corporate staff, unaffected stations and vendor/contractors.
- Coordinate maintenance of EOF equipment as necessary.
- Ensure shift relief and continual staffing for the EOF.

17) Administrative Coordinator EOF

The Administrative Coordinator reports to the Logistics Manager. Responsibilities include:

- Direct the activities of the Computer Specialist.
- Direct the clerical staff and ensure the clerical requirements for the other EOF and JIC staff are met.
- Obtain clerical support for the EOF and JIC.

- Coordinate shift relief and continual staffing for the EOF.
- Obtain services as appropriate to support operation of the EOF.

18) Computer Specialist EOF

The Computer Specialist reports to the Administrative Coordinator. Responsibilities include:

- Assist any personnel in logging in, initializing or using a desired computer program.
- Investigate and repair problems encountered with communications equipment and computer equipment/applications.

19) Security Coordinator EOF

The Security Coordinator reports to the Logistics Manager. Responsibilities include:

- Provide and interpret information on security events.
- Assist with access control activities at the EOF and JIC.
- Perform the following in support of the TSC Security Coordinator:
  - Provide assistance in resolving security events.
  - Assist as a liaison for local, state and federal law enforcement agencies during security related events.
  - Serve as the primary contact to the security force for additional support, if necessary, during a security event.
- Obtain additional resources to support access control measures needed at the EOF and JIC.

20) State/Local Communicator EOF

The State/Local Communicator reports to the Logistics Manager. Responsibilities include:

- Communicate and receive information via the Nuclear Accident Reporting System (NARS) circuit or commercial telephone line with appropriate state and county agencies.
- Ensure that the Logistics Manager is made aware of issues and questions raised by offsite agencies and then relay the replies to these requests.

21) EOC Communicator — EOF

The EOC Communicator reports to the Logistics Manager. Responsibilities include:

- Coordinate and dispatch EOC Liaisons as needed or requested.
- Establish and maintain periodic contact with each location where Exelon Nuclear EOC Liaisons have been dispatched.
- Ensure EOC Liaisons are provided event information and notifications.
- Ensure that the Logistics Manager is made aware of issues and questions raised by offsite agencies and then relay the replies to these requests.

22) County EOC Liaison(s) — County EOCs

The County EOC Liaison(s) will be dispatched to County Emergency Operations Centers (EOCs) based on established agreements with the counties. The County EOC Liaisons use the EOC Communicator as their contact at the EOF. Responsibilities include:

- Monitor and report County EOC activities to the EOF.
- Conduct briefings and answer questions.
- Provide simplified explanations to EOC personnel of technical details distributed through approved channels.
- Assist with confirmation/verification of information distributed through approved channels.
- Provide media at the EOC with approved Exelon Nuclear press releases.
- Assist Emergency Public Information personnel in rumor control and media monitoring.

23) State EOC Liaison(s) — State EOCs

At the request of state officials and/or at the discretion of the Corporate Emergency Director, Exelon Nuclear will provide Liaison personnel to state Emergency Operation Centers (EOCs). The state EOC Liaisons use the EOC Communicator as their contact at the EOF. Responsibilities include:

- Monitor and report state EOC activities to the EOF.
- Conduct briefings and answer questions as requested.
- Assist Emergency Public Information personnel in rumor control and media monitoring.

24) Regulatory Liaison — EOF

The Regulatory Liaison reports to the Logistics Manager. Responsibilities include:

- Coordinate interfaces between Exelon Nuclear personnel and governmental agencies within the EOF.
- Obtain necessary equipment and supplies to support activities of governmental agencies located in the EOF.
- Act as the Exelon Nuclear Liaison to the NRC Site Team representatives.

c. Public Information Emergency Response Organization

1) Corporate Spokesperson — JIC

The Corporate Spokesperson reports to the Corporate Emergency Director and is responsible for directing the Exelon Emergency Public Information Organization and providing news information to the media. Responsibilities include:

- Maintain command and control of the Joint Information Center.
- Coordinate with Federal, state and local agencies, as well as with other organizations involved in the emergency response, to maintain factual consistency of information to be conveyed to the news media/public.
- Conduct periodic briefings with the news media.
- Interface with the Public Information Director.
- Coordinate and direct responses to media inquiries.
- Ensure that the composition and timeliness of Exelon News Releases are adequate.
- Provide for timely exchange of information between other spokespersons.

2) Technical Spokesperson — JIC

The Technical Spokesperson reports to the Corporate Spokesperson. Responsibilities include:

- Assist in development of technical and plant status information for use in news releases and media briefings.
- Assist the Events Recorder in the preparation of a chronological event description log.

- Prepare briefing papers which contain additional detail and background not found in the news releases.
- Provide answers as soon as possible to media questions.
- Provide a follow-up explanation that corrects misinformation as soon as practicable.

3) Radiation Protection Spokesperson JIC

The Radiation Protection Spokesperson reports to the Corporate Spokesperson. Responsibilities include.

- Assist in development of environmental and health physics information for use in news releases and media briefings.
- Assist the Events Recorder in the preparation of a chronological event description log.
- Prepare briefing papers which contain additional detail and background not found in the news releases.
- Provide answers as soon as possible to media questions.
- Provide a follow-up explanation that corrects misinformation as soon as practicable.

4) JIC Director JIC

The JIC Director reports the Corporate Spokesperson to ensure the operability of and to supervise the activities in the JIC. Responsibilities include:

- Maintain cognizance of conditions of the plant and environment, and the actions of Exelon Nuclear and governmental support personnel.
- Coordinate with Federal, state and local agencies, as well as with other organizations involved in the emergency response, to maintain factual consistency of information to be conveyed to the news media/public.
- Participate, as needed, in rumor control activities.
- Ensure that adequate information flow between the EOF and the JIC is coordinated through the Public Information Director.
- Authorize admittance of non-Exelon Nuclear officials to the JIC.

5) JIC Coordinator JIC

The JIC Coordinator reports to the JIC Director and supervises the facilities support staff. Responsibilities include:

- Ensure the JIC is activated and operational. This includes the availability of communications and visual aids.
- Ensure that access to the JIC areas occupied by Exelon personnel is controlled.

- Establish a minimum frequency for addressing news media/public representatives and ensure that some form of communication occurs within that time frame (i.e., an update at least hourly.)

- Ensure that approved News Releases and Chronological Event Description Logs are made available in the JIC.

- Document unanswered questions and serious public misinformation issues. Follow-up on these questions and issues to ensure that they are being adequately addressed.

- Coordinate the interface between Exelon Nuclear and the news media/public, including, as necessary, briefings, news conferences, interviews and responses to information requests.

7) Administrative Coordinator JIC

The Administrative Coordinator reports to the JIC Director. Responsibilities include:

- Coordinate with the EOF Administrative Coordinator to ensure the clerical requirements for the other JIC staff are met.

- Coordinate shift relief and continual staffing for the JIC.

- Obtain services as appropriate to support operation of the JIC.

8) Access Controller JIC

The Access Controller reports to the JIC Director and is responsible for controlling facility access and obtaining authorization prior to admitting non-Exelon Nuclear officials into the JIC.

9) Public Information Director (PID) JIC

When the Emergency Public Information Organization is activated, the Public Information Director reports to the Corporate Spokesperson and is responsible for all emergency event related information intended to be conveyed from Exelon Nuclear to the news media/public. The Public Information Director supervises the activities of the, News Writer, Events Recorder and media monitoring and rumor control personnel. Responsibilities include:

- Provide the Corporate Emergency Director with an overview of the public and media impacts resulting from the Exelon Nuclear and governmental activities.

- Participate with the Corporate Emergency Director regarding information to be released to the public.

- Authorize the issuance of news releases.

- Interface with the Corporate Spokesperson at the JIC.
- Act as a liaison between the ERO and Exelon Nuclear's corporate executives.
- Maintain cognizance of conditions of the plant and environment, and the actions of Exelon Nuclear and governmental support personnel.
- Coordinate information flow between the EOF and the JIC.
- Coordinate with the Media Monitoring Staff to review and access media coverage of the emergency event.

10) News Writer — JIC

The News Writer reports to the Public Information Director. Responsibilities include:

- Compose draft news releases with assistance from the Technical Spokesperson and the Radiation Protection Spokesperson.
- Provide the drafted news releases to the Corporate Emergency Director for technical review prior to Public Information Director approval.

11) Events Recorder — JIC

The Events Recorder reports to the Public Information Director. Responsibilities include:

- Develop a chronological event description log.

12) Media Monitoring Staff — JIC

The Media Monitor reports to the Public Information Director. Responsibilities include:

- Ensure that the media is being monitored and that Exelon Nuclear personnel review the information detailed or contained in media releases.
- Inform the Public Information Director of all media reports and of actions taken to correct any misinformation or rumors.
- Direct the activities of the Rumor Control Staff with respect to the function of monitoring rumors from sources other than the media.

13) Rumor Control Staff — JIC

The Rumor Control Staff reports to the Public Information Director and acts in support of the Media Monitors. Responsibilities include:

- Ensure that rumors are reviewed, documented and responded to by Exelon Nuclear personnel as deemed appropriate.

- Until the JIC is fully activated, document and respond to rumors as quickly as possible, through the Exelon Communications and Public Affairs.

- Inform the Media Monitors when rumors representing serious misinformation are encountered.

6. Exelon Emergency Response Organization Block Diagram

ERO staffing tables contained within the station specific Annex, lists the key positions of the ERO and the supporting positions assigned to interface with federal, state, and county authorities. Figures B-1a through B-1d illustrates the overall emergency response organization. Section B.5 discusses specific responsibilities and the interrelationships for key positions.

7. Exelon Corporate Emergency Response Organization

The Corporate ERO consists of the EOF Organization and the Emergency Public Information Organization. Personnel staffing these corporate organizations are covered in detail in Section B.5 of this plan.

The Corporate Emergency Response Organization is staffed by Exelon personnel, and operates out of the Emergency Operations Facility (EOF) and the Joint Information Center (JIC). The Corporate ERO is supported by News Media Spokespersons, environmental assessment staff and monitoring teams that provide long-term support to the affected station. Additionally, the Corporate ERO has long term liaison responsibilities with federal, state, and local authorities.

The Emergency News Center (ENC) function is responsible for the collection and analysis of event information and status, and development of Company news statements. This information is then communicated to the JIC Spokespersons. The ENC function may be located at either the EOF or the JIC.

The Corporate ERO is activated at an Alert. The EOF Organization is responsible for evaluating, coordinating and directing the overall company activities involved in the emergency response. Within the EOF, the Corporate Emergency Director shall assume Command and Control from the Station Emergency Director when classification escalates to an Alert or higher, unless the EOF capabilities are limited such that the overall control and responsibility for PARs and offsite notifications cannot be assumed. The EOF may also function in a supporting role to the station when the Station Emergency Director maintains Command and Control.

8. Industry/Private Support Organizations

Exelon Nuclear retains contractors to provide supporting services to nuclear generating stations. A contract/purchase order with a private contractor is acceptable in lieu of an agreement letter for the specified duration of the contract. Among services currently provided are the following:

a. Institute of Nuclear Power Operations (INPO): Experience has shown that a utility may need resources beyond in-house capabilities for the recovery from a nuclear plant emergency. One of the roles of the Institute of Nuclear Power Operations (INPO) is to assist affected utilities by quickly applying the resources of the nuclear industry to meet the needs of an emergency. INPO has an emergency response plan that enables it to provide the following emergency support functions:

- Assistance to the affected utility in locating sources of emergency personnel, equipment and operational analysis.
- INPO, Electric Power Research Institute (EPRI) and Nuclear Energy Institute (NEI) maintain a coordination agreement on emergency information with their member utilities.
- INPO provides the "Nuclear Network", or its replacement, electronic communications system to its members, participants, NEI, and EPRI to coordinate the flow of media and technical information about the emergency.
- Exelon Nuclear may obtain utility industry information and assistance from any party to this agreement through the coordination of INPO.

To support these functions, INPO maintains the following emergency support capabilities:

- A dedicated emergency call number.
- Designated INPO representative(s) who can be quickly dispatched to the utility emergency response organization to coordinate INPO support activities and information flow.
- The 24-hour per day operation of an Emergency Response Center at INPO headquarters.

Exelon Nuclear will notify INPO (via the designated emergency call number) for all situations involving an Alert, Site Area Emergency, or General Emergency declaration per the Exelon Nuclear Reportability Manual.

INPO has coordinated the preparation of a Voluntary Assistance Agreement for Transportation Accidents. Exelon Nuclear has signed this agreement which establishes the rights and responsibilities of electric utilities in requesting or providing assistance for response to a nuclear materials Transportation Accident.

b. American Nuclear Insurers (ANI): In early 1982, ANI issued Bulletin #5B (1981) "Accident Notification Procedures for Liability Insurers" which provides revised criteria for the notification of the Pools in the event of a nuclear emergency at one of the liability insured nuclear power reactor sites. This revision brings the ANI/MAELU (Mutual Atomic Energy Liability Underwriters) notification criteria into alignment with the standard emergency classification system adopted by the nuclear industry. This document also identifies a suitable channel for follow-up communication by ANI after initial notification.

- ANI/MAELU Emergency Assistance: In the event of an extraordinary nuclear occurrence (as defined in the Price-Anderson Law) ANI and MAELU (the insurance pools) have plans prepared to provide prompt emergency funding to affected members of the public.

- ANI/MAELU Emergency Assistance (Claims Handling Procedures): The pools' emergency assistance arrangements contemplate the mobilization and dispatch of emergency claims teams to directly dispense emergency assistance funds to affected members of the public.

  The pools should be notified in the event of a nuclear emergency requiring notification of state or Federal governmental agencies, or if the insured believes that offsite persons may be affected and financial assistance of a nature discussed may be required. In these instances, ANI expects notification as soon as possible after the initiation of the emergency. Exelon notification to the pools in the event of an Alert, Site Area Emergency, or General Emergency will be in accordance with the Exelon Nuclear Reportability Manual.

  Even if it appears to be remote that offsite persons will be affected, the pools should be notified in order that response plans can be initiated to the point of alerting teams of adjusters to stand by. Response activity can be discontinued if it proves less severe and does not require pool response.

  All nuclear occurrences of an emergency or non-emergency nature that fall under the nuclear liability policy should be reported formally in writing to ANI by the Exelon Nuclear Insurance Administrator.

- Emergency Notification and Follow-up Procedures: Pre-established lines of communication exist between each utility and ANI in order to exchange all required information during a developing emergency situation.

  ANI maintains 24-hour coverage of an emergency notification number. During normal office hours (8:00 am - 4:00 pm) their number will be answered by the receptionist who will transfer an incoming emergency call to an appropriate individual in the office. Outside of normal office hours, this telephone line is covered by an answering service. The answering service will intercept the call and obtain the name, affiliation and telephone number of the caller. They will then notify a designated ANI staff member who will in turn call back the utility to obtain appropriate information regarding the nuclear accident.

In order that follow-up information is available to the Insurance Pool Exelon Nuclear has established the Corporate Emergency Director or their designee as a Point of Contact that ANI personnel may use to update themselves regarding the status of the emergency.

NOTE: For the below listed support services, the specific contractors may change but the functions are maintained.

c. Environmental Monitoring Services:

Environmental Inc.: Environmental Inc. provides emergency Radiological Environmental Monitoring Program (REMP) services for all Exelon Nuclear Stations. These services include:

- Sample collection
- Handling, packaging and storage of test samples
- Sample shipment
- Chain of Custody

The Environmental Inc. Midwest Laboratory in Northbrook, Illinois would analyze the environmental samples for their radioactivity content and report results to Exelon Nuclear. The Mid-Atlantic REMP sampling activities have been subcontracted to Normandeau and Associates.

d. Teledyne Brown Engineering: Teledyne Brown Engineering provides bioassay analysis and radiochemical analysis services.

e. Department Of Energy (DOE) Radiation Emergency Assistance Center/Training Site (REAC/TS): DOE REAC/TS provides services of medical and health physics support. REAC/TS advises on the health physics aspects of situations requiring medical assistance.

f. Murray and Trettel, Inc.: Murray and Trettel, Inc. provide meteorological monitoring services, including weather forecasts. Murray and Trettel maintain all Exelon Nuclear station meteorological facilities. Murray and Trettel have computer capability to poll remotely the meteorological facilities to ascertain local conditions and to detect instrument failure.

g. Landauer, Inc.: Landauer provides extremity dosimetry services. In an emergency Landauer would provide additional dosimetry to the affected nuclear station and EOF, if needed.

h. Manufacturer Design and Engineering Support: Under established contracts, the following will provide available engineering expertise, specialized equipment and other services identified as needed and deemed appropriate to assist in an emergency situation:

- General Electric (GE) Nuclear Energy
- Westinghouse Electric Company

9. Supplemental Emergency Assistance to the ERO

Agreements are maintained (for each nuclear station) with outside support agencies who do not take part in the organizational control of the emergency that provide assistance when called on during an emergency or during the recovery phase. These agreements identify the emergency measures to be provided, the mutually accepted criteria for implementation, and the arrangements for exchange of information. These support agencies (to be named in each Station Annex) provide services of:

a. Law enforcement;

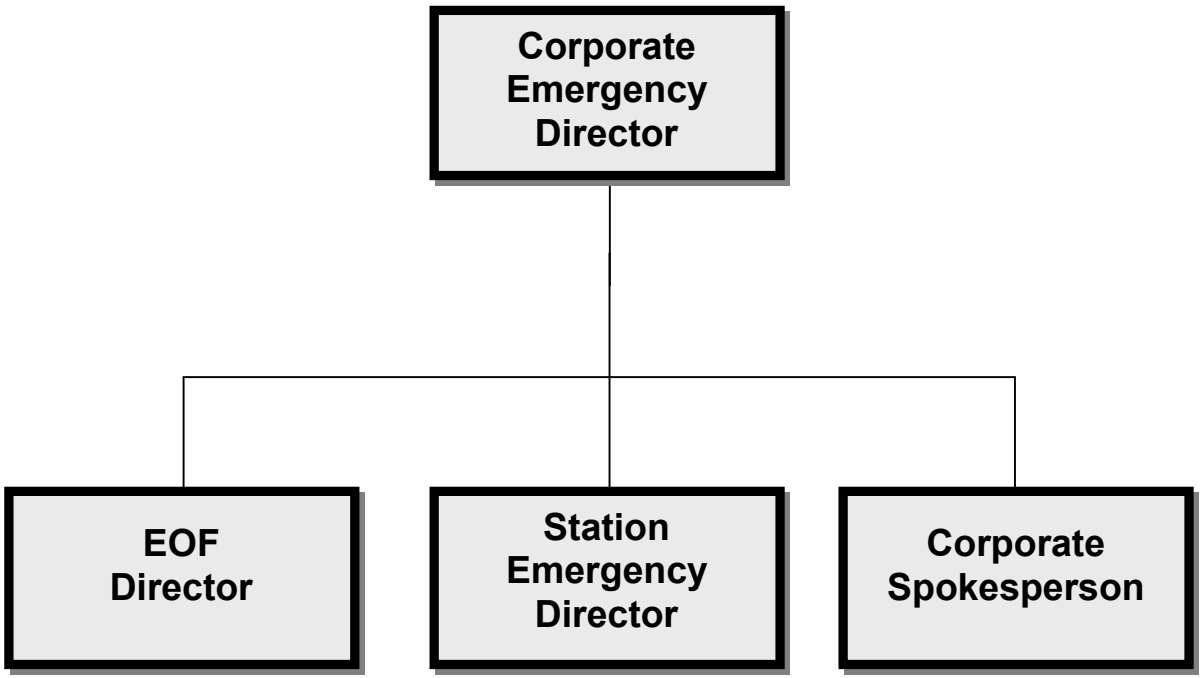
b. Fire protection;

c. Ambulance services;

d. Medical and hospital support

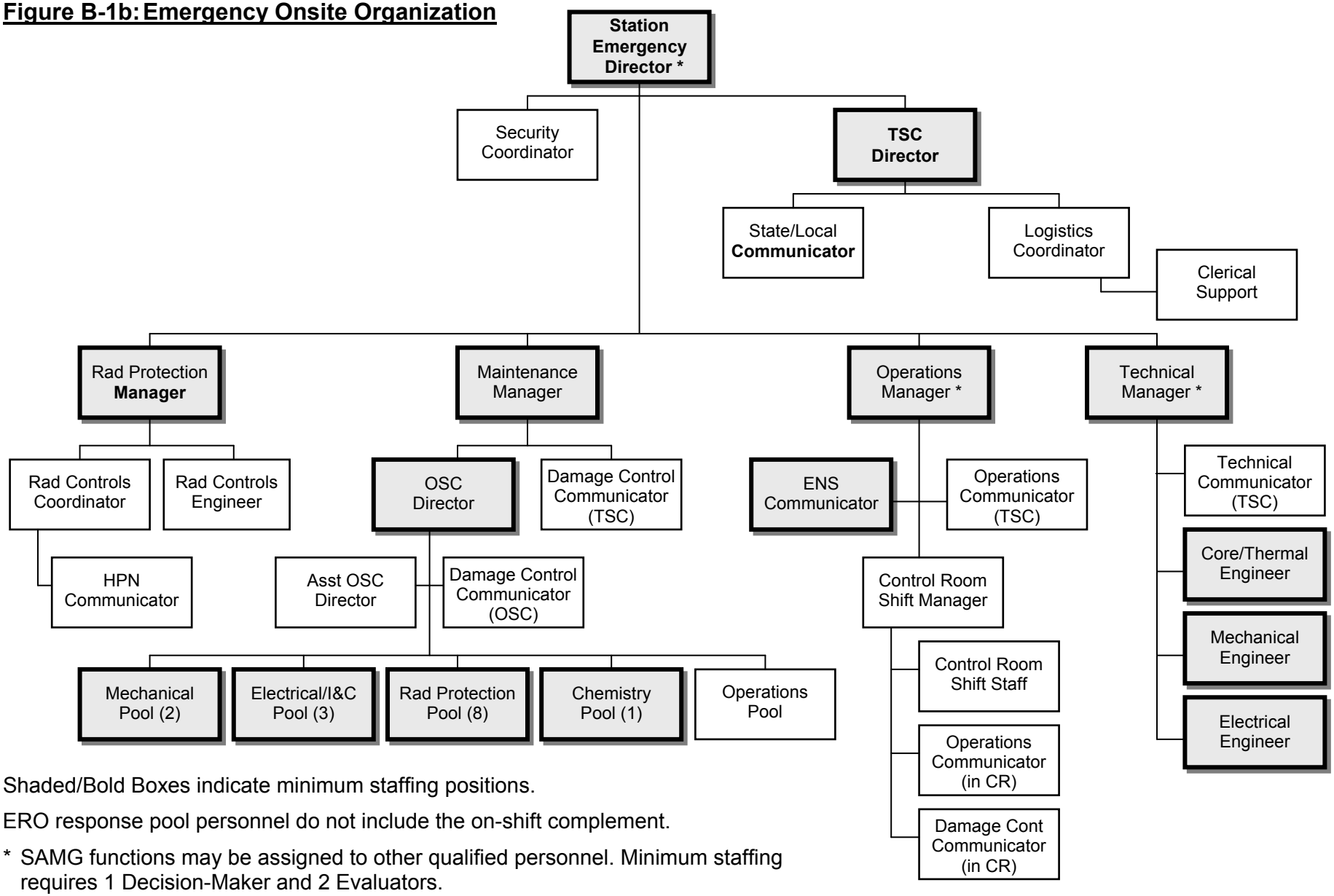
Support groups providing transportation and treatment of injured station personnel are described in Section L of this plan.

Figure B-1a: Exelon Overall ERO Command Structure



Shaded/Bold Boxes indicate minimum staffing positions.

Figure B-1b: Emergency Onsite Organization

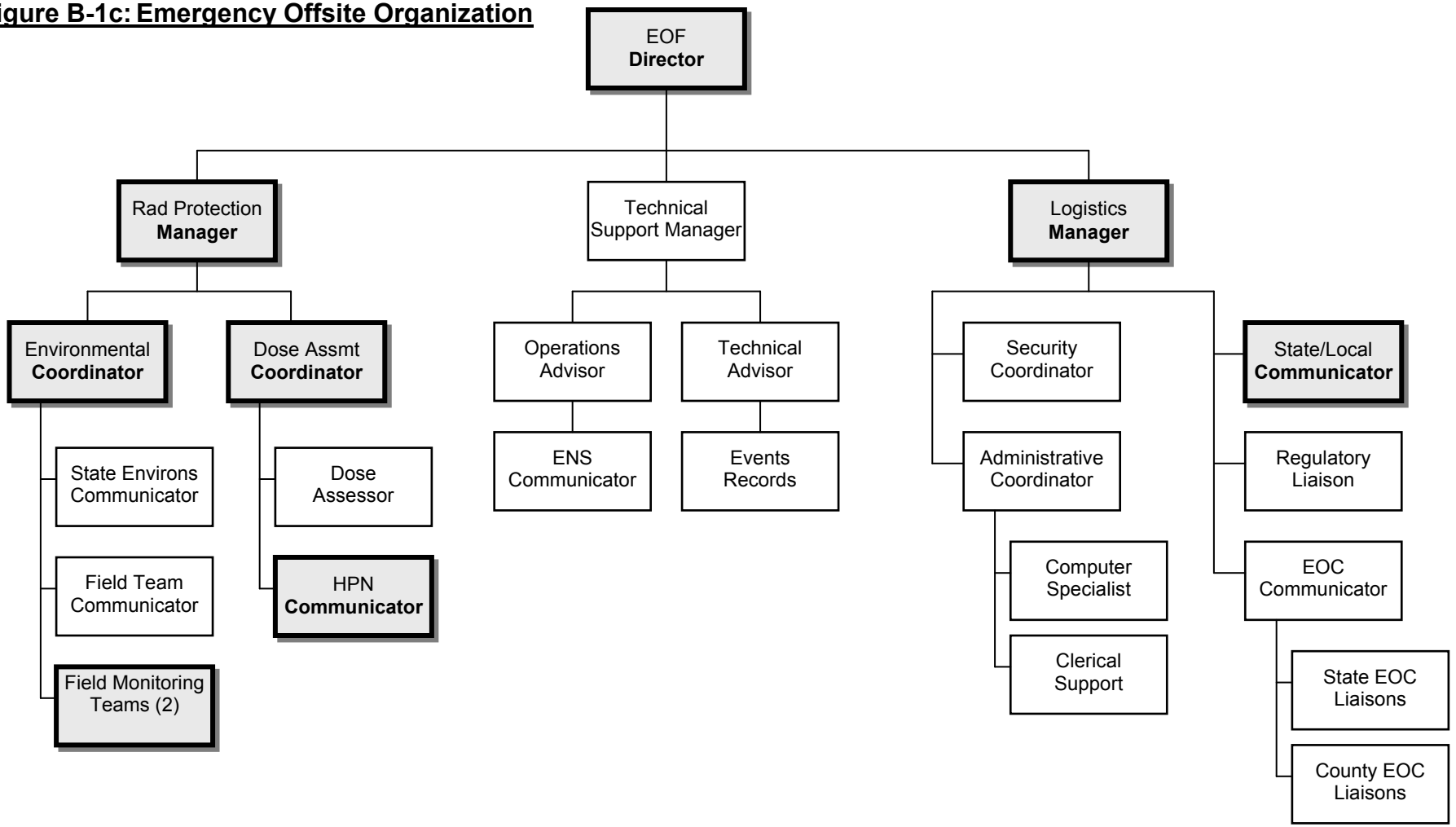


Shaded/Bold Boxes indicate minimum staffing positions.

ERO response pool personnel do not include the on-shift complement.

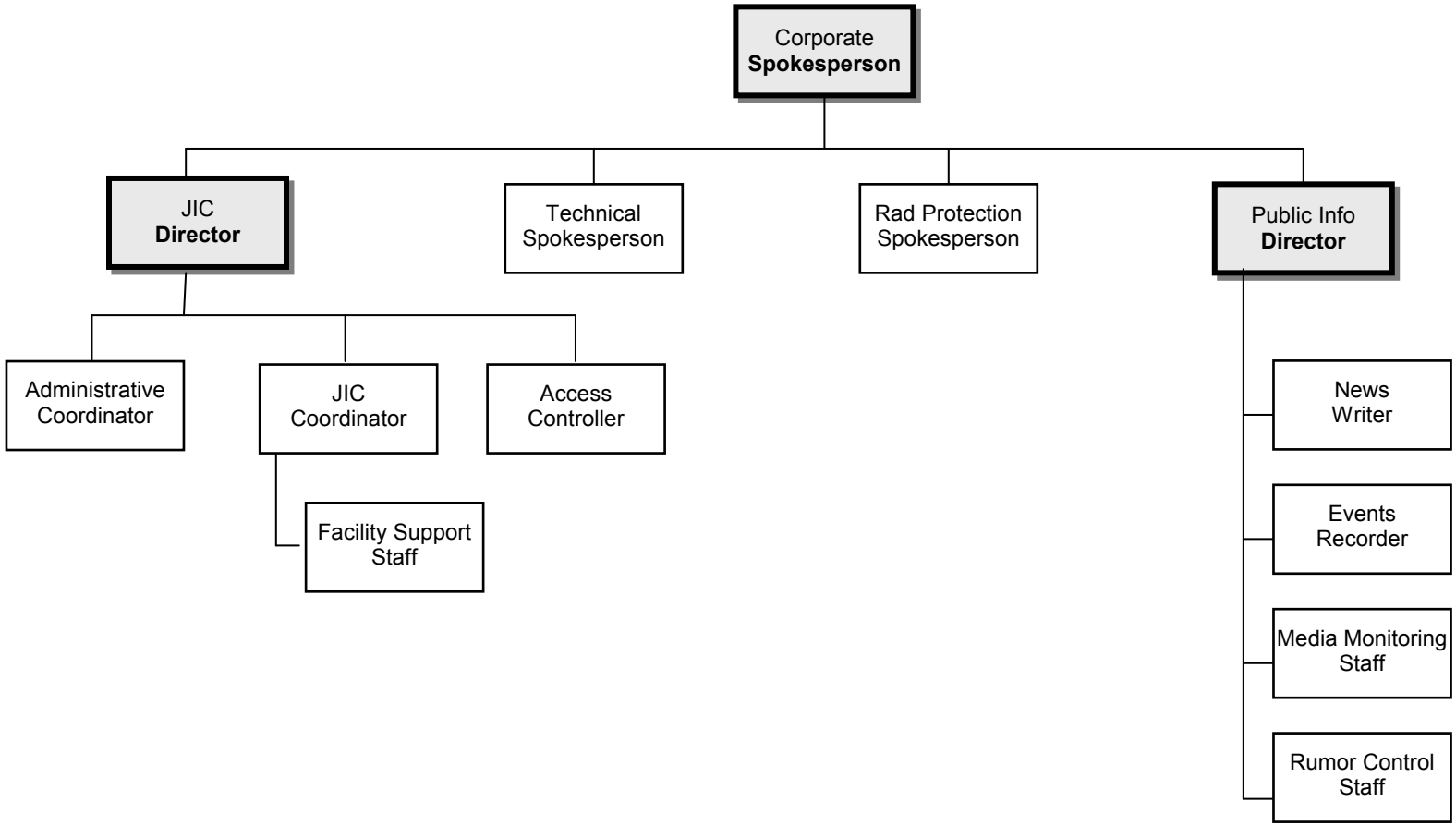
* SAMG functions may be assigned to other qualified personnel. Minimum staffing requires 1 Decision-Maker and 2 Evaluators.

Figure B-1c: Emergency Offsite Organization



Shaded/Bolded Boxes indicate minimum staffing positions.

Figure B-1d: Emergency Public Information Organization



Shaded/Bolded Boxes indicate minimum staffing positions.

Section C: Emergency Response Support and Resources

This section describes the provisions for requesting and effectively utilizing support resources and for accommodating offsite officials at the Exelon Nuclear emergency response facilities.

1. Federal Response Support and Resources

Assistance is available from federal agencies through the National Response Framework (NRF). The lead federal agency who provides direct assistance to Exelon during an emergency is the Nuclear Regulatory Commission (NRC). Other federal agencies, such as the Federal Emergency Management Agency (FEMA) and the Department of Energy (DOE), provide assistance to the state through implementation of the NRF.

a. Sections A and B of this plan identify the specific individuals by title who are authorized to request federal assistance.

b. Federal agencies that may provide assistance in direct support of Exelon Nuclear in the event of an accident are identified in Section A of this plan. If needed, federal resources are made available to Exelon Nuclear in an expeditious and timely manner.

c. Each emergency response facility has the equipment and communications capability necessary for a continuous high level of response, interaction, and communication among key personnel during emergency conditions. The emergency facilities are able to accommodate federal representatives with working areas provided for their use. Accommodations for the expected NRC site response team assume the following approximate numbers for each facility:

	Initial Activation (minimum)	Full Activation
EOF	9	16
TSC	3	5
CR	1	1
JIC	1	10

The Exelon Emergency Response Organization will provide senior management support for site response teams and communications over a Management Counterpart Link to federal response headquarters.

2. Liaisons

a. The NRC, FEMA, and the state(s) may dispatch representatives to the EOF where accommodations have been provided.

b. At the Alert level and above, Exelon Nuclear personnel may be assigned as liaisons to the requesting state's and/or county Emergency Operations Center (EOC). These representatives act as technical liaisons to interpret emergency action levels and protective action recommendations made by Exelon.

3. Radiological Laboratories

Support of the radiation monitoring and analysis effort is provided by an onsite laboratory. The onsite laboratory is the central point for receipt and analysis of all onsite samples and includes equipment for chemical analyses and for the analysis of radioactivity. Additional facilities for counting and analyzing samples can be provided by the other Exelon Nuclear generating stations, state, federal or contracted laboratory services. These laboratories can act as backup facilities in the event that the plant's counting room and laboratory become unusable or the offsite radiological monitoring and environmental sampling operation exceeds the capacity or capability of the station laboratory during an emergency. Additional outside analytical assistance may be requested from contracted vendors or state and federal agencies. The equipment and analytical capabilities for each station's laboratories are listed in the station's E-Plan Annex. The state, federal and contract laboratories maintain independent evaluation and certification processes and have the capability of quantitative analysis of terrestrial, marine and air samples.

4. Other Assistance

Any unaffected Exelon Nuclear Generating station is available to provide certain types of assistance and support, including engineering, design, consultation, whole body counting, and dosimetry evaluation and equipment. Additional facilities, organizations, and individuals, as listed in the Emergency Response Facilities (ERF) Telephone Directory, are available and may be used in support of emergency response. In addition, American Nuclear Insurers (ANI) provides insurance to cover Exelon legal liability up to the limits imposed by the Price-Anderson Act, for bodily injury and/or property damage caused by the nuclear energy hazard resulting from an incident at the plant. Written agreements which describe the level of assistance and resources provided to Exelon Nuclear by external sources are included in Appendix 3 as applicable.

Section D: Emergency Classification System

This section describes the classification and emergency action level scheme used to determine the minimum response to an abnormal event at the stations. This scheme is based on plant systems, effluent parameters, and operating procedures. The initial response of federal, state, and county agencies is dependent upon information provided by the ERO. Exelon works closely with the state and county agencies to ensure consistency in classification schemes and procedural interfaces.

1. Emergency Classification System

The E-Plan provides for classification of emergencies into five (5) categories or conditions, covering the postulated spectrum of emergency situations. The first four (4) categories: Notification of Unusual Event (referred to as Unusual Event), Alert, Site Area Emergency, and General Emergency, are characterized by Emergency Action Levels (EALs) or event initiating conditions and address emergencies of increasing severity. The fifth, the Recovery classification, is unique in that it may be viewed as a phase of the emergency requiring specific criteria to be met and/or considered prior to its declaration. Recovery is that period when the emergency phase is over and activities are in progress to return the situation to a normal state (acceptable condition).

a. Unusual Event - Events are in process or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

   This is the least severe of the four (4) levels. The purpose of this classification is to bring response personnel and offsite agencies to a state of readiness in the event the situation degrades and to provide systematic handling of information and decision making. The Shift Manager, as Shift Emergency Director will classify an Unusual Event.

   Required actions at this classification include:

   - Notifications to station management and the NDO.
   - Notification, within 15 minutes, of the state and local communities.
   - At the discretion of the Emergency Director, station management or the Nuclear Duty Officer (NDO), full or selective staffing of the TSC, OSC and EOF may be initiated.
   - Notification of the Nuclear Regulatory Commission (NRC) as soon as possible but within 60 minutes of classification.
   - Assessment of the situation and response as necessary, which may include escalating to a higher classification if conditions warrant.

- When the event is terminated, close-out is performed over communication links to offsite authorities participating in the response (i.e., NRC, state, county), followed by formal transmission of a state/local notification form within 24 hours.

b. Alert - Events are in process or have occurred which indicate an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of EPA Protective Action Guideline exposure levels.

The purpose of this classification is to ensure that emergency response personnel are readily available and to provide offsite authorities with current status information. An Alert will be classified as the initiating event or as escalation from an Unusual Event. In either case, the classification will most likely made by the Shift Manager (Shift Emergency Director) prior to the transfer of Command and Control.

Required actions at this classification include:

- Notifications to station management and the NDO.
- Notification, within 15 minutes, of the state and local communities. The EOF will assume state update responsibilities.
- Activation of the TSC, OSC, EOF, and the JIC organizations.
- Transfer of Command and Control.
- Notification of the NRC as soon as possible but within 60 minutes of classification.
- Notification of INPO and ANI.
- Assessment of the situation and response as necessary, which may include escalating to a higher classification if conditions warrant.
- On-site and off-site Field Monitoring Teams are sent to staging areas or dispatched to monitor for releases of radiation to the environment.
- Keeping offsite authorities informed of plant status by providing periodic updates to include meteorological and radiological data.
- When the event is terminated, notification is performed over communication links followed by an Initial Incident Report to offsite authorities participating in the response (i.e., NRC, state, county) within 8 hours.

c. Site Area Emergency - Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

   The purpose of this classification, in addition to those of the Alert level, is to ensure that all emergency response centers are staffed and provisions are made for information updates to the public through offsite authorities and the news media. The classification will most likely be made by the Station Emergency Director following activation of the TSC.

   Required actions at this classification, in addition to those listed under the Alert level, include:

   - If not previously performed, Assembly/Accountability shall be performed and Site Evacuation of non-essential personnel shall be initiated.

   - Keeping offsite authorities informed of plant status by providing periodic updates to include meteorological data and projected or actual doses for any releases that have occurred.

d. General Emergency - Event(s) are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

   The purpose of this classification, in addition to those of the Site Area Emergency level, is to initiate predetermined protective actions for the public and provide continuous assessment of information from monitoring groups. The classification will most likely be made by the Station Emergency Director following activation of the TSC.

   Required actions at this classification, in addition to those listed under the Alert and Site Area Emergency, include:

   - A Protective Action Recommendation will be determined.

   - Assessment of the situation and response as necessary.

e. Recovery: That period when the emergency phase is over and activities are being taken to return the situation to a normal state (acceptable condition). The plant is under control and no potential for further degradation to the plant or the environment is believed to exist.

   Recovery will be classified by the Station Emergency Director after obtaining authorization from the Corporate Emergency Director.

   Required actions at this classification include:

   - The affected state(s) and the NRC should be consulted prior to entry into Recovery.
   - Notifications will be made to station management, the NDO, state(s) and NRC.
   - A Recovery organization will be established to manage repairs to return the Unit to an acceptable condition, and support environmental monitoring activities as requested in coordination with Federal and state efforts.
   - INPO and ANI are notified of Recovery classification.

f. Classification Downgrading: Exelon Nuclear policy is that emergency classifications shall not be downgraded to a lower classification. Once declared, the event shall remain in effect until no Classification is warranted or until such time as conditions warrant classification to Recovery.

g. Guidance for Termination of an Emergency: The purpose of terminating an emergency is to provide an orderly turnover of plant control from the Emergency Response Organizations to the normal Exelon Nuclear plant organization. Termination of the emergency is authorized by the Emergency Director in Command and Control. The considerations provided in the Recovery/Termination Checklist in the emergency implementing procedures must be performed prior to exiting the emergency event. Consultation with governmental agencies and other parties should be conducted prior to termination of an event classified as Site Area or General Emergency. Notifications shall be transmitted to appropriate agencies to terminate an event.

h. Station Nuclear Security Plan: Each nuclear station has a Security Plan that complies with the requirements of 10 CFR 73. The interface between the E-Plan and the Security Plan is one of parallel operation. The plans are compatible. The E-Plan response measures, once initiated, are executed in parallel with measures taken in accordance with the Security Plan.

Threats made to Exelon Nuclear facilities are evaluated in accordance with established threat assessment procedures and the respective Security Plans. The Security Plan, Appendix C, Contingency Events, identifies situations that could be initiating conditions for EAL classifications. Contingency events include bomb threats, attack threats, civil disturbances, protected area intrusions, loss of guard/post contact, vital area intrusions, bomb devices discovered, loss of guard force, hostages, extortion, fire/explosions, internal disturbances, security communications failure, and obvious attempts of tampering. The Security Plan provides guidance for decisions and actions to be taken for each security contingency event. As guidance, the Security Plan allows for differing responses depending upon the assessment of the actual situation within each contingency event classification.

The assessment of any security contingency event and the decision to initiate, or not to implement the E-Plan, will be the responsibility of the Shift or Station Emergency Director. All identified security contingency events have the potential of being assessed as initiating conditions for a radiological emergency declaration.

Determination of a credible security threat may require the staffing of emergency response facilities based on the classification of an Unusual Event per the Emergency Action Levels (EALs).

2. Emergency Action Level Technical Bases

Station Annexes include Site Specific Emergency Action Levels (EALs) consistent with the general class descriptions and provided in NEI guidance documentation in accordance with Regulatory Guide 1.101, “Emergency Planning and Preparedness for Nuclear Power Reactors.” Where possible, these EALs will be related to plant instrumentation readings.

Emergency classifications are characterized by Emergency Action Levels (EALs). The Threshold Values are referenced whenever an Initiating Condition is reached. An Initiating Condition is one of a predetermined subset of unit conditions where either the potential exists for a radiological emergency, or such an emergency has occurred. Defined in this manner, an Initiating Condition is an emergency condition, which sets it apart from the broad class of conditions that may or may not have the potential to escalate into a radiological emergency. Initiating Conditions are arranged in one of the Recognition Categories.

EALs are for unplanned events. A planned evolution involves preplanning to address the limitations imposed by the condition, the performance of required surveillance testing, and the implementation of specific controls prior to knowingly entering the condition. Planned evolutions to test, manipulate, repair, perform maintenance or modifications to systems and equipment that result in an EAL Threshold Value being met or exceeded are not subject to classification and activation requirements as long as the evolution proceeds as planned. However, these conditions may be subject to the reporting requirements of 10 CFR 50.72.

An emergency is classified after assessing abnormal plant conditions and comparing them to EAL Threshold Values for the appropriate Initiating Conditions. Classifications are based on the evaluation of each unit for multi-reactor sites. Matrix tables organized by recognition categories are used to facilitate the comparison. The matrix tables are used when the unit is in the Technical Specification defined modes of Power Operations, Hot Standby, Hot Shutdown (for classifications purposes, startup evolutions are included in the Power Operations mode) and Cold Shutdown or Refueling (for classification purposes a defueled plant will be considered in the Refueling mode).

All recognition categories should be reviewed for applicability prior to classification. The initiating conditions are coded with a letter and/or number designator. All initiating conditions, which describe the severity of a common condition (series), have the same initial designator.

3. Timely Classification of Events

Classification of an emergency condition occurs within 15 minutes after the availability of indications from plant instrumentation, plant alarms, computer displays, or incoming verbal reports that an EAL has been exceeded and, is then promptly made upon identification of the appropriate EAL. The 15-minute period encompasses all assessment, classification, and declaration actions associated with making an emergency declaration from the first availability of a plant indication or receipt of a report up to and including the declaration of the emergency.

Validation or confirmation of plant indications or reports of the condition are to be accomplished within the 15-minute period as part of the assessment. Since this validation or confirmation is being performed to determine the validity of an alarm, indication, or report, the 15-minute period starts with the availability of the alarm, indication, or report, and not the completion of the validation or confirmation, because the former is the time that the information was first available.

The 15-minute criterion is not to be construed as a grace period in which attempts to restore plant conditions are taken to avoid declaring an EAL that has already been exceeded. This statement does not preclude taking actions to correct or mitigate an off-normal condition, but once an EAL has been recognized as being exceeded, the emergency declaration shall be made promptly without waiting for the 15-minute period to elapse. The 15-minute criterion shall not prevent the implementation of response actions deemed necessary to protect public health and safety provided that any delay in the declaration would not deny the State and local authorities the opportunity to implement measures necessary to protect the public health and safety.

For EAL thresholds that specify duration of the condition, the emergency declaration process runs concurrently with the specified threshold duration. Once the condition has existed for the duration specified in the EAL or it is determined that the duration time will likely be exceeded, no further assessment is necessary—the EAL has been exceeded.

4. Offsite Classification Systems

Exelon Nuclear works with the state to ensure consistency between classification schemes. The content of the EALs is reviewed with the state and county authorities on an annual basis.

5. Offsite Emergency Procedures

Exelon Nuclear works with the state and county authorities to ensure that procedures are in place that provide for emergency actions to be taken which are consistent with the protective actions recommended by Exelon accounting for local offsite conditions that exist at the time of the emergency.

Section E: Notification Methods and Procedures

This section describes the notification of state and county response organizations and Exelon emergency response personnel. It outlines the content of initial and follow-up messages to response organizations within the Plume Exposure Pathway Emergency Planning Zone (EPZ).

1. Bases for Emergency Response Organization Notification

Exelon Nuclear, in cooperation with state and county authorities, has established mutually agreeable methods and procedures for notification of offsite response organizations consistent with the emergency classification and action level scheme. Notifications to offsite agencies include a means of verification or authentication such as the use of dedicated communications networks, verification code words, or providing call back verification phone numbers.

Notification/Classification for Dual Unit Emergencies: when the classification involves both units of a dual unit facility (i.e., tornado or earthquake), the classification shall be reported as affecting both units.

In situations when both units of a dual unit facility are affected by emergency events, but the events are not related or the classification for each unit is different, notification will be made for the highest classification. Clarification of the relationship between the classification levels determined for the units should be provided in the periodic state updates and the NRC Event Notification Worksheet.

In situations when one unit is affected by unrelated events, notification will be made for the highest classification via the state/local notification and the second event information provided in the periodic state updates.

Notification for Transportation Accidents: A Transportation Accident is defined in 49 CFR 171.15 and 49 CFR 171.16. If a Transportation Accident involving material in the custody of an Exelon facility occurs, Exelon Nuclear will notify the appropriate internal and offsite agencies in accordance with the Exelon Nuclear Reportability Manual.

2. Notification and Mobilization of Emergency Response Personnel

Emergency implementing procedures are established for notification and mobilization of emergency response personnel as follows:

a. Onsite: When an emergency is declared, reclassified, or terminated an announcement is made (over the plant public address system or by other means) that includes the emergency classification declared and response actions to be taken by site personnel.

   At the Unusual Event classification, select ERO augmentation personnel are notified and requested to remain available to respond. At an Alert classification or higher ERO augmentation personnel are notified for activation of the TSC, OSC, EOF, and JIC using the ERO Notification System or, a system of pagers and/or call trees via commercial telephone as back-up.

b. Offsite: Notifications are promptly made to offsite emergency response organizations as follows:

1) State/Local Agencies: A notification shall be made within fifteen (15) minutes of:

- The initial emergency classification.
- Classification escalation.
- The issuance of or change to a Protective Action Recommendation (PAR) for the general public.
- Changes in radiological release status, occurring outside of an event classification or PAR notification, based on an agreement with the state(s).

The emergency warning points are simultaneously notified using the Nuclear Accident Reporting System (NARS), or a commercial telephone line as backup.

A notification will also be initiated to cognizant state/local government agencies as soon as possible but within one hour of the termination of an event classification, or entry into Recovery Phase.

2) Nuclear Regulatory Commission (NRC): An event will be reported to the NRC Operations Center immediately after notification of the appropriate state or local agencies but not later than one (1) hour after the time of initial classification, escalation, termination or entry into the Recovery Phase. The NRC is notified by a dedicated telephone system called the Emergency Notification System (ENS). If the ENS is inoperative, the required notification is made via commercial telephone service, other dedicated telephone service, or any other method that shall ensure that a report is made as soon as practical. An NRC Event Notification Worksheet should be utilized to transmit initial information to the NRC. If a continuous communication is requested and established, a log is used in lieu of the ENS Worksheet.

Specific requirements for the notifications to the NRC for classified emergency events are detailed in 10 CFR 50.72 with guidance provided in the Exelon Reportability Manual.

The computerized data link to the NRC, referred to as the Emergency Response Data System (ERDS), continuously supplies specified plant data to the NRC.

Mobilization of federal, state, and county response organizations is performed in accordance with their applicable emergency plan and procedures. At a minimum, mobilization of federal response organizations and activation of state and county EOCs is expected to occur at the declaration of a Site Area Emergency.

The state and county authorities are responsible for the process of notification of the general public.

c. Support Organizations: When an emergency is initially classified, escalated or terminated, notifications are promptly made to the following support organizations:

- Medical, rescue, and fire fighting support services are notified for assistance as the situation dictates.
- The Institute of Nuclear Power Operations (INPO) is notified at an Alert or higher classification with requests for assistance as necessary.
- The American Nuclear Insurers (ANI) are notified at an Alert or higher classification with requests for assistance as necessary.
- Vendor and contractor support services are notified for assistance as the situation dictates.

3. Initial Notification Messages

Exelon Nuclear, in conjunction with state and county authorities, has established the contents of the initial notification message form transmitted during a classified emergency. The contents of the form include, as a minimum:

- Designation ("This is a Drill" or "Actual Event").
- Identity of site.
- Event classification.
- EAL number (as agreed upon with state authorities).
- Non-technical event description (as agreed upon with state authorities).
- Date and time of declaration (or entry into Recovery or Termination).
- Whether a release is taking place (Note: “Release” means a radiological release attributable to the emergency event.)
- Wind direction and speed.
- Whether offsite protective measures may be necessary.
- Potentially affected Subareas (or Sectors as applicable) when a General Emergency is declared.

Notification approval, transmittal date and time, and offsite agencies contacted are recorded either on the notification form or in an event logbook.

4. Follow-up Messages

For all emergency classifications, update messages to state authorities will be provided at the time of the notification on a prearranged frequency. The facility in Command and Control is responsible for ensuring that the updates are completed. State updates contain the prearranged information plus any additional information requested at the time of the notification.

Follow-up notifications are provided to the NRC Operations Center as soon as possible, but not later than one (l) hour after significant new information is available involving:

a. The results of evaluations or assessments of plant conditions.

b. The effectiveness of response or protective measures taken.

c. Information related to plant behavior that is not understood.

If requested by the NRC, an open, continuous communications channel will be maintained with the NRC Operations Center over the Emergency Notification System (ENS) and/or Health Physics Network (HPN) Circuits.

5. State and County Information Dissemination

The state and county emergency response plans describe procedures for state and county officials to make a public notification decision promptly (within about 15 minutes) on being informed by the plant of an emergency. The system for disseminating information to the public includes notification by pre-scripted messages through appropriate broadcast media such as the Emergency Alert System (EAS).

6. Notification of the Public

The capability exists for the prompt notification of the general public within the Plume Exposure Pathway Emergency Planning Zones (EPZs) for Exelon Nuclear stations covered under this plan.

This notification capability consists of two principal elements: (1) the Alert and Notification Systems (ANS) and (2) the Emergency Alerting System (EAS) radio stations.

- The Alert and Notification System (ANS) consists of fixed sirens used as a primary means of notification and Route Alerting. Activation of the ANS sirens by the civil authorities will alert the public to turn on their radios to a local EAS radio station for detailed information on the emergency situation. Route Alerting, a backup means of notification, which consists of vehicles with public address (PA) systems, is capable of being used in the event the primary method of alerting and notification is unavailable. The backup method has the capability to alert and notify the public within the plume exposure pathway EPZ within a reasonable time, but does not need to meet the 15-minute design objective for the primary prompt public alert and notification system.

- The Emergency Alerting System (EAS) is a network of local radio stations prepared to transmit or relay emergency information and instructions from the civil authorities to the general public

The ANS is operated by local governmental agencies and maintained by Exelon Nuclear. To assure the ANS is maintained in an operational readiness posture, the local agencies have agreed to test the system (by sounding the sirens) on a periodic basis that meets or exceeds FEMA guidance and to report inoperable equipment to EP-designated maintenance personnel. The goal of the testing and maintenance program is to identify inoperable equipment in a timely manner and to restore equipment to a functional status commensurate with FEMA operability requirements as referenced in FEMA-REP-10, "Guide for the Evaluation of Alert and Notification Systems for Nuclear Power Plants" Section E.6.2.1. In addition to this routine test and repair program, preventive maintenance of the ANS will be performed on an annual basis.

A more site-specific description of the various prompt public notification systems is presented in the station specific annexes to the E-Plan. The activation of the ANS sirens, deployment of emergency service vehicles and operation of the Emergency Alerting System is discussed in detail in the state specific response plans.

7. Messages to the Public

The respective States have developed EAS messages for the public consistent with the classification scheme. These draft messages are included as part of the States' Emergency Plan and contain instructions with regard to specific protective actions to be taken by occupants and visitors of affected areas. Messages may include instructions such as: take shelter and go indoors, close windows and doors, turn off ventilation systems; directions given for evacuation; directions to stay tuned to specific stations for further information, ad-hoc respiratory protection, (e.g. handkerchief over mouth, etc.). Exelon will provide support for the content of these messages when requested. The States control the distribution of radio protective drugs to the general public.

Section F: Emergency Communications

This section describes the provisions utilized for prompt communications among principal emergency response organizations, communications with the ERO and communications with the general public.

1. Communications/Notifications

Exelon Nuclear has extensive and reliable communication systems installed at its generating stations and Corporate Headquarters. Examples of the communications network include systems such as normal and dedicated telephone lines on landlines, microwave and fiber-optic voice channels, cell phones, satellite phones, mobile radio units, handi-talkies and computer peripherals. This network provides:

- Voice communication through normal telephone, dedicated line and automatic ring-down between selected facilities, conference call capability, speaker phones, and operator assistance where required.

- Communications between selected Exelon vehicles and appropriate fixed locations, as well as with state mobile units and fixed locations.

- Facsimile, network, and modem transmission.

Figure F-1 depicts the initial notification paths and the organizational titles from the Exelon Nuclear Emergency Response Facilities (ERFs) to federal, state and local emergency response organizations, and industry support agencies. The Exelon primary and alternate methods of communication, and the NRC communications network, are illustrated on Figures F-2 and F-3.

a. Exelon Nuclear maintains the capability to make initial notifications to the designated offsite agencies on a 24-hour per day basis. The offsite notification system, referred to as the Nuclear Accident Reporting System (NARS) provides communications to state and county warning points and Emergency Operations Centers from the CR, TSC, and EOF. Backup methods include facsimile and commercial telephone lines. state and county warning points are continuously staffed.

b-d. Exelon Nuclear has established several dedicated communication systems that ensure reliable and timely exchange of information necessary to provide effective Command and Control over any emergency response; (1) between Exelon and state and local agencies within the EPZs, (2) with federal emergency response organizations, (3) between the plant, the EOF, and the state and county EOCs, and (4) between Emergency Response Facilities and Field Monitoring Teams. A general description of the systems is as follows:

1) Nuclear Accident Reporting System (NARS): The NARS is a dedicated communications system that has been installed for the purpose of notifying state and local authorities of declared nuclear emergencies. This system links together the station Control Rooms, the EOF, TSCs and state and local authorities as appropriate. The specific design, operation, and responsibility for maintenance of the NARS systems vary between Exelon Nuclear regions.

2) Damage Control Line: A dedicated telephone link called the Damage Control Line that enables communication between the Control Room, the TSC and the OSC to coordinate the dispatching of emergency damage control teams from the OSC (see Figure F-2).

3) Operations Status Line: A dedicated telephone link called the Operations Status Line that enables communication between the Control Room, the TSC and the EOF to monitor the activities of the Control Room staff (see Figure F-2).

4) Technical Conference Line: A dedicated telephone line called the Technical Conference Line between the TSC and the EOF to communicate mitigating activities and priorities for the station to the EOF (see Figure F-2).

5) Director's Hotline: A dedicated telephone link called the Director's Hotline that enables direct Emergency Director communication between the Control Room, TSC, and the EOF (see Figure F-2).

6) Private Branch Exchange (PBX) Telephone System: The PBX telephone system provides communication capability between telephones located within the plant by dialing a four-digit station code. The PBX is used to connect the CR, TSC, EOF, and OSC. The PBX telephone system also provides for outside communications through interconnections with the corporate telephone communications system and commercial telephone lines.

7) Local Commercial Telephone System: This system provides standard commercial telephone service through the public infrastructure, consisting of central offices and the wire line and microwave carrier. The commercial telephone system includes connections to PBX, emergency telephone system, dedicated lines to emergency facilities, and lines to the JICs. The commercial vendor provides primary and secondary power for their lines at their central office.

8) Emergency Response Data System (ERDS): ERDS will continuously supply the NRC with selected plant data points on a near real time basis. The selected data points are transmitted automatically to the NRC at approximately 1-minute intervals.

9) Field Monitoring Team (FMT) Communications: A separate communications system has been installed to allow coordinated environmental monitoring and assessment during an emergency. This system consists of the necessary hardware to allow communication between the Control Room, TSC, EOF, and mobile units in Exelon Nuclear vehicles. Though direct communications between the Control Room and the FMTs is not required per the prescribed methods of FMT coordination, the FMTs can be contacted from equipment in the Control Room if required. Commercial cell phones or other means are available as back up to the primary field team communications system.

In addition, station communication links exist to ensure appropriate information transfer capabilities during an emergency. The station may also utilize its Public Address System, station radios and pagers to augment its emergency communications.

e. ERO Notification System: Exelon Nuclear utilizes an automated ERO Notification System to rapidly notify members of the ERO. The system consists of a computer with modem equipment capable of initiating and receiving telephone calls. When contact is made, the system automatically requests an identification number and then responds. One of the calls made by the system is to the paging system vendor. The pager vendor's system accepts group and individual numbers from the ERO Notification System, activating several radio transmitters which, in turn, activates personal pagers belonging to members of the ERO. The system is designed with redundant power, phone and computer components with geographic separation. Implementing procedures specify the course of action to be taken if the ERO Notification System fails that require station personnel to manually activate the ERO group page feature and/or directly call-out key emergency response personnel.

f. NRC Communications (ENS and HPN)

Communications with the NRC Operations Center will be performed via the NRC ENS and HPN circuits or commercial telephone line. Information is normally communicated from an approved NRC Event Notification Worksheet prior to establishing an open ENS and/or HPN line.

The actual configuration of these systems may vary from station to station. Installation and use of these NRC telephones is under the direction of the NRC (see Figure F-3).

Emergency Notification System (ENS): Dedicated telephone equipment is in place between each nuclear station's Control Room and the NRC, with an extension of that line in the TSC. A separate line is available in the EOF with the capability of being patched with the station through the NRC. This line is used for NRC event notifications and status updates.

Health Physics Network (HPN): There also exists a separate dedicated telephone between the NRC, the TSC, and EOF for conveying health physics information to the NRC as requested or as an open line.

2. Medical Communications

Communications are established with the primary and backup medical hospitals and transportation services via commercial telephone that is accessed by station personnel.

3. Communications Testing

Communications equipment is checked in accordance with Section H.10. Communications drills between Exelon Nuclear and state and county government facilities are conducted in accordance with Section N.2.a. In addition, minimum siren testing is performed in accordance with the site specific siren Design Report.

Figure F-1: Exelon Notification Scheme (For Full Augmentation)

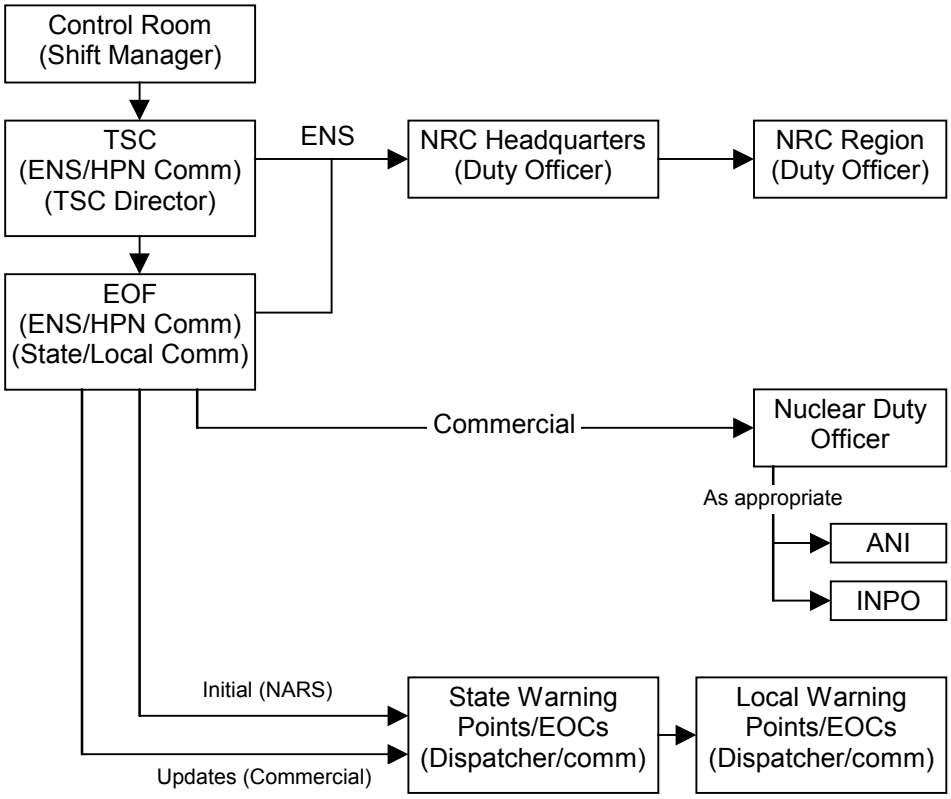
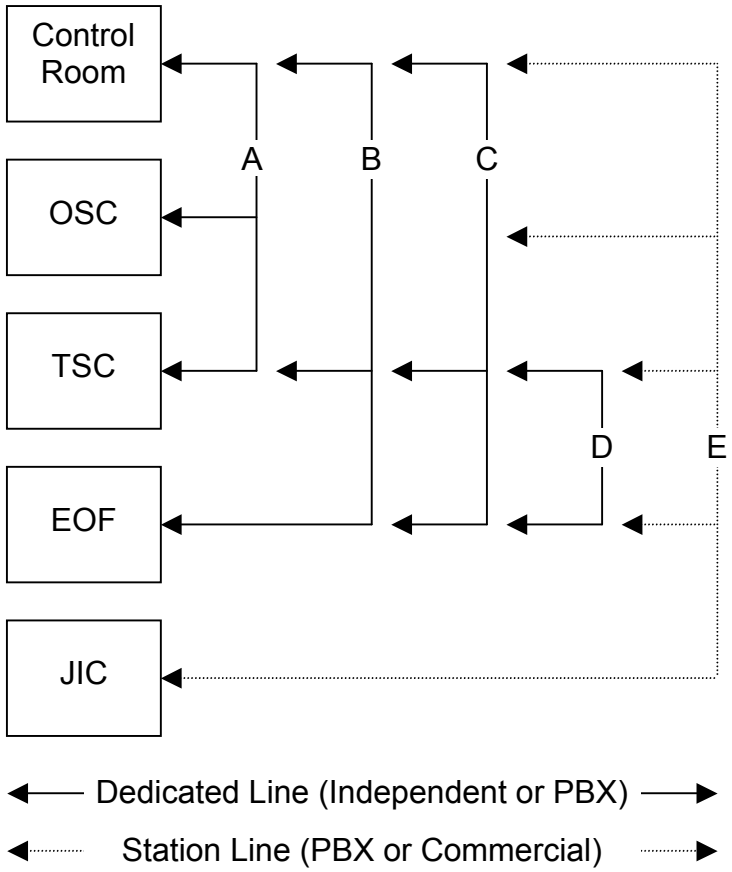


Figure F-2: ERF Communications Matrix



A = Damage Control Line between the OSC, TSC, and Control Room.

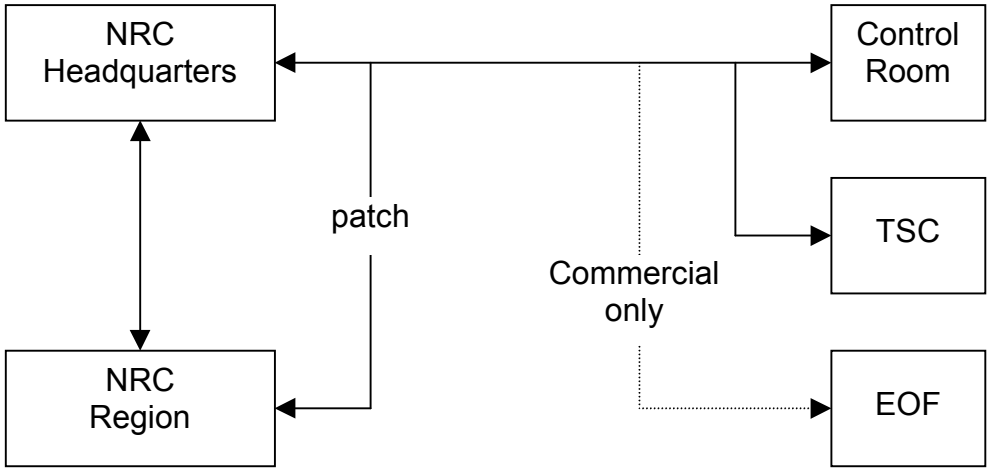
B = Directors Hotline line between the Control Room, TSC and EOF.

C = Operations Line between the TSC, Control Room and EOF.

D = Technical Conference Line between the TSC and EOF.

E = Station telephone line.

Figure F-3: NRC Communications for Nuclear Response



NOTE: ENS and HPN circuits may use the Federally maintained system, company tie lines or PBX as dedicated primary communications systems and have commercial backups.

Section G: Public Education and Information

This section describes the Exelon Nuclear public education and information program. It outlines the methods for distributing public information materials on an annual basis and describes how the public is informed in the event of an emergency.

1. Public Information Publication

The state has overall responsibility for maintaining a continuing disaster preparedness public education program. The emergency public information publication for the Exelon Nuclear generating stations is updated annually, in coordination with state and county agencies, to address how the general public is notified and what their actions should be in an emergency. Exelon distributes the publication on an annual basis by mail to all residents within the ten-mile plume exposure EPZs and to appropriate locations where a transient population may obtain a copy. The public information publication includes the following information:

a. Educational information on radiation.

b. A description of the times that require public notification (what to do if a take-shelter or evacuate recommendation is given).

c. A map of major evacuation routes.

d. A list of communities likely to serve as host shelter areas and instructions on how to obtain additional information, especially for the disabled or their caretakers and those without transportation.

2. Public Education Materials

Public information publications instruct the public to go indoors and turn on their radios when they hear the ANS sirens operating. These publications also identify the local radio stations to which the public should tune in for information related to the emergency.

3. Media Accommodations

a. The Exelon Communications and Public Affairs Department is notified when an Unusual Event or higher Emergency condition exists. They will handle public and media inquires in the early stages of the event (until the JIC is activated) by distributing background information, news releases, and providing information to corporate management.

1) The Emergency Public Information Organization: The Emergency Public Information Organization is part of the Corporate ERO. It may be activated at any time at the discretion of the Nuclear Duty Officer. However, when there is a procedural requirement to activate the EOF, the Emergency Public Information Organization shall also be activated.

The primary purpose of the Emergency Public Information Organization is to disseminate information from Exelon Nuclear's ERO about the emergency events to the public, via the news media. However, the authority for issuance of news releases for the classification of an Unusual Event or prior to ERO activation will always reside with the Exelon Communications and Public Affairs Department. Upon activation, the Emergency Public Information Organization has the responsibility and authority for issuance of news releases to the public.

The Emergency Public Information Organization is comprised of senior managers from Exelon Nuclear who will function as spokespersons, and other Exelon Nuclear individuals including personnel from the Governmental Affairs and Human Relations areas. Exelon Nuclear's spokespersons disseminate information to the news media/public concerning the emergency events out of a Joint Information Center (JIC).

2) The Joint Information Center (JIC): The JIC is the facility in which media personnel gather to receive information related to the emergency event. The JIC is the location where approved news releases will be provided to the media for dissemination to the public. News releases are coordinated between the EOF and JIC personnel and state and/or Federal representatives in the JIC. Exelon public information personnel operate from the EOF and the JIC, which is under the direction of the Corporate Spokesperson and functions as the single point contact to interface with Federal, state, and local authorities who are responsible for disseminating information to the public.

   Each station has a designated JIC. Each JIC is equipped with appropriate seating, lighting and visual aids to allow for public announcements and briefings to be given to the news media. Additionally, JICs are equipped with commercial telephone lines for making outgoing calls. The Emergency Public Information Organization functions from the JIC and EOF in preparing and releasing utility information about the emergency event. The JIC is activated at the declaration of an Alert or higher classification. Functions of the JIC include:

   - Serving as the primary location for accumulating accurate and current information regarding the emergency conditions and writing news releases.
   - Providing work space and phones for public information personnel from the state, counties, NRC, FEMA, and industry-related organizations.
   - Providing telephones for use by the news media personnel.
   - Providing responses to media inquiries through Media Monitoring Staff telephones that the media can call for information about an emergency.

b. The news media is not permitted into the EOF during an emergency.

4. Coordination of Public Information

a. The JIC is staffed by Exelon and government public information representatives who will be the source of public information during an emergency at the station. The Corporate Spokesperson is the primary spokesperson for Exelon Nuclear. The Corporate Spokesperson has direct access to all necessary information (see Section B.5).

b. The JIC is staffed by federal, state, county, and utility personnel to assure timely, periodic exchange and coordination of information. Representatives coordinate information prior to conducting news briefings.

c. Rumors or misinformation are identified during an emergency by the media/rumor control monitors. They respond to public and news media calls and monitor media reports.

d. The common MW Region JIC is located west of Chicago, in Warrenville IL, in the Exelon Nuclear Cantera facility. This facility supports the Braidwood, Byron, Clinton, Dresden, LaSalle and Quad Cities stations.

   The JIC for the MA Region Three Mile Island, Limerick and Peach Bottom Stations is co-located with the EOF at 175 North Caln Road, Coatesville, Pennsylvania.

   The JIC for the Oyster Creek Station is co-located with the EOF at 1268 Rt. 37 West, Toms River, NJ.

5. Media Orientation

Emergency Preparedness, in conjunction with Exelon Communications and Public Affairs Department, offers training (at least annually) to acquaint news media with the E-Plan, information concerning radiation, and points of contact for release of public information in an emergency. Training is provided for those media agencies that accept the training offer.

Section H: Emergency Facilities and Equipment

Onsite and offsite facilities are available for emergency assessment, communications, first aid and medical care, and damage control. Of particular importance are the Emergency Response Facilities (ERFs); the Control Room (CR), the Technical Support Center (TSC), the Operations Support Center (OSC), the Emergency Operations Facility (EOF), and the Joint Information Center (JIC).

This section describes the emergency facilities and equipment used by the Emergency Response Organization and outlines the requirements which aid in timely and accurate response actions. It also describes the surveillance programs used to monitor and ensure that these facilities and equipment are maintained in a high degree of constant readiness.

1. Control Room, Technical Support Center, and Operations Support Center

Exelon Nuclear has established a TSC and an on-site OSC, which are activated upon declaration of an Alert or higher classification. Until they become operational, required functions of these facilities are performed in the Control Room.

Under certain adverse conditions for Security-Based Events, personnel may be assembled in an “ERO Offsite Staging Area” prior to being dispatched to one of the facility ERFs.

a. Station Control Room: The Control Room is the centralized onsite location from which the Nuclear Station's reactors and major plant systems are operated. The Control Room is equipped with instrumentation to supply detailed information on the reactors and major plant systems. The Control Room is continuously staffed with qualified licensed operators. The Control Room is the first onsite facility to become involved with the response to emergency events. Control Room personnel must evaluate and effect control over the emergency and initiate activities necessary for coping with the emergency until such time that support centers can be activated. These activities shall include:

- Reactor and plant control.
- Initial direction of all plant related operations.
- Accident recognition, classification, mitigation and initial corrective actions.
- Alerting of onsite personnel.
- Notification of appropriate individuals.
- Activation of emergency response facilities and ERO notification.
- Notification of offsite agencies.
- Continuous evaluation of the magnitude and potential consequences of an incident.

- Initial dose projections.
- Recommendations for immediate protective actions for the public.

As other ERFs become activated, they will supply support to the Control Room, although overall Command and Control of the emergency will transfer to the SED (TSC) or the CED (EOF). Throughout all emergencies, the Control Room maintains its emergency activation status until its normal operational status may be resumed.

b. Technical Support Center (TSC): Each nuclear generating station has established a TSC for use during emergency situations by station management, technical, and engineering support personnel. The TSC is activated for all emergencies classified as Alert or higher. Activation for other events is optional. When activated the TSC functions include:

- Support for the Control Room's emergency response efforts.
- Support the SED with assigned Command & Control functions.
- Continued evaluation of event classification.
- Assessment of the plant status and potential offsite impact.
- Coordination of emergency response actions.
- Notification of appropriate corporate and station management.
- Notification and update of the NRC via Emergency Notification System (ENS).

The TSC is the onsite location utilized to support the Control Room for assessment of plant status and potential offsite impact, and for implementation of emergency actions. TSC provides technical data and information to the EOF.

Figure B-1b illustrates the staffing and organization of the TSC.

Each TSC provides reliable voice communications to the Control Room, the OSC, the EOF, the NRC, and state and local Emergency Operations Centers. In addition, they provide facsimile transmissions capability (see Section F.1).

Each TSC is sized to accommodate a minimum of 25 spaces and supporting equipment. This includes provisions for five NRC representatives. Adequate space is also available for the appropriate state representative(s).

Personnel in the TSC shall be protected from radiological hazards, including direct radiation and airborne contaminants under accident conditions with similar radiological habitability as Control Room personnel. To ensure adequate radiological protection, permanent radiation monitoring systems have been installed in the TSC and/or periodic radiation surveys are conducted. These systems indicate radiation dose rates and airborne radioactivity inside the TSC while in use. In addition, protective breathing apparatus (full-face air purifying respirators) and KI are available for use as required.

The TSC has access to a complete set of as-built drawings and other records, including general arrangement diagrams, P&IDs, and the electrical schematics. The TSC has the capability to record and display vital plant data, in real time, to be used by knowledgeable individuals responsible for engineering and management support of reactor operations, and for implementation of emergency procedures.

c. Operations Support Center (OSC): Each nuclear generating station has established an OSC. The OSC is the onsite location to where station support personnel report during an emergency and from which they will be dispatched for assignments or duties in support of emergency operations. The OSC shall be activated whenever the TSC is activated, but need not remain activated at the Alert level if its use is judged unnecessary by the Station Emergency Director. At the Site Area and General Emergency levels, the OSC or an alternate OSC shall be activated at all times. Activation for other events is optional. Station disciplines reporting to the OSC include, but are not limited to:

- Operating personnel not assigned to the Control Room,
- Radiation Protection Personnel,
- Chemistry Personnel,
- Maintenance Personnel (mechanical, electrical and I&C).

Figure B-1b illustrates the staffing and organization for the OSC.

Each OSC is equipped with communication links to the Control Room, the TSC and the EOF (see Section F). A limited inventory of supplies will be kept for the OSC. This inventory will include respirators, protective clothing, flashlights and portable survey instruments.

2. Emergency Operations Facility (EOF)

The EOF is the location where the Corporate Emergency Director will direct a staff in evaluating and coordinating the overall company activities involved with an emergency. Activation of the EOF is mandatory upon declaration of an Alert or higher classification. The EOF provides for:

- Management of overall emergency response.

- Coordination of radiological and environmental assessments.
- Determination of recommended public protective actions.
- Management of recovery operations.
- Coordination of emergency response activities with federal, state, and local agencies.

The common MW Region EOF is located west of Chicago, in Warrenville IL, in the Exelon Nuclear Cantera facility. This facility supports the Braidwood, Byron, Clinton, Dresden, LaSalle and Quad Cities stations.

The common MA Region EOF is located west of Philadelphia, in Coatesville PA. This facility supports Limerick, Peach Bottom and TMI Stations.

The EOF for Oyster Creek Station is co-located with the JIC at 1268 Rt. 37 West, Toms River, NJ.

These facilities are designed with the following considerations:

- The location provides optimum functional and availability characteristics for carrying out overall strategic direction of Exelon Nuclear onsite and support operations, determination of public protective actions to be recommended to offsite officials, and coordination with Federal, state and local organizations.
- It is well engineered for the design life of the plant and is of sufficient size to accommodate about 50 people.
- It is equipped with reliable voice communications capabilities to the TSC, the OSC, the Control Room, NRC, and state and local emergency operations centers. In addition, the EOF has facsimile transmission capability.
- Equipment is provided to gather, store, and display data needed in the EOF to analyze and exchange information on plant conditions with the Station. The EOF technical data system receives, stores, processes, and displays information sufficient to perform assessments of the actual and potential onsite and offsite environmental consequences of an emergency condition.
- The EOF has ready access to plant records, procedures, and emergency plans needed for effective overall management of Exelon Nuclear emergency response resources.

3. Emergency Operations Centers

EOCs operated by the state and local communities have been established to perform direction and control of emergency response functions.

The respective state EOCs are capable of continuous (24-hour) operations for a protracted period. These centers contain sufficient communications (radio, telephone and teletype) equipment, maps, emergency plans, and status boards to provide the necessary interfaces with other federal, state, county, and Exelon emergency facilities.

The county EOCs serve as Command and Control headquarters for local emergency response activities as well as a center for the coordination of communications to field units and to the state EOCs. These EOCs have the equipment necessary, (such as facsimile machines, telecommunications equipment, radio gear, photocopiers, wall maps, etc.) to carry out their emergency responsibilities.

4. Activation

NOTE: NUREG-0654 Criterion II.B.5 states that the "licensee must be able to augment on-shift capabilities within a short period after declaration of an emergency". It further defines that short period as 30 and 60 minutes. The time frames for rapid augmentation of a nuclear power plant staff in the event of an emergency are not rigid inviolate requirements but rather goals. It is Exelon Nuclear's intent to expend its best efforts to meet the augmentation criteria goals regarding staffing Emergency Response Facilities with sufficiently skilled individuals capable of handling an emergency. Both the NRC and Exelon Nuclear realize that due to diversity of normal residential patterns for the stations' staff, possible adverse weather conditions, road congestion and site access restrictions, these time frames might be exceeded.

Exelon Nuclear has put into place plans and procedures to ensure timely activation of its emergency response facilities. The Shift Manager (as Shift Emergency Director) will initiate a call-out in accordance with the implementing procedures. The ERO augmentation process identifies individuals who are capable of fulfilling the specific response functions that are listed in ERO staffing tables contained within the station specific Annex. This table was developed based on the functions listed in NUREG-0654, Table B-1.

Although the response time will vary due to factors such as weather and traffic conditions, a goal of 60 minutes for minimum staffing, following the declaration of an Alert or higher emergency classification, has been established for the ERO personnel responding to the station emergency facilities and the EOF. Additionally, plans have been developed to ensure timely functional activation and staffing of the JIC when the classification of Alert is declared.

It is the goal of the organization to be capable of activating the applicable Emergency Response Facility upon achieving minimum staffing. The facility can be declared activated when the following conditions are met:

a. Minimum staffing has been achieved.

b. The facility is functional.

Although the minimum staffing criteria applies to the JIC, the activation time is not applicable. Public Information personnel must first coordinate the decision to activate the JIC with the appropriate offsite authorities.

The Director in charge may elect to activate their facility without meeting minimum staffing; if it has been determined that sufficient personnel are available to fully respond to the specific event (this would not constitute a successful minimum staff response).

5. Monitoring Equipment Onsite

Each nuclear station is equipped with instrumentation for seismic monitoring (with the exception of Oyster Creek), radiation monitoring, fire protection and meteorological monitoring. Instrumentation for the detection or analysis of emergency conditions is maintained in accordance with station Technical Specifications, if applicable, or commitments made to the NRC. The actual instrumentation varies somewhat from site to site and thus will not be described in detail in this plan. Descriptions of the equipment will appear in each Station Annex. This equipment includes but is not limited to the following:

a. Geophysical Monitors

1) Meteorological Instrumentation: A permanent meteorological monitoring station is located near each station for display and recording of wind speed, wind direction, and ambient and differential temperature for use in making offsite dose projections. Meteorological information is presented in the CR, TSC, and EOF by means of the plant computer system. This information is remotely interrogated using a computer or other data access terminal.

With regard to Exelon Nuclear's meteorological monitoring program, there has been a quality assurance program adopted from 10 CFR 50, Appendix B. However, since the meteorological facilities are not composed of structures, systems, and components that prevent or mitigate the consequences of postulated accidents and are not "safety related," not all aspects of 10 CFR 50, Appendix B, apply. Those aspects of quality assurance germane to supplying good meteorological information for a nuclear power station were adopted into the meteorological quality assurance program. The meteorological program is also subject to the requirements of the QATR, Section 19, Augmented Quality.

The National Weather Service (NWS), or regional weather forecast providers, may be contacted during severe weather periods. These providers analyze national and local weather in order to provide localized weather forecasts for the system or for the station area as appropriate.

2) Seismic Monitoring: The seismic monitoring system measures and records the acceleration (earthquake ground motion) of the structure. Earthquakes produce low frequency accelerations which, when detected by the remote sensing devices, are permanently recorded as information which defines the response spectrum. The system remains in a standby condition until an earthquake causes the remote unit(s) to activate the recording circuits and tape transports. It also provides signals for immediate remote indication that specific preset response accelerations have been exceeded.

3) Hydrological Monitors: The design basis flood, probable maximum precipitation, and other improbable, conceivable extremes in hydrologic natural phenomena are well below any design limits for the stations as detailed in the UFSAR.

b. Radiological Monitors and Sampling

1) The Radiation Monitoring System (RMS): In-plant radiological measurements provide information that may help determine the nature, extent and source of emergency conditions. The RMS is available to give early warning of a possible emergency and provides for a continuing evaluation of the situation in the Control Room. Radiation monitoring instruments are located at selected areas within the facility to detect, measure, and record radiation levels. In the event the radiation level should increase above a preset level, an alarm is initiated in the Control Room. Certain radiation monitoring instruments also alarm locally in selected areas of the facility. The RMS is divided into 3 subsystems:

a) Area Radiation Monitors (ARMs) are used for the direct measurement of in-plant exposure rates. The ARM readings allow in-plant exposure rate determinations to be made remotely without requiring local hand-held meter surveys. This information may be used, initially, to aid in the determination of plant area accessibility. In addition to permanent monitors, portable Continuous Air Monitors (CAMs) measure airborne particulate and airborne iodine activities at various locations within the operating areas.

b) Process Radiation Monitors (PRMs) are used for the measurement of radioactive noble gas, iodine, and particulate concentrations in plant effluent and other gaseous and fluid streams.

c) The accident, or high range, radiation monitoring system monitors radiation levels at various locations within the operating area. These are high range instruments used to track radiation levels under accident or post accident conditions. These instruments include the Containment/Drywell Radiation Monitors.

The RMS provides the necessary activity or radiation levels required for determining source terms in dose projection procedures. Key RMS data is linked to the plant computer, which allows information to be passed to the TSC and EOF. The isotopic mix, including isotopes such as those in Table 3 of NUREG-0654, is based upon a default accident mix. Refer to the station specific UFSAR for further detail on the RMS capabilities and design.

2) Liquid and Gaseous Sampling Systems: The process sampling system consists of the normal sampling system and additional sampling panels located throughout the plant. Sampling systems are installed or can be modified to permit reactor coolant and containment atmosphere sampling even under severe accident conditions.

The sampling systems use a number of manual sampling techniques to enable reactor coolant and containment sampling operations over a wide range of plant conditions. It is capable of providing information relative to post-accident plant conditions to allow operator actions to be taken to mitigate and control the course of an accident. Refer to the specific UFSAR for further detail on sampling capabilities.

3) Portable Radiation Monitoring Equipment: Portable radiation survey instruments are available for a wide variety uses such as area, sample, and personnel surveys and continued accident assessment. Instruments are stored throughout the plant and in the emergency facilities.

c. Process Monitors: The Control Room and applicable redundant backup locations are equipped with extensive plant process monitors for use in both normal and emergency conditions. These indications include but are not limited to reactor coolant system pressure and temperature, containment pressure and temperature, liquid levels, flow rates, status or lineup of equipment components. This instrumentation provides the basis for initiation of corrective actions.

1) Plant Monitoring/Information System: A plant monitoring/information system provides the data acquisition and database capability for performing plant monitoring and functions. The system is designed to scan, convert to engineering units, make reasonability and alarm limit checks, apply required transformations, store for recall and analysis, and display the reading of transformed data from plant instrumentation. The system scans flows, pressures, temperatures, fluid levels, radiation levels, equipment, and valve status at required frequencies. Scanned variables are quality tagged. The system provides for short and mid term storage of data for on-line retrieval and fast recall, and long term storage to appropriate media.

2) Safety Parameter Display (SPDS) & Plant Parameter Display (PPDS) Systems: SPDS and PPDS provide a display of plant parameters from which the safety status of operation may be assessed in the Control Room, TSC and EOF for each nuclear station. The primary function of the SPDS and PPDS is to help operating personnel in the Control Room make quick assessments of plant safety status. SPDS and/or PPDS displays in the TSC and EOF promote the exchange of information between these facilities and the Control Room and assists the emergency organization in the decision making process.

d. Fire Detection System: The Fire Detection System is designed to quickly detect visible or invisible smoke (or other products of combustion) and/or heat in designated areas of the plant. The fire alarm communication systems and subsystems are located at strategic points throughout the plant to warn personnel of a nuclear incident or other emergency conditions. Existing plant alarm systems are sufficiently audible to alert personnel in the event of a fire or need for assembly. These alarm communication systems consist of warning sirens and lights (in high noise areas) and the PA system. Refer to the respective station UFSAR for further description of the station's fire protection system.

6. Monitoring Equipment Offsite

Exelon has made provisions to acquire data from and have access to the following offsite sources of monitoring and analysis equipment:

a. Geophysical Monitors: In the event that the onsite meteorological tower or monitoring instrumentation becomes inoperative and the contracted weather provider cannot be contacted, meteorological data may be obtained directly from the National Weather Service or the internet.

A considerable array of seismometers are located in the region. A central point of contact to obtain information about a seismic event is the National Earthquake Information Service in Golden, Colorado.

Exelon Nuclear Corporate Offices can coordinate hydrology and seismology expertise in the event onsite information becomes unavailable.

b. Radiological Environmental Monitors and Sampling: Exelon Nuclear has contracted with a company to conduct an extensive offsite environmental monitoring program to provide data on measurable levels of radiation and radioactive materials in the environs. The program (described fully in the Offsite Dose Calculation Manual), includes:

- Fixed continuous air samplers.
- Routine sampling of river water; milk and fish.
- A fixed dosimeter monitoring network.

The dosimeter program consists of the following elements at each nuclear station:

- A near-site ring of dosimeters covering the 16 meteorological sectors.
- A 16-sector ring of dosimeters placed in a zone within about 5 miles from the plant.
- Dosimeters placed at each of the normal fixed air sampler locations (typically about 8-15 air samplers per nuclear station).

c. Laboratory Facilities: External facilities for counting and analyzing samples can be provided by the other Exelon Nuclear stations, state, federal or contracted laboratories. These laboratories can act as backup facilities in the event that the affected station's counting room and laboratory become unusable or the offsite radiological monitoring and environmental sampling operation exceeds the capacity or capability of the station laboratory during an emergency. It is estimated that these laboratories will be able to respond within several hours from initial notification.

Outside analytical assistance may be requested from state and federal agencies, or through contracted vendors. The state maintains a mobile radiological laboratory that provides the primary means of analyzing off-site environmental samples. The NRC mobile laboratory may be made available for Site Area and General Emergencies. The DOE, through the Radiological Assistance Program (RAP) has access to any national laboratory with a Bell Lab contract (e.g., Brookhaven, Oak Ridge, Lawrence Livermore, etc.).

A general description of the laboratory capabilities is provided in Section C.3.

7. Offsite Monitoring Equipment Storage

Each nuclear station maintains a sufficient supply of emergency equipment (such as portable survey, counting, and air sampling instrumentation and other radiological monitoring equipment and supplies) that may be used for environmental monitoring. These supplies meet the initial requirements of two environmental Field Monitoring Teams. During subsequent phases of an emergency, additional equipment is available from other Exelon Nuclear generating stations, vendors and offsite response organizations.

8. Meteorological Monitoring

The station has installed and maintains a meteorological tower equipped with instrumentation for continuous reading of the wind speed, wind direction, air temperature and delta air temperature. Additional capabilities are available to obtain representative current meteorological information from other sources, such as the National Weather Service. A full description of the onsite meteorological capabilities is given in Section H.5.a of this Plan.

9. OSC Capabilities

The OSC provides area for coordinating and planning of OSC activities and the staging of personnel. Further space is available in adjacent offices and locker rooms to accommodate additional personnel as may be required. Alternate locations are available. The onsite storeroom of each nuclear station maintains a supply of parts and equipment for normal plant maintenance. These parts, supplies and equipment are available for damage control use as necessary.

Sufficient radiation protection equipment (i.e., protective clothing, respiratory protection gear, KI, and other health physics equipment and supplies) is stored and maintained near the OSC (as well as the other emergency response facilities). Damage Control Team equipment is available near the OSC as well as in the maintenance shops. This equipment includes items such as a camera, portable lighting, and additional portable communications equipment. The OSC is stocked with an assortment of first aid and medical treatment equipment and supplies. The OSC maintains reliable voice communications with the CR, TSC, and EOF. For a complete description of communications equipment, refer to Section F. When an emergency condition exists at one station, additional supplies can be obtained from other unaffected stations and Exelon resources upon request.

10. Facility and Equipment Readiness

Emergency facilities and equipment are inspected and inventoried in accordance with emergency preparedness procedures. These procedures provide information on location and availability of emergency equipment and supplies. An inventory of all emergency equipment and supplies is performed on a quarterly basis and after each use in an emergency or drill. During this inventory, radiation monitoring equipment is checked to verify that required calibration period and location are in accordance with the inventory lists. Inspections include an operational check of instruments and equipment. Equipment, supplies, and parts which have a shelf-life are identified, checked, and replaced as necessary. Sufficient reserves of instruments and equipment are maintained to replace those which are removed from emergency kits or lockers for calibration or repair. The stations are responsible for maintaining a supply of KI at their respective site.

11. General Use Emergency Equipment

Inventory procedures identify the equipment that makes up kits used in an emergency situation available within each emergency facility.

12. Collection Point for Field Samples

The onsite chemistry lab, unless otherwise specified in the respective Station Annex, has been designated as the central point for the receipt of radiological field monitoring samples. Sampling and analysis equipment is available for quantitative activity determination of marine and air samples, and qualitative activity determination of terrestrial samples. Sufficient field monitoring equipment is maintained at the stations for initial sampling. Instrumentation and equipment utilized for sample activity determination are routinely calibrated to ensure timely availability. Additional facilities as described in C.3 and H.6.c are available for sample and analysis of environmental samples.

Refer to Station Annexes for further description of contracted environmental sampling and analysis support for a particular site.

Section I: Accident Assessment

To effectively coordinate and direct all facets of the response to an emergency situation, diligent accident assessment efforts are required throughout the emergency. All four emergency classifications have similar assessment methods, however, each classification requires a greater magnitude of assessment effort dependent upon the plant symptoms and/or initiating event(s).

1. Plant Parameters and Corresponding Emergency Classification

Plant system and effluent parameter values are utilized in the determination of accident severity and subsequent emergency classification. Environmental and meteorological events are also determining factors in emergency classification. An emergency condition can be the result of just one parameter or condition change, or the combination of several. The specific symptoms, parameter values or events for each level of emergency classification are detailed in the emergency implementing procedures. Specific plant system and effluent parameters that characterize a classifiable event (EALs) are presented in each Station Annex.

In order to adequately assess the emergency condition, each emergency facility has the necessary equipment and instrumentation installed to make available essential plant information on a continuous basis. Evaluation of plant conditions is accomplished through the monitoring of plant parameters both from indication in the Control Room and within the plant. Some of the more important plant parameters to be monitored in the Control Room are assembled into a single display location, which is entitled the "Safety Parameter Display System" (SPDS). The SPDS monitors such parameters as: reactor coolant system pressure, reactor or pressurizer water level, containment pressure, suppression pool water level and temperature, reactor power, safety system status, containment radiation level and effluent monitor readings. The instrumentation and equipment capabilities available for each emergency facility are described in Section H.

2. Onsite Accident Assessment Capabilities

The resources available to provide initial and continuing information for accident assessment throughout the course of an event include plant parameter display systems, liquid and gaseous sampling system, Area and Process Radiation Monitoring Systems, and Accident Radiation Monitoring Systems (which includes the high range containment radiation monitors). Descriptions of these systems are given in Section H.5.b.

3. Source Term Determination

Source term (or core damage) estimations serve several roles within the Exelon Emergency Preparedness Program. For planning purposes, core damage considerations are used as the bases for several of the Emergency Action Level (EAL) Initiating Conditions and as the threshold for the declaration of a General Emergency (the definition of a General Emergency specifies conditions which involve ‘substantial’ core degradation or melting as one of the bases for classification).

From an implementation perspective, core damage estimations provide a means of realistically differentiating between the four core states (no damage, clad failure, and fuel melt, and vessel melt-through) to:

- Evaluate the status of the fuel barriers and how their status relates to the risks and possible consequences of the accident.
- Provide input on core configuration (coolable or uncoolable) for prioritization of mitigating activities.
- Determine the potential quality (type) and/or quantity (%) of source term available for release in support of projected offsite doses and protective action recommendations.
- Provide information that quantifies the severity of an accident in terms that can be readily understood and visualized.
- Support the determination of radiological protective actions that should be considered for long term recovery activities.

The assessment methodologies utilized by Exelon are intended to provide a rapid best estimate of core damage which, when evaluated together, help to develop an overall picture of the extent of core damage. The methods used to estimate the amount or type of core damage occurring under accident conditions includes the following:

- Containment Radiation Monitors: An indirect method used to determine the amount of core damage. Applicable to Loss of Coolant Accident (LOCA) scenarios. Based upon an end-of-life source term and static nuclide ratio assumptions yielding a limited accuracy. Valid any time following an accident.
- Core Temperatures: Methods such as Core Exit Thermocouple (CET), Peak Core Temperatures and Hot Leg Temperatures provide indirect methods used to indicate the type and/or amount of core damage. Applicable for all types of accidents. Valid any time following an accident.
- Core Uncovery: Methods such as Core Uncovery Time, RVLIS Level and Source Range Monitor count rate provide indirect methods used to indicate the type of core damage (clad failure or fuel melt). Applicable for all types of accidents. Provides a relatively accurate estimate of the state of the core early in the event. Valid any time following an accident.
- Containment Hydrogen Concentration: An indirect method used to establish the type of core damage. Applicable to LOCA type accidents where all the hydrogen generated by the metal-water reaction is released into containment. Valid any time following an accident.
- Sample Analysis - Isotopic Ratio Comparison: A direct method used to establish the type of core damage. Compares expected isotopic ratios with a sample to determine a general core state. Applicable under all types of accidents. Valid any time following an accident.

- Sample Analysis - Presence of Abnormal Isotopes: A direct method used to provide a go/no go indication of fuel melt by the presence of unusually high concentrations of the less volatile fission products. Applicable under all types of accidents. Valid any time following an accident.
- Sample Analysis - Concentration Evaluation: A direct method that yields the most accurate numerical estimations of the amount of core damage. Applicable for all types of accidents. Requires the sampled system(s) be in a steady state that usually prevents its use until the plant is in a stable condition.

4. Effluent Monitor Data and Dose Projection

Dose assessment or projection represents the calculation of an accumulated dose at some time in the future if current or projected conditions continue. During an accident, the Plant Parameter Display System and personal computers will provide the ERO with the timely information required to make decisions. Radiological and meteorological instrumentation readings are used to project dose rates at predetermined distances from the station, and to determine the integrated dose received. Dose assessment methods used by Exelon personnel to project offsite doses include:

A. Monitored Release Points - This method utilizes the plant's effluent radiation monitors and system flow rates. Effluent release points are used to directly calculate a release rate. The point of the release determines the way the source term is affected and is adjusted by the dose assessment process.

B. Containment Leakage/Failure - This method uses a variety of containment failures or leak rates in conjunction with available source term estimations to develop a release rate to the environment. A direct vent of containment can be modeled as a failure to isolate.

C. Release Point Samples - This method uses a sample at the release point and an estimated flow rate to develop a release rate at the point of release.

D. Field Monitoring Team Data - This method uses a field survey or sample and the atmospheric model to back calculate a release rate and ratio concentrations of radioactive material at various points up and downwind of plume centerline.

The computer applications used to provide dose calculations are evaluated against the EPA-400 plume exposure Protective Action Guides (PAGs) applicable for the early phase of an accident. These evaluations place an emphasis on determining the necessity for offsite protective action recommendations. Dose assessment actions will be performed in the following sequence:

First: Onset of a release to 1 hour post-accident: Shift personnel will rely on a simplified computerized dose model to assist them in developing offsite dose projections using real time data from effluent monitors and site meteorology.

Second: 1 hour post-accident to event termination: Estimates of off-site doses based on more sophisticated techniques are provided. Dedicated ERO personnel will analyze the offsite consequences of a release using more complex computerized dose modeling. These additional methods are able to analyze more offsite conditions than the simplified quick method, as well account for more specific source term considerations.

5. Meteorological Information

Local meteorological data is available from an onsite meteorological tower. The data available includes wind speed, wind direction, temperature, and delta temperature. These data are used by the utility, state, and NRC to provide near real-time predictions of the atmospheric effluent transport and diffusion. Meteorological data from the tower is available in the CR, TSC, and EOF. A full description of the onsite meteorological capabilities is given in Section H.5.a.

6. Unmonitored Release

Dose projections can be made during a release through use of actual sample data in situations where effluent monitors are either off-scale or inoperative or the release occurs by an unmonitored flow path. In the absence of effluent sample data, a dose projection can be performed simply by specifying the accident category as a default. The selection of a default accident category defines the mix, the total curies, and the release pathway(s). The total number of curies from a default mix for each isotope is used to provide an upper bound for release concentration, and hence, an upper bound for the dose rate and dose to the public.

7. Field Monitoring

In addition to the capabilities and resources described in Section H.6.b and H.7, Exelon Nuclear maintains the ability to take offsite air samples and to directly measure gamma dose rates the event of an airborne or liquid release. The capability to take offsite soil, water, and vegetation samples is also provided by either the Field Teams or a contracted vendor.

The environmental monitoring equipment, as described in Section H, contain portable survey, counting, and air sampling instrumentation and other radiological monitoring equipment and supplies to be used by the Field Monitoring Teams. Samples are taken at predetermined locations as well as those specified both during and after a release. Environmental measurements are used as an aid in the determination and assessment of protective and recovery actions for the general public.

8. Field Monitoring Teams

Field Monitoring Teams are dispatched by Exelon Nuclear to perform a variety of functions during conditions that may involve significant releases of radioactive materials from the plant. Radiological survey and sample data is used to define affected area boundaries, verify or modify dose projections and protective action recommendations, and assess the actual magnitude, extent, and significance of a liquid or gaseous release.

In addition to contamination and dose rate measurements, the change out of dosimeters and air sampler cartridges can be performed. Other actions may include soil, water and vegetation sampling.

The initial environmental surveys involve simple-to-perform measurements to quickly confirm or modify the dose projections based on plant parameters. Subsequent environmental monitoring efforts will be aimed at further defining the offsite consequences including instituting an expanded program to enable prompt assessments of any subsequent releases from the plant.

The expertise necessary to conduct limited offsite environmental survey and sampling exists onsite 24 hours a day. A minimum of two offsite Field Monitoring Teams are notified and activated at an Alert or higher classification. Teams are composed of two individuals are assembled at the station to test and inventory dedicated survey and sampling equipment. Teams are then dispatched in company or personal vehicles into the surrounding area when a release is or is expected to occur. Radiological survey and sample data is transmitted to the emergency facilities. Vendor/contractor support can be used to perform collection, shipment and analysis of environmental sample media as described in Section B.8.c.

9. Iodine Monitoring

Field monitoring equipment has the capability to detect and measure airborne radioiodine concentrations as low as 1×10^{-7} µCi/cm^3 in the presence of noble gases. Interference from the presence of noble gas and background radiation will be minimized by ensuring that monitoring teams move to areas of low background prior to analyzing the sample cartridge. The collected air sample is measured by hand held survey meter as an initial check of the projection derived from plant data to determine if significant quantities of elemental iodine have actually been released (the chemical form that would pose a health hazard).

10. Dose Estimates

Specific procedures exist for the correlation of air activity levels to dose rate for key isotopes. Provisions have been established for estimating integrated dose from the projected and actual dose rates and for the comparison of these estimates with the protective action guides.

11. State Monitoring Capabilities

The states have the ability to dispatch their own field monitoring teams to track the airborne radioactive plume. The states also have the ability and resources to coordinate with federal and utility monitoring teams to compare sample results.

Section J: Protective Response

Protective response consists of emergency actions, taken during or after an emergency situation, which are intended to minimize or eliminate hazards to the health and safety of the public and/or station personnel. A range of protective actions has been developed for emergency workers and the general public in the Plume Exposure Pathway EPZ. Additionally, guidelines have been established to aid in choosing protective actions during an emergency that are consistent with federal guidance. Exelon Nuclear is responsible for onsite actions, while the responsibility for offsite actions rests with the state, county, and other offsite response agencies.

1. Notification of Onsite Personnel

For all emergency classifications, all personnel within the Protected Area are notified within 15 minutes of the initial classification or escalation of an emergency by recognizable alarms and/or verbal announcements over the plant Public Address (PA) System. Announcements include the emergency classification and response actions to be taken by personnel onsite (such as ERO, non-ERO, contractor personnel, and visitors). Provisions are made to alert personnel in high noise areas and outbuildings within the Protected Area as applicable.

Each station has identified locations where people might be expected to be present outside the Protected Area but within the Owner Controlled Area. Accountability of persons within the Owner Controlled Area but outside the Protected Area is not required. However, provisions are established for notification of personnel within the Owner Controlled Area any time a Site Evacuation has been initiated, or as otherwise deemed appropriate.

2. Evacuation Locations

If a Site Evacuation is required, nonessential personnel are directed to either assemble within designated Assembly Areas or to immediately evacuate the site. Personnel will be directed to either proceed to their homes or to reassemble at designated offsite locations. Visitors to the station will assemble with and follow the instructions of their escorts. Nonessential personnel within the Protected Area will normally exit through the security building. Personal transportation (if available) will normally be used and established evacuation routes will be followed. Personnel without transportation will be identified and provided transportation as necessary.

3. Radiological Monitoring of Evacuees

Personnel evacuating the site will be monitored for contamination by the portal monitors as they exit the Protected Area, with portable friskers in Assembly Areas, or sent to offsite monitoring locations on an as needed basis.

4. Evacuation

Evacuation is the primary protective action anticipated for onsite personnel not having immediate emergency response assignments. Each nuclear station has identified locations that serve as Assembly Areas and offsite locations for non-essential personnel when they are not instructed to proceed home. The specific locations of these areas are shown in each Station Annex. Implementing procedures describe equipment, supplies and general operation of these facilities. The Station Emergency Director will designate personnel within the Site Boundary as essential or nonessential. Evacuation of non-essential personnel is usually conducted immediately after accountability if a Site Area Emergency or General Emergency has been declared and conditions permit. Evacuation shall commence in accordance with station procedures as directed by the Station Emergency Director or his/her designee, unless one of the following conditions exist:

a. Severe weather conditions threaten safe transport.

b. A significant radiological hazard would be encountered.

c. There is a security threat occurring, which would have an adverse impact on the personnel while leaving the site.

d. A condition similar to the above in magnitude, which in the opinion of the Station Emergency Director would adversely affect the site personnel.

Security forces will be dispatched, when available, to access road(s) to control entry to site facilities. Unauthorized and non-ERO personnel will be denied entry.

The initiation of a site evacuation will be reported to the appropriate state/local agency.

Exelon has established the implementation of alternate onsite protective actions for security-based events that are more appropriate than the actions for radiological emergencies. These alternate protective actions could include taking immediate cover, immediate protected area evacuation, immediate owner controlled area evacuation, and dispatch of the ERO to their alternate reporting center.

5. Accountability

The purpose of Accountability is to determine the locations of all personnel inside the Protected Area and to muster emergency personnel at prearranged locations. When Accountability of onsite personnel is determined to be necessary by the Station Emergency Director, all personnel within the protected area shall be accounted for and the names of missing individuals (if any) are determined within thirty (30) minutes of the announcement.

Accountability is usually performed in conjunction with Assembly, and is required to be initiated whenever a Site Area Emergency or higher classification is declared. The movement of personnel for the purposes of Accountability may be delayed if their health and safety could be in jeopardy, such as severe weather or for security concerns.

If it is determined that the prearranged Assembly Area is unfit for personnel, the Station Emergency Director may designate an alternative Assembly Area and direct personnel using appropriate communication systems that are available.

Once established, Accountability within the Protected Area is maintained throughout the course of the event. Should missing personnel be identified, search and rescue operations are initiated.

6. Provisions for Onsite Personnel

Exelon maintains an inventory of respiratory protection equipment, anti-contamination clothing, and KI that is made available to emergency workers remaining onsite should conditions warrant. During the course of an emergency, protective actions are considered to minimize radiological exposures or contamination problems associated with all onsite personnel. For those who must work within the restricted area of the affected site, measures that are considered are:

a. Use of Respirators: On-shift and emergency response personnel use respiratory protection in any environment involving exposure to high level gaseous activity or oxygen deficient atmosphere, or where air quality is in doubt. In the presence of airborne particulates, emergency response personnel may be directed by health physics personnel to use full-face filter type respirators. The criteria for issuance of respiratory protection are described in Radiation Protection procedures.

b. Use of Protective Clothing: Anti-contamination clothing, located in the TSC, OSC and station dress out areas is available for use by onsite personnel. The criteria for issuance of protective clothing are described in Radiation Protection procedures.

c. Use of Potassium Iodide (KI): The use of KI may be recommended when a projected dose of 50 Rem Committed Dose Equivalent (CDE) is exceeded for an emergency worker's thyroid. This is the value specified in EPA 400-R-92-001, “Manual of Protective Action Guides and Protective Actions for Nuclear Incidents.”. The stations are responsible for maintaining a supply of KI at their respective site. The Station Emergency Director has the responsibility for approval of issuing KI to Exelon Nuclear emergency workers.

7. Mechanism for Implementing Protective Action Recommendations

Plant conditions, projected dose and dose rates, and/or field monitoring data are evaluated to develop PARs for the purpose of preventing or minimizing exposure to the general public. PARs are provided to the offsite agencies responsible for implementing protective actions for the general public within the 10-mile EPZ. PARs are approved by the Emergency Director in Command and Control.

In an emergency that requires immediate protective actions be taken prior to activation of the offsite emergency facilities, PARs are provided directly to the state and county 24 hour warning points by the Emergency Director.

8. Evacuation Time Estimates (ETEs)

The evacuation time estimates (ETE) were developed in accordance with NUREG/CR-7002, Criteria for Development of Evacuation Time Estimate Studies. Section IV of Appendix E to 10CFR50 requires that an analysis of the time required to evacuate be provided for various sectors and distances within the plume exposure pathway EPZ for transient and permanent residents which includes special facilities schools, nursing homes, hospitals, and recreational areas The evacuation time estimate (ETE) is a calculation of the time to evacuate the plume exposure pathway emergency planning zone (EPZ), which is an area with a radius of about 10 miles around the station.

The ETE study used population data from the 2010 census. The evacuation times are based on a detailed consideration of the EPZ roadway network and population distribution. The ETE Study is contained in an addendum to the station Annex and presents evacuation times for daytime and nighttime scenarios under various weather conditions for the evacuation of various areas around the station.

Within 365 days of the availability of each decennial census data from the U.S. Census Bureau, each station shall develop an ETE analysis using this decennial data and submit it under 10CFR50.4 to the NRC. The ETE analysis shall be submitted to the NRC at least 180 days before using it to form protective action recommendations and providing it to State and local governmental authorities for use in developing offsite protective action strategies.

During the years between decennial censuses, EPZ permanent resident population changes are estimated once a year, but no later than 365 days from the date of the previous estimate, using the most recent U.S. Census Bureau annual resident population estimate and State/local government population data, if available. If at any time during the decennial period, the EPZ permanent resident population increases such that it causes the longest ETE value for the 2-mile zone or 5-mile zone, including all affected Emergency Response Planning Areas, or for the entire 10-mile EPZ to increase by 25 percent or 30 minutes, whichever is less, from the currently NRC approved or updated ETE, the ETE analysis will be updated to reflect the impact of that population increase. These estimates are available for NRC inspection during the period between decennial censuses and will be submitted to the NRC with any updated ETE analysis under 10CFR50.4 no later than 365 days after the determination that the criteria for updating the ETE have been met and at least 180 days before using it to form protective action recommendations and providing it to State and local governmental authorities for use in developing offsite protective action strategies.

9. Capability of Implementing Protective Action Recommendations

The responsibility for implementing protective measures based on protective action guides for the offsite population at risk is the responsibility of the state and local governments. Detailed procedures for public protective actions are contained in the state and other local radiological emergency response plans as appropriate.

The state agencies are responsible for evaluation of Exelon Nuclear recommended protective actions and preparing a recommendation to the Governor, or his/her appointed agent. Only when the state acts under the Governor's order does a recommended protective action become a directed protective action.

If the plant conditions are stable and offsite radiological conditions are such that the public health and safety are not endangered, then return to evacuated areas may be discussed with the affected state(s). State authorities are responsible for actually recommending return and transmitting this recommendation.

10. Implementation of Protective Action Recommendations

The utility, state, and county emergency plans used to implement the protective measures for the plume exposure pathway take numerous factors into consideration as stated in NUREG-0654 II.J. Among these considerations are:

a. Most of the public evacuees are expected to travel in their own vehicles, leaving the EPZ via designated evacuation routes. Station Annexes show the evacuation routes, EPZ Subareas and pre-selected sampling/monitoring points. The state and county plans contain official maps and information on the locations of off-site centers.

b. The population distribution around the station. Population distribution for the plume exposure EPZ is illustrated in the Station Annexes.

c. As indicated in Section E, offsite agencies are notified in the event the E-Plan is activated. State and county agencies have the capability to notify all members of the transient and resident population within the Plume Exposure Pathway EPZ.

d-l. NUREG-0654 II.J.10.d-l items are addressed separately in state and county emergency plans.

m. At a General Emergency classification, Exelon Nuclear will provide the state with recommendations for protective actions for the public. For incidents involving actual, potential, or imminent releases of radioactive material to the atmosphere, EPA 400-R-92-001, the NRC Response Technical Manual (RTM-96) and NUREG-0654, Supp. 3 are used as the basis for the general public PARs.

1) Plant Based PARs

Station specific PAR Flowcharts have been developed to aid Exelon Nuclear personnel providing PARs based on the above. Station specific PAR Flowcharts with Subarea or Sector tables are documented in the Station Annexes, including station-specific requirements regarding PAR determination. These flowcharts and tables provide technically based Protective Action Recommendations based on plant conditions and core damage indicators. Possible plant based PARs issued by Exelon Nuclear at a General Emergency include:

- Shelter of the general public within a two mile radius and five miles downwind (puff release less than PAGs, impediments to evacuation, Hostile Action event).

- Evacuation of the general public within a two mile radius and five miles downwind.

In addition to the above actions to minimize or prevent potential exposure to radiation, a recommendation of heightened awareness will be issued for the remainder of the EPZ consistent with the specific terminology in use by the applicable offsite organizations. For example, some entities use the term shelter to achieve heightened awareness, while others reserve shelter exclusively for dose reduction measures.

2) Dose Based PARs

Evacuation is recommended if projected doses reach the minimum EPA PAGs ($\geq$ 1 Rem EPA TEDE[1] or $\geq$ 5 Rem CDE Thyroid).

Shelter is recommended based on projected doses during a puff release as specified on the station specific PAR Flowcharts contained in the stations respective Emergency Plan Annex.

[1] EPA TEDE is defined as the sum of the doses from external exposure and inhalation from the plume, and from 4 days of external exposure to deposited materials.

Many assumptions exist in dose assessment calculations, involving both source term and meteorological factors, which make computer predictions over long distances highly questionable. However, in the event dose assessment results indicate the need to recommend actions beyond the outer EPZ boundaries, which is past 10 miles, Field Monitoring Teams are dispatched to downwind areas to verify the calculated exposure rates prior to issuing PARs outside the EPZ.

Exelon personnel normally do not have the necessary information to determine whether off site conditions would require sheltering instead of evacuation. An effort to base PARs on external factors (such as road conditions, traffic/traffic control, weather, or offsite emergency response capabilities) is usually performed by the state.

11. Ingestion Pathway Protective Measures

The responsibility for specifying protective measures to be used for the ingestion pathway rests with the state. These measures include the methods for protecting the public from consumption of contaminated water and foodstuffs.

12. Monitoring of Evacuees

The state and county organizations have the capability to register and monitor evacuees at designated reception centers. This capability includes personnel and equipment capable of monitoring residents and transients evacuating from the plume exposure EPZ and arriving at the reception centers, in accordance with FEMA guidelines.

Section K: Radiological Exposure Control

This section of the plan describes the means for controlling emergency worker radiological exposures during an emergency, as well as the measures that are used by Exelon to provide necessary assistance to persons injured or exposed to radiation and/or radioactive materials. Exposure guidelines in this section are consistent with EPA Emergency Worker and Lifesaving Activity Protective Action Guides described in EPA 400-R-92-001.

1. Emergency Exposure Guidelines

Being licensed by the NRC, all Exelon Nuclear generating stations maintain personnel exposure control programs in accordance with 10 CFR 20 under normal operating conditions. The Station Emergency Director is assigned the non-delegable responsibility for authorizing personnel exposure levels under emergency conditions per EPA-400. In emergency situations, workers may receive exposure under a variety of circumstances in order to assure safety and protection of others and of valuable property. These exposures will be justified if the maximum risks or costs to others that are avoided by their actions outweigh the risks to which the workers are subjected. The Emergency Worker Dose Limits are as follows:

Dose Limit (Rem TEDE)	Activity	Condition
0-5	All	Personnel should be kept within normal 10 CFR 20 limits during bona fide emergencies, except as authorized for activities as indicated below.
5-10	Protecting valuable property	Lower dose not practicable.
10-25	Lifesaving or protection of large populations	Lower dose not practicable.
> 25	Lifesaving or protection of large populations	Only on a voluntary basis to persons fully aware of the risks involved.

Limit dose to the lens of the eye to 3 times the above values and doses to any other organ (including skin and body extremities) to 10 times the above values.

Whenever possible, the concurrence of the Station's Radiation Protection (Department) Manager should be secured before exposing individuals to dose equivalents beyond the EPA-400 lower limit.

2. Emergency Radiation Protection Program

The TSC Radiation Protection Manager is the individual responsible for the implementation of the radiation protection actions during an emergency. Radiation protection guidelines include the following:

- Volunteers over forty-five years of age are considered first for any emergency response action requiring exposure greater than normal limits. Routine dose limits shall not be extended to emergency dose limits for declared pregnant individuals. As in the case of normal occupational exposure, doses received under emergency conditions should be maintained as low as reasonably achievable.

- Persons undertaking any emergency operation in which the dose will exceed 25 Rem TEDE should do so only on a voluntary basis and with full awareness of the risks involved including the numerical levels of dose at which acute effects of radiation will be incurred and numerical estimates of the risk of delayed effects.

- In the context of the emergency limits, exposure of workers that is incurred for the protection of large populations may be considered justified for situations in which the collective dose avoided by the emergency operation is significantly larger than that incurred by the workers involved.

- Exposure accountability is maintained and proper personnel radiological monitoring equipment is provided for all personnel during emergency conditions.

- Access to high radiation areas is only permitted with prior approval of the applicable Radiation Protection Manager. Personnel are not allowed to enter known or potential high radiation areas unless their exposure has been properly evaluated.

- Periodic habitability surveys of emergency facilities are performed during an emergency. If the facility is determined to be uninhabitable, the facility is evacuated in order to prevent or minimize exposure to radiation and radioactive materials. Alternate assembly areas are established, as necessary, to relocate and monitor evacuated personnel.

3. Personnel Monitoring

a. Emergency workers will receive DLR badges and personal self-reading dosimeters capable of measuring expected exposures on a real time basis. The capability exists for the emergency processing of DLRs on a 24-hour per day basis, if necessary.

b. Emergency worker dose records are maintained by the Radiation Protection Managers (as appropriate) in accordance with the emergency and radiological protection procedures. Emergency workers are instructed to read their dosimeters frequently. DLRs may be processed with increased periodicity.

4. Non-Exelon Personnel Exposure Authorization

The responsibility for authorizing non-Exelon emergency workers (i.e. state and local agency emergency workers) to receive exposures in excess of the EPA General Public Protective Action Guides rests with the state and county organizations, except when such emergency workers are onsite. Authorization of exposures in excess of EPA General Public Protective Action Guides, in this latter instance, rests with the Station Emergency Director.

5. Contamination and Decontamination

During an emergency, the Station Emergency Director is responsible for preventing or minimizing personnel exposure to radioactive materials deposited on the ground or other surfaces. Special consideration should be given to setting up contamination control arrangements for personnel entering the OSC after completion of assigned activities.

a. During emergency conditions, normal plant contamination control criteria will be adhered to as much as possible. However, these limits may be modified by the applicable Radiation Protection Manager per existing Radiation Protection procedures, should conditions warrant.

b. Contamination Control Means: Personnel found to be contaminated will normally be attended to at decontamination areas located onsite. Temporary decontamination areas can also be set up inside at various locations. Decontamination showers and supplies are provided onsite with additional personnel decontamination equipment and capabilities. Shower and sink drains in the controlled area are routed to the miscellaneous waste processing system where the liquid is processed and monitored prior to discharge. Potentially contaminated emergency vehicles will be surveyed before they are allowed to leave the plant or offsite assembly area. If the survey area is not suitable for monitoring and decontamination due to radiological or other concerns, vehicles will be surveyed at an alternate location.

6. Contamination Control Measures

Controls are established 24 hours per day to contain the spread of loose surface radioactive contamination.

a. Contaminated areas are isolated as restricted areas with appropriate radiological protection and access control. Personnel leaving contaminated areas are monitored to ensure they and their clothing are not contaminated. If contamination above acceptable levels is found, they will be decontaminated in accordance with plant procedures. If normal decontamination procedures do not reduce personnel contamination to acceptable levels, the case will be referred to a competent medical authority. Supplies, instruments, and equipment that are in contaminated areas or have been brought into contaminated areas will be monitored prior to removal. If found to be contaminated, they will be decontaminated using normal plant decontamination techniques and facilities or may be disposed of as radwaste. Contaminated vehicles will be decontaminated before being released.

b. Measures will be taken to control onsite access to potentially contaminated potable water and food supplies. Under emergency conditions when uncontrolled releases of activity have occurred, eating, drinking, smoking, and chewing are prohibited in all station emergency response facilities until such time as habitability surveys indicate that such activities are permissible.

c. Restricted areas and contaminated items will be returned to normal use when contamination levels have been returned to acceptable levels. Contamination control criteria for returning areas and items to normal use are contained in the plant procedures.

7. Decontamination of Relocated Personnel

Nonessential onsite personnel may be evacuated to an offsite relocation center or assembly area, as discussed in Section J. Radiological controls personnel at that location monitor evacuees and determine the need for decontamination. Existing and temporary facilities to limit contamination and exposure will be utilized and established at the site as necessary during an emergency situation. In the event that decontamination of evacuees locally is not possible, personnel will be sent to designated locations for monitoring and decontamination. Provisions for extra clothing are made and suitable decontaminates are available for the expected type of contaminations, particularly with regards to skin contaminations.

Section L: Medical and Public Health Support

This section describes the arrangements for medical services for contaminated injured individuals sent from the station.

1. Offsite Hospital and Medical Services

Hospital personnel have been trained and hospitals are equipped to handle contaminated or radiation injured individuals. Specifically, training of medical support personnel at the agreement hospitals will include basic training on the nature of radiological emergencies, diagnosis and treatment, and follow-up medical care. Station personnel are available to assist medical personnel with decontamination radiation exposure and contamination control. Arrangements, by letter of agreement or contract, are maintained by Exelon Nuclear with a qualified hospital located in the vicinity of each nuclear generating station for receiving and treating contaminated or exposed persons with injuries requiring immediate hospital care. Exelon Nuclear shall provide medical consultants to aid in any special care necessary at these facilities.

Arrangements are also maintained by the corporate office with a qualified major medical facility well equipped and staffed for dealing with persons having radiation injuries and whenever necessary, such persons will be transferred to this major hospital facility for extended specialized treatment. Exelon Nuclear will have available to the staff of this hospital, medical consultants who will provide the direction of the special care necessary for the treatment of persons having radiation injuries.

These agreements are verified annually. Refer to section II.P.4 for details.

2. Onsite First Aid Capability

Each nuclear station maintains onsite first aid supplies and equipment necessary for the treatment of contaminated or injured persons. In general, physicians or nurses are not staffed at Exelon Nuclear's generating stations, and as such, medical treatment given to injured persons is of a "first aid" nature. Each station does have an industrial hygiene advisor. Additionally, the Radiation Protection Technicians at each nuclear station are experienced in control of radioactive contamination and decontamination work. Station personnel are also trained and qualified to administer first aid. At least two of these individuals are available on shift at all times. The functions of station personnel in handling onsite injured people are:

1) Afford rescue;

2) Administer first aid including such resuscitative measures as are deemed necessary;

3) Begin decontamination procedures; and

4) Arrange for suitable transportation to a hospital when required.

Primary attention shall be directed to the actual factors involved in the treatment of casualties, such as: control of bleeding, resuscitation including heart and lung, control of bleeding after resuscitation, protection of wounds from bacterial or radioactive contamination and the immobilization of fractures.

Station personnel provide an initial estimate of the magnitude of surface contamination of the injured and preliminary estimates of total body dose to the injured. Primary rapid and simple decontamination of the surface of the body (when possible and advisable) before transportation to a designated hospital may be carry out as directed or performed by Radiation Protection personnel. When more professional care is needed, injured persons are transported to a local clinic or hospital. Contaminated and injured persons are transported to a dedicated facility specified for each Nuclear Station.

3. Medical Service Facilities

Because of the specialized nature of the diagnosis and treatment of radiation injuries, Corporate Emergency Preparedness maintains an agreement with REAC/TS. REAC/TS is a radiological emergency response team of physicians, nurses, health physicists and necessary support personnel on 24-hour call to provide consultative or direct medical or radiological assistance at the REAC/TS facility or at the accident site. Specifically, the team has expertise in and is equipped to conduct: medical and radiological triage; decontamination procedures and therapies for external contamination and internally deposited radionuclides, including chelation therapy; diagnostic and prognostic assessments or radiation-induced injuries; and radiation dose estimates by methods that include cytogenetic analysis, bioassay, and in vivo counting.

In addition to REAC/TS, respective Station Annexes may identify additional medical consultants, based on agreements with local hospitals, to support personnel training and medical response.

4. Medical Transportation

Arrangements are made by each nuclear generating station for prompt ambulance transport of persons with injuries involving radioactivity to designated hospitals. Such service is available on a 24-hour per day basis and is confirmed by letter of agreement. Radiation monitoring services shall be provided by Exelon Nuclear whenever it becomes necessary to use the ambulance service for the transportation of contaminated persons.

A qualified Radiation Protection person shall accompany the ambulance to the hospital. Additional Radiation Protection personnel may be contacted and dispatched to local hospitals to assist in the monitoring and decontamination of the injured victim and hospital and ambulance facilities and personnel.

Section M: Reentry and Recovery Planning

This section describes the measures to be taken for reentry into the areas of the nuclear power station which have been evacuated as a result of an accident. It also outlines the Exelon Nuclear Recovery Organization and its concepts of operation.

1. Reentry and Recovery

a. Evaluating Reentry Conditions

During an emergency, immediate actions are directed toward limiting the consequences of the accident to afford maximum protection to station personnel and the general public. Once corrective measures have been taken and effective control of the plant has been re-established, a more methodical approach to reentry is taken. This E-Plan divides reentry into two separate categories:

- Reentry *during the emergency phase of an accident* is performed to save a life, control a release of radioactive material, prevent further damage to plant equipment or restore plant equipment. If necessary, this category of reentry may be performed using emergency exposure limits. Briefings, rather than written radiation protection procedures, may be used when making these entries.

  All reentry activities conducted during the emergency are authorized by the Station Emergency Director and coordinated by the OSC Director and the Radiation Protection Manager.

- Reentry *during the recovery phase of an accident* is performed using normal exposure limits. Either normal procedures or procedures that consider existing as well as potential conditions inside affected areas are developed specifically for each reentry.

  Reentry activities during the recovery phase are authorized by the Recovery Director and coordinated by the recovery organization managers in charge of personnel making the reentry.

The following items are considered when planning for any reentry:

- Review of available radiation surveillance data to determine plant areas potentially affected by radiation and/or contamination.

- Review of radiation exposure history of personnel required to participate in the accident mitigation or recovery operations.

- Determination of the need for additional personnel and the sources of these additional personnel.

- Review of adequacy of radiation survey instrumentation and equipment (types, ranges number, calibration, etc.).

- Review of non-radiological hazards and required protective measures (e.g., fire, electrical, Hazmat).
- Pre-planning of activities and briefings for the reentry team that include the following:
  - Personnel knowledge requirements.
  - Methods and procedures that will be employed during the entry.
  - Specific tasks to be performed.
  - Anticipated radiation and contamination levels.
  - Radiation survey equipment and types and ranges of dosimetry required.
  - Shielding requirements and availability.
  - Appropriate communications.
  - Protective clothing and equipment requirements.
  - Access control procedures.
  - Decontamination requirements.
  - De-briefing requirements.
  - Respiratory protection.
- A review of security controls to prevent unauthorized or unintentional entry into hazardous areas.

b. Evaluating Entry into Recovery

The Recovery Phase is that period when major repairs are being performed to return the plant to an acceptable condition and the possibility of the emergency condition degrading no longer exists. Once the plant has been stabilized, contained and controlled, the Recovery Phase may be entered. It is the responsibility of the Station Emergency Director to classify Recovery after obtaining authorization from the Corporate Emergency Director.

Establishment of Recovery can be conducted from any emergency classification level. However, it is possible that the lower classifications of Unusual Event and Alert will conclude with the event being terminated. There may be cases where certain EAL initiating conditions remain exceeded, but the station is under control and no further danger of degradation exists. In such a case, it may be appropriate to enter Recovery. Site Area and General Emergencies will require a Recovery Phase to be established prior to event termination. Exelon Nuclear may consult with/notify cognizant governmental agencies prior to declaring Recovery or event termination.

Termination/Recovery considerations are contained in the implementing procedures to provide guidance for evaluating the risk of entering Recovery without alleviating the intent of the Initiating Condition. The purpose of Recovery is to provide the necessary personnel to handle the long-term activities and to return the plant to an acceptable condition.

The following conditions are guidelines for the determination of establishing Recovery (this is not intended to be a complete list and additional criteria may apply, depending on the specifics of the event):

- The risk to the health and safety of the public has been mitigated.
- Plant parameters and equipment status have been established and controlled.
- In-plant radiation levels are stable or decreasing, and acceptable, given the plant conditions.
- The potential for uncontrolled releases of radioactive material to the environment has been eliminated.
- Environmental monitoring has been established.
- The radioactive plume has dissipated and plume tracking is no longer required (the only environmental assessment activities in progress are those necessary to assess the extent of deposition resulting from passage of the plume).
- Exelon Nuclear workers have been protected.
- Any security threat has been neutralized, and/or plant security is under the direction of Exelon Nuclear personnel.
- Adequate plant safety systems are operable.
- The reactor is in a stable shutdown condition and long-term core cooling is available

- The fuel pool damage has been mitigated, or spent fuel damage has been contained and controlled.
- Primary and/or secondary containment integrity has been established.
- Plant systems and equipment are restored and/or replaced such that plant conditions are stable highly unlikely to degrade further.
- Conditions that initiated the emergency have been contained, controlled, eliminated or stabilized such that the classification is no longer applicable.
- The operability and integrity of radioactive waste systems, decontamination facilities, power supplies, electrical equipment and of plant instrumentation including radiation monitoring equipment.
- Any fire, flood, earthquake or similar emergency condition or threat to security no longer exists.
- All required notifications have been made.
- Discussions have been held with federal, state and county agencies and agreement has been reached to terminate the emergency.
- At an Alert or higher classification, the ERO is in place and emergency facilities are activated.
- Any contaminated injured person has been treated and/or transported to a medical care facility.
- Offsite conditions do not unreasonably limit access of outside support to the station and qualified personnel and support services are available.

It is not necessary that all conditions listed above be met; however, all items must be considered prior to entering the recovery phase. For example, it is possible after a severe accident that some conditions remain that exceed an Emergency Action Level, but entry into the Recovery Phase is appropriate.

2. Recovery Organization

Once plant conditions have been stabilized and the Recovery Phase has been initiated, the Emergency Director may form a Recovery Organization for long-term operations. These types of alterations will be discussed with the NRC prior to implementation.

- For events of a minor nature, (i.e. for Unusual Event classifications) the normal on shift organization is normally adequate to perform necessary recovery actions.

- For events where damage to the plant has been significant, but no offsite releases have occurred and/or protective actions were not performed, (i.e. for Alert classifications) the station Emergency Response Organization, or portions thereof, should be adequate to perform the recovery tasks prior to returning to the normal station organization.

- For events involving major damage to systems required to maintain safe shutdown of the plant and offsite radioactive releases have occurred, (i.e. for Site Area Emergency or General Emergency classifications) the station recovery organization is put in place.

The specific members of the station recovery organization are selected based on the sequence of events that preceded the recovery activities as well as the requirements of the recovery phase. The basic framework of the station recovery organization is as follows:

a. The Recovery Director: The Corporate Emergency Director is initially designated as the Recovery Director. The Recovery Director is charged with the responsibility for directing the activities of the station recovery organization. These responsibilities include:

    - Ensuring that sufficient personnel, equipment, or other resources from Exelon and other organizations are available to support recovery.

    - Directing the development of a recovery plan and procedures.

    - Deactivating any of the plant Emergency Response Organization which was retained to aid in recovery, in the appropriate manner. Depending upon the type of accident and the onsite and offsite affects of the accident, portions of the ERO may remain in place after initiation of the recovery phase.

    - Coordinating the integration of available federal and state assistance into onsite recovery activities.

    - Coordinating the integration of Exelon support with federal, state and county authorities into required offsite recovery activities.

    - Approving information released by the public information organization which pertains to the emergency or the recovery phase of the accident.

    - Determining when the recovery phase is terminated.

b. The Recovery Plant Manager: The Station Manager or a designated alternate will become the Recovery Plant Manager. The Recovery Plant Manager reports to the Recovery Director and is responsible for:

    - Coordinating the development and implementation of the recovery plan and procedures.

- Ensuring that adequate engineering activities to restore the plant, are properly reviewed and approved.
- Directing all onsite activities in support of the station recovery effort.
- Designating other Exelon recovery positions required in support of onsite recovery activities.

c. The Recovery Offsite Manager: A senior Corporate Emergency Preparedness or Regulatory Affairs individual, or a designated alternate, is the Recovery Offsite Manager. The Recovery Offsite Manager reports to the Recovery Director and is responsible for:

- Providing liaison with offsite agencies and coordinating Exelon assistance for offsite recovery activities.
- Coordinating Exelon ingestion exposure pathway EPZ sampling activities and the development of an offsite accident analysis report.
- Developing a radiological release report.
- Designating other Exelon recovery positions required in support of offsite recovery activities.

d. The Company Spokesperson: A senior Exelon management individual is designated as the Company Spokesperson. The Company Spokesperson reports to the Recovery Director and is responsible for:

- Functioning as the official spokesperson to the press for Exelon on all matters relating to the accident or recovery.
- Coordinating non-Exelon public information groups (federal, state, county, etc.).
- Coordinating media monitoring and rumor control.
- Determining what public information portions of the ERO will remain activated.

The remainder of the recovery organization is established and an initial recovery plan developed at the end of the emergency phase or just after entry into the recovery phase. Consideration is given to recovery activity needs and use of the normal station organizations. Individual recovery supervisors may be designated in any or all of the following areas:

- Training
- Radiation Protection
- Chemistry

- Technical/Engineering Support
- Nuclear Oversight
- Operations
- Security
- Maintenance
- Special Offsite Areas (Community Representatives, Environmental Samples, Investigations, etc.)

3. Recovery Phase Notifications

When the decision is made to enter the recovery phase, all members of the Exelon ERO are informed of the change. All Exelon personnel are instructed of the Recovery Organization and their responsibilities to the recovery effort.

4. Total Population Exposure

Total population exposure calculations are performed and periodically updated during the recovery phase of an accident. A method has been developed for estimating the total population exposure resulting from the accident from data collected in cooperation with the state and other federal agencies. Total population exposure is determined through a variety of procedures including:

- Examination of pre-positioned dosimeters.
- Bioassay.
- Estimates based on release rates and meteorology.
- Estimates based on environmental monitoring of food, water, and ambient dose rates.

The state will be the lead agency in the collection and analysis of environmental air, soil, foliage, food, and water samples and for the generation of radiation monitoring reports. Exelon Nuclear environmental sampling activities will be coordinated with state efforts, as requested, and results shared with cognizant agencies.

Section N: Drill and Exercise Program

This section describes the Drill and Exercise Program that Exelon Nuclear has implemented to:

- Verify the adequacy of the Emergency Preparedness Program.
- Develop, maintain, and evaluate the capabilities of the ERO to respond to emergency conditions and safeguard the health and safety of station personnel and the general public.
- Identify deficiencies in the E-Plan and the associated procedures, or in the training of response personnel, and ensure that they are promptly corrected.
- Ensure the continued adequacy of emergency facilities, supplies and equipment, including communications networks.

The Exercise Cycle is defined as a six-year period of time until the performance of the first evaluated Hostile Action based exercise. Following performance of the first Hostile Action based exercise, the cycle duration time will change from a six-year period to an eight-year period. Per Section IV.F.2.j of 10CFR50 Appendix E, the first eight-year exercise cycle for a site will begin in the calendar year in which the first hostile action exercise is conducted (but no later than December 31, 2015). During each eight calendar year exercise cycle, sites shall vary the content of scenarios during exercises to provide the opportunity for the ERO to demonstrate proficiency in the key skills necessary to respond to the following scenario elements:

- hostile action directed at the plant site,
- no radiological release or an unplanned minimal radiological release that does not require public protective actions,
- an initial classification of or rapid escalation to a Site Area Emergency or General Emergency,
- implementation of strategies, procedures, and guidance developed under § 50.54(hh)(2), and integration of offsite resources with onsite response.

Exelon uses drill and exercise scenarios that provide reasonable assurance that anticipatory responses do not result from preconditioning of participants. Such scenarios include a wide spectrum of radiological releases and events, including hostile action

1. Exercises

a. Biennial Exercises

Federally prescribed exercises are conducted at each nuclear station in order to test the adequacy of timing and content of implementing procedures and methods; to test emergency equipment and communication networks; and to ensure that emergency personnel are familiar with their duties. Exercises involving offsite agency participation, required under Section F.2.c & d to 10 CFR 50 Appendix E, are conducted at each nuclear station based on FEMA-REP-14 guidance and the respective state and local emergency response plans.

Partial participation means appropriate offsite authorities shall actively take part in the exercise sufficient to test direction and control functions to include protective action decision making related to Emergency Action Levels and communication capabilities among affected state and local authorities and Exelon Nuclear.

Full participation exercises will include appropriate offsite local and state authorities and Exelon personnel physically and actively taking part in testing the integrated capability to adequately assess and respond to an accident at the plant. Additionally, full participation exercises will includes testing the major observable portions of the onsite and offsite emergency plans and mobilization of state, local, and Exelon personnel and other resources in sufficient numbers to verify the capability to respond to the accident scenario.

Where partial or full participation by offsite agencies occurs, the sequence of events simulates an emergency that results in the release of radioactivity to the offsite environs, sufficient in magnitude to warrant a response by offsite authorities.

b. Off-Year Exercises

An Off-Year Exercise is conducted at each station during the calendar year when an NRC Evaluated Exercise is not scheduled. An Off-Year Exercise shall involve a combination of at least two facilities in order to demonstrate at least two of the functions of management and coordination of emergency response, accident assessment, protective action decision-making, or plant system repair and corrective actions. For Off-Year Exercises involving no or limited participation by offsite agencies, emphasis is placed on development and conduct of an exercise that is more mechanistically and operationally realistic. Players will be able, by implementing appropriate procedures and corrective actions, to determine the outcome of the scenario to a greater extent than when core damage and the release of radioactivity are prerequisites for demonstration of all objectives.

c. Pre-Exercises

Pre-Exercise Drills should be conducted prior to a Biennial Exercise where Federal Emergency Management Agency (FEMA) evaluation of state and local performance is expected. Pre-Exercise Drills may be conducted prior to Off-Year Exercises that only involve the utility. The Pre-Exercise is a training and experience tool for the participants to sharpen awareness and practice skills necessary to accomplish specific E-Plan duties and responsibilities.

Exercises provide an opportunity to evaluate the ability of participating organizations to implement a coordinated response to postulated emergency conditions. Exercises are conducted to ensure that all major elements of the E-Plan and preparedness program are demonstrated at least once in each exercise cycle. Each station shall conduct at least one off-hours exercise between 6:00 p.m. and 4:00 a.m. every exercise cycle. Weekends and holidays are also considered off-hours periods. Provisions will be made for qualified personnel from Exelon, federal, state, or local governments to observe and critique each exercise as appropriate.

2. Drills

In addition to the exercises described above, Exelon conducts drills for the purpose of testing, developing, and maintaining the proficiency of emergency responders. Drills are scheduled on the Emergency Preparedness annual events plan, which contains provisions for the following drills:

a. Communication Drills

- Monthly - The capability of the Nuclear Accident Reporting System (NARS) to notify the state and local government warning points and EOCs within the plume exposure pathway EPZ are demonstrated. Also, the capability to notify the NRC is demonstrated using the Emergency Notification System (ENS) and the Health Physics Network (HPN) where available.

- Quarterly - The capability to notify the NRC Region, FEMA Region, American Nuclear Insurers (ANI) and federal emergency response organizations as listed in the Emergency Response Facilities (ERF) Telephone Directory are demonstrated from the EOF. Also, computer and critical communications equipment shall be functionally tested.

  Communications between states outside the 10 mile EPZ but within the 50-mile EPZ are tested by the host state.

- Annually - The emergency communications systems outlined in Section F are fully tested. This includes (1) communications between the plant and the state and local EOCs and Field Monitoring Teams, and (2) communications between the CR, the TSC, and the EOF.

Each of these drills includes provisions to ensure that all participants in the test are able to understand the content of the messages.

b. Fire Drills: Fire drills shall be conducted at each nuclear station in accordance with Station Technical Specifications and/or Station procedures.

c. Medical Emergency Drills: A medical emergency drill, involving a simulated contaminated individual, and containing provisions for participation by local support services organizations (i.e., ambulance and support hospital) are conducted annually at each nuclear station. local support service organizations, which support more than one station, shall only be required to participate once each calendar year. The offsite portions of the medical drill may be performed as part of the required biennial exercise.

d. Radiological Monitoring Drills: Plant environs and radiological monitoring drills (onsite and offsite) are conducted annually. These drills include collection and analysis of all sample media (such as, water, vegetation, soil, and air), and provisions for communications and record keeping.

e. Health Physics Drills: Health Physics Drills involving a response to, and analysis of, simulated airborne and liquid samples and direct radiation measurements within the plant are conducted semi-annually. At least annually, these drills shall include a demonstration of the sampling system capabilities, or the Core Damage Assessment Methodology (CDAM) objectives as applicable.

f. Augmentation Drills: Augmentation drills serve to demonstrate the capability of the process to augment the on-shift staff with a TSC, OSC and EOF in a short period after declaration of an emergency. These drills are conducted using the following methods:

- Quarterly, each station will initiate an unannounced off-hours ERO augmentation drill where no actual travel is required. Each region's Corporate ERO shall also perform an unannounced off-hours ERO augmentation drill that may be conducted independent of, or in conjunction with, a station drill.

- At least once per exercise cycle, an off-hours unannounced activation of the ERO Notification System with actual response to the emergency facilities is conducted by each station. Each region's Corporate ERO need only participate once per cycle.

g. Accountability Drills: Accountability drills are conducted annually. The drill includes identifying the locations of all individuals within the protected area.

3. Conduct of Drills and Exercises

Advance knowledge of the scenario will be kept to a minimum to allow "free-play" decision making and to ensure a realistic participation by those involved. Prior to the drill or exercise, a package will be distributed to the controllers and evaluators that will include the scenario, a list of performance objectives, and a description of the expected responses.

For each emergency preparedness exercise or drill conducted, a scenario package is developed that includes at least the following:

a. The basic objective(s) of the drill or exercise and the appropriate evaluation criteria.

b. The date(s), time period, place(s), and participating organizations.

c. The simulated events.

d. A time schedule of real and simulated initiating events.

e. A narrative summary describing the conduct of the scenario to include such things as simulated casualties, offsite fire department assistance, rescue of personnel, use of protective clothing, deployment of radiological monitoring teams, and public information activities.

f. A description of the arrangements for and advance materials to be provided to official observers.

Prior approval by the appropriate station management is obtained for all drills and exercises conducted in support of the Emergency Preparedness Program.

4. Critique and Evaluation

Drill and exercise performance objectives are evaluated against measurable demonstration criteria. As soon as possible following the conclusion of each drill or exercise, a critique is conducted to evaluate the ability of the ERO to implement the E-Plan and procedures.

A formal written critique report is prepared by Emergency Preparedness following a drill or exercise involving the evaluation of designated objectives or following the final simulator set with ERO participation. The report will evaluate the ability of the ERO to respond to a simulated emergency situation. The report will also contain corrective actions and recommendations.

Biennially, representatives from the NRC observe and evaluate the licensee’s ability to conduct an adequate self-critical critique. For partial and full offsite participation exercises both the NRC and FEMA will observe, evaluate, and critique.

Critique comments identified by participants during a training drill where objectives are not formally being evaluated will be reviewed and dispositioned by Emergency Preparedness, but do not require a formal report.

5. Resolution of Drill and Exercise Findings

The critique and evaluation process is used to identify areas of the Emergency Preparedness Program that require improvement. The Emergency Preparedness Manager is responsible for evaluation of recommendations and comments to determine which items will be incorporated into the program or require corrective actions, and for the scheduling, tracking, and evaluation of the resolution to the items.

Whenever exercises and/or drills indicate deficiencies in the E-Plan or corresponding implementing procedures, such documents will be revised as necessary.

Remedial exercises will be required if the emergency plan is not satisfactorily tested during the Biennial Exercise, such that NRC, in consultations with FEMA, cannot find reasonable assurance that adequate protective measures can be taken in the event of a radiological emergency. The extent of State and local participation in remedial exercises must be sufficient to show that appropriate corrective measures have been taken regarding the elements of the plan not properly tested in the previous exercises.

Section O: Emergency Response Training

This section describes the emergency response training that is provided to those who may be called upon in an emergency. It outlines the training provided by Exelon Nuclear to both its employees and offsite support personnel requiring site access.

1. Assurance of Training

The E-Plan Training Program assures the training, qualification, and requalification of individuals who may be called on for assistance during an emergency. Specific emergency response task training, prepared for each E-Plan position, is described in lesson plans and study guides. The lesson plans, study guides, and written tests are contained in the ERO Training Program. Responsibilities for implementing the training program are contained in plant procedures. A description of the content of the training courses is given in TQ-AA-113.

Offsite training is provided to support organizations that may be called upon to provide assistance in the event of an emergency. The following outlines the training received by these organizations:

a. Emergency Preparedness shall annually train, or document an annual written offer to train, those non-Exelon Nuclear organizations referenced in the Station Annexes that may provide specialized services during a nuclear plant emergency (e.g., local law enforcement, fire-fighting, medical services, transport of injured, etc.). The training made available is designed to acquaint the participants with the special problems potentially encountered during a nuclear plant emergency, notification procedures and their expected roles. Those organizations that must enter the site shall also receive site-specific emergency response training and be instructed as to the identity (by position and title) of those persons in the onsite organization who will control their support activities.

b. Training of offsite emergency response organizations is described in their respective radiological emergency plans, with support provided by Exelon Nuclear as requested.

2. Functional Training of the ERO

In addition to general and specialized classroom training, members of the Exelon Nuclear ERO receive periodic performance based emergency response training. Performance based training is provided using one or more of the following methods:

- Familiarization Sessions: A familiarization session is an informal, organized tabletop discussion of predetermined objectives.

- Walk Throughs: Consists of a facility walk through to familiarize plant ERO personnel with procedures, communications equipment, and facility layout. Walk throughs also provide the opportunity to discuss facility activities, responsibilities and procedures with an instructor.

- Drills: A drill is a supervised instruction period aimed at testing, developing and maintaining skills in a particular operation. Drills described in Section N of this plan are a part of training. These drills allow each individual the opportunity to demonstrate the ability to perform their assigned emergency functions. During drills, on-the-spot correction of erroneous performance may be made and a demonstration of the proper performance offered by the Controller.

3. First Aid Response

Selected station personnel are trained in accordance with the Exelon Nuclear approved First Aid Program. First-Aid Teams will likely be augmented with additional personnel such as Fire Brigade Members and other personnel qualified to assist in the rescue.

4. Emergency Response Organization Training Program

Exelon Nuclear ERO personnel who are responsible for implementing this plan receive specialized training. The training program for emergency response personnel is developed based on the requirements of 10 CFR 50, Appendix E and position specific responsibilities as defined in this document.

On-Shift emergency response personnel perform emergency response activities as an extension of their normal duties and are trained annually as part of their duty specific training. Additional Emergency Preparedness information is provided as part of the Station Nuclear General Employee Training.

New ERO personnel receive an initial overview course that familiarizes them with the E-Plan by providing basic information in the following areas as well as specific information as delineated in the sections below:

- Planning Basis
- Emergency Classifications
- Emergency Response Organization and Responsibilities
- Call-out of Emergency Organization
- Emergency Response Facilities
- Communications Protocol/Emergency Public Information
- Offsite Organizations

Emergency response personnel in the following categories receive knowledge and/or performance based training initially and retraining thereafter on an annual basis as defined within Appendix 4 or applicable Station Annex:

a. Directors, Managers and Coordinators within the station and corporate ERO: Personnel identified by the Emergency Response Organization Telephone Directory as Directors, Managers and Coordinators for the station and corporate EROs receive training appropriate to their position in accordance with the approved ERO Training Program. These personnel receive specialized training in the areas of:

   - Notifications
   - Emergency Classifications
   - Protective Action Recommendations
   - Emergency Action Levels
   - Emergency Exposure Control

   Selected Directors, Managers, Coordinators and Shift Emergency Directors receive training in accordance with the approved ERO Training Program. Training in accident assessment sufficient to classify an event and to mitigate the consequences of an event are also covered.

b. Personnel Responsible for Accident Assessment:

   The skills and knowledge required to perform plant stabilization and mitigation are a normal function of operations specific positions, as identified in Section B of this plan. Power changes and planned and unplanned reactor shutdowns are handled on a normal operation basis. Subsequent plant stabilization and restoration is pursued utilizing normal operating procedures. Licensed Operators receive routine classroom and simulator training to ensure proficiency in this area.

   1) Active Senior Licensed Control Room Personnel shall have training conducted in accordance with the approved ERO Training Program such that proficiency is maintained on the topics listed below. These subjects shall be covered as a minimum on an annual basis.

      - Event Classification.
      - Protective Action Recommendations.
      - Radioactive Release Rate Determination.
      - Notification form completion and use of the Nuclear Accident Reporting System (NARS).
      - Federal, state and local notification procedures as appropriate.

- Site specific procedures for activating the onsite and offsite ERO.

To remove peripheral duties from the Operations shift, the following group of positions responsible for accident assessment, corrective actions, protective actions, and related activities receive the training listed below:

2) Core Damage Assessment Personnel: During an emergency when core/cladding damage is suspected, a specialized group of trained individuals perform core damage assessment. At a minimum, personnel responsible for core damage assessment receive classroom and hands-on training in the following areas:

   - Available Instrumentation and Equipment
   - Isotopic Assessment and Interpretation
   - Computerized Core Damage Assessment Methodology (CDAM) and/or proceduralized assessment methods.

c. Radiological Monitoring Teams and Radiological Analysis Personnel

1) Offsite Radiological Monitoring: Offsite radiological monitoring is performed by trained individuals who provide samples and direct readings for dose assessment calculations and dose projection comparisons.

   Personnel identified as members of Field Monitoring Teams receive training in accordance with the approved training program. Field Monitoring Team members receive classroom and hands-on training in the following areas:

   - Equipment and Equipment Checks
   - Communications
   - Plume Tracking Techniques

2) Personnel Monitoring: Personnel monitoring is performed by trained individuals who monitor station personnel and their vehicles for contamination during an emergency. Personnel Monitoring Team members receive classroom and hands-on training in the following areas:

   - Personnel Monitoring Equipment and Techniques
   - Decontamination Techniques for Personnel
   - Decontamination Techniques for Vehicles

3) Dose Assessment: Dose Assessment training includes the skills and knowledge necessary for calculation and interpretation of an offsite release and its impact on the environment under varying meteorological conditions. Individuals responsible for performing dose assessment are trained in the following areas:

- Computerized Dose Assessment
- Protective Action Recommendations
- Field Monitoring Team Interface
- Protective Action Guidelines associated with offsite plume exposure doses
- Basic Meteorology

d. Police, Security, and Fire Fighting Personnel

1) Local Police and Fire Fighting Personnel: The local Police and Fire Departments are invited to receive training as outlined in Part 1.a of this section.

2) Security Personnel: Station security personnel are trained in accordance with training defined by the Nuclear General Employee Training (NGET) and Exelon Nuclear Security Program.

3) Fire Control Teams (fire brigades): Station fire brigades are trained in accordance with training defined by the Exelon Nuclear Fire Protection Program. Fire Brigade personnel are considered the primary members of rescue teams and will receive the appropriate EP training as part of their training program. Training also includes rescue of personnel from hazardous environments.

e. Repair and Damage Control Teams: Operations, Maintenance and Radiation Protection personnel are trained as part of their normal job specific duties to respond to both normal and abnormal plant operations.

Operations personnel are trained to: (1) recognize and to mitigate degrading conditions in the plant, (2) mechanically and electrically isolate damaged or malfunctioning equipment, (3) isolate fluid leaks, and (4) minimize transients.

Maintenance personnel are trained to troubleshoot and repair damaged or malfunctioning electrical, mechanical, or instrumentation systems as appropriate to their job classification.

Radiation Protection personnel are trained to assess the radiological hazards associated with equipment repair and instruct personnel as to the appropriate protective clothing requirements, respiratory protection requirements, stay times, and other protective actions specific to the conditions present.

At least 50% of personnel from those departments, who are potential responders to the OSC as Damage Control Team members, are required to be qualified in the use of respiratory protection equipment. This includes in-plant supervision and craft/technicians for the following departments:

- Operations
- Radiation Protection
- Chemistry
- Maintenance (mechanical, electrical and I&C)

f. First Aid and Rescue Personnel: First aid and rescue team members receive training as outlined in Part 3 of this section.

g. Local Support Service Personnel: Local support service personnel providing assistance during an emergency are invited to receive training as outline in Parts 1.a and 1.b of this section.

h. Medical Support Personnel: Onsite medical personnel receive specialized training in the handling of contaminated victims and hospital interface. Offsite ambulance and hospital personnel are offered annual training in accordance with a program provided by Emergency Preparedness.

i. Public Information Personnel: Corporate and station personnel responsible for disseminating emergency public information and responding to media and public information requests receive specialized public information training.

j. Communications Personnel: ERO personnel receive training on communications protocol as a part of the initial Emergency Response Overview Course. Personnel using specialized communications equipment that is not part of their normal daily function receive initial and requalification training on the equipment. Personnel involved in notifications to offsite agencies receive specialized training in the notification process.

5. General, Initial, and Annual Training Program Maintenance

a. Station Departments and Emergency Preparedness share the responsibility for ensuring that the ERO receives all necessary training and retraining. In order to carry this out, responsibilities are assigned as follows:

Corporate Responsibilities for Corporate ERO Personnel

- Scheduling and conducting initial, retraining, and make-up classes.

- Acting as the sole contact point for ensuring attendance.
- Record keeping for the training courses, including dates of scheduled classes and non-attendance information.
- Verifying that all emergency response personnel training records are current.
- Ensure instructional materials are prepared and reviewed every two years.

Station Responsibilities for Station ERO Personnel

- Station management shall ensure the attendance of onsite personnel for training, including required E-Plan courses.
- Each Station shall conduct onsite emergency personnel initial and retraining for station Emergency Response Personnel using approved lesson plans.
- The Station Training Department shall provide those shift personnel included in a continuing training program an annual review of the following items as a minimum:
  - Assembly Areas
  - Emergency Response Facility assignment
  - Potential Hazards (radiological and non-radiological)
  - Anticipated actions including assembly requirements, protective equipment requirements (clothing, masks, SCBA, etc.), the use of KI, emergency exposure limits and accountability requirements.

b. Initial and Requalification ERO Training: The proficiency of emergency response personnel (as defined in 10 CFR 50 Appendix E) is ensured by the following means:

- Assigning persons to emergency duties that are similar to those performed as a part of their regular work assignment or experience.
- Initial training and annual retraining on applicable generic and site-specific portions of the E-Plan and the corresponding implementing procedures. Individuals not demonstrating the required level of knowledge in initial or retraining classes receive additional training on the areas requiring improvement. Annual retraining is conducted on a calendar year basis, or as indicated in the Station Annex.
- Training on E-Plan changes shall be completed within one hundred twenty (120) days of implementation of the change.

- Participation in exercises and/or drills as developed or authorized by the Emergency Preparedness Department and designed to sharpen those skills that they are expected to use in the event of a nuclear emergency.

All personnel assigned position specific responsibilities in the ERO are documented by inclusion in the Emergency Response Organization Telephone directory listing of positions and personnel.

c. Nuclear General Employee Training (NGET): All personnel with unescorted station access are provided with initial orientation training on the notification and instruction methods used in the event of an emergency. Additionally, all badged individuals also receive initial orientation on the basic principles of radiological safety including the effects of radiation and the theory and use of radiation detection devices. Appropriate actions for escorted individuals shall be the responsibility of the escort. NGET provides initial and annual requalification training on the basic elements of the E-Plan for all personnel working at the plant. Specifically, these elements include:

- Station emergency alarms and their meaning
- Assembly areas
- Site and Exclusion Area Evacuation procedures
- Special precautions and limitations during an emergency
- Purpose of the E-Plan

Section P: Responsibility for the Maintenance of the Planning Effort

This section describes the responsibilities for development, review and distribution of the E-Plan and actions that must be performed to maintain the emergency preparedness program. It also outlines the criteria for insuring that personnel who perform the planning are properly trained.

1. Emergency Preparedness Staff Training

The Emergency Preparedness staff is involved in maintaining an adequate knowledge of state of the art planning techniques and the latest applications of emergency equipment and supplies. At least once each calendar year each member of the Emergency Preparedness staff is involved in one of the following activities:

- Training courses specific or related to emergency preparedness.
- Observation of or participation in drills and/or exercises at other stations.
- Participation in industry review and evaluation programs.
- Participation in regional or national emergency preparedness seminars, committees, workshops or forums.
- Specific training courses in related areas, such as systems, equipment, operations, radiological protection, or Problem Identification & Resolution (PI&R).

2. Authority for the Emergency Preparedness Effort

The Site Vice Presidents are responsible for the safe and reliable operation of the generating stations within Exelon Nuclear. The issuance and control of this plan and the activities associated with emergency preparedness at Exelon Nuclear shall be the overall responsibility of the Vice President, Fleet Support. This individual is assigned the responsibility for overall implementation of the E-Plan and station Annexes.

3. Responsibility for Development and Maintenance of the Plan

Each regional Emergency Preparedness Manager is responsible for the overall radiological emergency preparedness program associated with the operation of the nuclear power stations within their respective region and to administer the program to ensure availability of resources in the event of an emergency. The regional Emergency Preparedness Managers report to an EP Director who in turn reports to the Vice President, Fleet Support.

The Emergency Preparedness Managers are assisted by regional corporate and Station Emergency Preparedness staff. Specific responsibilities include the following:

Program Administration

- Develop and maintain the E-Plan, Station Annexes, implementing procedures and administrative documents.
- Develop and maintain 50.54(q) evaluations for changes to EP documents.
- Coordinate and maintain the EP Activities Schedule.
- Develop and maintain working relationships and coordinate meetings with Federal, state and local agencies.
- Ensure integration of plans between Exelon and offsite agencies.
- Provide an opportunity to discuss Emergency Action Levels and the availability of Nuclear Oversight audit results relating to interface with governmental agencies.
- Coordinate, negotiate and maintain agreements and contracts with offsite agencies and support organizations.
- Obtain Letters of Agreement with major medical facilities, and medical consultants specifically skilled in the medical aspects of radiation accidents and other medical consultants as might be necessary for the case of a person involved in a radiation incident.
- Coordinate the development and annual distribution of the station's public information publication.
- Coordinate and administer the Self Evaluation Program to monitor and evaluate the adequacy of the Emergency Preparedness Program.
- Coordinate and support EP Self-Assessments, Audits and Inspections.
- Ensure the documentation and resolution of adverse conditions in the emergency preparedness program discovered through drills, audits, etc. in accordance with the Exelon Nuclear Corrective Action Program.
- Coordinate and develop Operational Experience responses.
- Coordinate, document and review Performance Indicator data and reports.
- Provide oversight of Drill and Exercise Performance (DEP) evaluations during License Operator Requalification (LOR) Training.
- Coordinate and conduct EP Event reviews and reports.

- Maintain adequate documentation/files to support EP activities.
- Develop and manage the EP budget.
- Maintain the Emergency Response Facilities (ERF) Telephone Directory.

Drills and Exercises

- Coordinate and maintain the EP Drill and Exercise Schedule.
- Coordinate and conduct exercises and drills.
- Coordinate NRC, FEMA, state, and local exercise scheduling and development activities.
- Coordinate drill and exercise scenario development activities.
- Develop and publish drill and exercise scenario manuals.
- Coordinate and perform controller and evaluator functions for drills and exercises.
- Coordinate response cells for drills and exercises.
- Develop and issue drill and exercise reports.

Facilities and Equipment

- Provide maintenance and administration of the Alert and Notification System (ANS).
- Provide maintenance of the ERO call-out system.
- Ensure the Emergency Response Facilities are maintained in a constant state of readiness.
- Coordinate and review the EP equipment inventories.
- Coordinate and conduct maintenance and testing of the communications systems.
- Maintain the EP computer applications.

ERO Qualification and Administration

- Develop and maintain ERO Lesson Plans, Examinations, and Qualification Cards.
- Maintain EP NGET training content.

- Coordinate, schedule and conduct ERO qualification and requalification training.
- Oversee the maintenance of ERO training records.
- Maintain and coordinate publishing of the ERO Duty Rosters.
- Provide adequate oversight and support for the training of offsite response personnel.
- Coordinate conduct of Emergency Medical Assistance Program training.
- Coordinate annual training for the media.

Each Plant Manager is responsible for implementation of the E-Plan at their respective Stations. The Plant Manager has the following responsibilities for maintenance of the Emergency Preparedness Program:

- Ensure the adequate staffing and training of station ERO members.
- Schedule and conduct drills and exercises to maintain the state of readiness of the Emergency Preparedness Program.
- Ensure the operational readiness of station facilities and communication systems for use during an emergency.
- Ensure the operational readiness of station emergency equipment and supplies is maintained.
- Ensure the emergency response procedures and the training and retraining of Station Emergency Response personnel are maintained.

4. E-Plan and Agreement Revisions

The E-Plan, its Annexes, and supporting Agreements are reviewed on an annual basis. This review may also include applicable state and local emergency response agencies based on established agreements.

The annual E-Plan review/update includes required changes identified during audits, assessments, training, drills, and exercises. The Emergency Preparedness Director is responsible for determining which recommended changes are incorporated into a plan or emergency procedure revision. In those years when the review does not warrant a revision, a letter to that affect will be issued.

The E-Plan and its Annexes shall be revised as needed and the most current approved revisions shall remain in effect so long as they are certified as current. Revisions to the E-Plan are reviewed by the Stations' Plant Operational Review Committee (PORC) prior to approval. Changes to the plan are made without NRC approval only if such changes do not result in a reduction in effectiveness of the plan per 10 CFR 50.54(q), and the plan as changed continues to meet the standards of 10 CFR 50.47(b) and the requirements of 10 CFR 50, Appendix E. Proposed changes that reduce or have a potential to reduce the effectiveness of the approved plan are not implemented without prior approval by the NRC.

- Proposed revisions to the E-Plan and Station Annexes shall be completed in accordance with the Exelon Nuclear review and approval processes.

- The E-Plan and Station Annexes shall normally be implemented simultaneously to be consistent at all sites. Regional issues may result in slight delayed implementation within one region; however, the changes are implemented simultaneously at each station and corporate response facility within the associated region.

- E-Plan and Station Annex changes shall be categorized as (1) minor/ administrative or (2) significant programmatic changes. Minor/administrative changes shall be implemented within 30 days of approval. Significant programmatic changes shall be implemented as soon as practical and within 60 days of final approval simultaneously at all sites.

- After review and approval, the E-Plan and Station Annexes shall be:

  a) Reviewed by the applicable Emergency Preparedness Manager(s) and EP Director, or designee(s), and

  b) Approved for use by the Vice President, Fleet Support or designee.

- The Implementing Procedures shall be developed and revised concurrent with the E-Plan and Annexes, and reviewed every two years.

Annually, each Letter of Agreement is reviewed and certified current in order to assure the availability of assistance from each supporting organization not already a party to the individual State Plan for Radiological Accidents.

5. E-Plan Distribution

E-Plan manuals, Station Annexes and implementing procedures are distributed on a controlled basis to the Emergency Response Facilities. All controlled documents holders are issued revision changes upon approval. Selected Federal, state, and local agencies, and other appropriate locations requiring them are also issued copies. Procedures are in place that control the revision of the E-Plan and require the use of revision bars and individual page identifications (i.e. section of plan, revision number, etc.).

6. Supporting Emergency Response Plans

Other plans that support this E-Plan are:

- NUREG-1471, US Nuclear Regulatory Commission, "Concept of Operations: NRC Incident Response"
- National Response Framework (NRF), Nuclear/Radiological Incident Annex.
- Illinois Plan for Radiological Accidents (IPRA).
- The Iowa Emergency Plan.
- State of Wisconsin Peacetime Radiological Emergency Response Plan.
- Commonwealth of Pennsylvania Radiological Emergency Response Plan.
- State of Maryland Radiological Emergency Response Plan.
- Department of Energy, Region 5, “Radiological Assistance Plan"
- INPO Emergency Resources Manual.
- Nuclear Station Security Plans - Note: The Station Security Plan contains industrial security information that must be withheld from public disclosure under provisions of 10 CFR 2.790(d).
- State of New Jersey Radiological Emergency Response Plan for Nuclear Power Plants – Annex B: Oyster Creek
- Emergency Operations Plan for Ocean County

7. Implementing and Supporting Procedures

Appendix 2 of this plan contains a listing, by number and title, of those procedures that implement this plan during an emergency (EP-AA/MA/MW-11X series procedures). Additionally, administrative procedures that outline the steps taken to maintain the Exelon Emergency Preparedness Program have been developed (EP-AA/MA/MW-12X series procedures) and are listed in Appendix 2.

8. Cross Reference to Planning Criteria

The Plan is formatted in the same manner as NUREG-0654, FEMA-REP-1, Revision 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in support of Nuclear Power Plants." The use of this format lends itself to uncomplicated comparison of the criteria set forth in NUREG-0654, FEMA-REP-1.

9. Audit/Assessment of the Emergency Preparedness Program

To meet the requirements of 10 CFR 50.54(t), Exelon Nuclear Oversight shall coordinate an independent review the Emergency Preparedness Program to examine conformance with 10 CFR 50.47, 10 CFR 50.54, and 10 CFR 50 Appendix E. Included in the audit/assessment are the following:

- The E-Plan and associated implementing procedures.
- The Emergency Preparedness Training Program including drills and exercises.
- The readiness of the station Emergency Response Organization to perform its function.
- The readiness of facilities and equipment to perform as outlined in the plan and procedures.
- The interfaces between Exelon, the state, and county governmental agencies pertaining to the overall Emergency Preparedness Program.

Results of this audit are submitted for review to Corporate Management and the Station Vice President. The Emergency Preparedness Manager ensures that any findings that deal with offsite interfaces are reviewed with the appropriate agencies. Written notification will be provided to the state and counties of the performance of the audit and the availability of the audit records for review at Exelon facilities. Records of the audit are maintained for at least five years.

10. Maintenance of Emergency Organization Telephone Directory

Names and phone numbers of the Emergency Response Organization and support personnel shall be reviewed and updated at least quarterly.

Appendix 1: References

References consulted in the writing of this E-Plan are listed in this section. With exception of regulatory requirements, inclusion of material on this list does not imply adherence to all criteria or guidance stated in each individual reference.

1. 10 CFR 50.47, Emergency Plans
2. 10 CFR 50.72, Immediate Notification Requirements for Operating Nuclear Power Reactors
3. 10 CFR 50 Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants
4. 10 CFR 50 Appendix E, Emergency Planning and Preparedness for Production and Utilization Facilities
5. 10 CFR 20, Standards for Protection Against Radiation
6. 10 CFR 70, 73, and 100.
7. 33 CFR 153.
8. 40 CFR 110, 112, 116, 118, 302 and 355.
9. 44 CFR 350.
10. 44 CFR 401.
11. 49 CFR 171 and 172.
12. NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1, November, 1980.
13. NUREG-0654, Supplement 1, "Criteria for Utility Offsite Planning and Preparedness."
14. NUREG-0654, Supplement 3, "Criteria for Protective Action Recommendations for Severe Accidents."
15. NUREG-0396, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants," Dec. 1978.
16. NUREG-0578, "TMI-2 Lessons Learned Task Force Status Report and Short-Term Recommendations."
17. NUREG-0696, Revision 1, Functional Criteria for Emergency Response Facilities

18. NUREG-0737, Clarification of TMI Action Plan Requirements, dated October 1980.

19. NUREG-0737, Supplement 1, Requirements for Emergency Response Capability, December 1982.

20. NUREG 0728 - "Report to Congress: NRC Incident Response Plan."

21. US NRC Regulatory Guide 1.101, "Emergency Planning and Preparedness for Nuclear Power Reactors," revision 4, July, 2003.

22. U.S. NRC Response Technical Manual (RTM-96)

23. NEI 99-01, Methodology for Development of Emergency Action Levels.

24. EPA 400-R-92-001, October 1991, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents."

25. FEMA-REP-10, Guide for Evaluation of Alert and Notification Systems for Nuclear Power Plants

26. FEMA-REP-14, Exercise Evaluation Methodology

27. FEMA-Guidance Memorandum, MS-1 "Medical Services"

28. Exelon Nuclear Quality Assurance Topical Report (QATR), NO-AA-10

29. INPO Emergency Resources Manual

30. "Maintaining Emergency Preparedness Manual," dated December, 1996 INPO 96-009.

31. "Federal Bureau of Investigation and Nuclear Regulatory Commission Memorandum of Understanding for Cooperation Regarding Threat, Theft, or Sabotage in U.S. Nuclear Industry," Federal Register, Vol. 44, p. 75535, December 20, 1979.

32. Illinois Department of Nuclear Safety, Title 32, Chapter II, Subchapter b, Part 340, "Standards for Protection Against Radiation."

33. ComEd April l983 response to NUREG 0737 Supplement #1 or latest submitted schedule of planned operational dates.

34. "Voluntary Assistance Agreement By and Among Electric Utilities involved in Transportation of Nuclear Materials," dated November 1, 1980.

35. Comprehensive Environmental Response, Compensation and Liability Act of 1980.

36. Accidental Radioactive Contamination of Human Food and Animal Feeds; Recommendation for State and Local Agencies, Volume 47, No. 205, October 22, 1982.

37. American Nuclear Insurers Bulletin #5B (1981), "Accident Notification Procedures for Liability Insureds".

38. "Potassium Iodide as a Thyroid Blocking Agent in a Radiation Emergency: Final Recommendations on Use," Federal Register Vol. 47, No. 125, June 29, 1982.

39. Letter from William J. Dircks, Executive Director for Operations, NRC, to Dr. Donald F. Knuth, President KMC, Inc. dated October 26, 1981.

40. INPO Coordination agreement on emergency information among USCEA, EPRI, INPO, NUMARC and their member utilities, dated April (1988).

41. Babcock and Wilcox Company, Post Accident Sample Offsite Analysis Program (1982).

42. ANI/MAELU Engineering Inspection Criteria For Nuclear Liability Insurance, Section 6.0, Rev. 1, "Emergency Planning."

43. NRC RIS 2006-12, Endorsement of Nuclear Energy Institute Guidance “Enhancement to Emergency Preparedness Programs for Hostile Action.”

44. NRC Bulletin 2005-02, “Emergency Preparedness and Response Actions for Security-Based Events.”

45. NRC Information Notice 2009-01, National Response Framework

Appendix 2: Procedure Cross-Reference to NUREG-0654

Criteria	Planning Standard	Procedure/Document
NUREG-0654.II.A	Assignment of Responsibility (Organization Control)	EP-AA-120, Emergency Plan Administration
		Letters of Agreement
NUREG-0654.II.B	Onsite Emergency Organization	EP-AA-112, Emergency Response Organization (ERO) / Emergency Response Facility (ERF) Activation and Operation
		EP-AA-112-100, Control Room Operations
		EP-AA-112-200, TSC Activation and Operation
		EP-AA-112-300, Operations Support Center Activation and Operation
		EP-AA-112-400, Emergency Operations Facility Activation and Operation
		EP-AA-112-500, Emergency Environmental Monitoring
		EP-AA-112-600, Public Information Organization Activation and Operations
NUREG-0654.II.C	Emergency Response Support and Resources	EP-AA-112-400, Emergency Operations Facility Activation and Operations
NUREG-0654.II.D	Emergency Classification System	EP-AA-111, Emergency Classification and Protective Action Recommendations
NUREG-0654.II.E	Notification Methods and Procedures	EP-AA-114, Notifications
		EP-MA-114-100, Mid-Atlantic State/Local Notifications
		EP-MW-114-100, Midwest Region Offsite Notifications
NUREG-0654.II.F	Emergency Communications	EP-AA-114, Notifications
		EP-MA-114-100, Mid-Atlantic State/Local Notifications
		EP-MW-114-100, Midwest Region Offsite Notifications
		EP-AA-124, Inventories and Surveillances
		EP-MA-124-1001, Facility Inventories and Equipment Tests
		EP-MW-124-1001, Facilities Inventories and Equipment Tests
NUREG-0654.II.G	Public Education and Information	EP-AA-120, Emergency Plan Administration
NUREG-0654.II.H	Emergency Facilities and Equipment	EP-AA-112, Emergency Response Organization (ERO) / Emergency Response Facility (ERF) Activation and Operation
		EP-AA-121, Emergency Response Facilities and Equipment Readiness
		EP-AA-121-1001, Automated Call-Out System Maintenance

Criteria	Planning Standard	Procedure/Document
		EP-MA-121-1002, Exelon East Alert Notification System (ANS) Program
		EP-MW-121-1003, Mazon and Morrison Fire Alarm System Notification
		EP-MA-121-1004, Exelon East ANS Corrective Maintenance
		EP-MW-121-1004, Siren Change Documentation
		EP-MW-121-1005, Siren Outage Reporting and Monitoring
		EP-MW-121-1006, Contracted Siren Maintenance Oversight
		EP-AA-123, Computer Programs
		EP-AA-124, Inventories and Surveillances
		EP-MA-124-1001, Facility Inventories and Equipment Tests
		EP-MW-124-1001, Facilities Inventories and Equipment Tests
		EP-AA-125-1004, Emergency Response Facilities & Equipment Performance Indicators Guidance
NUREG-0654.II.I	Accident Assessment	EP-AA-110, Assessment of Emergencies
		EP-AA-110-200, Dose Assessment
		EP-AA-110-201, On Shift Dose Assessment
		EP-AA-110-301, Core Damage Assessment (BWR)
		EP-AA-110-302, Core Damage Assessment (PWR)
		EP-MW-110-1001, Data Point Tables
		EP-AA-123, Computer Programs
		EP-AA-123-1003, Core Damage Assessment Methodology (CDAM) Program Technical Basis
NUREG-0654.II.J	Protective Response	EP-AA-113, Personnel Protective Actions
		EP-AA-113-F-04, MA Emergency Director - Site Assembly, Accountability And Evacuation
		EP-AA-113-F-07, MW Emergency Director - Site Assembly, Accountability And Evacuation
		EP-AA-123, Computer Programs
		EP-AA-113-F-03, Thyroid Blocking Agent Authorization.
NUREG-0654.II.K	Radiological Exposure Control	EP-AA-110, Assessment of Emergencies
		EP-AA-113, Personnel Protective Actions
NUREG-0654.II.L	Medical and Public Health Support	EP-AA-120, Emergency Plan Administration

Criteria	Planning Standard	Procedure/Document
NUREG-0654.II.M	Recovery and Reentry Planning and Post-Accident Operations	EP-AA-115, Termination and Recovery
		EP-AA-120-1002, Offsite Readiness Evaluation
NUREG-0654.II.N	Exercises and Drills	EP-AA-122, Drills & Exercises
		EP-AA-122-1001, Drill & Exercise Scheduling, Development And Conduct
		EP-AA-122-1002, Drill & Exercise Evaluation
		EP-AA-122-1002-F-01 [through F-13], Drill & Exercise Demonstration Criteria Section A [through Section M]
		EP-AA-125-1001, EP Performance Indicator Guidance
		EP-AA-125-1002, ERO Performance – Performance Indicators Guidance
		EP-AA-125-1003, ERO Readiness - Performance Indicators Guidance
NUREG-0654.II.O	Radiological Emergency Response Training	TQ-AA-113, ERO Training And Qualification
NUREG-0654.II.P	Responsibility for the Planning Effort: Development, Periodic Review and Distribution of Emergency Plans	EP-AA-1, Emergency Preparedness
		EP-AA-10, Emergency Preparedness Program Description
		EP-AA-11, Operating Stations Emergency Preparedness Process Description
		EP-AA-1101, EP Fundamentals
		EP-AA-1102, ERO Fundamentals
		EP-AA-120, Emergency Plan Administration
		EP-AA-120-1001, 10CFR50.54(q) Change Evaluation.
		EP-AA-125, Emergency Preparedness Self Evaluation Process
		EP-AA-125-1001, EP Performance Indicator Guidance
		Emergency Response Facilities Telephone Directory

Appendix 3: List of Corporate Letters of Agreements

Organization/Agreement Type	Applicable To
Department Of Energy (DOE) Radiation Emergency Assistance Center/Training Site, REAC/TS (Letter on File) Medical Consultant	All
Environmental, Inc. (P.O.) Radiological Environmental Monitoring	All
GE Nuclear Energy, BWRs (Letter on File) BWR Emergency Support	All
Landauer, Inc. (P.O.) Emergency Dosimetry	All
INPO (Letter on File) Emergency Event Support	All
Murray & Trettel, Inc. (P.O.) Meteorological Support	All
Provena St. Joseph Medical Center (Letter on File) Back-up Emergency Medical Facility	MW Region
Teledyne Brown Engineering (P.O.) Bioassay Analysis/Radiochemical Analysis	All
Westinghouse Elec. Corp., PWRs (Letter on File) PWR Emergency Support	MW Region
Fulton Technologies (P.O.) Emergency Met Tower	MW Region
Red Alert Service (P.O.) Fire Foam Supply	All

Appendix 4: Glossary of Terms and Acronyms

Accident Assessment	Accident assessment consists of a variety of actions taken to determine the nature, effects and severity of an accident and includes evaluation of reactor operator status reports, damage assessment reports, meteorological observations, seismic observations, fire reports, radiological dose projections, in plant radiological monitoring, and environmental monitoring.
Activation	(1) "ERO Activation" is the process of initiating actions to notify and mobilize Emergency Response Organization (ERO) personnel following an event classification under the emergency plan. (2) "Facility Activation" refers to the decision to consider a facility fully operational based on the minimum staffing required in ERO staffing tables contained within the station specific Annex and the ability of facility staffing and equipment to perform its designed function(s).
Annual	Frequency of occurrence equal to once per calendar year, January 1 to December 31.
Assembly/Accountability	A procedural or discretionary protective action taken for all persons within the security "Protected Area", which involves the gathering of personnel into pre-designated areas, and the subsequent verification that the location of these personnel is known.
Assessment Actions	Those actions taken during or after an emergency to obtain and process information that is necessary to make decisions to implement specific emergency measures.
Biennial	Frequency of occurrence equal to once per two calendar year periods.
Biennial Exercise	An event that tests the integrated capability and a major portion of the basic elements existing within an emergency plan. An exercise usually involves participation of personnel from state and local governments, utility personnel, and may involve participation of Federal government personnel.

Classification	The classification of emergencies is divided into FIVE (5) categories or conditions, covering the postulated spectrum of emergency situations. The first four (4) emergency classifications are characterized by Emergency Action Levels (EALs) or event initiating conditions and address emergencies of increasing severity. The fifth, the Recovery classification, is unique in that it may be viewed as a phase of the emergency, requiring specific criteria to be met and/or considered prior to its declaration.
Command and Control	When in Command and Control, the designated Emergency Director (Shift, Station or Corporate) has overall responsibility for Exelon Nuclear's emergency response efforts, including the nondelegable responsibilities of Command and Control.
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.
Corrective Action	Those emergency measures taken to lessen or terminate an emergency situation at or near the source of the problem, to prevent an uncontrolled release of radioactive material, or to reduce the magnitude of a release. Corrective actions include, equipment repair or shutdown, installation of emergency structures, fire fighting, repair, and damage control.
Damage Assessment	Estimates and descriptions of the nature and extent of damages resulting from an emergency or disaster; of actions that can be taken to prevent or mitigate further damage; and of assistance required in response and recovery efforts based on actual observations by qualified engineers and inspectors.
Damage Control	The process of preventing further damage from occurring and preventing the increase in severity of the accident.
Decontamination	The reduction or removal of contaminated radioactive material from a structure, area, material, object, or person. Decontamination may be accomplished by (1) treating the surface so as to remove or decrease the contamination; (2) letting the material stand so that the radioactivity is decreased as a result of natural decay; and (3) covering the contamination.

Dedicated Communications	A communications link between two or more locations, access to which is limited to designated locations, and used only for the purpose intended. The communications link may be either telephone or radio.
Deep Dose Equivalent (DDE)	The dose equivalent at a tissue depth of 1 cm (1000 mg/cm^2); applies to external whole body exposure.
Dose	A generic term that means absorbed dose, dose equivalent, effective dose equivalent, deep dose equivalent, committed dose equivalent, committed effective dose equivalent, or total effective dose equivalent.
Dose Equivalent (DE)	The product of the absorbed dose in tissue, quality factor, and all other necessary modifying factors at the location of interest. The unit of dose equivalent is the Rem.
Dose Projection	The calculated estimate of a radiation dose to individuals at a given location (normally off-site), determined from the source term/quantity of radioactive material (Q) released, and the appropriate meteorological dispersion parameters (X/Q).
Dose Rate	The amount of ionizing (or nuclear) radiation to which an individual would be exposed per unit of time. As it would apply to dose rate to a person, it is usually expressed as rems per hour or in submultiples of this unit, such as millirems per hour. The dose rate is commonly used to indicate the level of radioactivity in a contaminated area.
Dosimeter	An instrument such as a Dosimeter of Legal Record (DLR), self-reading pocket dosimeter (SRPD), or electronic dosimeter (ED) for measuring, registering, or evaluating total accumulated dose or exposure to ionizing radiation.
Dosimeter of Legal Record (DLR)	Specific station type dosimeters used for monitoring personnel and the environment.
Drill	A supervised instruction period aimed at testing, developing and maintaining skills in a particular operation.
Early Phase	The period at the beginning of a nuclear incident when immediate decisions for effective use of protective actions are required and must be based primarily on predictions of radiological conditions in the environment. This phase may last from hours to days. For the purposes of dose projections it is assumed to last four days.

Emergency Action Levels (EALs)	A pre-determined, site-specific, observable threshold for a plant Initiating Condition that places the plant in a given emergency class. An EAL can be an instrument reading; an equipment status indicator; a measurable parameter (onsite or offsite); a discrete, observable event; or another phenomenon which, if it occurs, indicates entry into a particular emergency class.
Emergency Alert System (EAS)	A network of broadcast stations and interconnecting facilities which have been authorized by the Federal Communications Commission to operate in a controlled manner during a war, state of public peril or disaster, or other national or local emergency. In the event of a nuclear reactor accident, instructions/notifications to the public on conditions or protective actions would be broadcast by state or local government authorities on the EAS.
Emergency Director	Individual in Command and Control. One of the following: the Shift Emergency Director (Control Room), Station Emergency Director (TSC) or the Corporate Emergency Director (EOF).
Emergency Notification System (ENS)	The NRC Emergency Notification System hot line is a dedicated telephone system that connects the plant with NRC headquarters in White Flint, Maryland. It is directly used for reporting emergency conditions to NRC personnel.
Emergency Operations Facility (EOF)	Designated location from which the Licensee Emergency Response Organization conducts the company's overall emergency response in coordination with Federal, State and designated emergency response organizations.
Emergency Operating Procedures (EOPs)	EOPs are step-by-step procedures for direct actions taken by licensed reactor operators to mitigate and/or correct an off normal plant condition through the control of plant systems.
Emergency Operations Center (EOC)	A facility designed and equipped for effective coordination and control of emergency operations carried out within an organization's jurisdiction. The site from which civil government officials (municipal, county, state, and Federal) exercise direction and control in a civil defense emergency.
Emergency Personnel	Those organizational groups that perform a functional role during an emergency condition. Within Exelon Nuclear, emergency personnel include the Managers and Directors of the Emergency Response Organization, accident assessment personnel, radiological monitoring teams, fire brigades, first aid teams and security personnel.

Emergency Planning Zones (EPZ)	That area surrounding a nuclear station in which emergency planning is conducted for the protection of the public. With respect to protecting the public from the plume exposure resulting from an incident, the EPZ is usually an area with a radius of about 10 miles surrounding the facility. With respect to the ingestion exposure pathway, the EPZ is usually an area with a radius of about 50 miles.
Emergency Preparedness	A state of readiness that provides reasonable assurance that adequate protective measures can and will be taken upon implementation of the E-Plan in the event of a radiological emergency.
Emergency Response Data System (ERDS)	ERDS is a continuous direct near real-time electronic data link between the licensee's onsite computer system and the NRC Operations Center that provides for the automated transmission of a limited data set of selected parameters.
Environmental Monitoring	The use of radiological instruments or sample collecting devices to measure and assess background radiation levels and/or the extent and magnitude of radiological contamination in the environment around the plant. This may be done in various stages such as pre-operational, operational, emergency, and post operational.
Essential Personnel	Essential personnel are those needed to achieve the goals and tasks as deemed necessary by the Station Emergency Director.
Evacuation	The urgent removal of people from an area to avoid or reduce high level, short-term exposure usually from the plume or from deposited activity.
Exclusion Area	An Exclusion Area is an area specified for the purpose of reactor site evaluation in accordance with 10 CFR 100. It is an area of such size that an individual located at any point on its boundary for two hours immediately following onset of the postulated release would not receive a total radiation dose to the whole body in excess of 25 rem or a total radiation dose of 300 rem to the thyroid from iodine exposure.
Exercise	An event that tests the integrated capability of a major portion of the basic elements existing within emergency preparedness plans and organizations.

Exercise Cycle	A six-year period of time until the performance of the first evaluated Hostile Action based exercise. Following performance of the Hostile Action based exercise, the cycle duration time will change from a six-year period to an eight-year period.
Fission Product Barrier	The fuel cladding, reactor coolant system boundary, or the containment boundary.
Hazardous Material	A substance or material which has been determined by the United States Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated in 49 CFR 172.
Health Physics Network (HPN) Line	In the event of a Site Area Emergency, the NRC HPN line will be activated by the NRC Operations center in White Flint, Maryland. This phone is part of a network that includes the NRC Regional Office and the NRC Operations Headquarters in White Flint, Maryland. This system is dedicated to the transmittal of radiological information by plant personnel to NRC Operations Center and the Regional office. HPN phones are located in the TSC and EOF.
High Radiation Sampling System	Post-accident sampling capability to obtain and perform radioisotopic and chemical analyses of reactor coolant and containment atmosphere samples.
Imminent	Mitigation actions have been ineffective and trended information indicates that the event or condition will occur within 2 hours.
Ingestion Exposure Pathway	The potential pathway of radioactive materials to the public through consumption of radiologically contaminated water and foods such as milk or fresh vegetables. Around a nuclear power plant this is usually described in connection with the 50-mile radius Emergency Planning Zone (50 mile EPZ).
Initiating Condition	A predetermined UNIT condition where either the potential exists for a radiological emergency or such an emergency has occurred.
Integrated Drill	A drill conducted in the year that a Biennial Exercise is not scheduled including at least two Emergency Response Facilities in order to demonstrate at least two of the functions of management and control of emergency response, accident assessment, protective action decision-making, or plant system repair and corrective action.

Intermediate Phase	The period beginning after the source and releases have been brought under control and reliable environmental measurements are available for use as a basis for decisions on additional protective actions.
Joint Information Center	A Corporate Emergency Facility activated by Exelon and staffed by Exelon, state, and Federal Public Information personnel. This facility serves as the single point of contact for the media and public to obtain information about an emergency.
Late Phase	The period beginning when recovery action designed to reduce radiation levels in the environment to acceptable levels for unrestricted use are commenced and ending when all recovery actions have been completed. This period may extend from months to years (also referred to as the recovery phase).
Local Evacuation	The evacuation of personnel from a particular area, such as a room or building.
Low Population Zone (LPZ)	As defined in 10 CFR 100.3, the area immediately surrounding the exclusion area which contains residents, the total number and density of which are such that there is a reasonable probability that appropriate protective measures could be taken in their behalf in the event of a serious accident.
Main Control Room	The operations center of a nuclear power plant from which the plant can be monitored and controlled.
Monthly	Frequency of occurrence equal to once per calendar month.
Non-Essential Site Personnel	Those personnel not needed for the continuing existence or functioning of the ERO. They are personnel not required to fill certain positions in the ERO. Identification of non-essential personnel is circumstance-oriented as determined by the Station Emergency Director.

Notification, Public	Public notification means to communicate instructions on the nature of an incident that prompted the public alerting/warning and on protective or precautionary actions that should be taken by the recipients of the alert. A state and local government process for providing information promptly to the public over radio and TV at the time of activating the alerting (warning) signal (sirens). Initial notifications of the public might include instructions to stay inside, close windows, and doors, and listen to radio and TV for further instructions. Commercial broadcast messages are the primary means for advising the general public of the conditions of any nuclear accident. (See Emergency Alert System.)
Off-Site	The area around a nuclear generating station that lies outside the station's "site boundary”.
Offsite Dose Calculation Manual (ODCM)	The ODCM presents a discussion of the following: 1. The ways in which nuclear power stations can affect their environment radiologically 2. The regulations which limit radiological effluents from the nuclear power stations; and 3. The methodology used by the nuclear power stations to assess radiological impact on the environment and compliance with regulations.
On-Site	The area around a nuclear generating station that lies within the station's "site boundary”.
Owner Controlled Area	Company owned property on which a Nuclear Station is located and may include Exelon Nuclear leased lands adjacent to that Nuclear Station.
Operations Support Center (OSC)	An emergency response facility at the Plant to which support personnel report and stand by for deployment in an emergency situation.
Personnel Monitoring	The determination of the degree of radioactive contamination on individuals, using standard survey meters, and/or the determination of dosage received by means of dosimetry devices.

Plume Exposure Pathway	The potential pathway of radioactive materials to the public through: (a) whole body external exposure from the plume and from deposited materials, and (b) inhalation of radioactive materials.
Population-at-Risk	Those persons for whom protective actions are being or would be taken. In the 10-mile EPZ the population-at-risk consists of resident population, transient population, special facility population, and industrial population.
Potassium Iodide	(Symbol KI) A chemical compound that readily enters the thyroid gland when ingested. If taken in a sufficient quantity prior to exposure to radioactive iodine, it can prevent the thyroid from absorbing any of the potentially harmful radioactive iodine-131.
Potential	Mitigation actions are not effective and trended information indicates that the parameters are outside desirable bands and not stable or improving.
Projected Dose	That calculated dose that some individuals in the population group may receive if no protective actions are implemented. Projected doses are calculated to establish an upper limit boundary.
Protected Area	That onsite area within the security boundary as defined in each station's Security Plan.
Protection Factor (PF)	The relation between the amount of radiation that would be received by a completely unprotected person compared to the amount that would be received by a protected person such as a person in a shielded area. PF = Shielded dose rate / Unshielded dose rate.
Protective Action	Those emergency measures taken for the purpose of preventing or minimizing radiological exposures to affected population groups.
Protective Action Guide (PAG)	Projected radiological dose values to individuals in the general population that warrant protective action. Protective Action Guides are criteria used to determine if the general population needs protective action regarding projected radiological doses, or from actual committed (measured) dose values.

Protective Action Recommendations (PARs)	Recommended actions to the States for the protection of the offsite public from whole body external gamma radiation, and inhalation and ingestion of radioactive materials. Access control and other recommendations concerning the safeguards of affected food chain processes may be issued by the States as PARs.
Public Alerting/Warning	The process of signaling the public, as with sirens, to turn on their TV's or radios and listen for information or instructions broadcast by state or local government authorities on the Emergency Alert System (EAS).
Puff Release	A controlled containment vent that will be terminated prior to exceeding 60 minutes in duration and is less than the limit as defined in the Station Annexes.
Quarterly	Frequency of occurrence equal to once in each of the following four periods: January 1 through March 31; April 1 through June 30; July 1 through September 30; October 1 through December 31.
Recovery	The process of reducing radiation exposure rates and concentrations of radioactive material in the environment to levels acceptable for unconditional occupancy or use.
Release	A '*Release in Progress*' is defined as ANY radioactive release that is a result of, or caused by, the emergency event.
Restricted Area	Any area, access to which is controlled by Exelon for purposes of protection of individuals from exposure to radiation and radioactive materials.
Restricted Area Boundary	For classification and dose projection purposes, the boundary is a 400-meter (1/4-mile) radius around the plant. The actual boundary is specified in the ODCM.
Safety Analysis Report, Updated Final (UFSAR)	The UFSAR is a comprehensive report that a utility is required to submit to the NRC as a prerequisite and as part of the application for an operating license for a nuclear power plant. The multi-volume report contains detailed information on the plant's design and operation, with emphasis on safety-related matters.
Semi-Annual	Frequency of occurrence equal to once in each of the following periods: January 1 through June 30; July 1 through December 31.

Shall, Should, and May	The word "shall" is used to denote a requirement, the word "should" to denote a recommendation and the word "may" to denote permission, neither a requirement nor a recommendation.
Shielding	Any material or barrier that attenuates (stops or reduces the intensity of) radiation.
Site Boundary	Each Nuclear Station's Site Boundary is described in detail in the ODCM.
Site Evacuation	The evacuation of non-essential personnel from the plant site.
Source Term	Radioisotope inventory of the reactor core, or amount of radioisotope released to the environment, often as a function of time.
Technical Support Center (TSC)	A center outside of the Control Room in which information is supplied on the status of the plant to those individuals who are knowledgeable or responsible for engineering and management support of reactor operations in the event of an emergency, and to those persons who are responsible for management of the on-site emergency response.
Threshold Value	Measurable, observable detailed conditions which must be satisfied to determine an EAL applicability.
Thyroid Blocking Agent	An agent which when properly administered to an individual will result in sufficient accumulation of stable iodine in the thyroid to prevent significant uptake of radioiodine. Potassium Iodide is such an agent.
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.
Unrestricted Area	Any area to which access is not controlled by the licensee for protecting individuals from exposure to radiation and radioactive materials, and any area used for residential quarters.
Vital Areas	Areas within the station security fence which contain vital equipment. Examples include Control Rooms, Containment/Reactor Buildings, Turbine Buildings and Electrical Equipment Rooms.

Vital Equipment	Any equipment, system, device or material, the failure, destruction, or release of which 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 public health and safety following such failure, destruction, or release are also considered to be vital.
Weekly	Frequency occurrence equal to once per calendar week: Monday through Sunday.

Any abbreviation followed by a lower case 's' denotes the plural form of the term.

ACRONYMS

ac ..... alternating current

ALARA ..... as low as reasonably achievable

ANI ..... American Nuclear Insurers

ANS ..... Alert and Notification System

ANSI ..... American National Standards Institute

ARM ..... Area Radiation Monitor

ASLB ..... Atomic Safety Licensing Board

BNE ..... Bureau of Nuclear Engineering (New Jersey)

BWR ..... boiling water reactor

CB ..... citizen band

cc ..... cubic centimeter

CDE ..... Committed Dose Equivalent

CEOC ..... County Emergency Operation Center

CFR ..... Code of Federal Regulations

CHRMS ..... Containment High Range Monitoring System

CHRRMS ..... Containment High Range Radiation Monitoring System

cm2 ..... square centimeter

CNO ..... Chief Nuclear Officer

cpm ..... count per minute

CR ..... Control Room

CRO ..... Control Room Operator

CRT ..... Cathode Ray Tube

Cs ..... Cesium

dc ..... direct current

DEP ..... Department of Environmental Protection (New Jersey)

DEP.....Drill and Exercise Performance

DEQ ..... Department of Environmental Quality

DER/BRP .....Dept of Environmental Resources, Bureau of Radiation Protection (PA)

DFO.....Disaster Field Office

DGI.....Digital Graphics Incorporated

DHFS .....Department of Health and Family Services

DLR .....Dosimeter of Legal Record

DOE ..... U. S. Department of Energy

DOT..... U. S. Department of Transportation

DPH..... Department of Public Health

dpm .....disintegration per minute

EAL .....Emergency Action Level

EAS..... Emergency Alerting System

EMA ..... Emergency Management Agency

ENC.....Emergency News Center

ENS..... Emergency Notification System (NRC)

EOC .....Emergency Operations (or Operating) Center

EOF.....Emergency Operations Facility

EOP.....Emergency Operating Procedure

EPA..... U. S. Environmental Protection Agency

EPDS ..... Emergency Preparedness Data System

EPZ ..... Emergency Planning Zone

ERF .....Emergency Response Facility

ESF ..... Engineered Safety Feature

FEMA ..... Federal Emergency Management Agency

FRMAC .....Federal Radiological Monitoring and Assessment Center

FRMAP..... Federal Radiological Monitoring and Assessment Plan

FRPCC.....Federal Radiological Preparedness Coordinating Committee

FSAR..... Final Safety Analysis Report

Ge ..... Germanium

GET.....General Employee Training

GM ..... Geiger Mueller (radiation detection tube)

HEPA ..... high efficiency particulate air

HPN..... Health Physics Network (NRC)

hr ..... hour

I ..... Iodine

IDPH.....Iowa Department of Public Health

IEMA ..... Illinois Emergency Management Agency

IEMD ..... Iowa Emergency Management Division

IRAP.....Interagency Radiological Assistance Plan

INPO .....Institute of Nuclear Power Operations

JIC.....Joint Information Center

LGEOC.....Local Government Emergency Operations Center

Li .....Lithium

LOCA .....Loss of Coolant Accident

LPZ.....Low Population Zone

MAELU..... Mutual Atomic Energy Liability Underwriters

MEMA .....Maryland Emergency Management Agency

MCP ..... Municipal Command Post

mR..... milliroentgen

NARS .....Nuclear Accident Reporting System

NCRP ..... National Council on Radiation Protection

NJ-OEM ..... New Jersey-Office of Emergency Management

NOP ..... Nuclear Organization Procedure

NRC ..... U. S. Nuclear Regulatory Commission

NRF ..... National Response Framework

NRR ..... Nuclear Reactor Regulation (NRC)

NWS ..... National Weather Service

NSRAC ..... Nuclear Safety Review and Audit Committee

OEM ..... Office of Emergency Management (NJ State Police)

OSC ..... Operations Support Center

PAG ..... Protective Action Guide

PANS ..... Prompt Alert and Notification System

PAR ..... Protective Action Recommendation

PASS ..... Post Accident Sampling System

PEMA ..... Pennsylvania Emergency Management Agency

QATR ..... Quality Assurance Topical Report

R ..... roentgen

RAA ..... Remote Assembly Area (off-site)

RAC ..... Regional Advisory Committee (FEMA)

RAFT ..... Radiological Assistance Field Team (ILLINOIS)

RAP ..... Radiological Assistance Plan (ILLINOIS)

REAC ..... Radiological Emergency Assessment Center (ILLINOIS)

REP ..... Radiological Emergency Preparedness

RERP ..... Radiological Emergency Response Plan

RMS ..... Radiation Monitoring System

SAMG ..... Severe Accident Management Guidelines

SCBA ..... Self Contained Breathing Apparatus

SEOC ..... State Emergency Operations Center

SFCP ..... State Forward Command Post

SGTS ..... Standby Gas Treatment System

SHL ..... State Hygienic Laboratory (IOWA)

SPCC ..... Spill Prevention Control and Countermeasure

SPDS ..... Safety Parameter Display System

Sr ..... Strontium

SRC ..... State Radiological Coordinator

SSC ..... State Staging Center

STA ..... Shift Technical Advisor

TDD ..... Telecommunications Device for the Deaf

TEDE ..... Total Effective Dose Equivalent

TSC ..... Technical Support Center

µCi ..... microcurie

UFSAR ..... Updated Final Safety Analysis Report

WEM ..... Wisconsin Emergency Management

ATTACHMENT 3

EP-AA-1001, Revision 31

Radiological Emergency Plan Annex for Braidwood Station

EXELON NUCLEAR

RADIOLOGICAL EMERGENCY PLAN ANNEX FOR BRAIDWOOD STATION

Page Intentionally left Blank

Table of Contents

APPENDIXES

Appendix 1: NUREG-0654 Cross-Reference

Appendix 2: Station Letters of Agreement

ADDENDUMS

Addendum 1: On- Shift Staffing Technical Basis

Addendum 2: Evacuation Time Estimates for Braidwood Generating Station Plume Exposure Pathway Emergency Planning Zone

REVISION HISTORY

Revision 1; March 1986	Revision 3l: October 16, 1998	Revision 17, March 2006
Revision 2a; June 1987	Revision 3m: March 05, 1999	Revision 18, October 2006
Revision 2b; May 1988	Revision 4: May 13, 1999	Revision 19, April 2007
Revision 3; January 1991	Revision 5: June 23, 1999	Revision 20, October 2007
Revision 3a; November 1992	Revision 6: January 08, 2001	Revision 21, March 2008
Revision 3b; December 1993	Revision 7: October 08, 2001	Revision 22, August 2008
Revision 3c; January 1994	Revision 8: October 31, 2001	Revision 23, March 2010
Revision 3d; November 1994	Revision 9: January 03, 2002	Revision 24, May 2010
Revision 3e; December 1994	Revision 10: July 08, 2002	Revision 25, September 2010
Revision 3f; November 1995	Revision 11: August 30, 2002	Revision 26, February 2011
Revision 3g; June 1996	Revision 12: November 15, 2002	Revision 27, March 2011
Revision 3h; June 1996	Revision 13: May 16, 2003	Revision 28, June 2012
Revision 3i; June 1997	Revision 14, December 2004	Revision 29, November 2012
Revision 3j: January 05, 1998	Revision 15, May 2005	Revision 30, December 2012
Revision 3k: August 14, 1998	Revision 16, January 2006	Revision 31, June 2013

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

This document serves as the Braidwood 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 Radiological Emergency Plan.

1.1 Facility Description

The Braidwood Power Station - Units 1 & 2 (Braidwood Station) is located in northern Illinois, approximately 20.0 miles south-southwest of the City of Joliet and 3.0 miles west of the Kankakee River, in Will County. The site is situated in an area composed of flat agricultural farmland that has been scarred from coal strip mining.

The station site is roughly rectangular in shape, with the plant structures occupying the northwest portion of the site.

At its closest approach, the Kankakee River is approximately 3.0 miles east of the northeastern site boundary.

Braidwood Station occupies approximately 4454 acres of land. This area includes the main site area and the cooling lake. The main site area occupies approximately 1917 acres, and the cooling lake occupies the remaining 2537 acres.

Figure 1-1 shows the general location of Braidwood Station. More specific information on station siting may be found in the Updated Final Safety Analysis Report (UFSAR).

The plant consists of two identical pressurized water reactor (PWR) nuclear steam supply systems (NSSS) and turbine-generators furnished by Westinghouse Electric Corporation. Each nuclear steam supply system is designed for a power output of 3586.6 MWt. Cooling for the plant is provided by a cooling lake of 2537 acres with an average depth of approximately 10 feet.

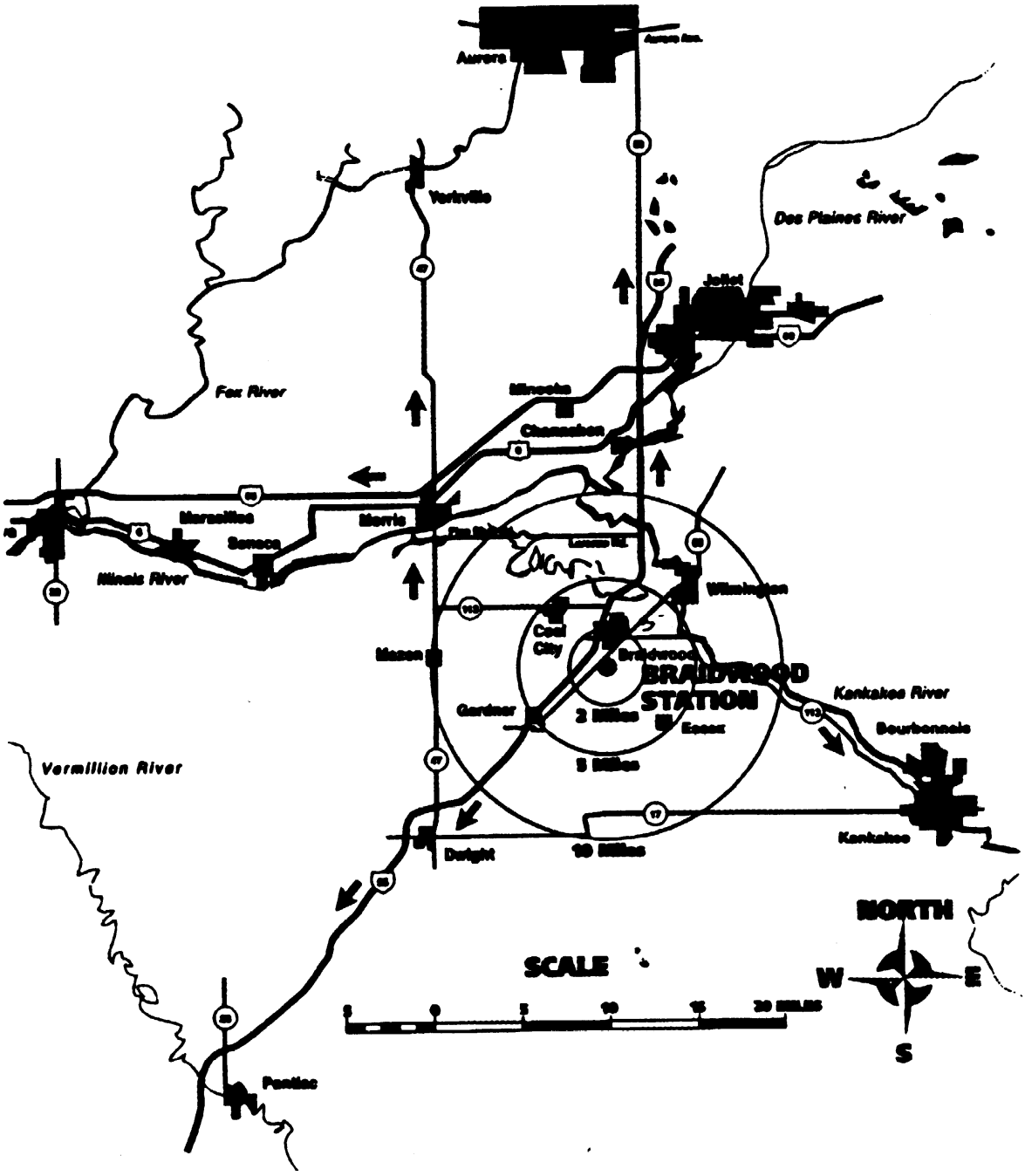
Braidwood Station has two release points for gaseous radioactive effluents, the two Auxiliary Building ventilation stacks. The top of each stack rises 200 feet above the grade elevation. Braidwood Station has one release point for liquid radioactive effluents, the Kankakee River. Liquid radioactive wastes are stored and sampled prior to release to the Kankakee River. A radiation monitor in the discharge line will automatically terminate releases if radioactivity levels exceed predetermined values.

1.2 Emergency Planning Zone

The plume exposure Emergency Planning Zone (EPZ) for Braidwood Station shall be an area surrounding the Station with a radius of about ten miles. (Exact boundaries are determined by the State of Illinois). Refer to Figure 1-1.

The ingestion pathway EPZ for Braidwood Station shall be an area surrounding the Station with a radius of about 50 miles.

Figure 1-1: Braidwood Station Location and 10 Mile EPZ



Section 2: Organizational Control of Emergencies

This section describes the Emergency Response Organization (ERO) and its key positions. It outlines the staffing requirements which provide initial emergency response actions and provisions for timely augmentation of on-shift personnel when required. It also describes interfaces among Exelon Nuclear emergency response personnel and specifies the offsite support available to respond to the nuclear generating stations.

2.1 Shift Organization Staffing

Initial response to any emergency is by the normal plant organization present at the site. This organization includes positions that are onsite 24 hours per day and is described in Section B.1 of the Exelon Nuclear Standardized Radiological Emergency Plan. The Normal Shift Organization will be augmented, in an emergency, with designated/additional Emergency Response Organization (ERO) personnel within 60 minutes of notification as specified under Table 2-1. ERO activation is described in Section H.4 of the Exelon Nuclear Standardized Radiological Emergency Plan.

Table 2-1 outlines ERO positions required to meet minimum staffing and full augmentation of the on-shift complement at an Alert or higher classification, and the major tasks assigned to each position. Responsibilities for each position are described in Section B.5 of the Exelon Nuclear Standardized Radiological Emergency Plan.

2.2 Emergency Response Organization Block Diagram

Figures B-1a through B-1d of the Exelon Nuclear Standardized Radiological Emergency Plan illustrates the overall emergency response organization.

2.3 Non-Exelon Nuclear Support Groups

Exelon Nuclear has contractual agreements with several companies whose services would be available in the event of a radiological emergency. These agencies and their available services are listed in Appendix 3 of the Exelon Nuclear Standardized Radiological Emergency Plan.

Emergency response coordination with governmental agencies and other support organizations is discussed in Section A of the Exelon Nuclear Standardized Radiological Emergency Plan.

Agreements exist on file at Braidwood Station with several support agencies. These agencies and their support roles are listed in Appendix 2, Station Letters of Agreement.

Table 2-1: Minimum Staffing Requirements

Functional Area	Major Tasks	Emergency Positions	Minimum Shift Size	Minimum Staffing *60 Minute Augmentation	Minimum Staffing Other On-Call	Minimum Staffing Full Augmentation
1. Plant Operations/Safe Shutdown and Assessment of Operational Aspects	Control Room Staff	Shift Manager	1			
		Shift Supervisor	1			
		Nuclear Station Operator	3			
		Non-Licensed Operator	4			
2. Emergency Direction and Control	Command and Control	Shift Emergency Director (CR)	1[(a)]			
		Station Emergency Director (TSC)		1		
		Corporate Emergency Director (EOF)		1		
3. Notification & Communication	Emergency Communications	Plant Shift Personnel	1			
		TSC Director (TSC)		1		
		EOF Director (EOF)		1		
		State/Local Communicator		1 (EOF)		1 (TSC)
		ENS Communicator		1 (TSC)		1 (EOF)
		HPN Communicator		1 (EOF)		1 (TSC)
	Plant Status	OPs Communicator (CR/TSC)				2
		Operations Advisor (EOF)				1
	In-Plant Team Control	Damage Control Comm. (CR/TSC/OSC)				3
	Technical Activities	Technical Communicator (TSC)				1
		Technical Advisor (EOF)				1
	Governmental	State Environs Communicator (EOF)				(b)
		EOC Communicator (EOF)				1
		State EOC Liaison (State EOC)				(b)
		County EOC Liaison (County EOC)				(b)
		Regulatory Liaison (EOF)				1
4. Radiological Assessment	Offsite Dose Assessment	RP Personnel	1			
		Dose Assessment Coordinator (EOF)		1		
		Dose Assessor (EOF)				1
		Radiation Controls Coordinator (TSC)				1
	Offsite Surveys	Environmental Coordinator (EOF)		1		
		Field Team Communicator (EOF)				1
		Offsite Field Team Personnel		4		(b)
	Onsite Surveys	Onsite Field Team Personnel		2		(b)
	In-plant Surveys	RP Personnel	1	2		(b)
	Chemistry	Chemistry Personnel	1	1		(b)
	RP Supervisory	Radiation Protection Manager(TSC/EOF)		2		

Functional Area	Major Tasks	Emergency Positions	Minimum Shift Size	Minimum Staffing *60 Minute Augmentation	Minimum Staffing Other On-Call	Full Augmentation
5. Plant System Engineering, Repair, and Corrective Actions	Technical Support	STA / Incident Assessor (CR)	1			
		Technical Manager (TSC)		1		
		Core Thermal/Hydraulic Engineer (TSC)		1		
		Mechanical Engineer (TSC)		1		
		Electrical Engineer (TSC)		1		
		SAMG Decision-Maker (TSC)		1[(a)]		
		SAMG Evaluator (TSC)		2[(a)]		
		Operations Manager (TSC)		1		
		Radiation Controls Engineer (TSC)				1
		Technical Support Manager (EOF)				1
	Repair and Corrective Actions	Mechanical Maintenance (OSC)	1[(a)]	2		(b)
		Electrical/I&C Maintenance (OSC)	1[(a)]	3		(b)
		Maintenance Manager (TSC)		1		
		OSC Director (OSC)		1		
		Assistant OSC Director (OSC)				1
		OPs Lead & Support Personnel (OSC)				(b)
6. In-Plant Protective Actions	Radiation Protection	RP Personnel	2[(a)]	4		(b)
7. Fire Fighting	--	Fire Brigade[(c)]	5			
8. 1st Aid and Rescue Operations	--	Plant Personnel	2[(a)]			(b)
9. Site Access Control and Personnel Accountability	Security & Accountability	Security Team Personnel	(d)	(d)		
		Security Coordinator (TSC)				1
	EOF Security	Security Coordinator (EOF)				1
10. Resource Allocation and Administration	Logistics	Logistics Manager (EOF)		1		
		Logistics Coordinator (TSC)				1
	Administration	Administrative Coordinator (EOF)				1
		Clerical Staff (TSC/EOF/JIC)				(b)
	Inter Facility Logs	Events Recorder (EOF/JIC)				2
	Facility Support	Computer Specialist (EOF)				1

Functional Area	Major Tasks	Emergency Positions		Minimum Shift Size	Minimum Staffing *60 Minute Augmentation	Minimum Staffing Other On-Call	Full Augmentation
11. Public Information	Media Interface	Corporate Spokesperson	(JIC)			1	
		Rad Protection Spokesperson	(JIC)				1
		Technical Spokesperson	(JIC)				1
	Information Development	Public Information Director				1	
		News Writer					1
	Media Monitoring and Rumor Control	Media Monitoring Staff					(b)
		Rumor Control Staff					(b)
	Facility Operation and Control	JIC Director	(JIC)			1	
		JIC Coordinator	(JIC)				1
		Administrative Coordinator	(JIC)				1
		Access Controls	(JIC)				1
		Facility Support Staff	(JIC)				(b)
		TOTAL:		**19**	**37**	**3**	**32[(b)]**

* Response time is based on optimum travel conditions.

(a) May be provided by personnel assigned other functions.

(b) Personnel numbers depend on the type and extent of the emergency.

(c) Fire Brigade per FSAR/Technical Specifications, as applicable.

(d) Function performed by on-shift security personnel.

Section 3: Classification of Emergencies

3.1 General

Section D of the Exelon Nuclear Standardized Emergency Plan divides the types of emergencies into four Emergency Classification Levels (ECLs). The first four are the UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY, and GENERAL EMERGENCY. These ECLs are entered by meeting the Emergency Action Level (EAL) Threshold Values provided in this section of the Annex. The ECLs are escalated from least severe to most severe according to relative threat to the health and safety of the public and emergency workers. Depending on the severity of an event, prior to returning to a standard day-to-day organization, a state or phase called RECOVERY may be entered to provide dedicated resources and organization in support of restoration and communication activities following the termination of the emergency.

UNUSUAL EVENT: Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

ALERT: Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

SITE AREA EMERGENCY: Events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

GENERAL EMERGENCY: Events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

RECOVERY: Recovery can be considered as a phase of the emergency and is entered by meeting emergency termination criteria provided in EP-AA-111 Emergency Classification and Protective Action Recommendations.

An emergency is classified by assessing plant conditions and comparing abnormal conditions to Initiating Conditions and Threshold Values for each Emergency Action Level.

Individuals responsible for the classification of events will refer to the Initiating Condition and Threshold Values on the matrix of the appropriate station Standardized Emergency Plan Annex (this document). This matrix will contain Initiating Conditions, EAL Threshold Values, Mode Applicability Designators, appropriate EAL numbering system, and additional guidance necessary to classify events. It may be provided as a user aid.

The matrix is set up in six Recognition Categories. The first is designated as "R" and relates to Abnormal Radiological Conditions / Abnormal Radiological Effluent Releases. The second is designated as "F" and relates to Fission Product Barrier Degradation. The third is designated as "M" and relates to hot condition System Malfunctions. The fourth is designated as "C" and relates to Cold Shutdown / Refueling System Malfunctions. The fifth is designated as "H" and relates to Hazards and Other Conditions. The sixth is designated "E-H" and relates to ISFSI Malfunctions.

The 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.

The Initiating Conditions are coded with a two letter and one number code. The first letter is the Recognition Category designator, the second letter is the Classification Level, “U” for (NOTIFICATION OF) UNUSUAL EVENT, “A” for ALERT, “S” for SITE AREA EMERGENCY and “G” for GENERAL EMERGENCY. The EAL number is a sequential number for that Recognition Category series. All Initiating Conditions that are describing the severity of a common condition (series) will have the same number.

The EAL number may then be used to reference a corresponding page(s), which provides the basis information pertaining to the Initiating Condition:

- Threshold Value
- Mode Applicability
- Basis

Emergency Action Levels are the measurable, observable detailed conditions that must be met in order to classify the event. Classification is not to be made without referencing, comparing and satisfying the Threshold Values specified in the Emergency Action Levels.

A list of definitions is provided as part of this document for terms having specific meaning to the Emergency Action Levels. Site specific definitions are provided for terms with the intent to be used for a particular Initiating Condition/Threshold Value and may not be applicable to other uses of that term at other sites, the Emergency Plan or procedures.

References are also included to documents that were used to develop the EAL Threshold Values.

References to the Emergency Director means the person in Command and Control as defined in the Emergency Plan. Classification of emergencies is a non-delegable responsibility of Command and Control for the onsite facilities with responsibility assigned to the Shift Emergency Director (Control Room Shift Manager) or the Station Emergency Director (TSC). Classification of emergencies remains the responsibility of the applicable onsite facility even after Command and Control is transferred to the Corporate Emergency Director (EOF).

Although the majority of the EALs provide very specific thresholds, the Emergency Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL is IMMINENT. If, in the judgment of the Emergency Director, an IMMINENT situation is at hand, the classification should be made as if the threshold has been exceeded. While this is particularly prudent at the higher emergency classification levels (as the early classification may provide for more effective implementation of protective measures), it is nonetheless applicable to all emergency classification levels.

3.2 Classification, Instrumentation and Transient Events

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 indications, or (3) by direct observation by plant personnel, such that doubt related to the indication's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

Indications used for monitoring and evaluation of plant conditions include the normally used instrumentation, backup or redundant instrumentation, and the use of other parameters that provide information that supports determination if an EAL threshold value has been reached. When an EAL refers to a specific instrument or indication that is determined to be inaccurate or unavailable, then alternate indications shall be used to monitor the specified condition.

During an event that results in changing parameters trending towards an EAL classification, and instrumentation that was available to monitor this parameter becomes unavailable or the parameter goes off scale, the parameter should be assumed to have been exceeded consistent with the trend and the classification made if there are no other direct or indirect means available to determine if the threshold has not been exceeded.

Planned evolutions involve preplanning to address the limitations imposed by the condition, the performance of required surveillance testing, and the implementation of specific controls prior to knowingly entering the condition in accordance with the specific requirements of the site's Technical Specifications. Activities which cause the site to operate beyond that allowed by the site's Technical Specifications, planned or unplanned, may result in an EAL threshold being met or exceeded. Planned evolutions to test, manipulate, repair, perform maintenance or modifications to systems and equipment that result in an EAL value being met or exceeded are not subject to classification and activation requirements as long as the evolution proceeds as planned and is within the operational limitations imposed by the specific operating license. However, these conditions may be subject to the reporting requirements of 10 CFR 50.72.

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.

Concerning Classification Downgrading Exelon Nuclear policy is that emergency classifications shall not be downgraded to a lower classification. Once declared, the event shall remain in effect until no Classification is warranted or until such time as conditions warrant classification to Recovery.

There may be cases in which a plant condition that exceeded an EAL was not recognized at the time of occurrence but is identified well after the condition has occurred (e.g., as a result of routine log or record review), and the condition no longer exists. In these cases, an emergency should not be declared. Reporting requirements of 10 CFR 50.72 are applicable, the guidance of NUREG-1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73 and the Reportability Reference Manual, should be applied.

3.3 Mode Applicability

The plant-operating mode that existed at the time that the event occurred, prior to any protective system or operator action initiated in response to the condition, is compared to the mode applicability of the EALs. If an event occurs, and a lower or higher plant-operating mode is reached before the emergency classification can be made, the declaration shall be based on the mode that existed at the time the event occurred.

For events that occur in Cold Shutdown or Refueling, escalation is via EALs that have Cold Shutdown or Refueling for mode applicability, even if Hot Shutdown (or a higher mode) is entered during any subsequent heat-up. In particular, the Fission Product Barrier Matrix EALs are applicable only to events that initiate in Hot Shutdown or higher.

If there is a change in Mode following an event declaration, any subsequent events involving EALs outside of the current declaration escalation path will be evaluated on the Mode of the plant at the time the subsequent events occur.

3.4 Emergency Director Judgment

Emergency Director Judgment EALs are provided in the Hazards and Other Condition Affecting Plant Safety section and on the Fission Product Barrier Matrix. Both of the Emergency Director Judgment EALs have specific criteria for when they should be applied.

The Hazards Section Emergency Director Judgment EALs are intended to address unanticipated conditions which are not addressed explicitly by other EALs but warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under specific emergency classifications (UE, Alert, SAE or GE).

The FPB Matrix ED Judgment EALs are intended to include unanticipated conditions, which are not addressed explicitly by any of the other FPB threshold values, but warrant determination because conditions exist that fall under the broader definition for a significant Loss or Potential Loss of the barrier (equal to or greater than the defined FPB threshold values).

3.5 Fission Product Barrier Restoration

Fission Product Barriers (FPBs) are not treated the same as EAL threshold values. Conditions warranting declaration of the loss or potential loss of a Fission Product Barrier may occur resulting in a specific classification. The condition that caused the loss or potential loss declaration could be rectified as the result of Operator action, automatic actions, or designed plant response. Barriers will be considered re-established when there are direct verifiable indications (containment penetration or open valve has been isolated, coolant sample results, etc) that the barrier has been restored and is capable of mitigating future events.

The reestablishment of a fission product barrier does not alter or lower the existing classification. Entry into Termination/Recovery phase is still required for exiting the present classification. However the reestablishment of the barrier should be considered in determining future classifications should plant conditions or events change.

3.6 Definitions

AFFECTING SAFE SHUTDOWN: Event in progress has adversely affected functions that are necessary to bring the plant to and maintain it in the applicable HOT or COLD SHUTDOWN condition. Plant condition applicability is determined by Technical Specification LCOs in effect.

Example 1: Event causes damage that results in entry into an LCO that requires the plant to be placed in HOT SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is not “AFFECTING SAFE SHUTDOWN.”

Example 2: Event causes damage that results in entry into an LCO that requires the plant to be placed in COLD SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is “AFFECTING SAFE SHUTDOWN.”

BOMB: An explosive device suspected of having sufficient force to damage plant systems or structures.

CIVIL DISTURBANCE: A group of persons violently protesting station operations or activities at the site.

CONFINEMENT BOUNDARY: The barrier(s) between areas containing radioactive substances and the environment.

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

EXTORTION: An attempt to cause an action at the station by threat of force.

FAULTED: In a steam generator, the existence of secondary side leakage that results in an uncontrolled drop in steam generator pressure or the steam generator being completely depressurized.

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fire. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTILE FORCE: One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

INTRUSION: A person(s) present in a specified area without authorization. Discovery of a BOMB in a specified area is indication of INTRUSION into that area by a HOSTILE FORCE.

INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI): A complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage.

NORMAL LEVELS: Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

NORMAL PLANT OPERATIONS: Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

OPERATING MODES:

(1) Power Operations:	Reactor Power > 5%, Keff ≥ 0.99
(2) Startup:	Reactor Power ≤ 5%, Keff ≥ 0.99
(3) Hot Standby:	RCS ≥ 350° F, Keff < 0.99
(4) Hot Shutdown:	200° F < RCS < 350° F, Keff < 0.99
(5) Cold Shutdown:	RCS ≤ 200° F, Keff < 0.99
(6) Refueling:	One or more vessel head closure bolts less than fully tensioned.
(D) Defueled:	All reactor fuel removed from reactor pressure vessel (full core off load during refueling or extended outage).

Hot Matrix – applies in modes (1), (2), (3), and (4)

Cold Matrix – applies in modes (5), (6), and (D)

OWNER CONTROLLED AREA (OCA): The property associated with the station and owned by the company. Access is normally limited to persons entering for official business.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

RUPTURED: In a steam generator, existence of primary-to-secondary leakage of a magnitude sufficient to require or cause a reactor trip and safety injection.

SABOTAGE: A deliberate damage, mis-alignment, or mis-operation of plant equipment with the intent to render the equipment inoperable. Equipment found tampered with or damaged due to malicious mischief may NOT meet the definition of SABOTAGE until this determination is made by security supervision.

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) automatic turbine runback >25% thermal reactor power, (2) electrical load rejection >25% full electrical load, (3) Reactor Trip, (4) Safety Injection Actuation, or (5) thermal power oscillations >10%.

STRIKE ACTION: A work stoppage within the PROTECTED AREA by a body of workers to enforce compliance with demands made on management. The STRIKE ACTION must threaten to interrupt NORMAL PLANT OPERATIONS.

UNISOLABLE: A breach or leak that cannot be promptly isolated.

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

Emergency Action Level Technical Basis Page Index

General		Site Area		Alert		Unusual Event	
EAL	**Pg.**	**EAL**	**Pg.**	**EAL**	**Pg.**	**EAL**	**Pg.**
RG1	3-29	RS1	3-32	RA1	3-35	RU1	3-38
				RA2	3-41	RU2	3-43
				RA3	3-46	RU3	3-47
FG1	3-48	FS1	3-49	FA1	3-50	FU1	3-51

Fuel Clad		RCS		Containment	
FC1	3-52	RC1	3-58	CT1	3-64
FC2	3-53				
				CT3	3-65
FC4	3-54			CT4	3-67
FC5	3-55	RC5	3-59		
		RC6	3-61	CT6	3-69
				CT7	3-71
FC8	3-56	RC8	3-62	CT8	3-73
FC9	3-57	RC9	3-63	CT9	3-74

MG1	3-75	MS1	3-77	MA1	3-79	MU1	3-81
MG2	3-82	MS2	3-83	MA2	3-84	MU2	3-85
		MS3	3-86				
		MS4	3-87	MA4	3-90	MU4	3-93
						MU5	3-95
						MU6	3-96
						MU7	3-97
				CA1	3-98	CU1	3-100
						CU2	3-102
						CU3	3-103
						CU4	3-104
				CA5	3-105	CU5	3-108
CG6	3-110	CS6	3-113	CA6	3-116	CU6	3-118
						CU7	3-119
HG1	3-122	HS1	3-124	HA1	3-126	HU1	3-128
		HS2	3-131	HA2	3-132		
				HA3	3-133	HU3	3-135
				HA4	3-138	HU4	3-142
				HA5	3-145	HU5	3-148
HG6	3-150	HS6	3-151	HA6	3-152	HU6	3-153
						E-HU1	3-154

Abnormal Rad Levels / Radiological Effluent

Radiological Effluents

GENERAL EMERGENCY

RG1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 5 6 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 3.87 E+09 uCi/sec** for **≥ 15 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 1000 mRem TEDE**
      OR
   b. **> 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**.
      OR
   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

SITE AREA EMERGENCY

RS1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 5 6 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 3.87 E+08 uCi/sec** for **≥ 15 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 100 mRem TEDE**
      OR
   b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.
      OR
   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

ALERT

RA1 Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer. 1 2 3 4 5 6 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **200 times alarm setpoint** established by a current radioactivity discharge permit for ≥ **15 minutes**.
   - 0PR01J, Liquid Radwaste Effluent Monitor
   - 0PR90J, Liquid Radwaste Effluent Monitor
   - 0PR02J, Gas Decay Tank Effluent Monitor
   - 0PR10J, Station Blowdown Monitor
   - 1/2 PR01J, Containment Purge Effluent Monitor
   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 4.42 E+07 uCi/sec** for **≥ 15 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.

UNUSUAL EVENT

RU1 Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer. 1 2 3 4 5 6 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **2 times alarm setpoint** established by a current radioactivity discharge permit for ≥ **60 minutes**.
   - 0PR01J, Liquid Radwaste Effluent Monitor
   - 0PR90J, Liquid Radwaste Effluent Monitor
   - 0PR02J, Gas Decay Tank Effluent Monitor
   - 0PR10J, Station Blowdown Monitor
   - 1/2 PR01J, Containment Purge Effluent Monitor
   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 4.42 E+05 uCi/sec** for **≥ 60 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

Abnormal Rad Levels / Radiological Effluent

Abnormal Rad Levels

GENERAL EMERGENCY

Table R1
Fuel Handling Incident Radiation Monitors

- Fuel Building Fuel Handling Incident Monitor 0RE-AR055
- Fuel Building Fuel Handling Incident Monitor 0RE-AR056
- Containment Fuel Handling Incident Monitor 1/2RE-AR011
- Containment Fuel Handling Incident Monitor 1/2RE-AR012

Table R2
Areas Requiring Continuous Occupancy

- Main Control Room - 1/2RE-AR010
- Central Alarm Station - (by survey)

SITE AREA EMERGENCY

RA2 Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel. 1 2 3 4 5 6 D

EAL Threshold Values:

1. VALID reading **> 1000 mR/hr** on any Table R1 Radiation Monitor due to **EITHER**:
   - Damaged irradiated fuel.
     OR
   - Water level drop.

   OR
2. Water level drop in the Reactor Refueling Cavity or Spent Fuel Pool that will result in irradiated fuel becoming uncovered.

RA3 Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. 1 2 3 4 5 6 D

EAL Threshold Values:

Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R2) to maintain plant safety functions.

ALERT

RU2 UNPLANNED rise in plant radiation levels. 1 2 3 4 5 6 D

EAL Threshold Values:

1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by:
      - Refueling Cavity water level **< 23 ft**. above the Reactor Flange (**423 ft**. indicated level).
        OR
      - Spent Fuel Pool water level **< 23 ft**. above the fuel (**422 ft. 9 in**. indicated level).
        OR
      - Report of visual observation of a drop in water level in the Fuel Transfer Canal, Refueling Cavity, or Spent Fuel Pool.

   AND

   b. VALID Area Radiation Monitor reading rise on one or more radiation monitor in Table R1.

   OR
2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.

RU3 Fuel Clad Degradation. 1 2 3 4

EAL Threshold Values:

Fuel clad degradation resulting in:

- Gross Failed Fuel Monitor 1/2RE-PR006 indicating I-135 concentration **> 5 uCi/cc.**
  OR
- Dose Equivalent I-131 specific coolant activity **> 60.0 uCi/gm**.
  OR
- Dose Equivalent XE-133 specific coolant activity **> 603.0 uCi/gm**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

Fission Product Barrier Matrix — Hot Matrix

GENERAL EMERGENCY

FG1 Loss of ANY Two Barriers AND Loss or Potential Loss of third barrier. 1 2 3 4

SITE AREA EMERGENCY

FS1 Loss or Potential Loss of ANY two barriers. 1 2 3 4

ALERT

FA1 ANY Loss or ANY Potential Loss of either Fuel Clad or RCS. 1 2 3 4

UNUSUAL EVENT

FU1 ANY Loss or ANY Potential Loss of Containment. 1 2 3 4

Sub-Category	FC - Fuel Clad		RC – Reactor Coolant System		CT - Containment	
	Loss	**Potential Loss**	**Loss**	**Potential Loss**	**Loss**	**Potential Loss**
1. CSF Status	1. **Core Cooling CSF - RED Path** conditions exist.	2. **Core Cooling CSF - ORANGE Path** conditions exist. **OR** 3. **Heat Sink CSF - RED Path** conditions exist.	None	1. **RCS Integrity CSF - RED Path** conditions exist. **OR** 2. **Heat Sink CSF - RED Path** conditions exist.	None	**Containment CSF - RED Path** conditions exist.
2. RCS Activity	Coolant activity **> 300 uCi/gm** Dose Equivalent I-131.	None	None	None	None	None
3. Containment Pressure	None	None	None	None	1. Rapid unexplained drop in Containment pressure following initial pressure rise. **OR** 2. Containment pressure or water level response **not** consistent with LOCA conditions.	3. Containment pressure **≥ 50 psig** and rising. **OR** 4. Hydrogen concentration in Containment **≥ 5%.** **OR** 5. a. Containment pressure **≥ 20 psig.** **AND** b. Less than one train of Containment Spray operating.
4. CETC Reading	1. Average of the ten highest reading core exit thermocouples (CETCs) is **> 1200° F**.	2. Average of the ten highest reading core exit thermocouples (CETCs) is **> 700° F**.	None	None	None	1. a. Average of the ten highest reading core exit thermocouples (CETCs) is **≥ 1200° F**. **AND** b. Functional Restoration procedures **not** effective in **< 15 minutes**. **OR** 2. a. Average of the ten highest reading core exit thermocouples (CETCs) is **≥ 700° F**. **AND** b. RVLIS plenum region **= 0%.** **AND** c. Functional Restoration procedures **not** effective in **< 15 minutes.**
5. Reactor Vessel Water Level / RCS Leak Rate	None	**Core Cooling CSF - ORANGE Path** conditions exist.	1. RCS leakage **> available makeup capacity** resulting in loss of subcooling as indicated by CETCs **< ACCEPTABLE VALUE** per Iconic Display or RCS Subcooling Margin Figure 1/2BwST 2-1.	2. UNISOLABLE leak exceeding the capacity of one charging pump in the normal charging mode.	None	None
6. S/G Leakage / Rupture	None	None	Steam Generator Tube Rupture that requires/results in entry into BwEP-3.	None	1. RUPTURED S/G is also FAULTED outside of Containment. **OR** 2. a. Primary-to-Secondary leakrate **> 10 gpm**. **AND** b. UNISOLABLE steam release from affected S/G to the environment.	None
7. Containment Isolation Valve Status	None	None	None	None	1. Failure of isolation valves in any one line to close. **AND** 2. Direct downstream pathway to the environment exists after a containment isolation signal.	None
8. Containment Rad Monitoring	Containment radiation monitor (AR020 (21)) reading **> 1.95E+03 R/hr**.	None	Containment radiation monitor reading (AR020(21)) reading **> 25 R/hr**.	None	None	Containment radiation monitor (AR020 (21)) reading **> 4.40E+03 R/hr**.
9. ED Judgment	1. Any condition in the opinion of the Emergency Director that indicates Loss of the Fuel Clad Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Fuel Clad Barrier.	1. Any condition in the opinion of the Emergency Director that indicates Loss of the RCS Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the RCS Barrier.	Any condition in the opinion of the Emergency Director that indicates Loss of the Containment Barrier.	Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment Barrier.

System Malfunction

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Loss of AC Power	**MG1** Prolonged loss of all offsite power and all On-Site AC power to emergency busses. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to unit ESF busses. **AND** 2. Failure of DG 1A(2A) and DG 1B(2B) emergency diesel generators to supply power to unit ESF busses. **AND** 3. a. Restoration of at least one unit ESF bus in **< 4 hours** is **not** likely. **OR** b. **EITHER** of the following: • **Core Cooling CSF - RED Path** conditions exist. **OR** • **Core Cooling CSF - ORANGE Path** conditions exist.	**MS1** Loss of all Off-site and all On-Site AC power to emergency busses for 15 minutes or longer. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to unit ESF busses. **AND** 2. Failure of DG 1A(2A) and DG 1B(2B) emergency diesel generators to supply power to unit ESF busses. **AND** 3. Failure to restore power to at least one unit ESF bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.	**MA1** AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. AC power capability to unit ESF busses reduced to only one of the following power sources for **≥ 15 minutes**: • Affected unit SAT 142-1(242-1) • Affected unit SAT 142-2(242-2) • Emergency Diesel Generator DG 1A(2A) • Emergency Diesel Generator DG 1B(2B) • Unit crosstie breakers **AND** 2. Any additional single power source failure will result in unit blackout.	**MU1** Loss of all Off-site AC power to busses for 15 minutes or longer. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of all off-site AC power to unit ESF busses for **≥ 15 minutes**.
RPS Failure /Inadvertent Criticality	**MG2** Automatic Trip and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists. 1 2 **EAL Threshold Values:** 1. Automatic Reactor Trip was **not** successful as indicated by Reactor Power **≥ 5%**. **AND** 2. Manual actions were **not** successful as indicated by Reactor Power **≥ 5%**. **AND** 3. **EITHER** of the following exists: • **Core Cooling CSF – RED Path** conditions exist. **OR** • **Heat Sink CSF – RED Path** conditions exist.	**MS2** Automatic Trip fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor. 1 2 **EAL Threshold Values:** 1. Automatic Reactor Trip was **not** successful as indicated by Reactor Power **≥ 5%**. **AND** 2. Manual Reactor Trip from Main Control Board was **not** successful as indicated by Reactor Power **≥ 5%**.	**MA2** Automatic Trip fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor. 1 2 **EAL Threshold Values:** 1. Automatic Reactor Trip was **not** successful as indicated by Reactor Power **≥ 5%**. **AND** 2. Manual Reactor Trip from Main Control Board was successful as indicated by Reactor Power **< 5%**.	**MU2** Inadvertent criticality. 3 4 **EAL Threshold Values:** UNPLANNED sustained positive startup rate observed on nuclear instrumentation.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
DC Power		**MS3** Loss of all vital DC power for 15 minutes or longer.. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of all vital DC power based on **< 108 VDC** on unit 125 VDC battery busses 111(211) and 112(212) for **≥ 15 minutes**.		
Annunciators		**MS4** Inability to monitor a SIGNIFICANT TRANSIENT in progress. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1) **AND** 2. SIGNIFICANT TRANSIENT in progress (Table M2). **AND** 3. Compensatory indications (computer points) are unavailable.	**MA4** UNPLANNED Loss of safety system annunciation or indication in the control room with EITHER (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1) **AND** 2. a. SIGNIFICANT TRANSIENT in progress (Table M2). **OR** b. Compensatory indications (computer points) are unavailable.	**MU4** UNPLANNED loss of safety system annunciation or indication in the control room for 15 minutes or longer. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1)
		Table M1 - Safety Systems • Gen & Aux Power (1/2PM01J MCB) • Reactor and Chem Volume Control (1/2PM05J MCB) • Eng. Safety Features (1/2PM06J MCB) • Process/Area Radiation Monitoring	**Table M2 - Significant Transients** • Automatic Turbine Runback **> 25%** thermal reactor power • Electrical load rejection **> 25%** full electrical load • Reactor Trip • Safety Injection Actuation • Thermal power oscillations **> 10%**	

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

Exelon Nuclear
HOT MATRIX

System Malfunction

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
RCS Leak				**MU5** RCS leakage. 1 2 3 4 **EAL Threshold Values:** 1. Unidentified or pressure boundary leakage **> 10 gpm**. **OR** 2. Identified leakage **> 25 gpm**.
Communications		**Table M3 – Communications Capability** System / Onsite / Offsite Radios: X / Plant page: X / Plant Telephone System: X / Commercial Telephones: / X ENS: / X HPN: / X Cellular phones: / X Satellite phones: / X		**MU6** Loss of all On-site or Off-site communications capabilities. 1 2 3 4 **EAL Threshold Values:** 1. Loss of all Table M3 **Onsite** communications capability affecting the ability to perform routine operations. **OR** 2. Loss of all Table M3 **Offsite** communications capability.
T. S. Time				**MU7** Inability to reach required shutdown within Technical Specification limits. 1 2 3 4 **EAL Threshold Values:** Plant is **not** brought to required operating mode within Technical Specifications LCO Action Statement Time.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

Exelon Nuclear
HOT MATRIX

Hazards and Other Conditions Affecting Plant Safety

Security

GENERAL EMERGENCY

HG1 HOSTILE ACTION resulting in loss of physical control of the facility. 1 2 3 4 5 6 D

EAL Threshold Values:

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1).

   OR

2. A HOSTILE ACTION has:
   - Caused failure of Spent Fuel Pool Cooling Systems

     AND
   - IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).

SITE AREA EMERGENCY

HS1 HOSTILE ACTION within the PROTECTED AREA. 1 2 3 4 5 6 D

EAL Threshold Values:

A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.

ALERT

HA1 HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. 1 2 3 4 5 6 D

EAL Threshold Values:

1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site.

   OR

2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.

UNUSUAL EVENT

HU1 Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant. 1 2 3 4 5 6 D

EAL Threshold Values:

1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities.

   OR

2. A validated notification from NRC providing information of an aircraft threat.

   OR

3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

C. R. Evacuation

Table H1 - Safety Functions

- Reactivity Control (ability to shut down the reactor and keep it shutdown)
- RCS Inventory (ability to cool the core)
- Secondary Heat Removal (ability to maintain heat sink)

SITE AREA EMERGENCY

HS2 Control Room evacuation has been initiated and plant control cannot be established. 1 2 3 4 5 6 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Control Room evacuation has been initiated.

   AND

2. Control of the plant **cannot** be established per 1/2BwOA PRI-5, Control Room Inaccessibility procedure in **< 15 minutes**.

ALERT

HA2 Control Room evacuation has been initiated. 1 2 3 4 5 6 D

EAL Threshold Values:

Entry into 1/2BwOA PRI-5, Control Room Inaccessibility procedure for Control Room evacuation.

Fire / Explosion

Table H2 – Vital Areas

- Containment
- Auxiliary Building
- Fuel Handling Building
- Main Steam Tunnels
- RWSTs
- Condensate Storage Tanks
- Lake Screen House

ALERT

HA3 FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown. 1 2 3 4 5 6 D

EAL Threshold Values:

FIRE or EXPLOSION resulting in any of the following:

- VISIBLE DAMAGE to a Table H2 permanent structure.

  OR
- VISIBLE DAMAGE to safety system equipment contained within a Table H2 area.

  OR
- Control Room indication of degraded safety system equipment performance contained within a Table H2 area.

UNUSUAL EVENT

HU3 FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA. 1 2 3 4 5 6 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm.

   OR

2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

Exelon Nuclear
HOT MATRIX

Hazards and Other Conditions Affecting Plant Safety

Natural / Destructive Phenomena

Table H2 - Vital Areas

- Containment
- Auxiliary Building
- Fuel Handling Building
- Main Steam Tunnels
- RWSTs
- Condensate Storage Tanks
- Lake Screen House

ALERT

HA4 Natural and destructive phenomena affecting VITAL AREAS 1 2 3 4 5 6 D

EAL Threshold Values:

1. a. Seismic event **> Operating Basis Earthquake (OBE)** as indicated by seismic check 0PA02J.

   AND

   b. Confirmed by **EITHER:**

   - Earthquake felt in plant.

     OR

   - National Earthquake Center.

     OR

   - Control Room indication of degraded performance of systems required for the safe shutdown of the plant.

   OR

2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area:

   - Tornado strike

     OR

   - High winds **> 85 mph**

     OR

   - Vehicle crash

     OR

   - Turbine failure-generated PROJECTILES

   OR

3. Flooding in the Auxiliary Building that results in **EITHER**:

   a. Degraded safety system performance as indicated in the Control Room.

   OR

   b. Industrial safety hazards (e.g., electric shock) that precludes access to operate or monitor safety equipment.

UNUSUAL EVENT

HU4 Natural and destructive phenomena affecting the PROTECTED AREA. 1 2 3 4 5 6 D

EAL Threshold Values:

1. a. Seismic event as indicated by Annunciator 0-38-E5, Accelograph Accel High (0PM01J).

   AND

   b. Confirmed by **EITHER:**

   - Earthquake felt in plant.

     OR

   - National Earthquake Center.

   OR

2. **EITHER** of the following occurring within the PROTECTED AREA boundary:

   - Tornado strike

     OR

   - Sustained **(> 15 minutes)** high winds **> 85 mph**

   OR

3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

   OR

4. Flooding in the Auxiliary Building that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

HOT MATRIX

Exelon Nuclear
HOT MATRIX

Hazards and Other Conditions Affecting Plant Safety

Toxic / Flammable Gas

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Table H2 - Vital Areas • Containment • Auxiliary Building • Fuel Handling Building • Main Steam Tunnels • RWSTs • Condensate Storage Tanks • Lake Screen House		**HA5** Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor. 1 2 3 4 5 6 D **EAL Threshold Values:** **Note:** If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event. Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.	**HU5** Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS. **OR** 2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.

Judgment

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
HG6 Other conditions existing which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY. 1 2 3 4 5 6 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**HS6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY. 1 2 3 4 5 6 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	**HA6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an ALERT. 1 2 3 4 5 6 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**HU6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT. 1 2 3 4 5 6 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

HOT MATRIX
HOT MATRIX

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
ISFSI MALFUNCTION				
ISFSI				**E-HU1** Damage to a loaded cask CONFINEMENT BOUNDARY 1 2 3 4 5 6 D **EAL Threshold Values:** Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

Abnormal Rad Levels / Radiological Effluent

Radiological Effluents

GENERAL EMERGENCY

RG1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 5 6 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 3.87 E+09 uCi/sec** for **≥ 15 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 1000 mRem TEDE**
      OR
   b. **> 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**.
      OR
   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

SITE AREA EMERGENCY

RS1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 5 6 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 3.87 E+08 uCi/sec** for **≥ 15 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 100 mRem TEDE**
      OR
   b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.
      OR
   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

ALERT

RA1 Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer. 1 2 3 4 5 6 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **200 times alarm setpoint** established by a current radioactivity discharge permit for ≥ **15 minutes**.
   - 0PR01J, Liquid Radwaste Effluent Monitor
   - 0PR90J, Liquid Radwaste Effluent Monitor
   - 0PR02J, Gas Decay Tank Effluent Monitor
   - 0PR10J, Station Blowdown Monitor
   - 1/2 PR01J, Containment Purge Effluent Monitor
   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 4.42 E+07 uCi/sec** for **≥ 15 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of ≥ **15 minutes**.

UNUSUAL EVENT

RU1 Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer. 1 2 3 4 5 6 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **2 times alarm setpoint** established by a current radioactivity discharge permit for ≥ **60 minutes**.
   - 0PR01J, Liquid Radwaste Effluent Monitor
   - 0PR90J, Liquid Radwaste Effluent Monitor
   - 0PR02J, Gas Decay Tank Effluent Monitor
   - 0PR10J, Station Blowdown Monitor
   - 1/2 PR01J, Containment Purge Effluent Monitor
   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 4.42 E+05 uCi/sec** for **≥ 60 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of ≥ **60 minutes**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Abnormal Rad Levels / Radiological Effluent				
Abnormal Rad Levels		**Table R1** **Fuel Handling Incident Radiation Monitors** • Fuel Building Fuel Handling Incident Monitor 0RE-AR055 • Fuel Building Fuel Handling Incident Monitor 0RE-AR056 • Containment Fuel Handling Incident Monitor 1/2RE-AR011 • Containment Fuel Handling Incident Monitor 1/2RE-AR012	**RA2** Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. VALID reading **> 1000 mR/hr** on any Table R1 Radiation Monitor due to **EITHER**: • Damaged irradiated fuel. **OR** • Water level drop. **OR** 2. Water level drop in the Reactor Refueling Cavity or Spent Fuel Pool that will result in irradiated fuel becoming uncovered.	**RU2** UNPLANNED rise in plant radiation levels. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by: • Refueling Cavity water level **< 23 ft**. above the Reactor Flange (**423 ft**. indicated level). **OR** • Spent Fuel Pool water level **< 23 ft**. above the fuel (**422 ft. 9 in**. indicated level). **OR** • Report of visual observation of a drop in water level in the Fuel Transfer Canal, Refueling Cavity, or Spent Fuel Pool. **AND** b. VALID Area Radiation Monitor reading rise on one or more radiation monitor in Table R1. **OR** 2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.
		Table R2 **Areas Requiring Continuous Occupancy** • Main Control Room - 1/2RE-AR010 • Central Alarm Station - (by survey)	**RA3** Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. 1 2 3 4 5 6 D **EAL Threshold Values:** Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R2) to maintain plant safety functions.	

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

COLD SHUTDOWN / REFUELING MATRIX

Cold Shutdown / Refueling System Malfunctions

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Loss of AC Power			**CA1** Loss of all Off-site and all On-Site AC power to emergency busses for 15 minutes or longer. [5] [6] [D] **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to unit ESF busses. **AND** 2. Failure of DG 1A(2A) and DG 1B(2B) emergency diesel generators to supply power to unit ESF busses. **AND** 3. Failure to restore power to at least one unit ESF bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.	**CU1** AC power capibilty to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout. [5] [6] **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. AC power capability to unit ESF busses reduced to only one of the following power sources for **≥ 15 minutes**: • Affected unit SAT 142-1(242-1) • Affected unit SAT 142-2(242-2) • Emergency Diesel Generator DG 1A(2A) • Emergency Diesel Generator DG 1B(2B) • Unit crosstie breakers **AND** 2. Any additional single power source failure will result in a unit blackout.
Inadvertent Criticality				**CU2** Inadvertent criticality. [5] [6] **EAL Threshold Values:** UNPLANNED sustained positive startup rate observed on nuclear instrumentation.
DC Power				**CU3** Loss of required DC power for 15 minutes or longer. [5] [6] **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of required DC power based on **< 108 VDC** on unit 125 VDC battery busses 111(211) and 112(212) for **≥ 15 minutes**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Cold Shutdown / Refueling System Malfunctions				
Communications			**Table C1 – Communications Capability** System / Onsite / Offsite Radios: X / Plant page: X / Plant Telephone System: X / Commercial Telephones: / X ENS: / X HPN: / X Cellular phones: / X Satellite phones: / X	**CU4** Loss of all On-site or Off-site communications capabilities. 5 6 D **EAL Threshold Values:** 1. Loss of all Table C1 **Onsite** communications capability affecting the ability to perform routine operations. **OR** 2. Loss of all Table C1 **Offsite** communications capability affecting the ability to perform offsite notifications.
Heat Sink		**Table C2 – RCS Reheat Duration Thresholds** RCS / Containment Closure / Duration Intact / N/A / 60 minutes* Not Intact / Established / 20 minutes* **OR** Reduced Inventory (< 397 ft.) / Not Established / 0 minutes *If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then EAL Threshold #1 is **not** applicable.	**CA5** Inability to maintain plant in cold shutdown. 5 6 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200°F** for **> Table C2 duration**. **OR** 2. UNPLANNED RPV pressure rise **> 10 psig** as a result of temperature rise due to loss of decay heat removal. (This threshold does not apply in solid plant conditions.)	**CU5** UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV. 5 6 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200°F**. **OR** 2. Loss of the following for **≥ 15 minutes:** • All RCS temperature indications **AND** • All RPV level indications

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

Cold Shutdown / Refueling System Malfunctions

RCS Leakage / Inventory

GENERAL EMERGENCY

CG6 Loss of RCS/RPV inventory affecting fuel clad integrity with containment challenged. [5] [6]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. RVLIS **< 0% Plenum (390 ft. el.)** for **≥ 30 minutes**.

   OR

   Reactor Vessel Refueling Level Indicators LT-046 and LT-049 **< 392 ft. el.** for **≥ 30 minutes**.

   AND

   b. Any Containment Challenge Indication (Table C4).

   OR

2. a. Reactor Vessel level unknown for **≥ 30 minutes.**

   AND

   b. Loss of Reactor Vessel inventory as indicated by any of the following:

   - Table C3 indication.

     OR

   - Erratic Source Range Neutron Monitor indication.

     OR

   - 1/2 RE-AR011 or 1/2 RE-AR012 Containment Fuel Handling Incident radiation monitors **> 3000 mR/hr**.

   AND

   c. Any Containment Challenge Indication (Table C4)

Table C4 – Containment Challenge Indications

- Hydrogen concentration in Containment **≥ 5%**
- UNPLANNED rise in containment pressure
- CONTAINMENT CLOSURE **not** established.

SITE AREA EMERGENCY

CS6 Loss of RCS/RPV inventory affecting core decay heat removal capability. [5] [6]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. With CONTAINMENT CLOSURE **not** established **EITHER**:

   - RVLIS **< 15% Plenum (392.4 ft. el.)**.

     OR

   - Reactor Vessel Refueling Level Indicators LT-046 and LT-049 **< 393 ft. el.**

   OR

2. With CONTAINMENT CLOSURE established **EITHER**:

   - RVLIS **< 0% Plenum (390 ft. el.)**

     OR

   - Reactor Vessel Refueling Level Indicators LT-046 and LT-049 **< 392 ft.**

   OR

3. a. Reactor Vessel level unknown for **≥ 30 minutes.**

   AND

   b. Loss of Reactor Vessel inventory as indicated by any of the following:

   - Table C3 indications.

     OR

   - Erratic Source Range Neutron Monitor indication.

     OR

   - 1/2 RE-AR011 or 1/2 RE-AR012 Containment Fuel Handling Incident radiation monitors **> 3000 mR/hr.**

Table C3 – Indications of RCS Leakage

- UNPLANNED Containment Sump level rise
- UNPLANNED Auxiliary Bldg. Sump level rise
- UNPLANNED Tank level rise
- UNPLANNED rise in RCS makeup
- Observation of leakage or inventory loss

ALERT

CA6 Loss of RCS/RPV inventory. [5] [6]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. Loss of RCS / Reactor Vessel inventory as indicated RVLIS **< 27% Plenum (393 ft. el.)**.

   OR

   b. Loss of RCS / Reactor Vessel inventory as indicated by LT-046 and LT-049 **< 393 ft. el.**

   OR

2. a. RCS / Reactor Vessel level unknown for **≥ 15 minutes.**

   AND

   b. Loss of RCS / Reactor Vessel inventory per Table C3 indications.

UNUSUAL EVENT

CU6 RCS leakage. [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

RCS leakage results in the inability to restore and maintain RCS or Pressurizer level **> procedurally established limit** for **≥ 15 minutes.**

CU7 UNPLANNED loss of RCS/RPV inventory. [6]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED Refueling Cavity or Vessel level drop that meets **EITHER**:

   - When controlling level above the Reactor Vessel flange, Refueling Cavity level drop below the Reactor Vessel flange **(400 ft.)** for **≥ 15 minutes**.

     OR

   - When controlling level below the Reactor Vessel flange, vessel level drop below the procedurally established limit for **≥ 15 minutes**.

   OR

2. a. Reactor Vessel level unknown.

   AND

   b. Loss of RCS /Reactor Vessel inventory per Table C3 indications.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Security	**HG1** HOSTILE ACTION resulting in loss of physical control of the facility. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1). **OR** 2. A HOSTILE ACTION has: • Caused failure of Spent Fuel Pool Cooling Systems **AND** • IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).	**HS1** HOSTILE ACTION within the PROTECTED AREA. 1 2 3 4 5 6 D **EAL Threshold Values:** A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.	**HA1** HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site. **OR** 2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.	**HU1** Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities. **OR** 2. A validated notification from NRC providing information of an aircraft threat. **OR** 3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.
C. R. Evacuation	**Table H1 - Safety Functions** • Reactivity Control (ability to shut down the reactor and keep it shutdown) • RCS Inventory (ability to cool the core) • Secondary Heat Removal (ability to maintain heat sink)	**HS2** Control Room evacuation has been initiated and plant control cannot be established. 1 2 3 4 5 6 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Control Room evacuation has been initiated. **AND** 2. Control of the plant **cannot** be established per 1/2BwOA PRI-5, Control Room Inaccessibility procedure in **< 15 minutes**.	**HA2** Control Room evacuation has been initiated. 1 2 3 4 5 6 D **EAL Threshold Values:** Entry into 1/2BwOA PRI-5, Control Room Inaccessibility procedure for Control Room evacuation.	
Fire / Explosion		**Table H2 – Vital Areas** • Containment • Auxiliary Building • Fuel Handling Building • Main Steam Tunnels • RWSTs • Condensate Storage Tanks • Lake Screen House	**HA3** FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown. 1 2 3 4 5 6 D **EAL Threshold Values:** FIRE or EXPLOSION resulting in any of the following: • VISIBLE DAMAGE to a Table H2 permanent structure. **OR** • VISIBLE DAMAGE to safety system equipment contained within a Table H2 area. **OR** • Control Room indication of degraded safety system equipment performance contained within a Table H2 area.	**HU3** FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA. 1 2 3 4 5 6 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm. **OR** 2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety			
Natural / Destructive Phenomena **Table H2 - Vital Areas** • Containment • Auxiliary Building • Fuel Handling Building • Main Steam Tunnels • RWSTs • Condensate Storage Tanks • Lake Screen House		**HA4** Natural and destructive phenomena affecting VITAL AREAS 1 2 3 4 5 6 D **EAL Threshold Values:** 1. a. Seismic event **> Operating Basis Earthquake (OBE)** as indicated by seismic check 0PA02J. **AND** b. Confirmed by **EITHER:** • Earthquake felt in plant. **OR** • National Earthquake Center. **OR** • Control Room indication of degraded performance of systems required for the safe shutdown of the plant. **OR** 2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area: • Tornado strike **OR** • High winds **> 85 mph** **OR** • Vehicle crash **OR** • Turbine failure-generated PROJECTILES **OR** 3. Flooding in the Auxiliary Building that results in **EITHER**: a. Degraded safety system performance as indicated in the Control Room. **OR** b. Industrial safety hazards (e.g., electric shock) that precludes access to operate or monitor safety equipment.	**HU4** Natural and destructive phenomena affecting the PROTECTED AREA. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. a. Seismic event as indicated by Annunciator 0-38-E5, Accelograph Accel High (0PM01J). **AND** b. Confirmed by **EITHER:** • Earthquake felt in plant. **OR** • National Earthquake Center. **OR** 2. **EITHER** of the following occurring within the PROTECTED AREA boundary: • Tornado strike **OR** • Sustained **(> 15 minutes)** high winds **> 85 mph** **OR** 3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals. **OR** 4. Flooding in the Auxiliary Building that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Toxic / Flammable Gas	**Table H2 - Vital Areas** • Containment • Auxiliary Building • Fuel Handling Building • Main Steam Tunnels • RWSTs • Condensate Storage Tanks • Lake Screen House		**HA5** Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor. 1 2 3 4 5 6 D **EAL Threshold Values:** **Note:** If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event. Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.	**HU5** Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS. **OR** 2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.
Judgment	**HG6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY. 1 2 3 4 5 6 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**HS6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY. 1 2 3 4 5 6 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	**HA6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an ALERT. 1 2 3 4 5 6 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**HU6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT. 1 2 3 4 5 6 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

COLD SHUTDOWN / REFUELING MATRIX

COLD SHUTDOWN / REFUELING MATRIX

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
ISFSI MALFUNCTION				
ISFSI				**E-HU1** Damage to a loaded cask CONFINEMENT BOUNDARY 1 2 3 4 5 6 D **EAL Threshold Values:** Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

COLD SHUTDOWN / REFUELING MATRIX

COLD SHUTDOWN / REFUELING MATRIX

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RG1

Initiating Condition:

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 3.87 E+09 uCi/sec** for **≥ 15 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of **EITHER**:

   a. **> 1000 mRem TEDE**

      OR

   b. **> 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond the site boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **>1000 mR/hr** are expected to continue for **≥ 60 minutes**.

      OR

   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS
RG1 (cont)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed the EPA Protective Action Guides (PAGs). Public protective actions will be necessary. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public and likely involve fuel damage.

While these failures are addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

Threshold #1 Basis:

The site-specific monitors listed include effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading threshold is not, the results from dose assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency-implementing procedures call for the timely performance of dose assessments using actual meteorology and release information. If the results of dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading threshold.

Threshold #2 Basis:

The "site boundary" is the nearest distance from potential release points at which protective actions would be required for members of the public.

Threshold #3 Basis:

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. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption on sample media followed by field analysis are used for determining the iodine (CDE) thyroid value.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RG1 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 5, AG1
2. EP-AA-112-500 Emergency Environmental Monitoring
3. EP-EAL-0601 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values Braidwood Station

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RS1

Initiating Condition:

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 3.87 E+08 uCi/sec** for **≥ 15 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of **EITHER**:

   a. **> 100 mRem TEDE**

      OR

   b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond the site boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.

      OR

   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS
RS1 (cont)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed 10% of the EPA Protective Action Guides (PAGs). Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

While these failures are addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

Threshold #1 Basis:

The site specific monitors listed include effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading threshold is not, the results from dose assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency-implementing procedures should call for the timely performance of dose assessments using actual meteorology and release information. If the results of dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading threshold.

Threshold #2 Basis:

The "site boundary" is the nearest distance from potential release points at which Protective Actions would be required for members of the public.

Threshold #3 Basis:

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. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption on sample media followed by field analysis are used for determining the iodine (CDE) thyroid value.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RS1 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 5, AS1
2. EP-AA-112-500 Emergency Environmental Monitoring
3. EP-EAL-0601 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values Braidwood Station

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RA1

Initiating Condition:

Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors **> 200 times high alarm setpoint** established by a current radioactive release package for **≥ 15 minutes**.

   - 0PR01J, Liquid Radwaste Effluent Monitor
   - 0PR90J, Liquid Radwaste Effluent Monitor
   - 0PR02J, Gas Decay Tank Effluent Monitor
   - 0PR10J, Station Blowdown Monitor
   - 1/2 PR01J, Containment Purge Effluent Monitor
   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 4.42 E+07 uCi/sec** for **≥ 15 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS
RA1 (cont)

Basis (cont):

This EAL addresses an actual or substantial potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in RU1 and RA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases are not to be prorated or averaged. For example, a release exceeding 600 times ODCM for 5 minutes does not meet the threshold

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

Threshold #1 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

The effluent monitors listed are those normally used for planned discharges. If a discharge is performed using a different flowpath or effluent monitor other than those listed (e.g., a portable or temporary effluent monitor), then the declaration criteria will be based on the monitor specified in the Discharge Permit.

Threshold #2 Basis:

This threshold is intended for effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

Threshold #3 Basis:

This threshold addresses uncontrolled releases that are detected by sample analyses, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS
RA1 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 5, AA1
2. 0BwIS RETS 2.1-1, Digital Channel Operational Test of 0PR01J
3. 0BwISR 11.A.3-002, Rev 001 Channel Operation Test of Liquid Radwaste Effluent Radiation Monitor 0PR01J
4. ODCM Section 12.3 Liquid Effluents
5. EP-EAL-0601 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values Braidwood Station

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RU1

Initiating Condition:

Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors **> 2 times high alarm setpoint** established by a current radioactive release package for **≥ 60 minutes**.

   - 0PR01J, Liquid Radwaste Effluent Monitor
   - 0PR90J, Liquid Radwaste Effluent Monitor
   - 0PR02J, Gas Decay Tank Effluent Monitor
   - 0PR10J, Station Blowdown Monitor
   - 1/2 PR01J, Containment Purge Effluent Monitor
   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 4.42 E+05 uCi/sec** for **≥ 60 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS
RU1 (cont)

Basis (cont):

This EAL addresses a potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in RU1 and RA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases are not to be prorated or averaged. For example, a release exceeding 4 times ODCM for 30 minutes does not meet the threshold.

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

Threshold #1 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

The effluent monitors listed are those normally used for planned discharges. If a discharge is performed using a different flowpath or effluent monitor other than those listed (e.g., a portable or temporary effluent monitor), then the declaration criteria will be based on the monitor specified in the Discharge Permit.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS
RU1 (cont)

Basis (cont):

Threshold #2 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL.

This threshold is intended for effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

Threshold #3 Basis:

This threshold addresses uncontrolled releases that are detected by sample analyses, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

Basis Reference(s):

1. NEI 99-01 Rev 5, AU1
2. UFSAR Section 11.5.2.3
3. 0BwSR 11.A.3-002, Rev 001 Channel Operation Test of Liquid Radwaste Effluent Radiation Monitor 0PR01J
4. ODCM Section 12.3 Liquid Effluents
5. EP-EAL-0601 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values Braidwood Station

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RA2

Initiating Condition:

Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

1. VALID reading **> 1000 mR/hr** on any Table R1 Radiation Monitor due to **EITHER**:

   - Damage to irradiated fuel

     OR

   - Water level drop

Table R1 - Fuel Handling Incident Radiation Monitors
• Fuel Building Fuel Handling Incident Monitor 0RE-AR055
• Fuel Building Fuel Handling Incident Monitor 0RE-AR056
• Containment Fuel Handling Incident Monitor 1/2RE-AR011
• Containment Fuel Handling Incident Monitor 1/2RE-AR012

   OR

2. Water level drop in the Reactor Refueling Cavity, Spent Fuel Pool or the Fuel Transfer Canal that will result in irradiated fuel becoming uncovered.

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses increases in radiation dose rates within plant buildings, and may be a precursor to a radioactivity release to the environment. These events represent a loss of control over radioactive material and represent an actual or substantial potential degradation in the level of safety of the plant.

These events escalate from RU2 in that fuel activity has been released, or is anticipated due to fuel heatup. This EAL applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS
RA2 (cont)

Basis (cont):

Threshold #1 Basis:

This EAL addresses radiation monitor indications of fuel uncovery and/or fuel damage.

Uncovering spent fuel represents a substantial degradation of the level of safety of the plant and warrants an Alert classification. Visual observation of spent fuel uncovery represents a major ALARA concern in that radiation levels could exceed 10,000 R/hr on the refuel bridge when fuel uncovery begins. The value of 1000 mR/hr was conservatively chosen for classification purposes.

Radiation monitor readings are used to provide indication of fuel uncovery and/or fuel damage. High monitor readings associated with the transfer or relocation of a source, stored in or near the pool or readings responding to a planned evolution such as removal of the reactor head or equipment relocation are not classified under this threshold since the reading would not be indicative of fuel uncovery and/or fuel damage.

Dropping heavy loads onto the spent fuel can cause significant damage to the spent fuel and an Alert is also warranted under these conditions provided that the above radiation monitor threshold readings are reached.

Escalation of this emergency classification level, if appropriate, would be based on RS1 or RG1.

Threshold #2 Basis:

Once Spent Fuel Pool water level drops below the low level alarm setpoint, further drops can be monitored only by visual observation unless the Spent Fuel Pool is in communication with the Refueling Cavity.

If available, video cameras may allow remote observation. Depending on available level instrumentation, the declaration threshold may need to be based on indications of water makeup rate.

Basis Reference(s):

1. NEI 99-01 Rev 5, AA2
2. UFSAR 11.5.2.2.6, 11.5.2.2.7, 15.7.4, Table 12.3-3
3. Technical Specification Table 3.3-6-1
4. 1/2BwOA REFUEL-1 Fuel Handling Emergency
5. 1/2BwOA REFUEL-2 Refueling Cavity or Spent Fuel Pool Level Loss
6. TRM 3.9.a, Refueling Operations, Decay Time
7. BwAR 1-1-A2, 2-1-A2, CNMT DRAIN LEAK DETECT FLOW HIGH alarm

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RU2

Initiating Condition:

UNPLANNED rise in plant radiation levels.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by:

   - Refueling Cavity water level **< 23 ft**. above the Reactor Flange (**423 ft**. indicated level).

     OR

   - Spent Fuel Pool water level **< 23 ft**. above the fuel (**422 ft. 9 in**. indicated level).

     OR

   - Report of visual observation of a drop in water level in the Fuel Transfer Canal, Refueling Cavity, or Spent Fuel Pool.

   AND

   b. VALID Area Radiation Monitor reading rise on one or more radiation monitors in Table R1.

Table R1 - Fuel Handling Incident Radiation Monitors
• Fuel Building Fuel Handling Incident Monitor 0RE-AR055
• Fuel Building Fuel Handling Incident Monitor 0RE-AR056
• Containment Fuel Handling Incident Monitor 1/2RE-AR011
• Containment Fuel Handling Incident Monitor 1/2RE-AR012

OR

2. UNPLANNED VALID Area Radiation Monitor reading or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS
RU2 (cont)

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

NORMAL LEVELS: Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

This EAL addresses increased radiation levels as a result of water level decreases above irradiated fuel or events that have resulted, or may result, in UNPLANNED increases in radiation dose rates within plant buildings. These radiation increases represent a loss of control over radioactive material and represent a potential degradation in the level of safety of the plant.

Threshold #1 Basis:

Level indications may include installed or temporary water level instrumentation. If available, video cameras may allow remote observation for determining water level changes.

This EAL addresses unplanned lowering of level in the refueling pathway and a corresponding rise in refuel floor radiation readings. For events in Refuel mode where the water level drops with no corresponding rise in refuel floor radiation readings classification would be via CU7. This event escalates to an Alert per RA2 if irradiated fuel outside the reactor vessel is uncovered.

Threshold #2 Basis:

This EAL addresses increases in plant radiation levels that represent a loss of control of radioactive material resulting in a potential degradation in the level of safety of the plant.

This EAL excludes radiation level increases that result from planned activities such as use of radiographic sources and movement of radioactive waste materials. A specific list of ARMs is not required, as it would restrict the applicability of the threshold. The intent is to identify loss of control of radioactive material in any monitored area. Survey results are not required for confirmation of area radiation monitor readings but are applicable to areas where area radiation monitors do not have sufficient range to indicate a rise by a factor of 1000 over NORMAL LEVELS.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS
RU2 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 5, AU2
2. Technical Specifications 3.7.14
3. 1/2BwOA REFUEL-1 Fuel Handling Emergency Unit 1/2
4. 1/2BwOA REFUEL-2 Refueling Cavity Or Spent Fuel Pool Level Loss Unit 1/2
5. BwAR 1-1-C1 SPENT FUEL PIT LEVEL HIGH LOW
6. 1/2BwOSR 0.1-6 Unit One(Two) Mode 6 Shiftly and Daily Operating Surveillance
7. BwOP RH-8 Filling the Reactor Cavity for Refueling
8. BwOP RH-9 Pump Down of the Reactor Cavity to the RWSTs
9. BwOP RC-4 Reactor Coolant System Drain
10. BwAR 1-6-C3 REFUELING CAVITY LVL HIGH LOW

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RA3

Initiating Condition:

Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R2) to maintain plant safety functions.

Table R2 – Areas Requiring Continuous Occupancy
• Main Control Room – 1/2RE-AR010 • Central Alarm Station - (by survey)

Basis:

This EAL addresses increased radiation levels that impact continued operation in areas requiring continuous occupancy to maintain safe operation or to perform a safe shutdown.

The cause and/or magnitude of the increase in radiation levels is not a concern of this EAL. The Emergency Director must consider the source or cause of the increased radiation levels and determine if any other EAL may be involved.

Areas requiring continuous occupancy include Main Control Room and the Central Alarm Station (CAS).

Basis Reference(s):

1. NEI 99-01 Rev 5, AA3
2. UFSAR Chapter 3.02, UFSAR Table 3.2-1

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RU3

Initiating Condition:

Fuel clad degradation.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Fuel clad degradation resulting in:

- Gross Failed Fuel Monitor 1/2RE-PR006 indicating I-135 concentration **> 5 uCi/cc.**

  OR

- Dose Equivalent I-131 specific coolant activity **> 60.0 uCi/gm**.

  OR

- Dose Equivalent XE-133 specific coolant activity **> 603.0 uCi/gm**.

Basis:

This EAL is included because it is a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant.

Escalation of this EAL to the Alert level is via the Fission Product Barriers.

Conditions that cause the monitor to alarm that are not related to fuel clad degradation should not result in the declaration of an Unusual Event.

This threshold addresses site-specific radiation monitor readings that provide indication of a degradation of fuel clad integrity.

This threshold addresses coolant samples exceeding coolant technical specifications for transient iodine spiking limits.

An Unusual Event is only warranted when actual fuel clad damage is the cause of the elevated coolant sample (as determined by laboratory confirmation). Fuel clad damage should be assumed to be the cause of elevated Reactor Coolant activity unless another cause is known.

Basis Reference(s):

1. NEI 99-01 Rev 5, SU4
2. Technical Specifications 3.4.16
3. 1/2BwOA PRI-4, High Reactor Coolant Activity Unit 1/2
4. PWR Letdown Rad Monitor Setpoint Calculation for Degraded Fuel Indication

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FG1

Initiating Condition:

Loss of ANY Two Barriers AND Loss or Potential Loss of the third barrier.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the General Emergency classification level each barrier is weighted equally.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FS1

Initiating Condition:

Loss or Potential Loss of ANY two barriers.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the Site Area Emergency classification level, each barrier is weighted equally.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FA1

Initiating Condition:

ANY Loss or ANY Potential Loss of either Fuel Clad or RCS.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the Alert classification level, Fuel Cladding and RCS barriers are weighted more heavily than the Containment barrier. Unlike the Containment barrier, loss or potential loss of either the Fuel Cladding or RCS barrier may result in the relocation of radioactive materials or degradation of core cooling capability. Note that the loss or potential loss of Containment barrier in combination with loss or potential loss of either Fuel Cladding or RCS barrier results in declaration of a Site Area Emergency under EAL FS1.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FU1

Initiating Condition:

ANY Loss or ANY Potential Loss of Containment.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

The Containment Barrier includes the containment building and connections up to and including the outermost containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outermost secondary side isolation valve.

The Containment Barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (i.e., Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment Barrier status is addressed by Technical Specifications.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FC1

Initiating Condition:

Critical Safety Function Status.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. **Core Cooling CSF - RED Path** conditions exist.

POTENTIAL LOSS

2. **Core Cooling CSF - ORANGE Path** conditions exist.

   OR

3. **Heat Sink CSF - RED Path** conditions exist.

Basis:

Loss Threshold #1 Basis:

Core Cooling - RED indicates significant superheating and core uncovery and is considered to indicate loss of the Fuel Clad Barrier.

Potential Loss Threshold #2 Basis:

Core Cooling - ORANGE indicates subcooling has been lost and that some clad damage may occur.

Potential Loss Threshold #3 Basis:

Heat Sink - RED when heat sink is required indicates the ultimate heat sink function is under extreme challenge.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3
2. 1/2BwST-2 Core Cooling
3. 1/2BwFR-C.1 Response to Inadequate Core Cooling
4. 1/2BwFR-C.2 Response to Degraded Core Cooling
5. 1/2BwST-3 Heat Sink

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FC2

Initiating Condition:

Primary Coolant Activity Level

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

Coolant activity **> 300 uCi/gm** Dose Equivalent I-131.

Basis:

300 uCi/gm Dose Equivalent I-131 is well above that expected for iodine spikes and corresponds to less than 5% fuel clad damage. This amount of radioactivity indicates significant clad damage and thus the Fuel Clad Barrier is considered lost.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3
2. S&L calculation BB-ER-02, Rev 0

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FC4

Initiating Condition:

Core Exit Thermocouple Readings

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. Average of the ten highest reading core exit thermocouples (CETCs) is **≥ 1200° F**.

POTENTIAL LOSS

2. Average of the ten highest reading core exit thermocouples (CETCs) is **≥ 700° F**.

Basis:

A failed CETC Channel can lead to indication of the CETC > 700° F until the system removes the failed channel from average. Fission product barrier loss or potential loss is based on VALID CETC readings.

Loss Threshold #1 Basis

The CETC value corresponds to the Core Cooling Critical Safety Function RED path but is evaluated separately from the CSF Status. The elevated temperature corresponds to significant superheating of the coolant and is indicative of a loss of the Fuel Cladding barrier.

Core Exit Thermocouple Readings are included in addition to the Critical Safety Functions to include conditions when the CSFs may not be in use (initiation after SI is blocked).

Potential Loss Threshold #2 Basis

The CETC value corresponds to the Core Cooling Critical Safety Function ORANGE path but is evaluated separately from the CSF Status because the CSF evaluation considers the degree of subcooling prior to status determination. The elevated temperature corresponds to a loss of subcooling and is indicative of a Potential Loss of the Fuel Cladding barrier.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3
2. 1/2BwST-2 Core Cooling
3. 1/2BwFR-C.1 Response to Inadequate Core Cooling
4. 1/2BwFR-C.2 Response to Degraded Core Cooling

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FC5

Initiating Condition:

Reactor Vessel Water Level

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

POTENTIAL LOSS

Core Cooling CSF - ORANGE Path conditions exist.

Basis:

There is no Loss threshold associated with this item.

The value for the Potential Loss threshold corresponds to the top of the active fuel.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3
2. 1/2BwFR-C.2 Response to Degraded Core Cooling

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FC8 – Loss

Initiating Condition:

Containment Radiation Monitoring

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

Containment radiation monitor (AR020 (21)) reading **> 1.95E+03 R/hr**.

Basis:

The Containment radiation monitor reading is a value which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the containment.

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 Loss threshold. Thus, this threshold indicates a loss of both the Fuel Clad barrier and RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3
2. Core Damage Assessment Methodology

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FC9

Initiating Condition:

Emergency Director Judgment.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. Any condition in the opinion of the Emergency Director that indicates Loss of the Fuel Clad Barrier.

POTENTIAL LOSS

2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Fuel Clad Barrier.

Basis:

These thresholds address 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 threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

RC1

Initiating Condition:

Critical Safety Function Status

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

POTENTIAL LOSS

1. **RCS Integrity CSF - RED Path** conditions exist.

   OR

2. **Heat Sink CSF - RED Path** conditions exist.

Basis:

The RCS Barrier includes the RCS primary side and its connections up to and including the pressurizer safety and relief valves, and other connections up to and including the primary isolation valves.

Potential Loss Threshold #1 Basis

RCS Integrity - RED indicates an extreme challenge to the safety function derived from appropriate instrument readings.

Potential Loss Threshold #2 Basis

Heat Sink - RED when heat sink is required indicates the ultimate heat sink function is under extreme challenge.

There is no Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3
2. 1/2BwST-4 Integrity
3. 1/2BwFR-P.1 Response To Imminent Pressurized Thermal Shock Condition
4. 1/2BwST-3 Heat Sink

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

RC5

Initiating Condition:

RCS Leak Rate

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. RCS leakage **> available makeup capacity** resulting in loss of subcooling as indicated by CETCs **< ACCEPTABLE VALUE** per Iconic Display or RCS Subcooling Margin Figure 1/2BwST 2-1.

POTENTIAL LOSS

2. UNISOLABLE leak exceeding the capacity of one charging pump in the normal charging mode.

Basis:

UNISOLABLE: is a breach or leak that cannot be promptly isolated.

Promptly allows for actions to be taken to isolate the leak. Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

The RCS Barrier includes the RCS primary side and its connections up to and including the pressurizer safety and relief valves, and other connections up to and including the primary isolation valves.

Loss Threshold #1 Basis

This threshold addresses conditions where leakage from the RCS is greater than available inventory control capacity such that a loss of subcooling has occurred. The loss of subcooling is the fundamental indication that the inventory control systems are inadequate in maintaining RCS pressure and inventory against the mass loss through the leak.

Potential Loss Threshold #2 Basis

This threshold is based on the apparent inability to maintain normal liquid inventory within the RCS by normal operation of the Chemical and Volume Control System (CVCS) which is considered to be the flow rate equivalent to one charging pump discharging to the charging header. Isolating letdown is a standard abnormal operating procedure action and may prevent unnecessary classifications when a non-RCS leakage path such as a CVCS leak exists. The intent of this condition is met if attempts to isolate Letdown are NOT successful. Additional charging pumps being required is indicative of a substantial RCS leak.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

RC5 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3
2. 1/2BwST-2 Core Cooling
3. 1/2BwFR-C.1 Response to Inadequate Core Cooling
4. NES-G-14.02, Calculation No. BYR99-010 / BRW-99-0017-I
5. UFSAR Fig. 6.3-4

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

RC6

Initiating Condition:

SG Tube Rupture

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

Steam Generator Tube Rupture that requires/results in entry into BwEP-3.

Basis:

RUPTURED: In a steam generator, existence of primary-to-secondary leakage of a magnitude sufficient to require or cause a reactor trip and safety injection.

This threshold addresses the full spectrum of Steam Generator (SG) tube rupture events in conjunction with Containment barrier Loss thresholds. It addresses RUPTURED SG(s) for which the leakage is large enough to cause actuation of ECCS (SI). This is consistent to the RCS leak rate barrier Potential Loss threshold.

By itself, this threshold will result in the declaration of an Alert. However, if the SG is also FAULTED (i.e., two barriers failed), the declaration escalates to a Site Area Emergency per Containment barrier Loss thresholds.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3
2. NES-G-14.02, Calculation No. BYR99-010 / BRW-99-0017-I
3. 1/2BwEP-0 Reactor Trip Or Safety Injection Unit 1/2
4. 1/2BwEP-3 Steam Generator Tube Rupture

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

RC8

Initiating Condition:

Containment Radiation Monitoring

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

Containment radiation monitor reading (AR020(21)) reading **> 25 R/hr**.

Basis:

The RCS Barrier includes the RCS primary side and its connections up to and including the pressurizer safety and relief valves, and other connections up to and including the primary isolation valves.

This value indicates the release of reactor coolant to the containment.

This reading is less than that specified for Fuel Clad barrier threshold. Thus, this threshold would be indicative of a RCS leak only. If the radiation monitor reading increased to that specified by Fuel Clad barrier threshold, fuel damage would also be indicated.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

RC9

Initiating Condition:

Emergency Director Judgment.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. Any condition in the opinion of the Emergency Director that indicates Loss of the RCS Barrier.

POTENTIAL LOSS

2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the RCS Barrier.

Basis:

The RCS Barrier includes the RCS primary side and its connections up to and including the pressurizer safety and relief valves, and other connections up to and including the primary isolation valves.

These thresholds address 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 threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT1

Initiating Condition:

Critical Safety Function Status.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

POTENTIAL LOSS

Containment CSF - RED Path conditions exist.

Basis:

The Containment Barrier includes the containment building, its connections up to and including the outboard containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outboard secondary side isolation valve.

RED path indicates an extreme challenge to the safety function derived from appropriate instrument readings and/or sampling results, and thus represents a potential loss of containment.

Conditions leading to Containment RED path result from RCS barrier and/or Fuel Clad Barrier Loss. Thus, this threshold is primarily a discriminator between Site Area Emergency and General Emergency representing a potential loss of the third barrier.

There is no Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3
2. 1/2BwST-5 Containment
3. 1/2BwFR-Z.1 Response to High Containment Pressure

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT3

Initiating Condition:

Containment Pressure

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. Rapid unexplained drop in Containment pressure following initial pressure rise.

   OR

2. Containment pressure or water level response **not** consistent with LOCA conditions.

POTENTIAL LOSS

3. Containment pressure **≥ 50 psig** and rising.

   OR

4. Hydrogen concentration in Containment **≥ 5%.**

   OR

5. a. Containment pressure **≥ 20 psig.**

      AND

   b. Less than one train of Containment Spray operating.

Basis:

The Containment Barrier includes the containment building, its connections up to and including the outboard containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outboard secondary side isolation valve.

Loss Thresholds #1 and #2 Basis:

Rapid unexplained loss of pressure (i.e., not attributable to containment spray or condensation effects) following an initial pressure rise from a primary or secondary high energy line break indicates a loss of containment integrity. Containment pressure and sump levels should rise as a result of mass and energy release into containment from a LOCA. Thus, sump level or pressure not rising indicates containment breach and a loss of containment integrity.

This indicator relies on operator recognition of an unexpected response for the condition and therefore does not have a specific value associated with it. The unexpected response is important because it is the indicator for a containment breach condition.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT3 (cont)

Basis (cont):

Potential Loss Threshold #3 Basis:

The pressure is based on the containment design pressure.

Potential Loss Threshold #4 Basis:

If hydrogen concentration reaches or exceeds 5% in an oxygen rich environment, a potentially explosive mixture exists. If the combustible mixture ignites inside containment, loss of the Containment barrier could occur.

Potential Loss Threshold #5 Basis:

This threshold represents a potential loss of containment in that the containment heat removal/depressurization system are either lost or performing in a degraded manner, as indicated by containment pressure greater than the setpoint at which the equipment was supposed to have actuated.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3
2. UFSAR Section 15.6.5.2.1
3. 1/2BwST-5 Containment
4. NES-G-14.02, Calculation No. BYR99-010 / BRW-99-0017-I
5. Technical Specifications B 3.6.6, Containment Spray and Cooling Systems

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT4

Initiating Condition:

Core Exit Thermocouple Readings

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

POTENTIAL LOSS

1. a. Average of the ten highest reading core exit thermocouples (CETCs) is **≥ 1200° F**.

   AND

   b. Functional Restoration procedures **not** effective in **< 15 minutes**.

   OR

2. a. Average of the ten highest reading core exit thermocouples (CETCs) is **≥ 700° F**.

   AND

   b. RVLIS plenum region **= 0%.**

   AND

   c. Functional Restoration procedures **not** effective in **< 15 minutes.**

Basis:

A failed CETC Channel can lead to indication of the CETC ≥ 700° F until the system removes the failed channel from average. Fission product barrier loss or potential loss is based on VALID CETC readings.

The Containment Barrier includes the containment building, its connections up to and including the outboard containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outboard secondary side isolation valve.

Potential Loss Threshold #1 and #2 Basis:

The conditions in these thresholds represent an IMMINENT core melt sequence which, if not corrected, could lead to vessel failure and an increased potential for containment failure. In conjunction with the Core Cooling and RCS Leakage criteria in the Fuel and RCS barrier columns, this threshold would result in the declaration of a General Emergency -- loss of two barriers and the potential loss of a third. If the functional restoration procedures are ineffective, there is no "success" path.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT4 – Potential Loss (cont)

Basis (cont)

The functional restoration procedures are those emergency operating procedures that address the recovery of the core cooling critical safety functions. The procedure is considered effective if the temperature is decreasing or if the vessel water level is increasing.

Whether or not the procedures will be effective should be apparent within 15 minutes. The Emergency Director should make the declaration as soon as it is determined that the procedures have been, or will be ineffective.

There is no Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3
2. 1/2BwST-2 Core Cooling
3. 1/2BwFR-C.1 Response to Inadequate Core Cooling
4. 1/2BwFR-C.2 Response to Degraded Core Cooling

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT6

Initiating Condition:

SG Secondary Side Release with Primary to Secondary Leakage

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. RUPTURED S/G is also FAULTED outside of Containment.

   OR

2. a. Primary-to-Secondary leakrate **> 10 gpm**.

      AND

   b. UNISOLABLE steam release from affected S/G to the environment.

Basis:

RUPTURED: in a steam generator, existence of primary-to-secondary leakage of a magnitude sufficient to require or cause a reactor trip and safety injection.

FAULTED: in a steam generator, the existence of secondary side leakage that results in an uncontrolled drop in steam generator pressure or the steam generator being completely depressurized.

UNISOLABLE: is a breach or leak that cannot be promptly isolated.

Promptly allows for actions to be taken to isolate the leak. Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

The Containment Barrier includes the containment building, its connections up to and including the outboard containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outboard secondary side isolation valve.

The loss threshold recognizes that SG tube leakage can represent a bypass of the Containment barrier as well as a loss of the RCS barrier.

Users should realize that the two loss thresholds could be considered redundant. This was recognized during the development process. The inclusion of an threshold that uses Emergency Procedure commonly used terms like “RUPTURED and FAULTED” adds to the ease of the classification process and has been included based on this human factor concern.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT6 (cont)

Basis (cont)

This threshold results in an UE for smaller breaks that; (1) do not exceed the normal charging capacity threshold in RCS leak rate barrier Potential Loss threshold, or (2) do not result in ECCS actuation in RCS SG tube rupture barrier Loss threshold. For larger breaks, RCS barrier threshold criteria would result in an Alert. For SG tube ruptures which may involve multiple steam generators or unisolable secondary line breaks, this threshold would exist in conjunction with RCS barrier thresholds and would result in a Site Area Emergency. Escalation to General Emergency would be based on “Loss” or "Potential Loss" of the Fuel Clad Barrier.

Loss Threshold #1 Basis:

This threshold addresses the condition in which a RUPTURED steam generator is also FAULTED. This condition represents a bypass of the RCS and containment barriers and is a subset of the second threshold. In conjunction with RCS leak rate barrier loss threshold, this would always result in the declaration of a Site Area Emergency.

Loss Threshold #2 Basis:

This threshold addresses SG tube leaks that exceed 10 gpm in conjunction with an UNISOLABLE release path to the environment from the affected steam generator. The threshold for establishing the UNISOLABLE secondary side release is intended to be a prolonged release of radioactivity from the RUPTURED steam generator directly to the environment. This could be expected to occur when the main condenser is unavailable to accept the contaminated steam (i.e., SG tube rupture with concurrent loss of off-site power and the RUPTURED steam generator is required for plant cooldown or a stuck open relief valve). If the main condenser is available, there may be releases via air ejectors, gland seal exhausters, and other similar controlled, and often monitored, pathways. These pathways do not meet the intent of an UNISOLABLE release path to the environment. These minor releases are assessed using Abnormal Rad Levels / Radiological Effluent EALs.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3
2. 1/2BwEP-0 Reactor Trip or Safety Injection Unit 1/2
3. 1/2BwEP-3 Steam Generator Tube Rupture
4. 1/2BwOA SEC-8 Steam Generator Tube Leak

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT7

Initiating Condition:

Containment Isolation Failure or Bypass

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. Failure of isolation valves in any one line to close.

   AND

2. Direct downstream pathway to the environment exists after a containment isolation signal.

Basis:

The Containment Barrier includes the containment building, its connections up to and including the outboard containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outboard secondary side isolation valve.

Failure of containment isolation valves to isolate with a downstream pathway to the environment is only a concern during an event requiring mitigation by the Containment Barrier. If this condition exists during normal power operations, a Technical Specification Action Statement will address it. However, during events requiring Containment integrity, this will represent a breach of Containment.

This threshold addresses incomplete containment isolation that allows direct release (gaseous or liquid flowpath) to the environment outside of containment (for example into the Auxiliary Building, Turbine Building or outside atmosphere). It represents a loss of the containment barrier.

This threshold addresses failure of open isolation devices, which should close upon receipt of a manual or automatic containment isolation signal resulting in a radiological release pathway to the environment. The concern is the UNISOLABLE open pathway to the environment. A failure of the ability to close any open isolation valves in any one line indicates a breach of containment integrity.

Leakage into a closed system is to be considered only if the closed system is breached and thereby creates a significant pathway to the environment. Examples include UNISOLABLE containment atmospheric vent paths as well as UNISOLABLE primary systems (RCS). If the primary system leakage outside containment cannot be isolated, a loss of both the RCS and the Containment barriers results. No leakage threshold is specified since leaks outside containment, particularly under dynamic conditions, are difficult to quantify and may manifest themselves with diverse symptoms.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT7 (cont)

Basis (cont)

The use of the modifier “direct” in defining the release path discriminates against release paths through interfacing liquid systems. The existence of an in–line charcoal filter does not make a release path indirect since the filter is not effective at removing fission product noble gases. Typical filters have an efficiency of 95-99% removal of iodine. Given the magnitude of the core inventory of iodine, significant releases could still occur. In addition, since the fission product release would be driven by boiling in the reactor vessel, the high humidity in the release stream can be expected to render the filters ineffective in a short period.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3
2. NES-G-14.02, Calculation No. BYR99-010 / BRW-99-0017-I
3. UFSAR Fig. 6.3-4

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT8

Initiating Condition:

Containment Radiation Monitoring

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

POTENTIAL LOSS

Containment radiation monitor (AR020 (21)) reading **> 4.40E+03 R/hr**.

Basis:

The Containment Barrier includes the containment building, its connections up to and including the outboard containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outboard secondary side isolation valve.

The Containment radiation monitor value indicates significant fuel damage well in excess of the thresholds associated with both loss of Fuel Clad and loss of RCS barriers.

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.

There is no Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3
2. Core Damage Assessment Methodology

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT9

Initiating Condition:

Emergency Director Judgment.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. Any condition in the opinion of the Emergency Director that indicates Loss of the Containment Barrier.

POTENTIAL LOSS

2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment Barrier.

Basis:

The Containment Barrier includes the containment building, its connections up to and including the outboard containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outboard secondary side isolation valve.

These thresholds address any other factors that are to be used by the Emergency Director in determining whether the Containment Barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

The Containment Barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment Barrier status is addressed by Technical Specifications.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG1

Initiating Condition:

Prolonged loss of all Off-site and all On-Site AC power to emergency busses.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to unit ESF busses.

   AND

2. Failure of DG 1A(2A) and DG 1B(2B) emergency diesel generators to supply power to unit ESF busses.

   AND

3. a. Restoration of at least one unit ESF bus in **< 4 hours** is **not** likely.

      OR

   b. **EITHER** of the following:

      - **Core Cooling CSF - RED Path** conditions exist.

        OR

      - **Core Cooling CSF - ORANGE Path** conditions exist.

Basis:

Loss of all AC power to emergency busses compromises all plant safety systems requiring electric power. Prolonged loss of all AC power to emergency busses will lead to loss of fuel clad, RCS, and containment, thus warranting declaration of a General Emergency.

This EAL is specified to assure that in the unlikely event of a prolonged station blackout, timely recognition of the seriousness of the event occurs and that declaration of a General Emergency occurs as early as is appropriate, based on a reasonable assessment of the event trajectory.

The emergency busses of the affected unit can be powered from the unaffected unit through the crosstie breakers. Unit crosstie is considered an adequate source of offsite power when evaluating this EAL.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG1 (cont)

Basis: (cont)

The likelihood of restoring at least one emergency bus should be based on a realistic appraisal of the situation since a delay in an event classification escalation decision based on only a chance of mitigating the event could result in a loss of valuable time in preparing and implementing public protective actions.

In addition, under these conditions, fission product barrier monitoring capability may be degraded.

Basis Reference(s):

1. NEI 99-01 Rev 5, SG1
2. 20E-0-4001 Station One Line Diagram
3. UFSAR 8.3.1
4. 1/2BwOA ELEC-3 Loss Of 4KV ESF Bus
5. 1/2BwOA ELEC-4 Loss Of Offsite Power Unit 1/2
6. 1/2BwCA-0.0 Loss Of All AC Power Unit 1/2
7. 1/2BwCA-0.1 Loss Of All AC Power Recovery Without SI Required Unit 1/2
8. 1/2BwCA-0.2 Loss Of All AC Power Recovery With SI Required Unit 1/2
9. 1/2BwCA-0.3 Response To Opposite Unit Loss Of All AC Power
10. BwOP AP-37 Unit Two SAT Crosstie To Unit One ESF Bus
11. BwOP AP-38, Unit One SAT Crosstie To Unit Two ESF Bus
12. Safety Evaluations of the Byron Station and Braidwood Station Responses to the Station Blackout (SBO) Rule (TAC NOS. 68522, 68523 AND 68515, 68516)
13. 1/2BwST-2 Core Cooling
14. 1/2BwFR-C.1 Response to Inadequate Core Cooling
15. 1/2BwFR-C.2 Response to Degraded Core Cooling

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS1

Initiating Condition:

Loss of all Off-site and all On-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to unit ESF busses.

   AND

2. Failure of DG 1A(2A) and DG 1B(2B) emergency diesel generators to supply power to unit ESF busses.

   AND

3. Failure to restore power to at least one unit ESF bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.

Basis:

Loss of all AC power to emergency busses compromises all plant safety systems requiring electric power. Prolonged loss of all AC power to emergency busses will lead to loss of Fuel Clad, RCS, and Containment, thus this event can escalate to a General Emergency.

The emergency busses of the affected unit can be powered from the unaffected unit through the crosstie breakers. Unit crosstie is considered an adequate source of offsite power when evaluating this EAL.

Fifteen minutes was selected as a threshold to exclude momentary losses of off-site power.

Escalation to General Emergency is via Fission Product Barrier Degradation or MG1, "Prolonged Loss of All Off-site Power and Prolonged Loss of All On-site AC Power."

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS1 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 5, SS1
2. 20E-0-4001 Station One Line Diagram
3. UFSAR 8.3.1
4. 1/2BwOA ELEC-3 Loss Of 4KV ESF Bus
5. 1/2BwOA ELEC-4 Loss Of Offsite Power Unit 1/2
6. 1/2BwCA-0.0 Loss Of All AC Power Unit 1/2
7. 1/2BwCA-0.1 Loss Of All AC Power Recovery Without SI Required Unit 1/2
8. 1/2BwCA-0.2 Loss Of All AC Power Recovery With SI Required Unit 1/2
9. 1/2BwCA-0.3 Response To Opposite Unit Loss Of All AC Power
10. BwOP AP-37 Unit Two SAT Crosstie To Unit One ESF Bus
11. BwOP AP-38, Unit One SAT Crosstie To Unit Two ESF Bus
12. Safety Evaluations of the Byron Station and Braidwood Station Responses to the Station Blackout (SBO) Rule (TAC NOS. 68522, 68523 AND 68515, 68516)

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA1

Initiating Condition:

AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. AC power capability to unit ESF busses reduced to only one of the following power sources for **≥ 15 minutes**:
   - Affected unit SAT 142-1(242-1)
   - Affected unit SAT 142-2(242-2)
   - Emergency Diesel Generator DG 1A(2A)
   - Emergency Diesel Generator DG 1B(2B)
   - Unit crosstie breakers

   AND

2. Any additional single power source failure will result in unit blackout.

Basis:

Capability: (pertaining to electrical power supplies) is equipment that is available to provide and maintain AC power at the required voltage and frequency for the required load.

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. Another related condition could be the loss of all off-site power and loss of on-site emergency generators with only one train of emergency busses being backfed from the unit main generator, or the loss of on-site emergency generators with only one train of emergency busses being backfed from off-site power. The subsequent loss of this single power source would escalate the event to a Site Area Emergency in accordance with MS1.

Fifteen minutes was selected as a threshold to exclude momentary losses of power.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA1 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 5, SA5
2. 20E-0-4001 Station One Line Diagram
3. UFSAR 8.3.1
4. 1/2BwOA ELEC-3 Loss Of 4KV ESF Bus
5. 1/2BwOA ELEC-4 Loss Of Offsite Power Unit 1/2
6. 1/2BwCA-0.0 Loss Of All AC Power Unit 1/2
7. 1/2BwCA-0.1 Loss Of All AC Power Recovery Without SI Required Unit 1/2
8. 1/2BwCA-0.2 Loss Of All AC Power Recovery With SI Required Unit 1/2
9. 1/2BwCA-0.3 Response To Opposite Unit Loss Of All AC Power
10. BwOP AP-37 Unit Two SAT Crosstie To Unit One ESF Bus
11. BwOP AP-38, Unit One SAT Crosstie To Unit Two ESF Bus
12. Safety Evaluations of the Byron Station and Braidwood Station Responses to the Station Blackout (SBO) Rule (TAC NOS. 68522, 68523 AND 68515, 68516)

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU1

Initiating Condition:

Loss of all Off-site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of all off-site AC power to unit ESF busses for **≥ 15 minutes**.

Basis:

Prolonged loss of off-site 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 to emergency busses.

Fifteen minutes was selected as a threshold to exclude momentary losses of off-site power.

Basis Reference(s):

1. NEI 99-01 Rev 5, SU1
2. 20E-0-4001 Station One Line Diagram
3. UFSAR 8.3.1
4. 1/2BwOA ELEC-3 Loss Of 4KV ESF Bus
5. 1/2BwOA ELEC-4 Loss Of Offsite Power Unit 1/2
6. 1/2BwCA-0.0 Loss Of All AC Power Unit 1/2
7. 1/2BwCA-0.1 Loss Of All AC Power Recovery Without SI Required Unit 1/2
8. 1/2BwCA-0.2 Loss Of All AC Power Recovery With SI Required Unit 1/2
9. 1/2BwCA-0.3 Response To Opposite Unit Loss Of All AC Power
10. BwOP AP-37 Unit Two SAT Crosstie To Unit One ESF Bus
11. BwOP AP-38, Unit One SAT Crosstie To Unit Two ESF Bus

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG2

Initiating Condition:

Automatic Trip and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic Reactor Trip was **not** successful as indicated by Reactor Power **≥ 5%**.

   AND

2. Manual actions were **not** successful as indicated by Reactor Power **≥ 5%**.

   AND

3. **EITHER** of the following exists:

   - **Core Cooling CSF – RED Path** conditions exist.

     OR

   - **Heat Sink CSF – RED Path** conditions exist.

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful.

The third condition of this EAL indicates an extreme challenge to the ability to cool the core. In the event either of these challenges exists at a time that the reactor has not been brought below the power associated with the safety system design, a core melt sequence exists. In this situation, core degradation can occur rapidly. For this reason, the General Emergency declaration is intended to be anticipatory of the fission product barrier table declaration to permit maximum off-site intervention time.

Basis Reference(s):

1. NEI 99-01 Rev 5, SG2
2. 1/2BwST-1 Subcriticality
3. 1/2BwST-2 Core Cooling
4. 1/2BwST-3 Heat Sink
5. 1/2BwFR-S.1 Response to Nuclear Power Generation/ATWS
6. 1/2BwFR-H.1 Response to Loss of Secondary Heat Sink
7. 1/2BwFR C.1 Response to Inadequate Core Cooling
6. 1/2BwOSR 0.1-1,2,3 Unit One(Two) Modes 1, 2, And 3 Shiftly and Daily Operating Surveillance

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS2

Initiating Condition:

Automatic Trip fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic Reactor Trip was **not** successful as indicated by Reactor Power **≥ 5%**.

   AND

2. Manual Reactor Trip from Main Control Board was **not** successful as indicated by Reactor Power **≥ 5%**.

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful. A Site Area Emergency is warranted because conditions exist that lead to IMMINENT loss or potential loss of both fuel clad and RCS.

Manual Trip actions taken at the Main Control Board are any set of actions by the reactor operator(s) at which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

Manual Trip actions are not considered successful if action away from the Main Control Board is required to trip the reactor. This EAL is still applicable even if actions taken away from the Main Control Board are successful in shutting the reactor down because the design limits of the fuel may have been exceeded or because of the gross failure of the Reactor Protection System to shutdown the plant.

Escalation of this event to a General Emergency would be due to a prolonged condition leading to an extreme challenge to either core-cooling or heat removal.

Basis Reference(s):

1. NEI 99-01 Rev 5, SS2
2. 1/2BwST-1 Subcriticality
3. 1/2BwFR-S.1 Response to Nuclear Power Generation/ATWS
4. 1/2BwOSR 0.1-1,2,3 Unit One(Two) Modes 1, 2, And 3 Shiftly and Daily Operating Surveillance

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA2

Initiating Condition:

Automatic Trip fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic Reactor Trip was **not** successful as indicated by Reactor Power **≥ 5%**.

   AND

2. Manual Reactor Trip from Main Control Board was successful as indicated by Reactor Power **< 5%**.

Basis:

Manual Trip actions taken at the Main Control Board are any set of actions by the reactor operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

This condition indicates failure of the automatic protection system to trip the reactor in response to exceeding reactor protective system setpoints during a plant transient. Associated RPS instrument failures during non-transient plant conditions would be addressed by Technical Specifications. This condition is more than a potential degradation of a safety system in that a front line automatic protection system did not function in response to a plant transient. Thus the plant safety has been compromised because design limits of the fuel may have been exceeded. An Alert is indicated because conditions may exist that lead to potential loss of fuel clad or RCS and because of the failure of the Reactor Protection System to automatically shutdown the plant.

If manual actions taken at the Main Control Board fail to shutdown the reactor, the event would escalate to a Site Area Emergency.

Basis Reference(s):

1. NEI 99-01 Rev 5, SA2
2. 1/2BwST-1 Subcriticality
3. 1/2BwFR-S.1 Response to Nuclear Power Generation/ATWS
4. 1/2BwOSR 0.1-1,2,3 Unit One(Two) Modes 1, 2, And 3 Shiftly and Daily Operating Surveillance

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU2

Initiating Condition:

Inadvertent criticality.

Operating Mode Applicability:

3, 4

EAL Threshold Values:

UNPLANNED sustained positive startup rate observed on nuclear instrumentation.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

The term “sustained” is used in order to allow exclusion of expected short term positive startup rates from planned fuel bundle or control rod movements during core alteration. These short term positive startup rates are the result of the increase in neutron population due to subcritical multiplication.

This EAL addresses inadvertent criticality events. This EAL excludes inadvertent criticalities that occur during planned reactivity changes associated with reactor startups (e.g., criticality earlier than estimated).

This EAL indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification.

Basis Reference(s):

1. NEI 99-01 Rev 5, SU8
2. 1BwOS XCB-R1 U0 AND U1 MCR Meter Color Banding
3. 1/2BwFR-S.1, Response To Nuclear Power Generation/ATWS Unit 1/2
4. Bw TS LCO 3.3.1 RTS Instrumentation
5. 1/2BwOSR 0.1-4, Unit One(Two) Modes 4 Shiftly And Daily Operating Surveillance
6. 1/2BwGP 100-2 Plant Startup
7. 1/2BwGP 100-2T1, 1/2BwGP 100-2 Flowchart
8. 1/2BwGP 100-6T4 Defueled To Mode 6 Checklist
9. Regulatory Guide 8.12, Criticality Accident Alarm Systems

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS3

Initiating Condition:

Loss of all vital DC power for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of all vital DC power based on **< 108 VDC** on unit 125 VDC battery busses 111(211) and 112(212) for **≥ 15 minutes**.

Basis:

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power will cause core uncovering and loss of containment integrity when there is significant decay heat and sensible heat in the reactor system.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Escalation to a General Emergency would occur by Abnormal Rad Levels/Radiological Effluent, Fission Product Barrier Degradation.

Basis Reference(s):

1. NEI 99-01 Rev 5, SS3
2. UFSAR 8.3.2.1.1
3. 20E-0-4001 Station One Line Diagram
4. BwAR 1/2-21-E10, 125V DC PNL 111/113(211/213) VOLT LOW
5. 1/2BwOA ELEC 1 Loss of DC Bus UNIT 1/2
6. BwAR 1/2-22-E10, 125V DC PNL 112/114 (212/214) VOLT LOW

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS4

Initiating Condition:

Inability to monitor a SIGNIFICANT TRANSIENT in progress.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**
   - Safety System annunciators (Table M1)

     OR
   - Safety System indications (Table M1)

   AND
2. SIGNIFICANT TRANSIENT in progress (Table M2).

   AND
3. Compensatory indications (computer points) are unavailable.

Table M1 – Safety Systems
• Gen & Aux Power (1/2PM01J MCB)
• Reactor and Chem Volume Control (1/2PM05J MCB)
• Eng. Safety Features (1/2PM06J MCB)
• Process/Area Radiation Monitoring

Table M2 - Significant Transients
• Automatic Turbine Runback **> 25%** thermal reactor power
• Electrical load rejection **> 25%** full electrical load
• Reactor Trip
• Safety Injection Actuation
• Thermal power oscillations **> 10%**

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS4 (cont)

Basis:

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) automatic turbine runback > 25% thermal reactor power, (2) electrical load rejection > 25% full electrical load, (3) Reactor Trip, (4) Safety Injection Actuation, or (5) thermal power oscillations >10%.

This EAL is intended to recognize the threat to plant safety associated with the complete loss of capability of the control room staff to monitor plant response to a SIGNIFICANT TRANSIENT.

"Planned" and “UNPLANNED” actions are not differentiated since the loss of instrumentation of this magnitude is of such significance during a transient that the cause of the loss is not a factor.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

A Site Area Emergency is considered to exist if the control room staff cannot monitor safety systems needed for protection of the public while a significant transient is in progress.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS4 (cont)

Basis (cont):

Indications needed to monitor safety systems necessary for protection of the public must include control room indications; computer generated indications and dedicated annunciation capability. The specific parameters are those used to determine such functions as the ability to shut down the reactor, maintain the core cooled and in a coolable geometry, remove heat from the core, and maintain the reactor coolant system and primary containment.

"Compensatory indications" in this context includes computer based information. This includes all computer systems available for this use.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Basis Reference(s):

1. NEI 99-01 Rev 5, SS6
2. Drawing 20E-0-3372 B Auxiliary Building Main Control Room Panel El 451'
3. BwAP 300-1A1 At the Controls and Horse-Shoe Areas
4. BwOP AN-1 Plant Annunciator System Startup and Operation
5. UFSAR E.17
6. 1/2BwST-1 Subcriticality
7. 1/2BwST-2 Core Cooling
8. 1/2BwST-3 Heat Sink
9. 1/2BwST-4 Integrity
10. 1/2BwST-5 Containment
11. 1/2BwST-6 Inventory

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA4

Initiating Condition:

UNPLANNED Loss of safety system annunciation or indication in the control room with EITHER (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**
   - Safety System annunciators (Table M1)

     OR
   - Safety System indications (Table M1)

Table M1 – Safety Systems
• Gen & Aux Power (1/2PM01J MCB)
• Reactor and Chem Volume Control (1/2PM05J MCB)
• Eng. Safety Features (1/2PM06J MCB)
• Process/Area Radiation Monitoring

AND

2. a. SIGNIFICANT TRANSIENT in progress (Table M2).

Table M2 - Significant Transients
• Automatic Turbine Runback **> 25%** thermal reactor power
• Electrical load rejection **> 25%** full electrical load
• Reactor Trip
• Safety Injection Actuation
• Thermal power oscillations **> 10%**

OR

b. Compensatory indications (computer points) are unavailable.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA4 (cont)

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) automatic turbine runback > 25% thermal reactor power, (2) electrical load rejection > 25% full electrical load, (3) Reactor Trip, (4) Safety Injection Actuation, or (5) thermal power oscillations > 10%.

This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a SIGNIFICANT TRANSIENT.

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

"Compensatory indications" in this context includes computer based information. If both a major portion of the annunciation system and all computer monitoring are unavailable, the Alert is required.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA4 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 5, SA4
2. Drawing 20E-0-3372 B Auxiliary Building Main Control Room Panel El 451'
3. BwAP 300-1A1 At the Controls and Horse-Shoe Areas
4. BwOP AN-1 Plant Annunciator System Startup and Operation
5. UFSAR E.17

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU4

Initiating Condition:

UNPLANNED loss of safety system annunciation or indication in the control room for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**

- Safety System annunciators (Table M1)

  OR

- Safety System indications (Table M1)

Table M1 – Safety Systems
• Gen & Aux Power (1/2PM01J MCB) • Reactor and Chem Volume Control (1/2PM05J MCB) • Eng. Safety Features (1/2PM06J MCB) • Process/Area Radiation Monitoring

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment.

Recognition of the availability of computer based indication equipment is considered.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU4 (cont)

Basis (cont):

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

Fifteen minutes was selected as a threshold to exclude momentary power losses.

This Unusual Event will be escalated to an Alert based on a concurrent loss of compensatory indications or if a SIGNIFICANT TRANSIENT is in progress during the loss of annunciation or indication.

Basis Reference(s):

1. NEI 99-01 Rev 5, SU3
2. Drawing 20E-0-3372 B Auxiliary Building Main Control Room Panel El 451'
3. BwAP 300-1A1 At the Controls and Horse-Shoe Area
4. BwOP AN-1 Plant Annunciator System Startup and Operation
5. UFSAR E.17

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU5

Initiating Condition:

RCS leakage.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

1. Unidentified or pressure boundary leakage **> 10 gpm**.

   OR

2. Identified leakage **> 25 gpm**.

Basis:

This EAL is included as an Unusual Event because it may be a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified or pressure boundary leakage was selected as it is observable with normal control room indications. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances).

Relief valve operation should be excluded from this EAL. However, a relief valve that operates and fails to close per design should be considered applicable to this EAL if the relief valve cannot be isolated.

The EAL for identified leakage is set at a higher value due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage. In either case, escalation of this EAL to the Alert level is via Fission Product Barrier.

Basis Reference(s):

1. NEI 99-01 Rev 5, SU5
2. Technical Specifications 3.4.13 & 3.4.14
3. UFSAR 6.2, 5.24
4. 1/2BwOSR 3.4.13.1 Unit One(Two) Reactor Coolant System Water Inventory Balance Surveillance
5. LCOAR - RCS Leakage Detection Instrumentation – Tech Spec LCO 3.4.15
6. LCOAR – RCS Operational Leakage – Tech Spec LCO 3.4.13
7. 1/2BwOA PRI-1 Excessive Primary Leakage Unit 1/2
8. 1/2BwOSR 0.1-4 Unit One(Two) Modes 4 Shiftly and Daily Operating Surveillance
9. 1/2BwOS RF-1 Unit One(Two) Containment Floor Drain Monitoring System Non-Routine Surveillance
10. 1/2BwOS XCB-R1 U0 and U1 MCR Meter Color Banding

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU6

Initiating Condition:

Loss of all On-site or Off-site communications capabilities.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

1. Loss of all Table M3 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table M3 **Offsite** communications capability affecting the ability to perform offsite notifications.

Table M3 - Communications Capability

System	Onsite	Offsite
Radios	X	
Plant page	X	
Plant Telephone System	X	
Commercial Telephones		X
ENS		X
HPN		X
Cellular Phones		X
Satellite Phones		X

Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

Basis Reference(s):

1. NEI 99-01 Rev 4, SU6
2. EP-MW-124-1001 Facilities Inventories And Equipment Tests

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU7

Initiating Condition:

Inability to reach required Shutdown within Technical Specification limits.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Plant is **not** brought to required operating mode within Technical Specifications LCO Action Statement Time.

Basis:

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 Unusual Event is required when the plant is not brought 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.

Basis Reference(s):

1. NEI 99-01 Rev 5, SU2
2. Braidwood Technical Specifications

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA1

Initiating Condition:

Loss of all Off-site and all On-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

5, 6, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to unit ESF busses.

   AND

2. Failure of DG 1A(2A) and DG 1B(2B) emergency diesel generators to supply power to unit ESF busses.

   AND

3. Failure to restore power to at least one unit ESF bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.

Basis:

Loss of all AC power compromises all plant safety systems requiring electric power.

The event can be classified as an Alert when in cold shutdown, refueling, or defueled mode because of the significantly reduced decay heat and lower temperature and pressure, increasing the time to restore one of the emergency busses, relative to that specified for the Site Area Emergency EAL.

Escalating to Site Area Emergency, if appropriate, is by Abnormal Rad Levels / Radiological Effluent EALs.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA1 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 5, CA3
2. 20E-0-4001 Station One Line Diagram
3. UFSAR 8.3.1
4. 1/2BwOA ELEC-3 Loss Of 4KV ESF Bus
5. 1/2BwOA ELEC-4 Loss Of Offsite Power Unit 1/2
6. 1/2BwCA-0.0 Loss Of All AC Power Unit 1/2
7. 1/2BwCA-0.1 Loss Of All AC Power Recovery Without SI Required Unit 1/2
8. 1/2BwCA-0.2 Loss Of All AC Power Recovery With SI Required Unit 1/2
9. 1/2BwCA-0.3 Response To Opposite Unit Loss Of All AC Power
10. BwOP AP-37 Unit Two SAT Crosstie To Unit One ESF Bus
11. BwOP AP-38, Unit One SAT Crosstie To Unit Two ESF Bus
12. Safety Evaluations of the Byron Station and Braidwood Station Responses to the Station Blackout (SBO) Rule (TAC NOS. 68522, 68523 AND 68515,68516)

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU1

Initiating Condition:

AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. AC power capability to unit ESF busses reduced to only one of the following power sources for **≥ 15 minutes**:
   - Affected unit SAT 142-1(242-1)
   - Affected unit SAT 142-2(242-2)
   - Emergency Diesel Generator DG 1A(2A)
   - Emergency Diesel Generator DG 1B(2B)
   - Unit crosstie breakers

   AND

2. Any additional single power source failure will result in unit blackout.

Basis:

Capability: (pertaining to electrical power supplies) is equipment that is available to provide and maintain AC power at the required voltage and frequency for the required load.

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. The subsequent loss of this single power source would escalate the event to an Alert in accordance with CA1.

Fifteen minutes was selected as a threshold to exclude momentary losses of power.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU1 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 5, CU3
2. 20E-0-4001 Station One Line Diagram
3. UFSAR 8.3.1
4. 1/2BwOA ELEC-3 Loss Of 4KV ESF Bus
5. 1/2BwOA ELEC-4 Loss Of Offsite Power Unit 1/2
6. 1/2BwCA-0.0 Loss Of All AC Power Unit 1/2
7. 1/2BwCA-0.1 Loss Of All AC Power Recovery Without SI Required Unit 1/2
8. 1/2BwCA-0.2 Loss Of All AC Power Recovery With SI Required Unit 1/2
9. 1/2BwCA-0.3 Response To Opposite Unit Loss Of All AC Power
10. BwOP AP-37 Unit Two SAT Crosstie To Unit One ESF Bus
11. BwOP AP-38, Unit One SAT Crosstie To Unit Two ESF Bus
12. Safety Evaluations of the Byron Station and Braidwood Station Responses to the Station Blackout (SBO) Rule (TAC NOS. 68522, 68523 AND 68515, 68516)

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU2

Initiating Condition:

Inadvertent criticality.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

UNPLANNED sustained positive startup rate observed on nuclear instrumentation.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

The term “sustained” is used in order to allow exclusion of expected short term positive startup rates from planned fuel bundle or control rod movements during core alteration. These short term positive startup rates are the result of the increase in neutron population due to subcritical multiplication.

This EAL addresses criticality events that occur in Cold Shutdown or Refueling modes such as fuel mis-loading events and inadvertent dilution events.

This EAL indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification.

Basis Reference(s):

1. NEI 99-01 Rev 5, SU8 & CU8
2. 1BwOS XCB-R1 U0 AND U1 MCR Meter Color Banding
3. 1/2BwFR-S.1, Response To Nuclear Power Generation/ATWS Unit 1/2
4. Bw TS LCO 3.3.1 RTS Instrumentation
5. 1/2BwOSR 0.1-4, Unit One(Two) Modes 4 Shiftly And Daily Operating Surveillance
6. 1/2BwGP 100-2 Plant Startup
7. 1/2BwGP 100-2T1, 1/2BwGP 100-2 Flowchart
8. 1/2BwGP 100-6T4 Defueled To Mode 6 Checklist
9. Regulatory Guide 8.12, Criticality Accident Alarm Systems

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU3

Initiating Condition:

Loss of required DC power for 15 minutes or longer.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of required DC power based on **< 108 VDC** on unit 125 VDC battery busses 111(211) and 112(212) for **≥ 15 minutes**.

Basis:

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.

The required busses are the minimum allowed by Technical Specifications for the mode of operation. It is intended that the loss of the operating (operable) train is to be considered. If this loss results in the inability to maintain cold shutdown, the escalation to an Alert will be per CA5.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Basis Reference(s):

1. NEI 99-01 Rev 5, CU7
2. UFSAR 8.3.2.1.1
3. 20E-0-4001 Station One Line Diagram
4. BwAR 1/2-21-E10, 125V DC PNL 111/113(211/213) VOLT LOW
5. 1/2BwOA ELEC 1 Loss of DC Bus UNIT 1/2
6. BwAR 1/2-22-E10, 125V DC PNL 112/114 (212/214) VOLT LOW

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU4

Initiating Condition:

Loss of all On-site or Off-site communications capabilities.

Operating Mode Applicability:

5, 6, D

EAL Threshold Values:

1. Loss of all Table C1 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table C1 **Offsite** communications capability affecting the ability to perform offsite notifications.

Table C1 - Communications Capability

System	Onsite	Offsite
Radios	X	
Plant page	X	
Plant Telephone System	X	
Commercial Telephones		X
ENS		X
HPN		X
Cellular Phones		X
Satellite Phones		X

Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

Basis Reference(s):

1. NEI 99-01 Rev 4, CU6
2. EP-MW-124-1001 Facilities Inventories And Equipment Tests

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5

Initiating Condition:

Inability to maintain plant in cold shutdown.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200° F** for **> Table C2 duration**.

Table C2 – RCS Reheat Duration Thresholds

RCS	Containment Closure	Duration
Intact	N/A	60 minutes*
Not Intact	Established	20 minutes*
OR Reduced Inventory (< 397 ft.)	Not Established	0 minutes

* If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then this EAL is **not** applicable.

OR

2. UNPLANNED Reactor Vessel pressure rise **> 10 psig** as a result of temperature rise due to loss of decay heat removal. (This threshold does not apply in solid plant conditions.)

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

RCS is intact when the RCS pressure boundary is in its normal condition for the Cold Shutdown mode of operation (e.g., no freeze seals, etc.).

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS
CA5 (cont)

Basis (cont):

Threshold #1 Basis:

The RCS Reheat Duration Threshold table addresses complete loss of functions required for core cooling for greater than 60 minutes during refueling and cold shutdown modes when RCS integrity is established. The status of CONTAINMENT CLOSURE in this condition is immaterial given that the RCS is providing a high pressure barrier to fission product release to the environment. The 60 minute time frame should allow sufficient time to restore cooling without there being a substantial degradation in plant safety.

The RCS Reheat Duration Threshold table also addresses the complete loss of functions required for core cooling for greater than 20 minutes during refueling and cold shutdown modes when CONTAINMENT CLOSURE is established but RCS integrity is not established. The allowed 20 minute time frame was included to allow operator action to restore the heat removal function, if possible.

Finally, complete loss of functions required for core cooling during refueling and cold shutdown modes when neither CONTAINMENT CLOSURE nor RCS integrity are established. No delay time is allowed because the evaporated reactor coolant that may be released into the Containment during this heatup condition could also be directly released to the environment.]

The note (*) indicates that this EAL is not applicable if actions are successful in restoring an RCS heat removal system to operation and RCS temperature is being reduced within the specified time frame.

Threshold #2 Basis:

The 10 psig pressure rise due to loss of decay heat removal infers an intact RCS with uncontrolled RCS temperature rise in excess of the Technical Specification cold shutdown limit (200° F) for which CA5 Threshold #1 would permit up to sixty minutes to restore RCS cooling before declaration of an Alert. This EAL therefore covers situations of high decay heat loads, in which the event should be declared without delay.

Escalation to Site Area Emergency would be via MS8 should boiling result in significant RPV level loss leading to core uncovery.

A loss of Technical Specification components alone is not intended to constitute an Alert. The same is true of a momentary UNPLANNED excursion above the Technical Specification cold shutdown temperature limit when the heat removal function is available.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 5, CA4
2. 1/2BwOS XPC-W1 Unit One (Two) Containment Penetration Status Weekly Surveillance
3. 1/2BwOSR 3.4.3.1 Reactor Coolant System Pressure/Temperature Limit Surveillance
4. 1/2BwGP 100-1 Plant Heatup
5. 1/2BwGP 100-5, Plant Shutdown and Cool Down
6. 1/2BwGP 100-6, Refueling Outage

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU5

Initiating Condition:

UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200° F**.

   OR

2. Loss of the following for **≥ 15 minutes:**
   - All RCS temperature indications

     AND
   - All RCS level indications

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL is be a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant.

In cold shutdown, the ability to remove decay heat relies primarily on forced cooling flow. Operation of the systems that provide this forced cooling may be jeopardized due to the unlikely loss of electrical power or RCS inventory. Since the RCS usually remains intact in the cold shutdown mode, a large inventory of water is available to keep the core covered.

During refueling, the level in the RPV will normally be maintained above the RPV flange. Refueling evolutions that decrease water level below the RPV flange are carefully planned and procedurally controlled. Loss of forced decay heat removal at reduced inventory may result in more rapid increases in RCS/RPV temperatures depending on the time since shutdown.

Normal means of core temperature indication and RCS level indication may not be available in the refueling mode. Redundant means of RPV level indication are therefore procedurally installed to assure that the ability to monitor level will not be interrupted. However, if all level and temperature indication were to be lost in either the cold shutdown of refueling modes, Threshold #2 would result in declaration of an Unusual Event if both temperature and level indication cannot be restored within 15 minutes from the loss of both means of indication. Escalation to Alert would be via CA6 based on an inventory loss or CA5 based on exceeding its temperature criteria.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU5 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 5, CU4
2. Technical Specifications Table 1.1-1
3. 1/2BwOSR 0.1-6 Unit One(Two) Mode 6 Shiftly And Daily Operating Surveillance
4. BwOP RH-9 Pump Down of the Reactor Cavity to the RWSTs
5. BwOP RC-4 Reactor Coolant System Drain
6. 1/2BwOSR 3.3.3.1 Unit One(Two) Accident Monitoring Instrumentation Monthly Channel Checks
7. LCOAR - RCS Leakage Detection Instrumentation – Tech Spec LCO 3.4.15
8. LCOAR – RCS Operational Leakage – Tech Spec LCO 3.4.13
9. 1/2BwOSR 3.4.3.1 Reactor Coolant System Pressure/Temperature Limit Surveillance

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6

Initiating Condition:

Loss of RCS/RPV inventory affecting fuel clad integrity with containment challenged.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. RVLIS **< 0% Plenum (390 ft. el.)** for **≥ 30 minutes**.

   OR

   Reactor Vessel Refueling Level Indicators LT-046 and LT-049 **< 392 ft. el.** for **≥ 30 minutes**.

   AND

   b. Any Containment Challenge Indication (Table C4).

   OR

2. a. Reactor Vessel level unknown for **≥ 30 minutes.**

   AND

   b. Loss of Reactor Vessel inventory as indicated by any of the following:

   - Table C3 indication.

     OR

   - Erratic Source Range Neutron Monitor indication.

     OR

   - 1/2 RE-AR011 or 1/2 RE-AR012 Containment Fuel Handling Incident radiation monitors **> 3000 mR/hr**.

   AND

   c. Any Containment Challenge Indication (Table C4)

Table C3 – Indications of RCS Leakage
• UNPLANNED Containment Sump level rise
• UNPLANNED Auxiliary Bldg. Sump level rise
• UNPLANNED Tank level rise
• UNPLANNED rise in RCS makeup
• Observation of leakage or inventory loss

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6 (cont.)

EAL Threshold Values: (cont)

Table C4 – Containment Challenge Indications
• Hydrogen concentration in Containment **≥ 5%** • UNPLANNED rise in containment pressure • CONTAINMENT CLOSURE **not** established.

Basis:

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL represents the inability to restore and maintain Reactor Vessel level to above the top of active fuel with containment challenged. Fuel damage is probable if Reactor Vessel level cannot be restored, as available decay heat will cause boiling, further reducing the Reactor Vessel level. With the CONTAINMENT breached or challenged then the potential for unmonitored fission product release to the environment is high. This represents a direct path for radioactive inventory to be released to the environment. This is consistent with the definition of a General Emergency. The General Emergency is declared on the occurrence of the loss or IMMINENT loss of function of all three barriers.

A number of variables can have a significant impact on heat removal capability challenging the fuel clad barrier. Examples include mid-loop, reduced level/flange level, head in place, cavity flooded, RCS venting strategy, decay heat removal system design, vortexing pre-disposition, steam generator U-tube draining

Analysis indicates that core damage may occur within an hour following continued core uncovery therefore, 30 minutes was conservatively chosen.

If CONTAINMENT CLOSURE is re-established prior to exceeding the 30 minute core uncovery time limit, then escalation to GE would not occur.

When Reactor Vessel level indication is unavailable, the inventory loss must be detected by erratic Source Range Monitor indication, elevated containment radiation or unexplained rise in tank or sump level. Post-TMI studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and that Source Range Monitors can be used as a tool for making such determinations.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6 (cont)

Basis (cont):

Sump and tank level rises must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

As water level in the Reactor Vessel lowers, the dose rate above the core will increase. Indication of > 3000 mR/hr is indicative of core uncovery.

Basis Reference(s):

1. NEI 99-01 Rev 5, CG1
2. 1/2BwOS XPC-W1 Unit One (Two) Containment Penetration Status Weekly Surveillance
3. UFSAR E.17
4. BwOP RH-9 Pump Down of the Reactor Cavity to the RWSTs
5. BwOP RC-4 Reactor Coolant System Drain
6. UFSAR 6.2
7. 1/2BwOSR 0.1-4 Unit One (Two) Modes 4 Shiftly and Daily Operating Surveillance
8. 1/2BwOS RF-1 Unit One (Two) Containment Floor Drain Monitoring System Non-Routine Surveillance
9. 1/2BwOS XCB-R1 U0 and U1 MCR Meter Color Banding
10. 1/2BwGP 100-2 Plant Startup
11. 1/2BwGP 100-6T4 Defueled to Mode 6 Checklist
12. 1/2BwOSR 3.3.3.1 Unit One(Two) Accident Monitoring Instrumentation Monthly Channel Checks
13. 1/2BwFR-C.1, Response to Inadequate Core Cooling Unit 1/2
14. 1/2BwST-5 Containment
15. NES-G-14.02, Calculation No. BYR99-010 / BRW-99-0017-I
16. UFSAR stat Section 6.2.5.2.1
17. EP-EAL-0501, Estimation Of Radiation Monitor Readings Indicating Core Uncovery During Refueling

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6

Initiating Condition:

Loss of RCS/RPV inventory affecting core decay heat removal capability.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. With CONTAINMENT CLOSURE **not** established **EITHER**:
   - RVLIS **< 15% Plenum (392.4 ft. el.)**.

     OR
   - Reactor Vessel Refueling Level Indicators LT-046 and LT-049 **< 393 ft. el.**

   OR
2. With CONTAINMENT CLOSURE established **EITHER**:
   - RVLIS **< 0% Plenum (390 ft. el.)**

     OR
   - Reactor Vessel Refueling Level Indicators LT-046 and LT-049 **< 392 ft. el**

   OR
3. a. Reactor Vessel level unknown for **≥ 30 minutes.**

      AND

   b. Loss of Reactor Vessel inventory as indicated by any of the following:
      - Table C3 indications.

        OR
      - Erratic Source Range Neutron Monitor indication.

        OR
      - 1/2 RE-AR011 or 1/2 RE-AR012 Containment Fuel Handling Incident radiation monitors **> 3000 mR/hr.**

Table C3 – Indications of RCS Leakage
• UNPLANNED Containment Sump level rise • UNPLANNED Auxiliary Bldg. Sump level rise • UNPLANNED Tank level rise • UNPLANNED rise in RCS makeup • Observation of leakage or inventory loss

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6 (cont)

Basis:

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

Under the conditions specified, a continued drop in RCS/RPV level is indicative of a loss of inventory control. Inventory loss may be due to an RCS breach, pressure boundary leakage, or continued boiling in the Reactor Vessel. Thus, declaration of a Site Area Emergency is warranted.

Escalation to a General Emergency is via CG6 or RG1.

Threshold #1 and #2 Basis:

If a low-pressure boundary to fission product release does not exist (i.e., containment closure is not established), the level associated with this threshold is six inches below the bottom inside diameter of the RCS hot leg vessel penetration. If containment closure is established, a low-pressure boundary to fission product release exists and water level can drop to the top of active fuel before a Site Area Emergency declaration is required.

Threshold #3 Basis:

When Reactor Vessel level indication is unavailable, the inventory loss must be detected by erratic Source Range Monitor indication, elevated containment radiation or unexplained rise in tank or sump level. Post-TMI studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and that Source Range Monitors can be used as a tool for making such determinations.

The 30-minute duration allows sufficient time for actions to be performed to recover inventory control equipment.

As water level in the Reactor Vessel lowers, the dose rate above the core will rise. Indication of > 3000 mR/hr. is indicative of core uncovery.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6 (cont.)

Basis Reference(s):

1. NEI 99-01 Rev 5, CS1
2. 1/2BwOS XPC-W1 Unit One (Two) Containment Penetration Status Weekly Surveillance
3. UFSAR E.17
4. BwOP RH-9 Pump Down of the Reactor Cavity to the RWSTs
5. BwOP RC-4 Reactor Coolant System Drain
6. UFSAR 6.2
7. 1/2BwOSR 0.1-4 Unit One (Two) Modes 4 Shiftly and Daily Operating Surveillance
8. 1/2BwOS RF-1 Unit One (Two) Containment Floor Drain Monitoring System Non-Routine Surveillance
9. 1/2BwOS XCB-R1 U0 and U1 MCR Meter Color Banding
10. 1/2BwOSR 0.1-4, Unit One (Two) Modes 4 Shiftly and Daily Operating Surveillance
11. 1/2BwGP 100-2 Plant Startup
12. 1/2BwGP 100-6T4 Defueled to Mode 6 Checklist
13. 1/2BwOSR 3.3.3.1 Unit One (Two) Accident Monitoring Instrumentation Monthly Channel Checks

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA6

Initiating Condition:

Loss of RCS/RPV inventory.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. Loss of RCS / Reactor Vessel inventory as indicated RVLIS **< 27% Plenum (393 ft. el.)**.

   OR

   b. Loss of RCS / Reactor Vessel inventory as indicated by LT-046 and LT-049 **< 393 ft. el.**

   OR

2. a. RCS / Reactor Vessel level unknown for **≥ 15 minutes.**

   AND

   b. Loss of RCS / Reactor Vessel inventory per Table C3 indications.

Table C3 – Indications of RCS Leakage
• UNPLANNED Containment Sump level rise • UNPLANNED Auxiliary Bldg. Sump level rise • UNPLANNED Tank level rise • UNPLANNED rise in RCS makeup • Observation of leakage or inventory loss

Basis:

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL serves as precursors to a loss of ability to adequately cool the fuel. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further Reactor Vessel level decrease and potential core uncovery. This condition will result in a minimum emergency classification level of an Alert.

If Reactor Vessel level continues to lower then escalation to Site Area Emergency will be via CS6.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA6 (cont)

Basis (cont):

Threshold #1 Basis:

The inability to restore and maintain level after reaching this setpoint would be indicative of a failure of the RCS barrier.

Threshold #2 Basis:

When Reactor Vessel level indication is unavailable, the inventory loss must be detected by other means including rise in sump and tank levels, changes in makeup or observation of leakage.

The 15-minute interval for the loss of level indication was chosen because it is half of the Site Area Emergency duration.

Basis Reference(s):

1. NEI 99-01 Rev 5, CA1
2. UFSAR 6.2 & E.17
3. 1/2BwOSR 0.1-4 Unit One (Two) Modes 4 Shiftly and Daily Operating Surveillance
4. 1/2BwOS RF-1 Unit One (Two) Containment Floor Drain Monitoring System Non-Routine Surveillance
5. 1/2BwOS XCB-R1 U0 and U1 MCR Meter Color Banding
6. BwOP RH-9 Pump Down of the Reactor Cavity to the RWSTs
7. BwOP RC-4 Reactor Coolant System Drain

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU6

Initiating Condition:

RCS leakage.

Operating Mode Applicability:

5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

RCS leakage results in the inability to restore and maintain RCS or Pressurizer level **> procedurally established limit** for **≥ 15 minutes.**

Basis:

This EAL is considered to be a potential degradation of the level of safety of the plant. The inability to maintain or restore level is indicative of loss of RCS inventory.

Relief valve operation should be excluded from this EAL. However, a relief valve that operates and fails to close per design should be considered applicable to this EAL if the relief valve cannot be isolated.

Prolonged loss of RCS Inventory may result in escalation to the Alert emergency classification level via either CA6 or CA5.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU1
2. UFSAR 6.2 & E.17
3. 1/2BwOSR 0.1-4 Unit One(Two) Modes 4 Shiftly and Daily Operating Surveillance
4. 1/2BwOS RF-1 Unit One(Two) Containment Floor Drain Monitoring System Non-Routine Surveillance
5. 1/2BwOS XCB-R1 U0 and U1 MCR Meter Color Banding
6. BwOP RH-9 Pump Down of the Reactor Cavity to the RWSTs
7. BwOP RC-4 Reactor Coolant System Drain

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU7

Initiating Condition:

UNPLANNED loss of RCS/RPV inventory.

Operating Mode Applicability:

6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED Refueling Cavity or Vessel level drop that meets **EITHER**:

   - When controlling level above the Reactor Vessel flange, Refueling Cavity level drop below the Reactor Vessel flange **(400 ft.)** for **≥ 15 minutes**.

     OR

   - When controlling level below the Reactor Vessel flange, vessel level drop below the procedurally established limit for **≥ 15 minutes**.

   OR

2. a. Reactor Vessel level unknown.

   AND

   b. Loss of RCS /Reactor Vessel inventory per Table C3 indications.

Table C3 – Indications of RCS Leakage
• UNPLANNED Containment Sump level rise • UNPLANNED Auxiliary Bldg. Sump level rise • UNPLANNED Tank level rise • UNPLANNED rise in RCS makeup • Observation of leakage or inventory loss

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU7 (cont)

Basis (cont):

This EAL is a precursor of more serious conditions and considered to be a potential degradation of the level of safety of the plant.

Refueling evolutions that lowers RCS water level below the RPV flange are carefully planned and procedurally controlled. An UNPLANNED event that results in water level dropping below the RPV flange, or below the planned RCS water level for the given evolution (if the planned RCS water level is already below the RPV flange), warrants declaration of a UE due to the reduced RCS inventory that is available to keep the core covered.

The allowance of 15 minutes was chosen because it is reasonable to assume that level can be restored within this time frame, using one or more of the redundant means of makeup that should be available. If level cannot be restored in this time frame then it may indicate a more serious condition exists.

Continued loss of RCS Inventory will result in escalation to the Alert emergency classification level via either CA6 or CA5.

Threshold #1 Basis:

This EAL involves a drop in RCS level below the top of the RPV flange that continues for 15 minutes due to an UNPLANNED event. This EAL is not applicable to level changes in flooded reactor cavity level, which is addressed by RU2, until such time as the level drop reaches the level of the vessel flange.

If Reactor Vessel level continues to decrease and reaches the Bottom ID of the RCS Loop, then escalation to CA6 would be appropriate.

Threshold #2 Basis:

This EAL addresses conditions in the refueling mode when normal means of core temperature indication and RCS level indication may not be available. Redundant means of Reactor Vessel level indication will normally be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that RPV inventory loss was occurring by observing other indications such as sump and tank level changes, changes in makeup or observation of leakage. Sump and tank level changes must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

Escalation to the Alert emergency classification level would be via either CA6 or CA5.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU7 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 5, CU2
2. UFSAR 5.2
3. 1/2BwOSR 3.4.13.1 Unit One(Two) Reactor Coolant System Water Inventory Balance Surveillance
4. 1/2BwOL 3.4.15 LCOAR - Reactor Coolant System Leakage - Leakage Detection Systems
5. 1/2BwOA PRI-1 Excessive Primary Leakage Unit 1/2
6. UFSAR 6.2
7. 1/2BwOSR 0.1-4 Unit One(Two) Modes 6 Shiftly and Daily Operating Surveillance
8. 1/2BwOS RF-1 Unit One(Two) Containment Floor Drain Monitoring System Non-Routine Surveillance
9. BwOP RH-9 Pump Down of the Reactor Cavity to the RWSTs
10. BwOP RC-4 Reactor Coolant System Drain

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1

Initiating Condition:

HOSTILE ACTION resulting in loss of physical control of the facility.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Value:

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1).

   OR

2. A HOSTILE ACTION has:

   - Caused failure of Spent Fuel Pool Cooling Systems

     AND

   - IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).

Table H1 - Safety Functions
• Reactivity Control (ability to shut down the reactor and keep it shutdown) • RCS Inventory (ability to cool the core) • Secondary Heat Removal (ability to maintain heat sink)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1 (cont)

Basis: (cont)

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

Threshold #1 Basis

This threshold encompasses conditions under which a HOSTILE ACTION has taken physical control of VITAL AREAS (containing vital equipment or controls of vital equipment) required to maintain any safety function. As a result, there is a loss of one or more of the Table H1 functions and equipment control cannot be transferred to and operated from another location.

If control of the plant equipment necessary to maintain all safety functions can be operated from the Control Room or transferred to another location, then the above EAL threshold is not met.

Threshold #2 Basis

This threshold addresses loss of physical control of spent fuel pool cooling systems if imminent fuel damage is likely because there is freshly off-loaded fuel in the pool. The condition “freshly off-loaded reactor fuel in pool” equates to fuel off-loaded within the last 120 days in NF-AA-309 Special Nuclear Material And Core Component Move Development Sheet.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HG1
2. 0BwOA Security-1, Security Threat
3. 1/2BwOA PRI-5 Control Room Inaccessibility
4. SY-AA-101-132, Security Assessment and Response to Unusual Activities
5. Station Security Plan – Appendix C
6. NF-AA-309, Special Nuclear Material And Core Component Move Development Sheet

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS1

Initiating Condition:

HOSTILE ACTION within the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

This condition represents an escalated threat to plant safety above that contained in the Alert in that a HOSTILE FORCE has progressed from the OWNER CONTROLLED AREA to the PROTECTED AREA.

This EAL addresses the contingency for a very rapid progression of events. It is not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack with minimal time available for further preparation or additional assistance to arrive requires Offsite Response Organizations (ORO) readiness and preparation for the implementation of protective measures.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS1 (cont)

Basis (cont):

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the PROTECTED AREA. Those events are adequately addressed by other EALs.

Escalation of this emergency classification level, if appropriate, would be based on actual plant status after impact or progression of attack.

Basis Reference(s):

1. NEI 99-01 Rev 5, HS4
2. SY-AA-101-132, Security Assessment and Response to Unusual Activities
3. Station Security Plan – Appendix C
4. 0BwOA Security-1, Security Threat

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1

Initiating Condition:

HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site.

   OR

2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

OWNER CONTROLLED AREA (OCA): is the property associated with the station owned by the company. Access is normally limited to persons entering for official business.

Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

The fact that the site is under serious attack or is an identified attack target with minimal time available for further preparation or additional assistance to arrive requires a heightened state of readiness and implementation of protective measures that can be effective (such as on-site evacuation, dispersal or sheltering).

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1 (cont)

Basis: (cont)

Threshold #1 Basis

This EAL addresses the immediacy of an expected threat arrival or impact on the site within a relatively short time.

The intent of this EAL is to ensure that notifications for the airliner attack threat are made in a timely manner and that Offsite Response Organizations (ORO) and plant personnel are at a state of heightened awareness regarding the credible threat. Airliner is meant to be a large aircraft with the potential for causing significant damage to the plant.

This EAL is met when a plant receives information regarding an airliner attack threat from NRC and the airliner is within 30 minutes of the plant. Only the plant to which the specific threat is made need declare the Alert.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Threshold #2 Basis

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the OCA. Those events are adequately addressed by other EALs.

Note that this EAL is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA.

Basis Reference(s):

1. NEI 99-01 Rev 5, HA4
2. SY-AA-101-132, Security Assessment and Response to Unusual Activities
3. Station Security Plan – Appendix C
4. 0BwOA Security-1, Security Threat

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1

Initiating Condition:

Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities.

   OR

2. A validated notification from NRC providing information of an aircraft threat.

   OR

3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

Basis:

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

Security events assessed as HOSTILE ACTIONS are classifiable under HA1, HS1 and HG1.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1 (cont)

Basis: (cont)

A higher initial classification could be made based upon the nature and timing of the security threat and potential consequences. The licensee shall consider upgrading the emergency response status and emergency classification level in accordance with the site's Safeguards Contingency Plan and Emergency Plan.

Threshold #1 Basis

This threshold is included to ensure that appropriate notifications for the security threat are made in a timely manner. This includes information of a credible threat. Only the plant to which the specific threat is made need declare the Notification of an Unusual Event.

The determination of "credible" is made through use of information found in the Station Security Plan or SY-AA-101-132, "Security Assessment and Response to Unusual Activities" procedure.

Threshold #2 Basis

The intent of this EAL is to ensure that notifications for the aircraft threat are made in a timely manner and that Offsite Response Organizations (ORO) and plant personnel are at a state of heightened awareness regarding the credible threat. It is not the intent of this EAL to replace existing non-hostile related EALs involving aircraft.

This EAL is met when a plant receives information regarding an aircraft threat from NRC. Validation is performed by calling the NRC. Only the plant to which the specific threat is made need declare the Unusual Event.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Escalation to Alert emergency classification level would be via HA1 would be appropriate if the threat involves an airliner within 30 minutes of the plant.

Threshold #3 Basis

Reference is made to security force because these individuals are the designated personnel on-site qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the plant Safeguards Contingency Plan.

This threshold is based on Station Security Plan – Appendix C. 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 in some cases under 10 CFR 50.72.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 5, HU4
2. SY-AA-101-132, Security Assessment and Response to Unusual Activities
3. Station Security Plan – Appendix C
4. NRC Safeguards Advisory 10/6/01
5. 0BwOA Security-1, Security Threat
6. Letter from Mr. B. A. Boger (NRC) to Ms. Lynette Hendricks (NEI) dated 2/4/02

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS2

Initiating Condition:

Control Room evacuation has been initiated and plant control cannot be established.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Control Room evacuation has been initiated.

   AND

2. Control of the plant **cannot** be established per 1/2BwOA PRI-5, Control Room Inaccessibility procedure in **< 15 minutes**.

Basis:

The time period to establish control of the plant starts when either:

a. Control of the plant is no longer maintained in the Main Control Room

   OR

b. The last Operator has left the Main Control Room.

The intent of this EAL is to capture those events where control of the plant cannot be reestablished in a timely manner. In this case, expeditious transfer of control of safety systems has not occurred (although fission product barrier damage may not yet be indicated).

The intent of the EAL is to establish control of important plant equipment and knowledge of important plant parameters in a timely manner. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions. Typically, these safety functions are reactivity control, RCS inventory, and secondary heat removal.

The determination of whether or not control is established at the remote shutdown panel is based on Emergency Director (ED) judgment. The Emergency Director is expected to make a reasonable, informed judgment within the specified time for transfer that the licensee has control of the plant from the remote shutdown panel.

Escalation of this emergency classification level, if appropriate, would be by Fission Product Barrier or Abnormal Rad Levels/Radiological Effluent EALs.

Basis Reference(s):

1. NEI 99-01, Rev 5 HS2
2. 1/2BwOA PRI-5, Control Room Inaccessibility

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA2

Initiating Condition:

Control Room evacuation has been initiated.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Entry into 1/2BwOA PRI-5, Control Room Inaccessibility procedure for Control Room evacuation.

Basis:

With the control room evacuated, additional support, monitoring and direction through the Technical Support Center and/or other emergency response facilities may be necessary.

Inability to establish plant control from outside the control room will escalate this event to a Site Area Emergency.

Basis Reference(s):

1. NEI 99-01, Rev 5 HA5
2. 1/2BwOA PRI-5, Control Room Inaccessibility

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3

Initiating Condition:

FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

FIRE or EXPLOSION resulting in any of the following:

- VISIBLE DAMAGE to a Table H2 permanent structure.

  OR

- VISIBLE DAMAGE to safety system equipment contained within a Table H2 area.

  OR

- Control Room indication of degraded safety system equipment performance contained within a Table H2 area.

Table H2 – Vital Areas
• Containment • Auxiliary Building • Fuel Handling Building • Main Steam Tunnels • RWSTs • Condensate Storage Tanks • Lake Screen House

Basis:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3 (cont)

Basis (cont):

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

The areas listed in Table H2 specify specific structures or areas that contain safety system, or component and functions required for safe shutdown of the plant.

VISIBLE DAMAGE is used to identify the magnitude of the FIRE or EXPLOSION and to discriminate against minor FIRES and EXPLOSIONS.

The reference to structures containing safety systems or components is included to discriminate against FIRES or EXPLOSIONS in areas having a low probability of affecting safe operation. The significance here is not that a safety system was degraded but the fact that the FIRE or EXPLOSION was large enough to cause damage to these systems.

An EXPLOSION due to failure of pressurized equipment that does not cause damage to other permanent structures or equipment associated with plant operations does not meet the criteria for declaration under this EAL, but may result in other declaration criteria being met (e.g., when the line is an element of a Fission Product Barrier, or the results in inventory loss).

The use of VISIBLE DAMAGE should not be interpreted as mandating a lengthy damage assessment prior to classification. The declaration of an Alert and the activation of the Technical Support Center will provide the Emergency Director with the resources needed to perform detailed damage assessments.

The Emergency Director also needs to consider any security aspects of the EXPLOSION.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions, Fission Product Barrier or Abnormal Rad Levels / Radiological Effluent EALs.

Basis Reference(s):

1. NEI 99-01, Rev 5 HA2
2. Drawing S-01A Composite Site Plan
3. UFSAR Section 3.2

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3

Initiating Condition:

FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm.

Table H2 – Vital Areas
• Containment • Auxiliary Building • Fuel Handling Building • Main Steam Tunnels • RWSTs • Condensate Storage Tanks • Lake Screen House

OR

2. EXPLOSION within PROTECTED AREA affecting a Table H2 area.

Basis:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

PROTECTED AREA: An area which normally encompasses all controlled areas within the security protected area fence.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3 (cont)

Basis (cont):

This EAL addresses the magnitude and extent of FIRES or EXPLOSIONS that may be potentially significant precursors of damage to safety systems. It addresses the FIRE / EXPLOSION, and not the degradation in performance of affected systems that may result.

As used here, notification is visual observation and report by plant personnel or sensor alarm indication.

For the purposes of declaring an emergency event, the term “extinguished” means no visible flames.

Thresholds #1 Basis:

The 15 minute time period begins with a credible notification that a FIRE is occurring, or indication of a fire detection system alarm/actuation. Verification of a fire detection system alarm/actuation includes actions that can be taken within the control room or other nearby site specific location to ensure that it is not spurious. An alarm is assumed to be an indication of a FIRE unless it is disproved within the 15 minute period by personnel dispatched to the scene. In other words, a personnel report from the scene may be used to disprove a sensor alarm if received within 15 minutes of the alarm, but shall not be required to verify the alarm.

The intent of this 15 minute duration is to size the FIRE and to discriminate against small FIRES that are readily extinguished (e.g., smoldering waste paper basket). Such fires are excluded from consideration in this threshold since they have no safety consequence.

Threshold #2 Basis:

This EAL addresses only those EXPLOSIONS of sufficient force to damage permanent structures or equipment associated with plant operations within the PROTECTED AREA.

An EXPLOSION due to failure of pressurized equipment that does not cause damage to other permanent structures or equipment associated with plant operations does not meet the criteria for declaration under this EAL, but may result in other declaration criteria being met (e.g., when the line is an element of a Fission Product Barrier, or the results in inventory loss).

No attempt is made to assess the actual magnitude of the damage. The occurrence of the EXPLOSION is sufficient for declaration.

The Emergency director also needs to consider any security aspects of the EXPLOSION, if applicable.

Escalation of this emergency classification level, if appropriate, would be based on HA3.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3 (cont)

Basis Reference(s):

1. NEI 99-01, Rev 5 HU2
2. Drawing S-01A Composite Site Plan
3. UFSAR Section 3.2
4. BwAP-1100, Fire Protection Procedures

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4

Initiating Condition:

Natural or destructive phenomena affecting VITAL AREAS.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

1. a. Seismic event **> Operating Basis Earthquake (OBE)** as indicated by seismic check 0PA02J.

   AND

   b. Confirmed by **EITHER:**

   - Earthquake felt in plant.

     OR

   - National Earthquake Center.

     OR

   - Control Room indication of degraded performance of systems required for the safe shutdown of the plant.

   OR

2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area:

   - Tornado strike

     OR

   - High winds **> 85 mph**

     OR

   - Vehicle crash

     OR

   - Turbine failure-generated PROJECTILES

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

EAL Threshold Values: (cont.)

Table H2 – Vital Areas
• Containment • Auxiliary Building • Fuel Handling Building • Main Steam Tunnels • RWSTs • Condensate Storage Tanks • Lake Screen House

OR

3. Flooding in the Auxiliary Building that results in **EITHER**:

   a. Degraded safety system performance as indicated in the Control Room.

   OR

   b. Industrial safety hazards (e.g., electric shock) that precludes access to operate or monitor safety equipment.

Basis:

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

Basis (cont):

These EALs escalate from HU4 in that the occurrence of the event has resulted in VISIBLE DAMAGE to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control room indications of degraded system response or performance. The occurrence of VISIBLE DAMAGE and/or degraded system response is intended to discriminate against lesser events. 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. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction EALs.

Threshold #1 Basis:

This threshold addresses events that may have resulted in a Table H2 area being subjected to forces beyond design limits and thus damage may be assumed to have occurred to plant safety systems.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

Threshold #2 Basis:

This threshold addresses events within the PROTECTED AREA that results in VISIBLE DAMAGE to any Table H2 structure or Control Room indication of degraded performance of a safety system in any Table H2 area:

This threshold addresses the following events:

- Tornado strike.
- High winds.
- Vehicle crashes such as plane, helicopter, train, barge, car or truck crashes. The Emergency director also needs to consider any security aspects of the vehicle crash.
- Threat to safety-related equipment imposed by PROJECTILES generated by main turbine rotating component failures.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

Basis (cont):

Threshold #3 Basis:

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. The actual component failure or equipment misalignment is addressed by Technical Specifications or plant procedures unless the resulting flooding causes degraded performance of safety systems, or has created industrial safety hazards (e.g., electrical shock) that preclude necessary access to operate or monitor safety equipment. The inability to access, operate or monitor safety equipment represents an actual or substantial potential degradation of the level of safety of the plant.

Flooding as used in this EAL describes a condition where water is entering the room faster than installed equipment is capable of removal, resulting in a rise of water level within the room. Classification of this EAL should not be delayed while corrective actions are being taken to isolate the water source.

Basis Reference(s):

1. NEI 99-01, Rev 5 HA1
2. UFSAR Section 2.5.4.9.3
3. 0BwOA ENV-4, Earthquake
4. Annunciator 0-38-E5 Accelograph Accel High
5. Drawing S-01A Composite Site Plan
6. UFSAR Section 3.2 7
7. UFSAR Section 3.3.1.1
8. UFSAR Section 3.4
9. 0BwOA PRI-8 Auxiliary Building Flooding Unit 0
10. UFSAR Appendix C
11. 1/2BwOA TG-7, Main Generator Excessive Hydrogen Leakage

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4

Initiating Condition:

Natural or destructive phenomena affecting the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

1. a. Seismic event as indicated by Annunciator 0-38-E5, Accelograph Accel High (0PM01J).

   AND

   b. Confirmed by **EITHER:**

   - Earthquake felt in plant.

     OR

   - National Earthquake Center.

   OR

2. **EITHER** of the following occurring within the PROTECTED AREA boundary:

   - Tornado strike

     OR

   - Sustained **(> 15 minutes)** high winds **> 85 mph**

   OR

3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

   OR

4. Flooding in the Auxiliary Building that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY
HU4 (cont)

Basis:

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

These EALs are categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

Threshold #1 Basis:

Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

Threshold #2 Basis:

This EAL is based on a tornado striking (touching down) or high winds within the PROTECTED AREA.

Escalation of this emergency classification level, if appropriate, would be based on VISIBLE DAMAGE, or by other in plant conditions, via HA4.

Threshold #3 Basis:

This EAL addresses main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Generator seal damage observed after generator purge does not meet the intent of this EAL because it did not impact normal operation of the plant.

Of major concern is the potential for leakage of combustible fluids (lubricating oils) and gases (hydrogen cooling) to the plant environs. Actual FIRES and flammable gas build up are appropriately classified via HU3 and HU5.

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 this emergency classification level, if appropriate, would be to HA4 based on damage done by PROJECTILES generated by the failure or by the radiological releases. The latter events would be classified by the radiological EALs or Fission Product Barrier.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont)

Basis (cont):

Threshold #4 Basis:

The assessment of the potential for flooding to affect safety related equipment is based on the rate of level rise in the area and the ability to terminate the input prior to submerging or spraying the electrical portion of safety related equipment.

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. Minor leaks, such as valve packing or instrument line breaks would not constitute "Flooding." The Internal Flooding Areas of concern for the Unusual Event declaration are those areas that have the potential to affect safety related equipment needed for the current operating mode.

Escalation of this emergency classification level, if appropriate, would be based VISIBLE DAMAGE via HA4, or by other plant conditions.

Basis Reference(s):

1. NEI 99-01, Rev 5 HU1
2. UFSAR Section 2.5.4.9.3
3. 0BwOA ENV-4 Earthquake
4. Annunciator 0-38-E5 Accelograph Accel High
5. Drawing S-01A Composite Site Plan
6. UFSAR Section 3.2
7. UFSAR Section 3.3.1.1
8. 0BwOA PRI-8 Auxiliary Building Flooding Unit 0
9. 1/2BwOA TG-1 Turbine High Vibration, Eccentricity or Differential Expansion
10. 1/2BwOA TG-7 Main Generator Excessive Hydrogen Leakage
11. BwAR 1/2 PLO1J-1-A2 Hydrogen Pressure high or Low

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5

Initiating Condition:

Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Note: If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.

Table H2 – Vital Areas
• Containment • Auxiliary Building • Fuel Handling Building • Main Steam Tunnels • RWSTs • Condensate Storage Tanks • Lake Screen House

Basis:

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY
HA5 (cont)

Basis (cont)

Gases in a VITAL AREA can affect the ability to safely operate or safely shutdown the reactor.

The fact that SCBA may be worn does not eliminate the need to declare the event.

A precautionary area evacuation for the purpose of atmospheric testing does not warrant declaration until test results are obtained unless access is required for operation of operable equipment to maintain safe operations or safely shutdown the reactor. Declaration should not be delayed for confirmation from atmospheric testing if the atmosphere poses an immediate threat to life and health or an immediate threat of severe exposure to gases. This could be based upon documented analysis, indication of personal ill effects from exposure, or operating experience with the hazards such as an inadvertent actuation of installed Cardox fire suppression system.

Station evaluations have shown that, other than the Upper Cable Spreading Room at Braidwood Station, installed Halon systems by design do not create an IDLH atmosphere when discharged. Therefore, when an installed Halon Fire Suppression system discharge occurs (other than the Upper Cable Spreading Room at Braidwood Station), an IDLH atmosphere should not be assumed, and declaration of a toxic or asphyxiant IDLH atmosphere must be based on representative sampling of the affected area, unless there are indications of personal ill effects resulting from exposure.

Areas directly associated with a fire that may be considered to have a hazardous environment (due to smoke, design fire suppression system actuation or administrative controls awaiting ventilation and/or testing) do not warrant declaration of an Alert under this EAL but should be evaluated against the fire EALs.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of 19.5%, which can lead to breathing difficulties, unconsciousness or even death.

An uncontrolled release of flammable gasses 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. Flammable gasses, such as hydrogen and acetylene, are routinely used to maintain plant systems (hydrogen) or to repair equipment/components (acetylene - used in welding). This EAL assumes concentrations of flammable gasses which can ignite/support combustion.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions, Fission Product Barrier or Abnormal Rad Levels / Radioactive Effluent EALs.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5 (cont)

Basis Reference(s):

1. NEI 99-01, Rev 5 HA3
2. Drawing S-01A Composite Site Plan
3. UFSAR Section 3.2 Classification Of Structures, Components, And Systems
4. ACIT 660892-12, Station Halon Discharge IDLH Evaluation

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU5

Initiating Condition:

Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS.

   OR

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

Basis:

NORMAL PLANT OPERATIONS: Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

This EAL is based on the release of toxic, corrosive, asphyxiant or flammable gases of sufficient quantity to affect NORMAL PLANT OPERATIONS.

The fact that SCBA may be worn does not eliminate the need to declare the event.

This EAL is not intended to require significant assessment or quantification. It assumes an uncontrolled process that has the potential to affect plant operations. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation.

The release may have originated within the Protected Area boundary, or it may have originated offsite and subsequently drifted inside the Protected Area boundary. Offsite events (e.g., tanker truck accident releasing toxic gases, etc.) resulting in the plant being within the evacuation area should also be considered in this EAL because of the adverse affect on NORMAL PLANT OPERATIONS.

Areas directly associated with a fire that may be considered to have a hazardous environment (due to smoke, design fire suppression system actuation or administrative controls awaiting ventilation and/or testing) do not warrant declaration of an Unusual Event under this EAL but should be evaluated against the fire EALs.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of 19.5%, which can lead to breathing difficulties, unconsciousness or even death.

Escalation of this emergency classification level, if appropriate, would be based on HA5.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU5 (cont)

Basis Reference(s):

1. NEI 99-01, Rev 5 HU3
2. Drawing S-01A Composite Site Plan

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG6

Initiating Condition:

Other conditions existing which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the General Emergency class.

Basis Reference(s):

1. NEI 99-01, Rev 5 HG2
2. EPA-400, Manual Of Protective Action Guides And Protective Actions For Nuclear Incidents.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS6

Initiating Condition:

Other conditions existing which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency class description for Site Area Emergency.

Basis Reference(s):

1. NEI 99-01, Rev 5 HS3
2. EPA-400, Manual Of Protective Action Guides And Protective Actions For Nuclear Incidents.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA6

Initiating Condition:

Other conditions existing which in the judgment of the Emergency Director warrant declaration of an ALERT.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the Alert emergency class.

Basis Reference(s):

1. NEI 99-01, Rev 5 HA6
2. EPA-400, Manual Of Protective Action Guides And Protective Actions For Nuclear Incidents.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU6

Initiating Condition:

Other conditions existing which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Basis:

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

Basis Reference(s):

1. NEI 99-01, Rev 5 HU5

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

E-HU1

Initiating Condition

Damage to a loaded cask CONFINEMENT BOUNDARY.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**

Basis:

CONFINEMENT BOUNDARY – is the barrier(s) between areas containing radioactive substances and the environment.

An Unusual Event in this EAL is categorized on the basis of the occurrence of an event of sufficient magnitude that a loaded cask CONFINEMENT BOUNDARY is damaged or violated. This includes classification based on a loaded fuel storage cask CONFINEMENT BOUNDARY loss leading to the degradation of the fuel during storage or posing an operational safety problem with respect to its removal from storage.

Basis Reference(s):

1. NEI 99-01, Rev 5 E-HU1

Section 4: Emergency Measures

Exelon Nuclear emergency response actions are the same for all nuclear stations and are thus covered by Section E of the Emergency Plan.

4.1 Notification of the Emergency Organization

Standard NARS notifications for the Braidwood Station are made to the State of Illinois Emergency Management Agency (IEMA). At the Braidwood Station, if a General Emergency is the initiating event, the Emergency Director is also responsible for notifying the following local agencies:

- Will County EOC
- Will County Sheriff's Office
- Grundy County EMA
- Grundy County Sheriff's Office
- Kankakee County EOC
- Kankakee County Sheriff's Office

4.2 Assessment Actions

Throughout each emergency situation, continuing assessment will occur. Assessment actions at Braidwood Station may include an evaluation of plant conditions; in-plant, onsite, and initial offsite radiological measurements; and initial estimates of offsite doses. Core damage information is used to refine dose assessments and confirm or extend initial protective action recommendations. Braidwood Station utilizes WCAP-14696-A, Revision 1, (1999) as the basis for the methodology for post-accident core damage assessment. This methodology utilizes real-time plant indications. In addition, Braidwood Station may use samples of plant fluids and atmospheres as inputs to the CDAM (Core Damage Assessment Methodology) program for core damage estimation.

4.3 Protective Actions for the Offsite Public

To aid Control Room personnel during a rapidly developing emergency situation, Figure 4-1, "Protective Action Recommendation (PAR) Determination Flowchart for Braidwood Station" has been developed based on Section J of the Exelon Nuclear Radiological Emergency Plan.

4.3.1 Alert and Notification System (ANS) Sirens

The ANS consists of a permanently installed outdoor notification system within the ten mile radius around the station. The ten mile radius around the station is primarily an agricultural area with a population density below 2000 persons per square mile.

The ANS as installed consists of mechanical and electronic sirens that will cover this entire area with a minimum sound level of 60 db. Additionally, the ANS will cover the heavily populated areas within the ten mile radius around the station with a minimum sound level of 70 db to ensure complete coverage.

4.3.2 Evacuation Time Estimates

The ETE study used population data from the 2010 census which includes parts of three counties in Illinois (Will, Kankakee and Grundy). The evacuation times are based on a detailed consideration of the EPZ roadway network and population distribution. The ETE Study, contained in EP-AA-1001 Addendum 2, Evacuation Time Estimates for the Braidwood Generating Station Plume Exposure Pathway Emergency Planning Zone, presents evacuation times for daytime and nighttime scenarios under various weather conditions for the evacuation of various areas around the Braidwood Station, once a decision has been made to evacuate.

4.4 Protective Actions for Onsite Personnel

Braidwood Station has a siren system to assemble personnel during emergency conditions. Upon hearing a continuous two (2) minute siren, all personnel not having emergency assignments have been instructed to assemble in predesignated assembly areas. Refer to Figure 4-2.

If a site evacuation of non-essential personnel is required by Section J of the Emergency Plan, personnel will be either relocated and monitored at the designated relocation centers or sent home if there is no release or radiological or safety concerns. The designated relocation centers for Braidwood Station are:

- Mazon Relocation Center, Mazon, Illinois
- Dresden Station, Morris, Illinois
- LaSalle County Nuclear Power Station, Marseilles, Illinois

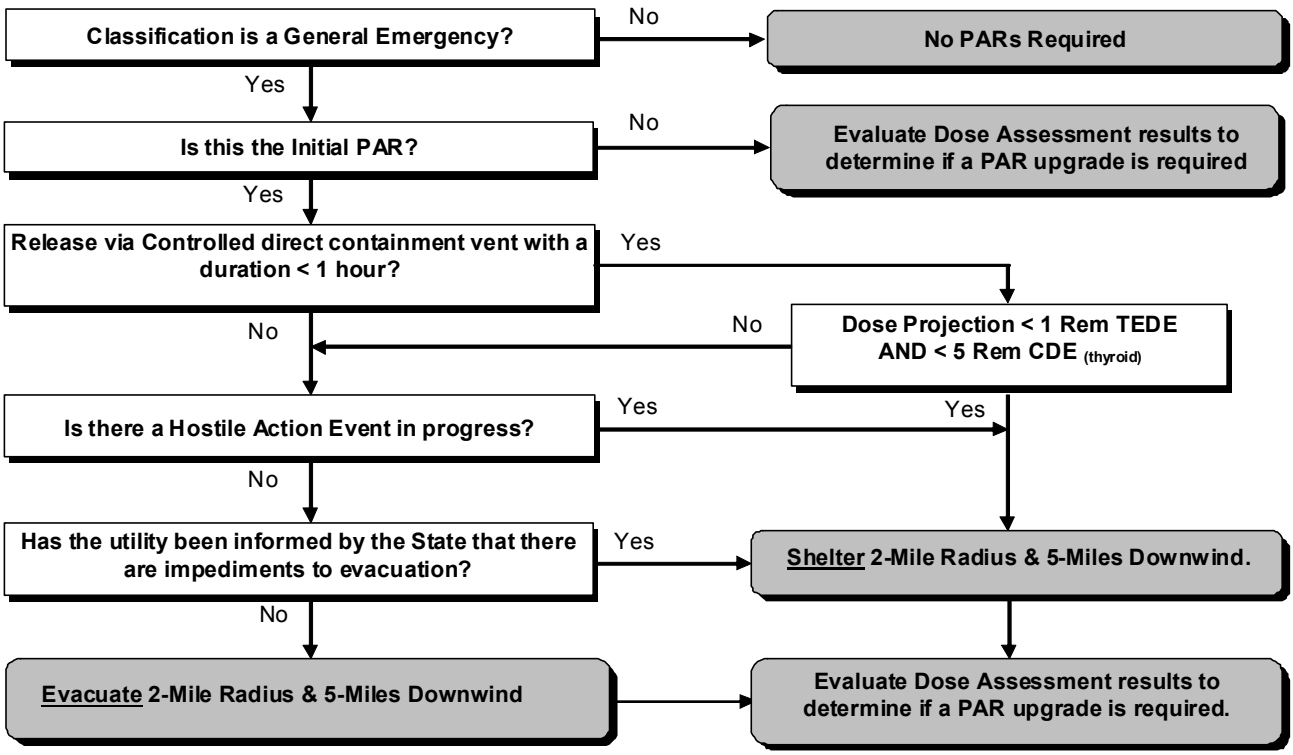
For evacuation routes, refer to EP-AA-113-F-17.

Traffic control for onsite areas will be accomplished by Station personnel, if necessary.

Equipment and personnel would be available at the Mazon Relocation Center, Dresden Station, and LaSalle Station for monitoring and decontamination of evacuated personnel. If major decontamination, follow-up or bioassay samples are necessary, those persons would be sent to Dresden or LaSalle Stations.

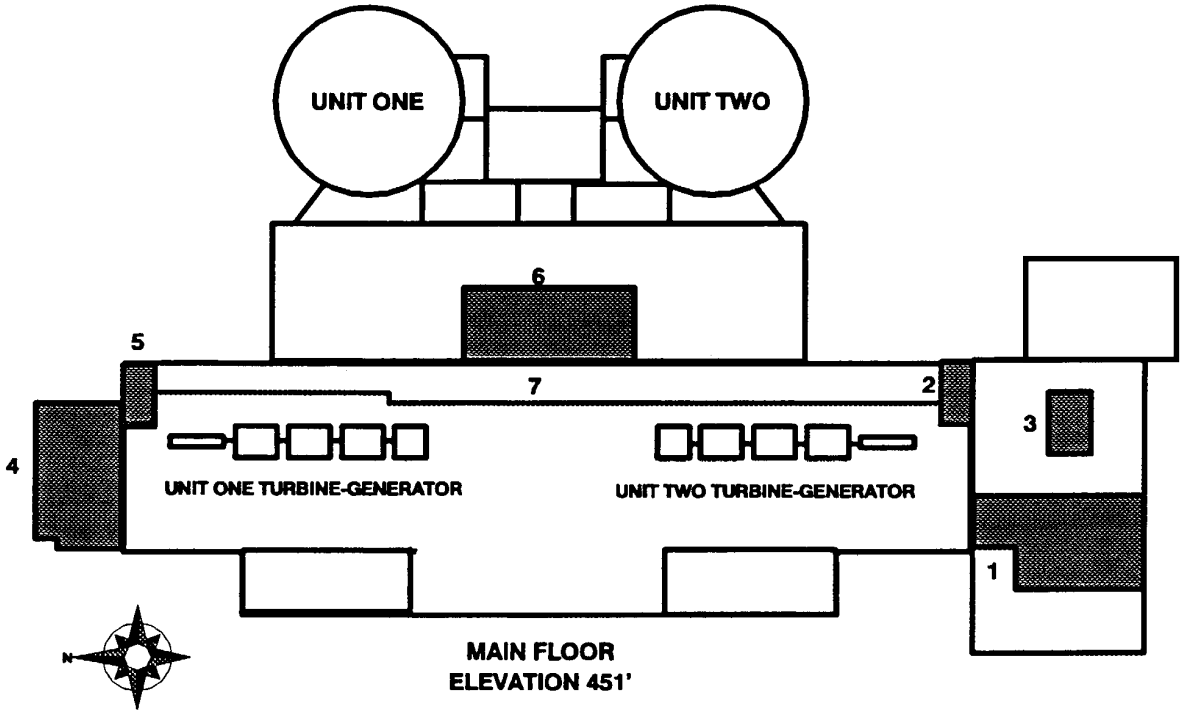
Other emergency measures are common to all nuclear stations and are thus discussed in the Emergency Plan.

Figure 4-1: Braidwood Station PAR Determination Flowchart



2 Mile Radius, 5 Miles Downwind			
WD (from)			Subareas
024º	to	043º	1, 10, 14
044º	to	059º	1, 10, 11, 14
060º	to	112º	1, 10, 11
113º	to	136º	1, 7, 10, 11
137º	to	153º	1, 7, 10
154º	to	179º	1, 2, 7, 10
180º	to	204º	1, 2, 10
205º	to	236º	1, 2, 3, 10
237º	to	289º	1, 3, 10
290º	to	329º	1, 3, 6, 10
330º	to	354º	1, 6, 10
355º	to	023º	1, 6, 10, 14

Figure 4-2: Braidwood Onsite Assembly Areas and Emergency Response Facilities



1. Maintenance Shop El. 401
2. Unit Two Turbine Bldg. Trackway El. 401
3. OSC El. 451 (Access)
4. TSC El. 451 (Access)
5. Unit One Turbine Bldg. Trackway El. 401
6. Control Room El. 451
7. Pathway to TSC

Section 5: Emergency Facilities and Equipment

5.1 Emergency Response Facilities

Refer to Figure 4-2 for the location of the Braidwood Station Control Room, Technical Support Center (TSC), and Operations Support Center (OSC) within the Station's Protected Area boundary.

5.1.1 Station Control Room

The Braidwood Station Control Room is the initial onsite center of emergency control and is located on the 451' elevation of the Auxiliary Building.

5.1.2 Technical Support Center (TSC)

Braidwood Station has designated a Technical Support Center which exists at the north end of the Turbine Building. The TSC fully meets the requirements of Section H.1.b of the Emergency Plan.

5.1.3 Operational Support Center (OSC)

Braidwood Station has designated a primary Operational Support Center. The Primary OSC is on 451' elevation of the Service Building. The OSC conforms to the requirements of Section H of the 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.

The backup OSC is the Shift Manager's office on 451' elevation of the Auxiliary Building.

5.1.4 Alternative Facility

The Alternative Facility maintains the capability for staging the TSC/OSC emergency response organization personnel in the event of a hostile action. This alternative facility has the capability for communications with the emergency operations facility, control room, and plant security. The Alternative Facility is located at 960 North Rt. 47 Morris, Illinois.

5.2 Assessment Resources

5.2.1 Onsite Meteorological Monitoring Instrumentation

A 320-foot meteorological tower has been erected on the site approximately 1880 feet northeast of the Braidwood U-1 reactor building, the major plant structure closest to the tower. Wind speed and wind direction are measured at 34 feet and 203 feet above grade level. Temperature is measured at 30 feet and temperature difference is determined between the 30-foot and 199-foot levels. A precipitation gauge is utilized to measure rain and snowfall at ground level near the base of the tower.

The onsite meteorological monitoring program is covered in the contract 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.

5.2.1.1 Instrumentation

The meteorological tower is instrumented with equipment that conforms with the recommendations of Regulatory Guide 1.23 and ANSI/ANS 2.5 (1984). The equipment is placed on booms oriented into the generally prevailing wind at the site.

Equipment signals are brought to an instrument shelter with controlled environmental conditions. The shelter at the base of the tower houses the recording equipment, signal conditions, etc. used to process and re-transmit the data to the end point users.

5.2.1.2 Meteorological Measurement Program During a Disaster

Cooperation between the corporate office and the meteorological contractor assures that a timely restoration of any outage can be made. Emergency field visits to the site are made as quickly as possible after detection of a failure.

Should a disaster of sufficient magnitude occur to destroy the tower structure, a contract is maintained to have a temporary tower erected within 72 hours, weather conditions permitting. Further, the meteorological contractor maintains two levels of sensors (wind speed, wind direction and temperature) in a state of readiness for use on the temporary tower.

Additionally, Exelon Nuclear's existing instrumented towers at other nuclear sites provide a high density measurement network with multiple backup opportunities.

Meteorological data are available to the station Control Room, Technical Support Center and Emergency Operations Facility for use in the Dose Assessment computer model for estimating the environmental impact of unplanned releases of radioactivity from the station.

5.2.2 Onsite Radiation Monitoring Equipment

The onsite radiation monitoring capability includes an installed process, effluent, and area radiation monitoring system; portable survey instrumentation; counting equipment for radiochemical analysis; and a personnel dosimetry program to record integrated exposure. Some onsite equipment is particularly valuable for accident situations and is described in the following subsections.

5.2.2.1 Radiation Monitoring System

Chapters 11 and 12 of the Braidwood UFSAR describe the radiation monitoring system (RMS) in detail. The installed RMS is designed to

continuously monitor the containment atmosphere, plant effluents, and various in-plant locations.

The system includes Control Room readouts and recorders for selected parameters that are monitored and an audible Control Room alarm when predetermined setpoints are exceeded. The system can be subdivided into process/effluent instrumentation and an area monitoring system.

- The process/effluent instrumentation consists of pumps, filter samplers, detectors, and associated electronics to determine noble gas, iodine, and particulate concentrations in plant cubicles or liquid and gaseous effluents. Several monitored effluent pathways have control functions that will terminate the release at a predetermined setpoint. These setpoints are premised on compliance with federal regulations.

- The area monitoring system provides information of existing radiation levels in various areas of the plant to ensure safe occupancy. It is equipped with Control Room and local readout and audible alarms to warn personnel of an increased radiation level.

5.2.2.2 Radiological Noble Gas Effluent Monitoring

Two General Atomic Company wide-range gas monitors (WRGMs) are installed on the auxiliary building vent stacks (final release points), one monitor per stack. The monitor has a range for radioactive gas concentration of 1×10^{-7} uCi/cc to 1×10^{5} uCi/cc. The monitor includes the following: two isokinetic nozzles, one for normal conditions operating at 2 ft3/min. and one for high range conditions operating at 0.06 ft3/min; sampling rack; sample conditioner to filter out large concentrations of radioiodine and particulates; and the wide-range gas detectors assembly, consisting of three radioactive gas detectors, a low-range detector, a mid-range detector, and a high-range detector. Each monitor system has a microprocessor which utilizes digital processing techniques to analyze data and control monitor functions. Control Room readouts include a RM-23 remote display module for all monitored parameters.

Two General Atomic Company detectors are provided for each of the four main steamlines upstream of the safety and relief valves. The range of the monitor is 10^{-1} mR/hr to 10^{4}mRem/hr. The monitors are mounted external to the main steamline piping and corrections made for the loss of low energy gammas.

5.2.2.3 Radioiodine and Particulate Effluent Monitoring

The General Atomic Company wide range gas monitor includes a sampling rack for collection of the auxiliary building vent stack particulate and radioiodine samples. Filter holders and valves are provided to allow grab sample collection for isotopic analyses in the station's counting

rooms. The sampling rack is shielded to minimize personnel exposure. The sampling media will be analyzed by a gamma ray spectrometer which utilizes a gamma spectrometer system. In addition, silver zeolite cartridges are available to further reduce the interference of noble gases.

5.2.2.4 High-Range Containment Radiation Monitors

Two high range containment radiation monitors are installed for each operating reactor. The monitors will detect and measure the radiation level within the reactor containment during and following an accident. The range of the monitors is 1 rad/hr to 10^7 Rads/hr.

5.2.2.5 In-plant Iodine Instrumentation

Effective monitoring of increasing iodine levels in buildings under accident conditions will include the use of portable instruments using silver zeolite as a sample media. Braidwood Station has a Post Accident Radionuclide Analysis Portable System (PARAPS) for analyzing samples that cannot be counted and analyzed in the normal Station counting room because of background problems. Auxiliary counting room locations have been identified within the Turbine Building. It is expected that a sample can be obtained, purged, and analyzed for iodine content within a two-hour time frame.

5.2.3 Onsite Process Monitors

An adequate monitoring capability exists to properly assess the plant status for all modes of operation and is described in the Braidwood UFSAR. The operability of the post-accident instrumentation ensures information is available on selected plant parameters to monitor and assess important variables following an accident. Instrumentation is available to monitor the parameters and ranges given in Technical Specifications.

Braidwood Station Emergency Operating Procedures assist personnel in recognizing inadequate core cooling using applicable instrumentation.

5.2.4 Onsite Fire Detection Instrumentation

The fire detection system is designed in accordance with applicable National Fire Protection Association (NFPA) Standards. The System is equipped with electrically supervised ionization smoke and heat detectors to quickly detect any fires and the instrumentation to provide local indication and Control Room annunciation. In addition to the smoke and heat detection systems, each fire protection carbon dioxide, halon, or water system is instrumented to inform the Control Room of its actuation or of system trouble.

In the event that a portion of the fire detection instrumentation is inoperable, fire watches in affected areas may be required.

5.2.5 Facilities and Equipment for Offsite Monitoring

Consult Chapter 11 of the station specific Offsite Dose Calculation Manual (ODCM) for the most current location for fixed continuous air samplers and DLR locations.

Braidwood Station maintains a supply of emergency equipment and supplies for offsite monitoring and sampling. These supplies meet the initial requirements of two (2) environmental field teams. During subsequent phases of an emergency, additional equipment is available from other Exelon Nuclear facilities, vendors and the Corporate Emergency Response Organization.

5.2.6 Site Hydrological Characteristics

The hydrological characteristics of the Braidwood Station vicinity are described in Section 2.4 of the Braidwood UFSAR. The river screen house is the only structure that could be affected by flooding on the Kankakee River. The controlling event for flooding at the site is the probable maximum flood for the cooling pond, resulting in a short-term maximum water surface elevation of 600.6 ft in the immediate plant area.

Although the plant grade elevation is 600 ft, the safety related facilities are situated at elevation 601 ft; 0.4 ft above the estimated maximum water surface elevation.

Low flows in the Kankakee River cannot affect safety related facilities of the plant. In the unlikely event that emergency make-up water requirements cannot be satisfied by surface water withdrawals from the Kankakee River, the Cooling Lake will operate under a closed cycle system. Emergency shut down water is available from the Cooling Lake. Because of the site hydrological characteristics given above, plant operation should not be affected by Kankakee River water level conditions and therefore, hydrological monitors have not been installed.

The Kankakee River was not used for any public water supply within 50 miles downstream of this site prior to 1990. In January, 1990, the City of Wilmington, Illinois began withdrawing water, four miles downstream on the west bed of the Kankakee River. Provisions have been established for weekly samples to be collected and computed for monthly analysis. The City of Joliet, Illinois has submitted a plan to also use the Kankakee River to supply public water. Upon completion of the facility, provisions will be made for weekly sample collection and analysis. In performing dose calculations from liquid releases, the liquid release model has been revised to reflect the change of parameters due to the new public water intake.

5.3 Protective Facilities and Equipment

The principal onsite assembly areas for Braidwood Station are the Machine Shop on the 401-foot elevation of the Service Building and the Turbine Building trackways. These areas are suitable because:

1) They are large open areas suitable for assembling a large number of people in a short time;

2) They can be easily exited if a site evacuation is deemed necessary following an assembly; and

3) They have a low probability of being affected by a serious accident involving the Reactor or primary systems.

The offsite relocation centers for Braidwood Station are discussed in Section 4 of this annex. Both locations are suitable, depending on the emergency condition, with personnel, supplies and communications readily available.

5.4 First Aid and Medical Facilities

Braidwood Station has an inplant first aid/decontamination room on the 426 foot elevation of the auxiliary building near the station laboratory complex. This room is provided with a sink, a shower, and a supply cabinet.

First aid kits, stretchers, sinks, eyewashes and emergency showers have been placed in strategic locations throughout the station.

Medical treatment given to injured persons at the station is of a "first aid" nature. When more professional care is needed, injured persons are transported to a local hospital or clinic. Provena St. Joseph Medical Center in Joliet, Illinois is the designated support hospital for handling contaminated injured personnel. Morris Hospital in Morris, IL is the backup medical facility for evaluation and treatment of persons suffering from traumatic injury, medical illness, or radiation exposure and uptake.

Appendix 1: NUREG-0654 Cross-Reference

Annex Section	NUREG-0654
1.0	Part I, Section A
1.1	Part I, Section C
1.2	Part I, Section D
Figure 1-1	Part I, Section D
2.0	Part II, Section A.4
2.1	Part II, Section A.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.m
4.3.1	Part II, Section E.6
4.3.2	Part II, Section J.8
4.4	Part II, Section J.1-5
Figure 4-1	Part II, Section J.10.m
Figure 4-2	Part II, Section J.5
4.4	Part II, Section J.2 & 3
Table 4-1	Part II, Section J.8
Table 4-2	Part II, Section J.10.b
5.1	Part II, Section H.1 & G.3
5.2.1	Part II, Section H.5.a & 8
5.2.2	Part II, Section H.5.b & 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
5.2.6	Part II, Section H.5.a & 6.a
5.3	Part II, Section J.1-5
5.4	Part II, Section L.1 & 2

Appendix 2: Station Letters of Agreement

1. Will County Sheriff – law enforcement.
2. Braidwood Fire Department – fire suppression support.
3. St. Joseph's Hospital – medical support and treatment.
4. Morris Hospital – backup medical support and treatment.

ATTACHMENT 4

EP-AA-1002, Revision 32

Exelon Nuclear Radiological Emergency Plan Annex for Byron Station

EXELON NUCLEAR

RADIOLOGICAL EMERGENCY PLAN ANNEX FOR BYRON STATION

Page Intentionally left Blank

Table of Contents

REVISION HISTORY

Revision 1; September 1984	Revision 12, July 8, 2002	
Revision 2; May 1986	Revision 13, October 4, 2002	
Revision 3; June 1987	Revision 14, November 15, 2002	
Revision 3b; May 1988	Revision 15, May 12, 2003	
Revision 3c; May 1989	Revision 16, December 2004	
Revision 3d; September 1989	Revision 17, January 2006	
Revision 4; January 1991	Revision 18, March 2006	
Revision 4a; April 1992	Revision 19, September 2006	
Revision 4b; November 1992	Revision 20, May 2007	
Revision 4c; February 1993	Revision 21, October 2007	
Revision 4d; December 1993	Revision 22, March 2008	
Revision 4e; January 1993	Revision 23, December 2008	
Revision 4f; November 1994	Revision 24, April 2009	
Revision 4h; November 1995	Revision 25, March 2010	
Revision 4i; December 1995	Revision 26, May 2010	
Revision 4k; June 1996	Revision 27, November 2010	
Revision 4l; February 1997	Revision 28, March 2011	
Revision 4m: January 5, 1998	Revision 29, May 2012	
Revision 4n: August 14, 1998	Revision 30, November 2012	
Revision 4p: October 16, 1998	Revision 31, December 2012	
Revision 5: May 13, 1999	Revision 32, June 2013	
Revision 6: June 23, 1999		
Revision 7: January 8, 2001		
Revision 8: October 8, 2001		
Revision 9, October 31, 2001		
Revision 10, November 1, 2001		
Revision 11, January 3, 2002		

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 Emergency Plan (E-Plan), Station Annexes, emergency plan implementing procedures, and associated program administrative documents. The Exelon E-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 E-Plan.

This document serves as the Byron Station Emergency Plan Annex and contains information and guidance that is unique to the station. This includes Emergency Action Levels (EALs), and facility geography 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 Emergency Plan.

1.1 Facility Description

The Byron Station, Units 1 and 2, are located in Northern Illinois, approximately 3.7 miles south-southwest of the City of Byron in Ogle County. This site is situated near the center of the county in a predominantly agricultural area. At its closest approach, the Rock River is approximately 1.5 miles west of the western site boundary and 2.2 miles west-southwest of the actual plant location. Byron Station occupies approximately 1288 acres of land. The station site is somewhat rectangular in shape, with the plant structures occupying the southeast portion of the site.

Figure 1-1 shows the general location of Byron Station. More specific information on station siting may be found in the Updated Final Safety Analysis Report (UFSAR).

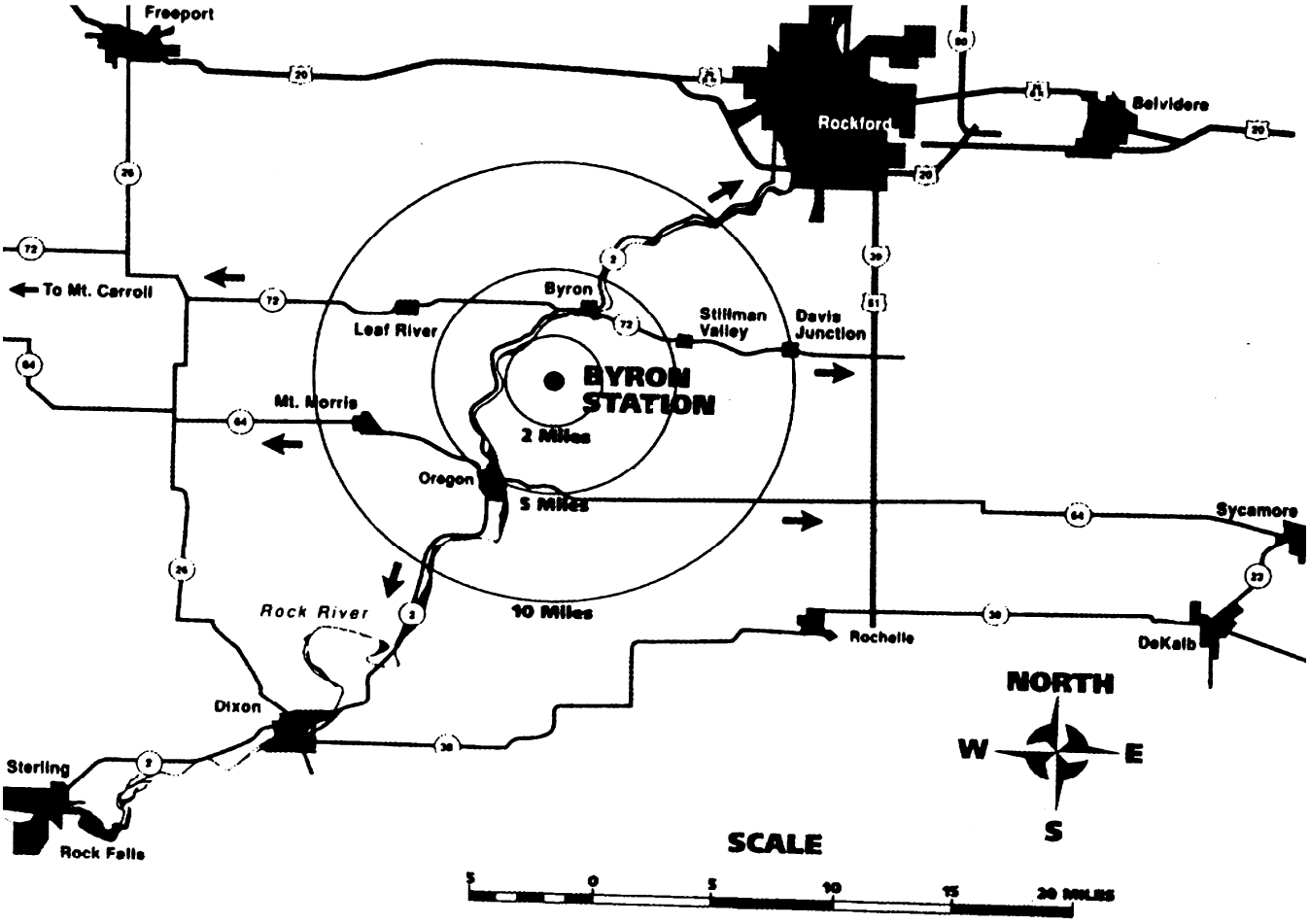
The plant consists of two identical pressurized water reactor (PWR) nuclear steam supply systems (NSSS) and turbine generators furnished by Westinghouse Electric Corporation. Each nuclear steam supply system is designed for a power output of 3586.6 MWt. Cooling for the plant is provided by two natural draft cooling towers for nonessential service cooling water and by mechanical draft cooling towers for essential service cooling water.

1.2 Emergency Planning Zone

The plume exposure Emergency Planning Zone (EPZ) for Byron Station is an area surrounding the station with a radius of about ten miles. (Exact boundaries are determined by the State of Illinois). Refer to Figure 1-1.

The ingestion pathway EPZ for Byron Station is an area surrounding the station with a radius of about 50 miles.

Figure 1-1: Byron Station Location and 10 Mile EPZ



Section 2: Organizational Control of Emergencies

This section describes the Emergency Response Organization (ERO) and its key positions. It outlines the staffing requirements which provide initial emergency response actions and provisions for timely augmentation of on-shift personnel when required. It also describes interfaces among Exelon Nuclear emergency response personnel and specifies the offsite support available to respond to the nuclear generating stations.

2.1 Shift Organization Staffing

Initial response to any emergency is by the normal plant organization present at the site. This organization includes positions that are onsite 24 hours per day and is described in Section B.1 of the Exelon Nuclear Standardized Radiological Emergency Plan. The Normal Shift Organization will be augmented, in an emergency, with designated/additional Emergency Response Organization (ERO) personnel within 60 minutes of notification as specified under Table 2-1. ERO activation is described in Section H.4 of the Exelon Nuclear Standardized Radiological Emergency Plan.

Table 2-1 outlines ERO positions required to meet minimum staffing and full augmentation of the on-shift complement at an Alert or higher classification, and the major tasks assigned to each position. Responsibilities for each position are described in Section B.5 of the Exelon Nuclear Standardized Radiological Emergency Plan.

2.2 Emergency Response Organization Block Diagram

Figures B-1a through B-1d of the Exelon Nuclear Standardized Radiological Emergency Plan illustrates the overall emergency response organization.

2.3 Non-Exelon Nuclear Support Groups

Exelon Nuclear has contractual agreements with several companies whose services would be available in the event of a radiological emergency. These agencies and their available services are listed in Appendix 3 of the Exelon Nuclear Standardized Emergency Plan.

Emergency response coordination with governmental agencies and other support organizations is discussed in Section A of the Exelon Nuclear Standardized Emergency Plan.

Agreements exist on file at Byron Station with several support agencies. These agencies and their support roles are listed in Appendix 2, Station Letters of Agreement.

Table 2-1: Minimum Staffing Requirements for the Exelon ERO

Functional Area	Major Tasks	Emergency Positions	Minimum Shift Size	Minimum Staffing *60 Minute Augmentation	Minimum Staffing Other On-Call	Minimum Staffing Full Augmentation
1. Plant Operations/Safe Shutdown and Assessment of Operational Aspects	Control Room Staff	Shift Manager	1			
		Shift Supervisor	1			
		Nuclear Station Operator	3			
		Non-Licensed Operator	4			
2. Emergency Direction and Control	Command and Control	Shift Emergency Director (CR)	1[(a)]			
		Station Emergency Director (TSC)		1		
		Corporate Emergency Director (EOF)		1		
3. Notification & Communication	Emergency Communications	Plant Shift Personnel	1			
		TSC Director (TSC)		1		
		EOF Director (EOF)		1		
		State/Local Communicator		1 (EOF)		1 (TSC)
		ENS Communicator		1 (TSC)		1 (EOF)
		HPN Communicator		1 (EOF)		1 (TSC)
	Plant Status	OPs Communicator (CR/TSC)				2
		Operations Advisor (EOF)				1
	In-Plant Team Control	Damage Control Comm. (CR/TSC/OSC)				3
	Technical Activities	Technical Communicator (TSC)				1
		Technical Advisor (EOF)				1
	Governmental	State Environs Communicator (EOF)				(b)
		EOC Communicator (EOF)				1
		State EOC Liaison (State EOC)				(b)
		County EOC Liaison (County EOC)				(b)
		Regulatory Liaison (EOF)				1
4. Radiological Assessment	Offsite Dose Assessment	RP Personnel	1			
		Dose Assessment Coordinator (EOF)		1		
		Dose Assessor (EOF)				1
		Radiation Controls Coordinator (TSC)				1
	Offsite Surveys	Environmental Coordinator (EOF)		1		
		Field Team Communicator (EOF)				1
		Offsite Field Team Personnel		4		(b)
	Onsite Surveys	Onsite Field Team Personnel		2		(b)
	In-plant Surveys	RP Personnel	1	2		(b)
	Chemistry	Chemistry Personnel	1	1		(b)
	RP Supervisory	Radiation Protection Manager(TSC/EOF)		2		

Functional Area	Major Tasks	Emergency Positions	Minimum Shift Size	Minimum Staffing *60 Minute Augmentation	Minimum Staffing Other On-Call	Full Augmentation
5. Plant System Engineering, Repair, and Corrective Actions	Technical Support	STA / Incident Assessor (CR)	1			
		Technical Manager (TSC)		1		
		Core Thermal/Hydraulic Engineer (TSC)		1		
		Mechanical Engineer (TSC)		1		
		Electrical Engineer (TSC)		1		
		SAMG Decision-Maker (TSC)		1[(a)]		
		SAMG Evaluator (TSC)		2[(a)]		
		Operations Manager (TSC)		1		
		Radiation Controls Engineer (TSC)				1
		Technical Support Manager (EOF)				1
	Repair and Corrective Actions	Mechanical Maintenance (OSC)	1[(a)]	2		(b)
		Electrical/I&C Maintenance (OSC)	1[(a)]	3		(b)
		Maintenance Manager (TSC)		1		
		OSC Director (OSC)		1		
		Assistant OSC Director (OSC)				1
		OPs Lead & Support Personnel (OSC)				(b)
6. In-Plant Protective Actions	Radiation Protection	RP Personnel	2[(a)]	4		(b)
7. Fire Fighting	--	Fire Brigade[(c)]	5			
8. 1st Aid and Rescue Operations	--	Plant Personnel	2[(a)]			(b)
9. Site Access Control and Personnel Accountability	Security & Accountability	Security Team Personnel	(d)	(d)		
		Security Coordinator (TSC)				1
	EOF Security	Security Coordinator (EOF)				1
10. Resource Allocation and Administration	Logistics	Logistics Manager (EOF)		1		
		Logistics Coordinator (TSC)				1
	Administration	Administrative Coordinator (EOF)				1
		Clerical Staff (TSC/EOF/JIC)				(b)
	Inter Facility Logs	Events Recorder (EOF/JIC)				2
	Facility Support	Computer Specialist (EOF)				1

Functional Area	Major Tasks	Emergency Positions		Minimum Shift Size	Minimum Staffing *60 Minute Augmentation	Minimum Staffing Other On-Call	Full Augmentation
11. Public Information	Media Interface	Corporate Spokesperson	(JIC)			1	
		Rad Protection Spokesperson	(JIC)				1
		Technical Spokesperson	(JIC)				1
	Information Development	Public Information Director				1	
		News Writer					1
	Media Monitoring and Rumor Control	Media Monitoring Staff					(b)
		Rumor Control Staff					(b)
	Facility Operation and Control	JIC Director	(JIC)			1	
		JIC Coordinator	(JIC)				1
		Administrative Coordinator	(JIC)				1
		Access Controls	(JIC)				1
		Facility Support Staff	(JIC)				(b)
		TOTAL:		**19**	**37**	**3**	**32[(b)]**

* Response time is based on optimum travel conditions.

(a) May be provided by personnel assigned other functions.

(b) Personnel numbers depend on the type and extent of the emergency.

(c) Fire Brigade per FSAR/Technical Specifications, as applicable.

(d) Function performed by on-shift security personnel.

Section 3: Classification of Emergencies

3.1 General

Section D of the Exelon Nuclear Standardized Emergency Plan divides the types of emergencies into four Emergency Classification Levels (ECLs). The first four are the UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY, and GENERAL EMERGENCY. These ECLs are entered by meeting the Emergency Action Level (EAL) Threshold Values provided in this section of the Annex. The ECLs are escalated from least severe to most severe according to relative threat to the health and safety of the public and emergency workers. Depending on the severity of an event, prior to returning to a standard day-to-day organization, a state or phase called RECOVERY may be entered to provide dedicated resources and organization in support of restoration and communication activities following the termination of the emergency.

UNUSUAL EVENT: Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

ALERT: Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

SITE AREA EMERGENCY: Events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

GENERAL EMERGENCY: Events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

RECOVERY: Recovery can be considered as a phase of the emergency and is entered by meeting emergency termination criteria provided in EP-AA-111 Emergency Classification and Protective Action Recommendations.

An emergency is classified by assessing plant conditions and comparing abnormal conditions to Initiating Conditions and Threshold Values for each Emergency Action Level.

Individuals responsible for the classification of events will refer to the Initiating Condition and Threshold Values on the matrix of the appropriate station Standardized Emergency Plan Annex (this document). This matrix will contain Initiating Conditions, EAL Threshold Values, Mode Applicability Designators, appropriate EAL numbering system, and additional guidance necessary to classify events. It may be provided as a user aid.

The matrix is set up in six Recognition Categories. The first is designated as "R" and relates to Abnormal Radiological Conditions / Abnormal Radiological Effluent Releases. The second is designated as "F" and relates to Fission Product Barrier Degradation. The third is designated as "M" and relates to hot condition System Malfunctions. The fourth is designated as "C" and relates to Cold Shutdown / Refueling System Malfunctions. The fifth is designated as "H" and relates to Hazards and Other Conditions. The sixth is designated "E-H" and relates to ISFSI Malfunctions.

The 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.

The Initiating Conditions are coded with a two letter and one number code. The first letter is the Recognition Category designator, the second letter is the Classification Level, “U” for (NOTIFICATION OF) UNUSUAL EVENT, “A” for ALERT, “S” for SITE AREA EMERGENCY and “G” for GENERAL EMERGENCY. The EAL number is a sequential number for that Recognition Category series. All Initiating Conditions that are describing the severity of a common condition (series) will have the same number.

The EAL number may then be used to reference a corresponding page(s), which provides the basis information pertaining to the Initiating Condition:

- Threshold Value
- Mode Applicability
- Basis

Emergency Action Levels are the measurable, observable detailed conditions that must be met in order to classify the event. Classification is not to be made without referencing, comparing and satisfying the Threshold Values specified in the Emergency Action Levels.

A list of definitions is provided as part of this document for terms having specific meaning to the Emergency Action Levels. Site specific definitions are provided for terms with the intent to be used for a particular Initiating Condition/Threshold Value and may not be applicable to other uses of that term at other sites, the Emergency Plan or procedures.

References are also included to documents that were used to develop the EAL Threshold Values.

References to the Emergency Director means the person in Command and Control as defined in the Emergency Plan. Classification of emergencies is a non-delegable responsibility of Command and Control for the onsite facilities with responsibility assigned to the Shift Emergency Director (Control Room Shift Manager) or the Station Emergency Director (TSC). Classification of emergencies remains the responsibility of the applicable onsite facility even after Command and Control is transferred to the Corporate Emergency Director (EOF).

3.2 Classification, Instrumentation and Transient Events

Although the majority of the EALs provide very specific thresholds, the Emergency Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL is IMMINENT. If, in the judgment of the Emergency Director, an IMMINENT situation is at hand, the classification should be made as if the threshold has been exceeded. While this is particularly prudent at the higher emergency classification levels (as the early classification may provide for more effective implementation of protective measures), it is nonetheless applicable to all emergency classification levels.

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 indications, or (3) by direct observation by plant personnel, such that doubt related to the indication's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

Indications used for monitoring and evaluation of plant conditions include the normally used instrumentation, backup or redundant instrumentation, and the use of other parameters that provide information that supports determination if an EAL threshold value has been reached. When an EAL refers to a specific instrument or indication that is determined to be inaccurate or unavailable, then alternate indications shall be used to monitor the specified condition.

During an event that results in changing parameters trending towards an EAL classification, and instrumentation that was available to monitor this parameter becomes unavailable or the parameter goes off scale, the parameter should be assumed to have been exceeded consistent with the trend and the classification made if there are no other direct or indirect means available to determine if the threshold has not been exceeded.

Planned evolutions involve preplanning to address the limitations imposed by the condition, the performance of required surveillance testing, and the implementation of specific controls prior to knowingly entering the condition in accordance with the specific requirements of the site's Technical Specifications. Activities which cause the site to operate beyond that allowed by the site's Technical Specifications, planned or unplanned, may result in an EAL threshold being met or exceeded. Planned evolutions to test, manipulate, repair, perform maintenance or modifications to systems and equipment that result in an EAL value being met or exceeded are not subject to classification and activation requirements as long as the evolution proceeds as planned and is within the operational limitations imposed by the specific operating license. However, these conditions may be subject to the reporting requirements of 10 CFR 50.72.

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.

Concerning Classification Downgrading Exelon Nuclear policy is that emergency classifications shall not be downgraded to a lower classification. Once declared, the event shall remain in effect until no Classification is warranted or until such time as conditions warrant classification to Recovery.

There may be cases in which a plant condition that exceeded an EAL was not recognized at the time of occurrence but is identified well after the condition has occurred (e.g., as a result of routine log or record review), and the condition no longer exists. In these cases, an emergency should not be declared. Reporting requirements of 10 CFR 50.72 are applicable, the guidance of NUREG-1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73 and the Reportability Reference Manual, should be applied.

3.3 Mode Applicability

The plant-operating mode that existed at the time that the event occurred, prior to any protective system or operator action initiated in response to the condition, is compared to the mode applicability of the EALs. If an event occurs, and a lower or higher plant-operating mode is reached before the emergency classification can be made, the declaration shall be based on the mode that existed at the time the event occurred.

For events that occur in Cold Shutdown or Refueling, escalation is via EALs that have Cold Shutdown or Refueling for mode applicability, even if Hot Shutdown (or a higher mode) is entered during any subsequent heat-up. In particular, the Fission Product Barrier Matrix EALs are applicable only to events that initiate in Hot Shutdown or higher.

If there is a change in Mode following an event declaration, any subsequent events involving EALs outside of the current declaration escalation path will be evaluated on the Mode of the plant at the time the subsequent events occur.

3.4 Emergency Director Judgment

Emergency Director Judgment EALs are provided in the Hazards and Other Condition Affecting Plant Safety section and on the Fission Product Barrier Matrix. Both of the Emergency Director Judgment EALs have specific criteria for when they should be applied.

The Hazards Section Emergency Director Judgment EALs are intended to address unanticipated conditions which are not addressed explicitly by other EALs but warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under specific emergency classifications (UE, Alert, SAE or GE).

The FPB Matrix ED Judgment EALs are intended to include unanticipated conditions, which are not addressed explicitly by any of the other FPB threshold values, but warrant determination because conditions exist that fall under the broader definition for a significant Loss or Potential Loss of the barrier (equal to or greater than the defined FPB threshold values).

3.5 Fission Product Barrier Restoration

Fission Product Barriers (FPBs) are not treated the same as EAL threshold values. Conditions warranting declaration of the loss or potential loss of a Fission Product Barrier may occur resulting in a specific classification. The condition that caused the loss or potential loss declaration could be rectified as the result of Operator action, automatic actions, or designed plant response. Barriers will be considered re-established when there are direct verifiable indications (containment penetration or open valve has been isolated, coolant sample results, etc) that the barrier has been restored and is capable of mitigating future events.

The reestablishment of a fission product barrier does not alter or lower the existing classification. Entry into Termination/Recovery phase is still required for exiting the present classification. However the reestablishment of the barrier should be considered in determining future classifications should plant conditions or events change.

3.6 Definitions

AFFECTING SAFE SHUTDOWN: Event in progress has adversely affected functions that are necessary to bring the plant to and maintain it in the applicable HOT or COLD SHUTDOWN condition. Plant condition applicability is determined by Technical Specification LCOs in effect.

Example 1: Event causes damage that results in entry into an LCO that requires the plant to be placed in HOT SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is not “AFFECTING SAFE SHUTDOWN.”

Example 2: Event causes damage that results in entry into an LCO that requires the plant to be placed in COLD SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is “AFFECTING SAFE SHUTDOWN.”

BOMB: An explosive device suspected of having sufficient force to damage plant systems or structures.

CIVIL DISTURBANCE: A group of persons violently protesting station operations or activities at the site.

CONFINEMENT BOUNDARY: The barrier(s) between areas containing radioactive substances and the environment.

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

EXTORTION: An attempt to cause an action at the station by threat of force.

FAULTED: In a steam generator, the existence of secondary side leakage that results in an uncontrolled drop in steam generator pressure or the steam generator being completely depressurized.

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fire. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTILE FORCE: One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

INTRUSION: A person(s) present in a specified area without authorization. Discovery of a BOMB in a specified area is indication of INTRUSION into that area by a HOSTILE FORCE.

INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI): A complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage.

NORMAL LEVELS: Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

NORMAL PLANT OPERATIONS: Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

OPERATING MODES:

(1) Power Operations:	Reactor Power > 5%, Keff ≥0.99
(2) Startup:	Reactor Power ≤ 5%, Keff ≥ 0.99
(3) Hot Standby:	RCS ≥ 350° F, Keff < 0.99
(4) Hot Shutdown:	200° F < RCS < 350° F, Keff < 0.99
(5) Cold Shutdown:	RCS ≤ 200° F, Keff < 0.99
(6) Refueling:	One or more vessel head closure bolts less than fully tensioned.
(D) Defueled:	All reactor fuel removed from reactor pressure vessel (full core off load during refueling or extended outage).

Hot Matrix – applies in modes (1), (2), (3), and (4)

Cold Matrix – applies in modes (5), (6), and (D)

OWNER CONTROLLED AREA (OCA): The property associated with the station and owned by the company. Access is normally limited to persons entering for official business.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

RUPTURED: In a steam generator, existence of primary-to-secondary leakage of a magnitude sufficient to require or cause a reactor trip and safety injection.

SABOTAGE: A deliberate damage, mis-alignment, or mis-operation of plant equipment with the intent to render the equipment inoperable. Equipment found tampered with or damaged due to malicious mischief may NOT meet the definition of SABOTAGE until this determination is made by security supervision.

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) automatic turbine runback > 25% thermal reactor power, (2) electrical load rejection > 25% full electrical load, (3) Reactor Trip, (4) Safety Injection Actuation, or (5) thermal power oscillations > 10%.

STRIKE ACTION: A work stoppage within the PROTECTED AREA by a body of workers to enforce compliance with demands made on management. The STRIKE ACTION must threaten to interrupt NORMAL PLANT OPERATIONS.

UNISOLABLE: A breach or leak that cannot be promptly isolated.

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concerns regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

Emergency Action Level Technical Basis Page Index

General		Site Area		Alert		Unusual Event	
EAL	**Pg.**	**EAL**	**Pg.**	**EAL**	**Pg.**	**EAL**	**Pg.**
RG1	3-29	RS1	3-32	RA1	3-35	RU1	3-38
				RA2	3-41	RU2	3-43
				RA3	3-46	RU3	3-47
FG1	3-48	FS1	3-49	FA1	3-50	FU1	3-51

Fuel Clad		RCS		Containment	
FC1	3-52	RC1	3-58	CT1	3-64
FC2	3-53				
				CT3	3-65
FC4	3-54			CT4	3-67
FC5	3-55	RC5	3-59		
		RC6	3-61	CT6	3-69
				CT7	3-71
FC8	3-56	RC8	3-62	CT8	3-73
FC9	3-57	RC9	3-63	CT9	3-74

MG1	3-75	MS1	3-77	MA1	3-79	MU1	3-81
MG2	3-82	MS2	3-83	MA2	3-84	MU2	3-85
		MS3	3-86				
		MS4	3-87	MA4	3-90	MU4	3-93
						MU5	3-95
						MU6	3-96
						MU7	3-97
				CA1	3-98	CU1	3-100
						CU2	3-102
						CU3	3-103
						CU4	3-104
				CA5	3-105	CU5	3-108
CG6	3-110	CS6	3-113	CA6	3-116	CU6	3-118
						CU7	3-119
HG1	3-122	HS1	3-124	HA1	3-126	HU1	3-128
		HS2	3-131	HA2	3-132		
				HA3	3-133	HU3	3-135
				HA4	3-138	HU4	3-142
				HA5	3-145	HU5	3-148
HG6	3-150	HS6	3-151	HA6	3-152	HU6	3-153
						E-HU1	3-154

Abnormal Rad Levels / Radiological Effluent

Radiological Effluents

GENERAL EMERGENCY

RG1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 5 6 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 9.99 E+09 uCi/sec** for **≥ 15 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 1000 mRem TEDE**
      OR
   b. **> 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**.
      OR
   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

SITE AREA EMERGENCY

RS1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 5 6 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 9.99 E+08 uCi/sec** for **≥ 15 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 100 mRem TEDE**
      OR
   b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.
      OR
   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

ALERT

RA1 Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer. 1 2 3 4 5 6 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **200 times alarm setpoint** established by a current radioactivity discharge permit for ≥ **15 minutes**.
   - 0PR001, Liquid Radwaste Effluent Monitor
   - 0PR002, Gas Decay Tank Effluent Monitor
   - 0PR010, Station Blowdown Monitor
   - 1/2 PR001, Containment Purge Effluent Monitor
   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 1.14 E+08 uCi/sec** for **≥ 15 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of ≥ **15 minutes**.

UNUSUAL EVENT

RU1 Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer. 1 2 3 4 5 6 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **2 times alarm setpoint** established by a current radioactivity discharge permit for ≥ **60 minutes**.
   - 0PR001, Liquid Radwaste Effluent Monitor
   - 0PR002, Gas Decay Tank Effluent Monitor
   - 0PR010, Station Blowdown Monitor
   - 1/2 PR001, Containment Purge Effluent Monitor
   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 1.14 E+06 uCi/sec** for **≥ 60 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of ≥ **60 minutes**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Abnormal Rad Levels / Radiological Effluent				
Abnormal Rad Levels		**Table R1** **Fuel Handling Incident Radiation Monitors** • Fuel Building Fuel Handling Incident Monitor 0RE-AR055 • Fuel Building Fuel Handling Incident Monitor 0RE-AR056 • Containment Fuel Handling Incident Monitor 1/2 RE-AR011 • Containment Fuel Handling Incident Monitor 1/2 RE-AR012	**RA2** Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. VALID reading **> 1000 mR/hr** on any Table R1 Radiation Monitor due to **EITHER**: • Damaged irradiated fuel. **OR** • Water level drop. **OR** 2. Water level drop in the Reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal that will result in irradiated fuel becoming uncovered.	**RU2** UNPLANNED rise in plant radiation levels. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by: • Refueling Cavity water level **< 23 ft**. above the Reactor Flange (**423 ft**. indicated level). **OR** • Spent Fuel Pool water level **< 23 ft**. above the fuel (**422 ft. 9 in**. indicated level). **OR** • Report of visual observation of a drop in water level in the Fuel Transfer Canal, Refueling Cavity, or Spent Fuel Pool. **AND** b. VALID Area Radiation Monitor reading rise on one or more radiation monitor in Table R1. **OR** 2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.
		Table R2 **Areas Requiring Continuous Occupancy** • Main Control Room - 1/2RE-AR010 • Central Alarm Station - (by survey)	**RA3** Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. 1 2 3 4 5 6 D **EAL Threshold Values:** Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R2) to maintain plant safety functions.	**RU3** Fuel Clad Degradation. 1 2 3 4 **EAL Threshold Values:** Fuel clad degradation resulting in: • Gross Failed Fuel Monitor 1/2RE-PR006 indicating I-135 concentration **> 5 uCi/cc.** **OR** • Dose Equivalent I-131 specific coolant activity **> 60.0 uCi/gm**. **OR** • Dose Equivalent XE-133 specific coolant activity **> 603.0 uCi/gm**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

Fission Product Barrier Matrix — Hot Matrix

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
FG1 Loss of ANY Two Barriers AND Loss or Potential Loss of third barrier. 1 2 3 4	**FS1** Loss or Potential Loss of ANY two barriers. 1 2 3 4	**FA1** ANY Loss or ANY Potential Loss of either Fuel Clad or RCS. 1 2 3 4	**FU1** ANY Loss or ANY Potential Loss of Containment. 1 2 3 4

Sub-Category	FC - Fuel Clad		RC – Reactor Coolant System		CT - Containment	
	Loss	**Potential Loss**	**Loss**	**Potential Loss**	**Loss**	**Potential Loss**
1. CSF Status	1. **Core Cooling CSF - RED Path** conditions exist.	2. **Core Cooling CSF - ORANGE Path** conditions exist. **OR** 3. **Heat Sink CSF - RED Path** conditions exist.	None	1. **RCS Integrity CSF - RED Path** conditions exist. **OR** 2. **Heat Sink CSF - RED Path** conditions exist.	None	**Containment CSF - RED Path** conditions exist.
2. RCS Activity	Coolant activity **> 300 uCi/gm** Dose Equivalent I-131.	None	None	None	None	None
3. Containment Pressure	None	None	None	None	1. Rapid unexplained drop in Containment pressure following initial pressure rise. **OR** 2. Containment pressure or water level response **not** consistent with LOCA conditions.	3. Containment pressure **≥ 50 psig** and rising. **OR** 4. Hydrogen concentration in Containment **≥ 5%.** **OR** 5. a. Containment pressure **≥ 20 psig.** **AND** b. Less than one train of Containment Spray operating.
4. CETC Reading	1. Average of the ten highest reading core exit thermocouples (CETCs) is **≥ 1200° F**.	2. Average of the ten highest reading core exit thermocouples (CETCs) is **≥ 700° F**.	None	None	None	1. a. Average of the ten highest reading core exit thermocouples (CETCs) is **≥ 1200° F**. **AND** b. Functional Restoration procedures **not** effective in **< 15 minutes**. **OR** 2. a. Average of the ten highest reading core exit thermocouples (CETCs) is **≥ 700° F**. **AND** b. RVLIS plenum region **= 0%.** **AND** c. Functional Restoration procedures **not** effective in **< 15 minutes.**
5. Reactor Vessel Water Level / RCS Leak Rate	None	**Core Cooling CSF - ORANGE Path** conditions exist.	1. RCS leakage **> available makeup capacity** resulting in loss of subcooling as indicated by CETCs **< ACCEPTABLE VALUE** per Iconic Display or RCS Subcooling Margin Figure 1/2BST 2-1.	2. UNISOLABLE leak exceeding the capacity of one charging pump in the normal charging mode.	None	None
6. S/G Leakage / Rupture	None	None	Steam Generator Tube Rupture that requires/results in entry into BEP-3.	None	1. RUPTURED S/G is also FAULTED outside of Containment. **OR** 2. a. Primary-to-Secondary leakrate **> 10 gpm**. **AND** b. UNISOLABLE steam release from affected S/G to the environment.	None
7. Containment Isolation Valve Status	None	None	None	None	1. Failure of isolation valves in any one line to close. **AND** 2. Direct downstream pathway to the environment exists after a containment isolation signal.	None
8. Containment Rad Monitoring	Containment radiation monitor (AR020 (21)) reading **> 1.95E+03 R/hr**.	None	Containment radiation monitor (AR020(21)) reading **> 25 R/hr**.	None	None	Containment radiation monitor (AR020 (21)) reading **> 4.40E+03 R/hr**.
9. ED Judgment	1. Any condition in the opinion of the Emergency Director that indicates Loss of the Fuel Clad Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Fuel Clad Barrier.	1. Any condition in the opinion of the Emergency Director that indicates Loss of the RCS Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the RCS Barrier.	Any condition in the opinion of the Emergency Director that indicates Loss of the Containment Barrier.	Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment Barrier.

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
Loss of AC Power	**MG1** Prolonged loss of all offsite power and all On-Site AC power to emergency busses. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to unit ESF busses. **AND** 2. Failure of DG 1A(2A) and DG 1B(2B) emergency diesel generators to supply power to unit ESF busses. **AND** 3. a. Restoration of at least one unit ESF bus in **< 4 hours** is **not** likely. **OR** b. **EITHER** of the following: • **Core Cooling CSF - RED Path** conditions exist. **OR** • **Core Cooling CSF - ORANGE Path** conditions exist.	**MS1** Loss of all Off-site and all On-Site AC power to emergency busses for 15 minutes or longer. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to unit ESF busses. **AND** 2. Failure of DG 1A(2A) and DG 1B(2B) emergency diesel generators to supply power to unit ESF busses. **AND** 3. Failure to restore power to at least one unit ESF bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.	**MA1** AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. AC power capability to unit ESF busses reduced to only one of the following power sources for **≥ 15 minutes**: • Affected unit SAT 142-1(242-1) • Affected unit SAT 142-2(242-2) • Emergency Diesel Generator DG 1A(2A) • Emergency Diesel Generator DG 1B(2B) • Unit crosstie breakers **AND** 2. Any additional single power source failure will result in unit blackout.	**MU1** Loss of all Off-site AC power to emergency busses for 15 minutes or longer. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of all off-site AC power to unit ESF busses for **≥ 15 minutes**.
RPS Failure / Inadvertent Criticality	**MG2** Automatic Trip and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists. 1 2 **EAL Threshold Values:** 1. Automatic Reactor Trip was **not** successful as indicated by Reactor Power **≥ 5%**. **AND** 2. Manual actions were **not** successful as indicated by Reactor Power **≥ 5%**. **AND** 3. **EITHER** of the following exists: • **Core Cooling CSF – RED Path** conditions exist. **OR** • **Heat Sink CSF – RED Path** conditions exist.	**MS2** Automatic Trip fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor. 1 2 **EAL Threshold Values:** 1. Automatic Reactor Trip was **not** successful as indicated by Reactor Power **≥ 5%**. **AND** 2. Manual Reactor Trip from Main Control Board was **not** successful as indicated by Reactor Power **≥ 5%**.	**MA2** Automatic Trip fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor. 1 2 **EAL Threshold Values:** 1. Automatic Reactor Trip was **not** successful as indicated by Reactor Power **≥ 5%**. **AND** 2. Manual Reactor Trip from Main Control Board was successful as indicated by Reactor Power **< 5%**.	**MU2** Inadvertent criticality. 3 4 **EAL Threshold Values:** UNPLANNED sustained positive startup rate observed on nuclear instrumentation.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

Exelon Nuclear
HOT MATRIX

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
DC Power		**MS3** Loss of all vital DC power for 15 minutes or longer.. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of all vital DC power based on **< 108 VDC** on unit 125 VDC battery busses 111(211) and 112(212) for **≥ 15 minutes**.		
Annunciators		**MS4** Inability to monitor a SIGNIFICANT TRANSIENT in progress. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1) **AND** 2. SIGNIFICANT TRANSIENT in progress (Table M2). **AND** 3. Compensatory indications (computer points) are unavailable.	**MA4** UNPLANNED Loss of safety system annunciation or indication in the control room with EITHER (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1) **AND** 2. a. SIGNIFICANT TRANSIENT in progress (Table M2). **OR** b. Compensatory indications (computer points) are unavailable.	**MU4** UNPLANNED loss of safety system annunciation or indication in the control room for 15 minutes or longer. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1)
		Table M1 - Safety Systems • Gen & Aux Power (1/2PM01J MCB) • Reactor and Chem Volume Control (1/2PM05J MCB) • Eng. Safety Features (1/2PM06J MCB) • Process/Area Radiation Monitoring	**Table M2 - Significant Transients** • Automatic Turbine Runback **> 25%** thermal reactor power • Electrical load rejection **> 25%** full electrical load • Reactor Trip • Safety Injection Actuation • Thermal power oscillations **> 10%**	

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

System Malfunction

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
RCS Leak				**MU5** RCS leakage. 1 2 3 4 **EAL Threshold Values:** 1. Unidentified or pressure boundary leakage **> 10 gpm**. **OR** 2. Identified leakage **> 25 gpm**.
Communications		**Table M3 – Communications Capability** System / Onsite / Offsite Radios: X Plant page: X Plant Telephone System: X Commercial Telephones: X ENS: X HPN: X Cellular phones: X Satellite phones: X		**MU6** Loss of all On-site or Off-site communications capabilities. 1 2 3 4 **EAL Threshold Values:** 1. Loss of all Table M3 **Onsite** communications capability affecting the ability to perform routine operations. **OR** 2. Loss of all Table M3 **Offsite** communications capability.
T. S. Time				**MU7** Inability to reach required shutdown within Technical Specification limits. 1 2 3 4 **EAL Threshold Values:** Plant is **not** brought to required operating mode within Technical Specifications LCO Action Statement Time.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Security	**HG1** HOSTILE ACTION resulting in loss of physical control of the facility. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1). **OR** 2. A HOSTILE ACTION has: • Caused failure of Spent Fuel Pool Cooling Systems **AND** • IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).	**HS1** HOSTILE ACTION within the PROTECTED AREA. 1 2 3 4 5 6 D **EAL Threshold Values:** A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.	**HA1** HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site. **OR** 2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.	**HU1** Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities. **OR** 2. A validated notification from NRC providing information of an aircraft threat. **OR** 3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.
C. R. Evacuation	**Table H1 - Safety Functions** • Reactivity Control (ability to shut down the reactor and keep it shutdown) • RCS Inventory (ability to cool the core) • Secondary Heat Removal (ability to maintain heat sink)	**HS2** Control Room evacuation has been initiated and plant control cannot be established. 1 2 3 4 5 6 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Control Room evacuation has been initiated. **AND** 2. Control of the plant **cannot** be established per 1/2 BOA PRI-5, Control Room Inaccessibility procedure in **< 15 minutes**.	**HA2** Control Room evacuation has been initiated. 1 2 3 4 5 6 D **EAL Threshold Values:** Entry into 1/2 BOA PRI-5, Control Room Inaccessibility procedure for Control Room evacuation.	
Fire / Explosion		**Table H2 – Vital Areas** • Containment • Auxiliary Building • Fuel Handling Building • Main Steam Tunnels • Essential Service Water Cooling Towers • Condensate Storage Tanks • RWSTs	**HA3** FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown. 1 2 3 4 5 6 D **EAL Threshold Values:** FIRE or EXPLOSION resulting in any of the following: • VISIBLE DAMAGE to a Table H2 permanent structure. **OR** • VISIBLE DAMAGE to safety system equipment contained within a Table H2 area. **OR** • Control Room indication of degraded safety system equipment performance contained within a Table H2 area.	**HU3** FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA. 1 2 3 4 5 6 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm. **OR** 2. EXPLOSION within PROTECTED AREA affecting a Table H2 area.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Natural / Destructive Phenomena	**Table H2 - Vital Areas** • Containment • Auxiliary Building • Fuel Handling Building • Main Steam Tunnels • Essential Service Water Cooling Towers • Condensate Storage Tanks • RWSTs		**HA4** Natural or destructive phenomena affecting VITAL AREAS 1 2 3 4 5 6 D **EAL Threshold Values:** 1. a. Seismic event **> Operating Basis Earthquake (OBE)** as indicated by seismic check 0PA02J. **AND** b. Confirmed by **EITHER:** • Earthquake felt in plant. **OR** • National Earthquake Center. **OR** • Control Room indication of degraded performance of systems required for the safe shutdown of the plant. **OR** 2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area: • Tornado strike **OR** • High winds **> 85 mph** **OR** • Vehicle crash **OR** • Turbine failure-generated PROJECTILES **OR** 3. Flooding in the Auxiliary Building that results in **EITHER**: a. Degraded safety system performance as indicated in the Control Room. **OR** b. Industrial safety hazards (e.g., electric shock) that precludes access to operate or monitor safety equipment.	**HU4** Natural or destructive phenomena affecting the PROTECTED AREA. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. a. Seismic event as indicated by Annunciator 0-38-E5, Accelograph Accel High (0PM01J). **AND** b. Confirmed by **EITHER:** • Earthquake felt in plant. **OR** • National Earthquake Center. **OR** 2. **EITHER** of the following occurring within the PROTECTED AREA boundary: • Tornado strike **OR** • Sustained **(> 15 minutes)** high winds **> 85 mph** **OR** 3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals. **OR** 4. Flooding in the Auxiliary Building that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Toxic / Flammable Gas	**Table H2 - Vital Areas** • Containment • Auxiliary Building • Fuel Handling Building • Main Steam Tunnels • Essential Service Water Cooling Towers • Condensate Storage Tanks • RWSTs		**HA5** Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor. 1 2 3 4 5 6 D **EAL Threshold Values:** **Note:** If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event. Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.	**HU5** Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS. **OR** 2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.
Judgment	**HG6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY. 1 2 3 4 5 6 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**HS6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY. 1 2 3 4 5 6 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	**HA6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an ALERT. 1 2 3 4 5 6 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**HU6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT. 1 2 3 4 5 6 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
ISFSI MALFUNCTION				
ISFSI				**E-HU1** Damage to a loaded cask CONFINEMENT BOUNDARY 1 2 3 4 5 6 D **EAL Threshold Values:** Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

Abnormal Rad Levels / Radiological Effluent

Radiological Effluents

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
RG1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 5 6 D **EAL Threshold Values:** **Note**: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results. 1. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 9.99 E+09 uCi/sec** for **≥ 15 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate). **OR** 2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**: a. **> 1000 mRem TEDE** **OR** b. **> 5000 mRem CDE Thyroid** **OR** 3. Field survey results at or beyond Site Boundary indicate **EITHER**: a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**. **OR** b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.	**RS1** Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 5 6 D **EAL Threshold Values:** **Note**: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results. 1. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 9.99 E+08 uCi/sec** for **≥ 15 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate). **OR** 2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**: a. **> 100 mRem TEDE** **OR** b. **> 500 mRem CDE Thyroid** **OR** 3. Field survey results at or beyond Site Boundary indicate **EITHER**: a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**. **OR** b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.	**RA1** Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer. 1 2 3 4 5 6 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown. 1. VALID reading on any of the following effluent monitors > **200 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 15 minutes**. • 0PR001, Liquid Radwaste Effluent Monitor • 0PR002, Gas Decay Tank Effluent Monitor • 0PR010, Station Blowdown Monitor • 1/2 PR001, Containment Purge Effluent Monitor • Discharge Permit specified monitor **OR** 2. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 1.14 E+08 uCi/sec** for **≥ 15 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate). **OR** 3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.	**RU1** Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer. 1 2 3 4 5 6 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown. 1. VALID reading on any of the following effluent monitors > **2 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 60 minutes**. • 0PR001, Liquid Radwaste Effluent Monitor • 0PR002, Gas Decay Tank Effluent Monitor • 0PR010, Station Blowdown Monitor • 1/2 PR001, Containment Purge Effluent Monitor • Discharge Permit specified monitor **OR** 2. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 1.14 E+06 uCi/sec** for **≥ 60 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate). **OR** 3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Abnormal Rad Levels / Radiological Effluent				
Abnormal Rad Levels		**Table R1** **Fuel Handling Incident Radiation Monitors** • Fuel Building Fuel Handling Incident Monitor 0RE-AR055 • Fuel Building Fuel Handling Incident Monitor 0RE-AR056 • Containment Fuel Handling Incident Monitor 1/2 RE-AR011 • Containment Fuel Handling Incident Monitor 1/2 RE-AR012	**RA2** Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. VALID reading **> 1000 mR/hr** on any Table R1 Radiation Monitor due to **EITHER**: • Damaged irradiated fuel. **OR** • Water level drop. **OR** 2. Water level drop in the Reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal that will result in irradiated fuel becoming uncovered.	**RU2** UNPLANNED rise in plant radiation levels. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by: • Refueling Cavity water level **< 23 ft**. above the Reactor Flange (**423 ft**. indicated level). **OR** • Spent Fuel Pool water level **< 23 ft**. above the fuel (**422 ft. 9 in**. indicated level). **OR** • Report of visual observation of a drop in water level in the Fuel Transfer Canal, Refueling Cavity, or Spent Fuel Pool. **AND** b. VALID Area Radiation Monitor reading rise on one or more radiation monitor in Table R1. **OR** 2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.
		Table R2 **Areas Requiring Continuous Occupancy** • Main Control Room - 1/2RE-AR010 • Central Alarm Station - (by survey)	**RA3** Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. 1 2 3 4 5 6 D **EAL Threshold Values:** Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R2) to maintain plant safety functions.	

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

COLD SHUTDOWN / REFUELING MATRIX

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Cold Shutdown / Refueling System Malfunctions				
Loss of AC Power			**CA1** Loss of all Off-site and all On-Site AC power to emergency busses for 15 minutes or longer. 5 6 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to unit ESF busses. **AND** 2. Failure of DG 1A(2A) and DG 1B(2B) emergency diesel generators to supply power to unit ESF busses. **AND** 3. Failure to restore power to at least one unit ESF bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.	**CU1** AC power capibilty to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout. 5 6 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. AC power capability to unit ESF busses reduced to only one of the following power sources for **≥ 15 minutes**: • Affected unit SAT 142-1(242-1) • Affected unit SAT 142-2(242-2) • Emergency Diesel Generator DG 1A(2A) • Emergency Diesel Generator DG 1B(2B) • Unit crosstie breakers **AND** 2. Any additional single power source failure will result in a unit blackout.
Inadvertent Criticality				**CU2** Inadvertent criticality. 5 6 **EAL Threshold Values:** UNPLANNED sustained positive startup rate observed on nuclear instrumentation.
DC Power				**CU3** Loss of required DC power for 15 minutes or longer. 5 6 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of required DC power based on **< 108 VDC** on unit 125 VDC battery busses 111(211) and 112(212) for **≥ 15 minutes**.

Cold Shutdown / Refueling System Malfunctions

Communications

Table C1 – Communications Capability

System	Onsite	Offsite
Radios	X	
Plant page	X	
Plant Telephone System	X	
Commercial Telephones		X
ENS		X
HPN		X
Cellular phones		X
Satellite phones		X

CU4 Loss of all On-site or Off-site communications capabilities. 5 6 D

EAL Threshold Values:

1. Loss of all Table C1 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table C1 **Offsite** communications capability affecting the ability to perform offsite notifications.

Heat Sink

Table C2 – RCS Reheat Duration Thresholds

RCS	Containment Closure	Duration
Intact	N/A	60 minutes*
Not Intact	Established	20 minutes*
OR Reduced Inventory (< 397 ft.)	Not Established	0 minutes

*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then EAL Threshold #1 is **not** applicable.

CA5 Inability to maintain plant in cold shutdown. 5 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200°F** for **> Table C2 duration**.

   OR

2. UNPLANNED RPV pressure rise **> 10 psig** as a result of temperature rise due to loss of decay heat removal. (This threshold does not apply in solid plant conditions.)

CU5 UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV. 5 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200°F**.

   OR

2. Loss of the following for **≥ 15 minutes:**
   - All RCS temperature indications

     AND
   - All RPV level indications

Cold Shutdown / Refueling System Malfunctions

RCS Leakage / Inventory

GENERAL EMERGENCY

CG6 Loss of RCS/RPV inventory affecting fuel clad integrity with containment challenged. [5] [6]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. RVLIS **< 0% Plenum (390 ft. el.)** for **≥ 30 minutes**.

   OR

   Reactor Vessel Refueling Level Indicators LT-046 and LT-049 **< 392 ft. el.** for **≥ 30 minutes**.

   AND

   b. Any Containment Challenge Indication (Table C4).

   OR

2. a. Reactor Vessel level unknown for **≥ 30 minutes.**

   AND

   b. Loss of Reactor Vessel inventory as indicated by any of the following:

   - Table C3 indication.

     OR

   - Erratic Source Range Neutron Monitor indication.

     OR

   - 1/2 RE-AR011 or 1/2 RE-AR012 Containment Fuel Handling Incident radiation monitors **> 3000 mR/hr**.

   AND

   c. Any Containment Challenge Indication (Table C4)

Table C4 – Containment Challenge Indications

- Hydrogen concentration in Containment **≥ 5%**
- UNPLANNED rise in containment pressure
- CONTAINMENT CLOSURE **not** established.

SITE AREA EMERGENCY

CS6 Loss of RCS/RPV inventory affecting core decay heat removal capability. [5] [6]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. With CONTAINMENT CLOSURE **not** established **EITHER**:

   - RVLIS **< 15% Plenum (392.4 ft. el.)**.

     OR

   - Reactor Vessel Refueling Level Indicators LT-046 and LT-049 **< 393 ft. el.**

   OR

2. With CONTAINMENT CLOSURE established **EITHER**:

   - RVLIS **< 0% Plenum (390 ft. el.)**

     OR

   - Reactor Vessel Refueling Level Indicators LT-046 and LT-049 **< 392 ft.**

   OR

3. a. Reactor Vessel level unknown for **≥ 30 minutes.**

   AND

   b. Loss of Reactor Vessel inventory as indicated by any of the following:

   - Table C3 indications.

     OR

   - Erratic Source Range Neutron Monitor indication.

     OR

   - 1/2 RE-AR011 or 1/2 RE-AR012 Containment Fuel Handling Incident radiation monitors **> 3000 mR/hr.**

Table C3 – Indications of RCS Leakage

- UNPLANNED Containment Sump level rise
- UNPLANNED Auxiliary Bldg. Sump level rise
- UNPLANNED Tank level rise
- UNPLANNED rise in RCS makeup
- Observation of leakage or inventory loss

ALERT

CA6 Loss of RCS/RPV inventory. [5] [6]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. Loss of RCS / Reactor Vessel inventory as indicated RVLIS **< 27% Plenum (393 ft. el.)**.

   OR

   b. Loss of RCS / Reactor Vessel inventory as indicated by LT-046 and LT-049 **< 393 ft. el.**

   OR

2. a. RCS / Reactor Vessel level unknown for **≥ 15 minutes.**

   AND

   b. Loss of RCS / Reactor Vessel inventory per Table C3 indications.

UNUSUAL EVENT

CU6 RCS leakage. [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

RCS leakage results in the inability to restore and maintain RCS or Pressurizer level **> procedurally established limit** for **≥ 15 minutes.**

CU7 UNPLANNED loss of RCS/RPV inventory. [6]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED Refueling Cavity or Vessel level drop that meets **EITHER**:

   - When controlling level above the Reactor Vessel flange, Refueling Cavity level drop below the Reactor Vessel flange **(400 ft.)** for **≥ 15 minutes**.

     OR

   - When controlling level below the Reactor Vessel flange, vessel level drop below the procedurally established limit for **≥ 15 minutes**.

   OR

2. a. Reactor Vessel level unknown.

   AND

   b. Loss of RCS /Reactor Vessel inventory per Table C3 indications.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

COLD SHUTDOWN / REFUELING MATRIX

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Security	**HG1** HOSTILE ACTION resulting in loss of physical control of the facility. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1). **OR** 2. A HOSTILE ACTION has: • Caused failure of Spent Fuel Pool Cooling Systems **AND** • IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).	**HS1** HOSTILE ACTION within the PROTECTED AREA. 1 2 3 4 5 6 D **EAL Threshold Values:** A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.	**HA1** HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site. **OR** 2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.	**HU1** Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities. **OR** 2. A validated notification from NRC providing information of an aircraft threat. **OR** 3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.
C. R. Evacuation	**Table H1 - Safety Functions** • Reactivity Control (ability to shut down the reactor and keep it shutdown) • RCS Inventory (ability to cool the core) • Secondary Heat Removal (ability to maintain heat sink)	**HS2** Control Room evacuation has been initiated and plant control cannot be established. 1 2 3 4 5 6 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Control Room evacuation has been initiated. **AND** 2. Control of the plant **cannot** be established per 1/2 BOA PRI-5, Control Room Inaccessibility procedure in **< 15 minutes**.	**HA2** Control Room evacuation has been initiated. 1 2 3 4 5 6 D **EAL Threshold Values:** Entry into 1/2 BOA PRI-5, Control Room Inaccessibility procedure for Control Room evacuation.	
Fire / Explosion		**Table H2 – Vital Areas** • Containment • Auxiliary Building • Fuel Handling Building • Main Steam Tunnels • Essential Service Water Cooling Towers • Condensate Storage Tanks • RWSTs	**HA3** FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown. 1 2 3 4 5 6 D **EAL Threshold Values:** FIRE or EXPLOSION resulting in any of the following: • VISIBLE DAMAGE to a Table H2 permanent structure. **OR** • VISIBLE DAMAGE to safety system equipment contained within a Table H2 area. **OR** • Control Room indication of degraded safety system equipment performance contained within a Table H2 area.	**HU3** FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA. 1 2 3 4 5 6 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm. **OR** 2. EXPLOSION within PROTECTED AREA affecting a Table H2 area.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

COLD SHUTDOWN / REFUELING MATRIX

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Natural / Destructive Phenomena	**Table H2 - Vital Areas** • Containment • Auxiliary Building • Fuel Handling Building • Main Steam Tunnels • Essential Service Water Cooling Towers • Condensate Storage Tanks • RWSTs		**HA4** Natural or destructive phenomena affecting VITAL AREAS 1 2 3 4 5 6 D **EAL Threshold Values:** 1. a. Seismic event **> Operating Basis Earthquake (OBE)** as indicated by seismic check 0PA02J. **AND** b. Confirmed by **EITHER:** • Earthquake felt in plant. **OR** • National Earthquake Center. **OR** • Control Room indication of degraded performance of systems required for the safe shutdown of the plant. **OR** 2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area: • Tornado strike **OR** • High winds **> 85 mph** **OR** • Vehicle crash **OR** • Turbine failure-generated PROJECTILES **OR** 3. Flooding in the Auxiliary Building that results in **EITHER**: a. Degraded safety system performance as indicated in the Control Room. **OR** b. Industrial safety hazards (e.g., electric shock) that precludes access to operate or monitor safety equipment.	**HU4** Natural or destructive phenomena affecting the PROTECTED AREA. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. a. Seismic event as indicated by Annunciator 0-38-E5, Accelograph Accel High (0PM01J). **AND** b. Confirmed by **EITHER:** • Earthquake felt in plant. **OR** • National Earthquake Center. **OR** 2. **EITHER** of the following occurring within the PROTECTED AREA boundary: • Tornado strike **OR** • Sustained **(> 15 minutes)** high winds **> 85 mph** **OR** 3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals. **OR** 4. Flooding in the Auxiliary Building that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

COLD SHUTDOWN / REFUELING MATRIX

Exelon Nuclear
COLD SHUTDOWN / REFUELING MATRIX

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Toxic / Flammable Gas	**Table H2 - Vital Areas** • Containment • Auxiliary Building • Fuel Handling Building • Main Steam Tunnels • Essential Service Water Cooling Towers • Condensate Storage Tanks • RWSTs		**HA5** Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor. 1 2 3 4 5 6 D **EAL Threshold Values:** **Note:** If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event. Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.	**HU5** Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS. **OR** 2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.
Judgment	**HG6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY. 1 2 3 4 5 6 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**HS6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY. 1 2 3 4 5 6 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	**HA6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an ALERT. 1 2 3 4 5 6 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**HU6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT. 1 2 3 4 5 6 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

COLD SHUTDOWN / REFUELING MATRIX
COLD SHUTDOWN / REFUELING MATRIX

COLD SHUTDOWN / REFUELING MATRIX

COLD SHUTDOWN / REFUELING MATRIX

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
ISFSI MALFUNCTION				
ISFSI				**E-HU1** Damage to a loaded cask CONFINEMENT BOUNDARY 1 2 3 4 5 6 D **EAL Threshold Values:** Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

COLD SHUTDOWN / REFUELING MATRIX

COLD SHUTDOWN / REFUELING MATRIX

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RG1

Initiating Condition:

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 9.99 E+09 uCi/sec** for **≥ 15 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of **EITHER**:

   a. **> 1000 mRem TEDE**

      OR

   b. **> 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond the site boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**.

      OR

   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RG1 (cont.)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed the EPA Protective Action Guides (PAGs). Public protective actions will be necessary. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public and likely involve fuel damage.

While these failures are addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

Threshold #1 Basis:

The site-specific monitors listed include effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading threshold is not, the results from dose assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency-implementing procedures call for the timely performance of dose assessments using actual meteorology and release information. If the results of dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading threshold.

Threshold #2 Basis:

The "site boundary" is the nearest distance from potential release points at which protective actions would be required for members of the public.

Threshold #3 Basis:

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. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption on sample media followed by field analysis are used for determining the iodine (CDE) thyroid value.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RG1 (cont.)

Basis Reference(s):

1. NEI 99-01, Rev 5 AG1
2. EP-AA-112-500 Emergency Environmental Monitoring
3. EP-EAL-0602 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values Byron Station

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RS1

Initiating Condition:

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 9.99 E+08 uCi/sec** for **≥ 15 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of **EITHER**:

   a. **> 100 mRem TEDE**

      OR

   b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond the site boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.

      OR

   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RS1 (cont.)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed 10% of the EPA Protective Action Guides (PAGs). Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

While these failures are addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

Threshold #1 Basis:

The site specific monitors listed include effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading threshold is not, the results from dose assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency-implementing procedures call for the timely performance of dose assessments using actual meteorology and release information. If the results of dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading threshold.

Threshold #2 Basis:

The "site boundary" is the nearest distance from potential release points at which Protective Actions would be required for members of the public.

Threshold #3 Basis:

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. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption on sample media followed by field analysis are used for determining the iodine (CDE) thyroid value.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RS1 (cont.)

Basis Reference(s):

1. NEI 99-01, Rev 5 AS1
2. EP-AA-112-500 Emergency Environmental Monitoring
3. EP-EAL-0602 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values Byron Station

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RA1

Initiating Condition:

Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors **> 200 times high alarm setpoint** established by a current radioactive release package for **≥ 15 minutes**.

   - 0PR001, Liquid Radwaste Effluent Monitor
   - 0PR002, Gas Decay Tank Effluent Monitor
   - 0PR010, Station Blowdown Monitor
   - 1/2 PR001, Containment Purge Effluent Monitor
   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 1.14 E+08 uCi/sec** for **≥ 15 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RA1 (cont.)

Basis (cont.):

This EAL addresses an actual or substantial potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in RU1 and RA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases are not to be prorated or averaged. For example, a release exceeding 600 times ODCM for 5 minutes does not meet the threshold

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

Threshold #1 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

The effluent monitors listed are those normally used for planned discharges. If a discharge is performed using a different flowpath or effluent monitor other than those listed (e.g., a portable or temporary effluent monitor), then the declaration criteria will be based on the monitor specified in the Discharge Permit.

Threshold #2 Basis:

This threshold is intended for effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

Threshold #3 Basis:

This threshold addresses uncontrolled releases that are detected by sample analyses, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RA1 (cont.)

Basis Reference(s):

1. NEI 99-01, Rev 5 AA1
2. UFSAR Section 11.5.2.3
3. 0BISR 11.a.3-002, Channel Operation Test of Liquid Radwaste Effluent Radiation Monitor 0PR01J
4. ODCM, CY-BY-170-301, Section 3.0, Liquid Effluents
5. EP-EAL-0602 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values Byron Station

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RU1

Initiating Condition:

Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors **> 2 times high alarm setpoint** established by a current radioactive release package for **≥ 60 minutes**.

   - 0PR001, Liquid Radwaste Effluent Monitor
   - 0PR002, Gas Decay Tank Effluent Monitor
   - 0PR010, Station Blowdown Monitor
   - 1/2 PR001, Containment Purge Effluent Monitor
   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Unit 1 and 2 Aux Bldg Vent WRGMs (1/2 RE-PR030) **> 1.14 E+06 uCi/sec** for **≥ 60 minutes** (as determined from Unit 1 & 2 PF430 or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RU1 (cont.)

Basis (cont.):

This EAL addresses a potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in RU1 and RA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases are not to be prorated or averaged. For example, a release exceeding 4 times ODCM for 30 minutes does not meet the threshold.

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

Threshold #1 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

The effluent monitors listed are those normally used for planned discharges. If a discharge is performed using a different flowpath or effluent monitor other than those listed (e.g., a portable or temporary effluent monitor), then the declaration criteria will be based on the monitor specified in the Discharge Permit.

Threshold #2 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL.

This threshold is intended for effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

Threshold #3 Basis:

This threshold addresses uncontrolled releases that are detected by sample analyses, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RU1 (cont.)

Basis Reference(s):

1. NEI 99-01, Rev 5 AU1
2. UFSAR Section 11.5.2.3
3. 0BISR 11.a.3-002, Channel Operation Test of Liquid Radwaste Effluent Radiation Monitor 0PR01J
4. ODCM, CY-BY-170-301, Section 3.0, Liquid Effluents
5. EP-EAL-0602 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values Byron Station

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RA2

Initiating Condition:

Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

1. VALID reading **> 1000 mR/hr** on any Table R1 Radiation Monitor due to **EITHER**:

   - Damage to irradiated fuel

     OR

   - Water level drop

Table R1 - Fuel Handling Incident Radiation Monitors
• Fuel Building Fuel Handling Incident Monitor 0RE-AR055
• Fuel Building Fuel Handling Incident Monitor 0RE-AR056
• Containment Fuel Handling Incident Monitor 1/2 RE-AR011
• Containment Fuel Handling Incident Monitor 1/2 RE-AR012

   OR

2. Water level drop in the Reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal that will result in irradiated fuel becoming uncovered.

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses increases in radiation dose rates within plant buildings, and may be a precursor to a radioactivity release to the environment. These events represent a loss of control over radioactive material and represent an actual or substantial potential degradation in the level of safety of the plant.

These events escalate from RU2 in that fuel activity has been released, or is anticipated due to fuel heatup. This EAL applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RA2 (cont.)

Basis (cont.):

Threshold #1 Basis:

This EAL addresses radiation monitor indications of fuel uncovery and/or fuel damage.

Uncovering spent fuel represents a substantial degradation of the level of safety of the plant and warrants an Alert classification. Visual observation of spent fuel uncovery represents a major ALARA concern in that radiation levels could exceed 10,000 R/hr on the refuel bridge when fuel uncovery begins. The value of 1000 mR/hr was conservatively chosen for classification purposes.

Radiation monitor readings are used to provide indication of fuel uncovery and/or fuel damage. High monitor readings associated with the transfer or relocation of a source, stored in or near the pool or readings responding to a planned evolution such as removal of the reactor head or equipment relocation are not classified under this threshold since the reading would not be indicative of fuel uncovery and/or fuel damage.

Dropping heavy loads onto the spent fuel can cause significant damage to the spent fuel and an Alert is also warranted under these conditions provided that the above radiation monitor threshold readings are reached.

Escalation of this emergency classification level, if appropriate, would be based on RS1 or RG1.

Threshold #2 Basis:

Once Spent Fuel Pool water level drops below the low level alarm setpoint, further drops can be monitored only by visual observation unless the Spent Fuel Pool is in communication with the Refueling Cavity.

If available, video cameras may allow remote observation. Depending on available level instrumentation, the declaration threshold may need to be based on indications of water makeup rate.

Basis Reference(s):

1. NEI 99-01, Rev 5 AA2
2. UFSAR 11.5.2.2.6, 11.5.2.2.7, 15.7.4, Table 12.3-3
3. Technical Specification Table 3.3.6-1
4. 1/2 BOA REFUEL-1 Fuel Handling Emergency Unit 1/2
5. 1/2 BOA REFUEL-2 Refueling Cavity or Spent Fuel Pool Level Loss Unit 1/2
6. TRM 3.9.A, Refueling Operations, Decay Time
7. BAR 1-1-A2, 2-1-A2, CNMT DRAIN LEAK DETECT FLOW HIGH alarm

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RU2

Initiating Condition:

UNPLANNED rise in plant radiation levels.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by:

   - Refueling Cavity water level **< 23 ft**. above the Reactor Flange (**423 ft**. indicated level).

     OR

   - Spent Fuel Pool water level **< 23 ft**. above the fuel (**422 ft. 9 in.** indicated level).

     OR

   - Report of visual observation of a drop in water level in the Fuel Transfer Canal, Refueling Cavity, or Spent Fuel Pool.

   AND

   b. VALID Area Radiation Monitor reading rise on one or more radiation monitors in Table R1.

Table R1 - Fuel Handling Incident Radiation Monitors
• Fuel Building Fuel Handling Incident Monitor 0RE-AR055
• Fuel Building Fuel Handling Incident Monitor 0RE-AR056
• Containment Fuel Handling Incident Monitor 1/2 RE-AR011
• Containment Fuel Handling Incident Monitor 1/2 RE-AR012

   OR

2. UNPLANNED VALID Area Radiation Monitor reading or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RU2 (cont.)

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

NORMAL LEVELS: Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

This EAL addresses increased radiation levels as a result of water level decreases above irradiated fuel or events that have resulted, or may result, in UNPLANNED increases in radiation dose rates within plant buildings. These radiation increases represent a loss of control over radioactive material and represent a potential degradation in the level of safety of the plant.

Threshold #1 Basis:

Level indications may include installed or temporary water level instrumentation. If available, video cameras may allow remote observation for determining water level changes.
This EAL addresses unplanned lowering of level in the refueling pathway and a corresponding rise in refuel floor radiation readings. For events in Refuel mode where the water level drops with no corresponding rise in refuel floor radiation readings classification would be via CU7. This event escalates to an Alert per RA2 if irradiated fuel outside the reactor vessel is uncovered.

Threshold #2 Basis:

This EAL addresses increases in plant radiation levels that represent a loss of control of radioactive material resulting in a potential degradation in the level of safety of the plant.

This EAL excludes radiation level increases that result from planned activities such as use of radiographic sources and movement of radioactive waste materials. A specific list of ARMs is not required, as it would restrict the applicability of the threshold. The intent is to identify loss of control of radioactive material in any monitored area. Survey results are not required for confirmation of area radiation monitor readings but are applicable to areas where area radiation monitors do not have sufficient range to indicate a rise by a factor of 1000 over NORMAL LEVELS.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RU2 (cont.)

Basis Reference(s):

1. NEI 99-01, Rev 5 AU2
2. Technical Specifications 3.7.14
3. 1/2 BOA REFUEL-1 Fuel Handling Emergency Unit 1/2
4. 1/2 BOA REFUEL-2 Refueling Cavity Or Spent Fuel Pool Level Loss Unit 1/2
5. BAR 1-1-C1 SPENT FUEL PIT LEVEL HIGH LOW
6. 1/2 BOSR 0.1-6 Unit One(Two) Mode 6 Shiftly and Daily Operating Surveillance
7. BOP RH-8 Filling the Refueling Cavity for Refueling
8. BOP RH-9 Pump Down of the Refueling Cavity to the RWST
9. BOP RC-4 Reactor Coolant System Drain
10. BAR 1-6-C3 REFUELING CAVITY LVL HIGH/LOW

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RA3

Initiating Condition:

Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R2) to maintain plant safety functions.

Table R2 – Areas Requiring Continuous Occupancy
• Main Control Room - 1/2 RE-AR010 • Central Alarm Station - (by survey)

Basis:

This EAL addresses increased radiation levels that impact continued operation in areas requiring continuous occupancy to maintain safe operation or to perform a safe shutdown.

The cause and/or magnitude of the increase in radiation levels is not a concern of this EAL. The Emergency Director must consider the source or cause of the increased radiation levels and determine if any other EAL may be involved.

Areas requiring continuous occupancy include Main Control Room and the Central Alarm Station (CAS).

Basis Reference(s):

1. NEI 99-01, Rev 5 AA3
2. UFSAR Chapter 3.02, UFSAR Table 3.2-1

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RU3

Initiating Condition:

Fuel clad degradation.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Fuel clad degradation resulting in:

- Gross Failed Fuel Monitor 1/2 RE-PR006 indicating I-135 concentration of **> 5 uCi/cc.**

  OR

- Dose Equivalent I-131 specific coolant activity **> 60.0 uCi/gm**.

  OR

- Dose Equivalent XE-133 specific coolant activity **> 603.0 uCi/gm**.

Basis:

This EAL is included because it is a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant.

Escalation of this EAL to the Alert level is via the Fission Product Barriers.

Conditions that cause the monitor to alarm that are not related to fuel clad degradation should not result in the declaration of an Unusual Event.

This threshold addresses site-specific radiation monitor readings that provide indication of a degradation of fuel clad integrity.

This threshold addresses coolant samples exceeding coolant technical specifications for transient iodine spiking limits.

An Unusual Event is only warranted when actual fuel clad damage is the cause of the elevated coolant sample (as determined by laboratory confirmation). Fuel clad damage should be assumed to be the cause of elevated Reactor Coolant activity unless another cause is known.

Basis Reference(s):

1. NEI 99-01, Rev 5 SU4
2. Technical Specifications 3.4.16
3. 1/2 BOA PRI-4, Abnormal Primary Chemistry Unit 1/2
4. PWR Letdown Rad Monitor Setpoint Calculation for Degraded Fuel Indication

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FG1

Initiating Condition:

Loss of ANY Two Barriers AND Loss or Potential Loss of the third barrier.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the General Emergency classification level each barrier is weighted equally.

Basis Reference(s):

1. NEI 99-01, Rev 5 Table 5-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FS1

Initiating Condition:

Loss or Potential Loss of ANY two barriers.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the Site Area Emergency classification level, each barrier is weighted equally.

Basis Reference(s):

1. NEI 99-01, Rev 5 Table 5-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FA1

Initiating Condition:

ANY Loss or ANY Potential Loss of either Fuel Clad or RCS

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the Alert classification level, Fuel Cladding and RCS barriers are weighted more heavily than the Containment barrier. Unlike the Containment barrier, loss or potential loss of either the Fuel Cladding or RCS barrier may result in the relocation of radioactive materials or degradation of core cooling capability. Note that the loss or potential loss of Containment barrier in combination with loss or potential loss of either Fuel Cladding or RCS barrier results in declaration of a Site Area Emergency under EAL FS1.

Basis Reference(s):

1. NEI 99-01, Rev 5 Table 5-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FU1

Initiating Condition:

ANY Loss or ANY Potential Loss of Containment

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

The Containment Barrier includes the containment building and connections up to and including the outermost containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outermost secondary side isolation valve.

The Containment Barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (i.e., Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment Barrier status is addressed by Technical Specifications.

Basis Reference(s):

1. NEI 99-01, Rev 5 Table 5-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FC1

Initiating Condition:

Critical Safety Function Status.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. **Core Cooling CSF - RED Path** conditions exist.

POTENTIAL LOSS

2. **Core Cooling CSF - ORANGE Path** conditions exist.

   OR

3. **Heat Sink CSF - RED Path** conditions exist.

Basis:

Loss Threshold #1 Basis:

Core Cooling - RED indicates significant superheating and core uncovery and is considered to indicate loss of the Fuel Clad Barrier.

Potential Loss Threshold #2 Basis:

Core Cooling - ORANGE indicates subcooling has been lost and that some clad damage may occur.

Potential Loss Threshold #3 Basis:

Heat Sink - RED when heat sink is required indicates the ultimate heat sink function is under extreme challenge.

Basis Reference(s):

1. NEI 99-01, Rev 5 Table 5-F-3
2. 1/2 BST-2 Core Cooling Unit 1/2
3. 1/2 BFR-C.1 Response to Inadequate Core Cooling Unit 1/2
4 1/2 BFR-C.2 Response to Degraded Core Cooling Unit 1/2
5. 1/2 BST-3 Heat Sink Unit 1/2
6. 1/2 BFR H.1, Response to Loss of Secondary Heat Sink Unit 1/2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FC2

Initiating Condition:

Primary Coolant Activity Level

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

Coolant activity **> 300 uCi/gm** Dose Equivalent I-131.

Basis:

300 uCi/gm Dose Equivalent I-131 is well above that expected for iodine spikes and corresponds to less than 5% fuel clad damage. This amount of radioactivity indicates significant clad damage and thus the Fuel Clad Barrier is considered lost.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev 5 Table 5-F-3
2. S&L calculation BB-ER-02, Rev 0

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FC4

Initiating Condition:

Core Exit Thermocouple Readings

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. Average of the ten highest reading core exit thermocouples (CETCs) is **≥ 1200° F**.

POTENTIAL LOSS

2. Average of the ten highest reading core exit thermocouples (CETCs) is **≥ 700° F**.

Basis:

A failed CETC Channel can lead to indication of the CETC > 700° F until the system removes the failed channel from average. Fission product barrier loss or potential loss is based on VALID CETC readings.

Loss Threshold #1 Basis

The CETC value corresponds to the Core Cooling Critical Safety Function RED path but is evaluated separately from the CSF Status. The elevated temperature corresponds to significant superheating of the coolant and is indicative of a loss of the Fuel Cladding barrier.

Core Exit Thermocouple Readings are included in addition to the Critical Safety Functions to include conditions when the CSFs may not be in use (initiation after SI is blocked).

Potential Loss Threshold #2 Basis

The CETC value corresponds to the Core Cooling Critical Safety Function ORANGE path but is evaluated separately from the CSF Status because the CSF evaluation considers the degree of subcooling prior to status determination. The elevated temperature corresponds to a loss of subcooling and is indicative of a Potential Loss of the Fuel Cladding barrier.

Basis Reference(s):

1. NEI 99-01, Rev 5 Table 5-F-3
2. 1/2 BST-2 Core Cooling Unit 1/2
3. 1/2 BFR-C.1 Response to Inadequate Core Cooling Unit 1/2
4. 1/2 BFR-C.2 Response to Degraded Core Cooling Unit 1/2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FC5

Initiating Condition:

Reactor Vessel Water Level

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

POTENTIAL LOSS

Core Cooling CSF - ORANGE Path conditions exist.

Basis:

There is no Loss threshold associated with this item.

The value for the Potential Loss threshold corresponds to the top of the active fuel.

Basis Reference(s):

1. NEI 99-01, Rev 5 Table 5-F-3
2. 1/2 BFR-C.2 Response to Degraded Core Cooling Unit 1/2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FC8

Initiating Condition:

Containment Radiation Monitoring

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

Containment radiation monitor (AR020 (21)) reading **> 1.95E+03 R/hr**.

Basis:

The Containment radiation monitor reading is a value which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the containment.

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 Loss threshold. Thus, this threshold indicates a loss of both the Fuel Clad barrier and RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev 5 Table 5-F-3
2. Core Damage Assessment Methodology

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FC9

Initiating Condition:

Emergency Director Judgment

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. Any condition in the opinion of the Emergency Director that indicates Loss of the Fuel Clad Barrier.

POTENTIAL LOSS

2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Fuel Clad Barrier.

Basis:

These thresholds address 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 threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

Basis Reference(s):

1. NEI 99-01, Rev 5 Table 5-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

RC1

Initiating Condition:

Critical Safety Function Status.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

POTENTIAL LOSS

1. **RCS Integrity CSF - RED Path** conditions exist.

   OR

2. **Heat Sink CSF - RED Path** conditions exist.

Basis:

The RCS Barrier includes the RCS primary side and its connections up to and including the pressurizer safety and relief valves, and other connections up to and including the primary isolation valves.

Potential Loss Threshold #1 Basis

RCS Integrity - RED indicates an extreme challenge to the safety function derived from appropriate instrument readings.

Potential Loss Threshold #2 Basis

Heat Sink - RED when heat sink is required indicates the ultimate heat sink function is under extreme challenge.

There is no Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev 5 Table 5-F-3
2. 1/2 BST-4 Integrity Unit 1/2
3. 1/2 BFR-P.1 Response To Imminent Pressurized Thermal Shock Condition Unit 1/2
4. 1/2 BST-3 Heat Sink Unit 1/2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

RC5

Initiating Condition:

RCS Leak Rate

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. RCS leakage **> available makeup capacity** resulting in loss of subcooling as indicated by CETCs **< ACCEPTABLE VALUE** per Iconic Display or RCS Subcooling Margin Figure 1/2 BST 2-1.

POTENTIAL LOSS

2. UNISOLABLE leak exceeding the capacity of one charging pump in the normal charging mode.

Basis:

UNISOLABLE: is a breach or leak that cannot be promptly isolated.

Promptly allows for actions to be taken to isolate the leak. Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

The RCS Barrier includes the RCS primary side and its connections up to and including the pressurizer safety and relief valves, and other connections up to and including the primary isolation valves.

Loss Threshold #1 Basis

This threshold addresses conditions where leakage from the RCS is greater than available inventory control capacity such that a loss of subcooling has occurred. The loss of subcooling is the fundamental indication that the inventory control systems are inadequate in maintaining RCS pressure and inventory against the mass loss through the leak.

Potential Loss Threshold #2 Basis

This threshold is based on the apparent inability to maintain normal liquid inventory within the Reactor Coolant System (RCS) by normal operation of the Chemical and Volume Control System which is considered to be the flow rate equivalent to one charging pump discharging to the charging header. Isolating letdown is a standard abnormal operating procedure action and may prevent unnecessary classifications when a non-RCS leakage path such as a CVCS leak exists. The intent of this condition is met if attempts to isolate Letdown are NOT successful. Additional charging pumps being required is indicative of a substantial RCS leak.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

RC5 (cont.)

Basis Reference(s):

1. NEI 99-01, Rev 5 Table 5-F-3
2. 1/2 BST-2 Core Cooling Unit 1/2
3. 1/2 BFR-C.1 Response to Inadequate Core Cooling Unit 1/2
4. NES-G-14.02, Calculation No. BYR99-010 / BRW-99-0017-I
5. UFSAR Fig. 6.3-4

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

RC6

Initiating Condition:

SG Tube Rupture

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

Steam Generator Tube Rupture that requires/results in entry into BEP-3.

Basis:

RUPTURED: In a steam generator, existence of primary-to-secondary leakage of a magnitude sufficient to require or cause a reactor trip and safety injection.

This threshold addresses the full spectrum of Steam Generator (SG) tube rupture events in conjunction with Containment barrier Loss thresholds. It addresses RUPTURED SG(s) for which the leakage is large enough to cause actuation of ECCS (SI). This is consistent to the RCS leak rate barrier Potential Loss threshold.

By itself, this threshold will result in the declaration of an Alert. However, if the SG is also FAULTED (i.e., two barriers failed), the declaration escalates to a Site Area Emergency per Containment barrier Loss thresholds.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev 5 Table 5-F-3
2. NES-G-14.02, Calculation No. BYR99-010 / BRW-99-0017-I
3. 1/2 BEP-0 Reactor Trip Or Safety Injection Unit 1/2
4. 1/2 BEP-3 Steam Generator Tube Rupture Unit 1/2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

RC8

Initiating Condition:

Containment Radiation Monitoring

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

Containment radiation monitor (AR020(21)) reading **> 25 R/hr**.

Basis:

The RCS Barrier includes the RCS primary side and its connections up to and including the pressurizer safety and relief valves, and other connections up to and including the primary isolation valves.

This value indicates the release of reactor coolant to the containment.

This reading is less than that specified for Fuel Clad barrier threshold. Thus, this threshold would be indicative of a RCS leak only. If the radiation monitor reading increased to that specified by Fuel Clad barrier threshold, fuel damage would also be indicated.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

RC9

Initiating Condition:

Emergency Director Judgment.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. Any condition in the opinion of the Emergency Director that indicates Loss of the RCS Barrier.

POTENTIAL LOSS

2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the RCS Barrier.

Basis:

The RCS Barrier includes the RCS primary side and its connections up to and including the pressurizer safety and relief valves, and other connections up to and including the primary isolation valves.

These thresholds address 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 threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

Basis Reference(s):

1. NEI 99-01, Rev 5 Table 5-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT1

Initiating Condition:

Critical Safety Function Status.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

POTENTIAL LOSS

Containment CSF - RED Path conditions exist.

Basis:

The Containment Barrier includes the containment building, its connections up to and including the outboard containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outboard secondary side isolation valve.

RED path indicates an extreme challenge to the safety function derived from appropriate instrument readings and/or sampling results, and thus represents a potential loss of containment.
Conditions leading to Containment RED path result from RCS barrier and/or Fuel Clad Barrier Loss. Thus, this threshold is primarily a discriminator between Site Area Emergency and General Emergency representing a potential loss of the third barrier.

There is no Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev 5 Table 5-F-3
2. 1/2 BST-5 Containment Unit 1/2
3. 1/2 BFR-Z.1 Response to High Containment Pressure Unit 1/2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT3

Initiating Condition:

Containment Pressure

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. Rapid unexplained drop in Containment pressure following initial pressure rise.

   OR

2. Containment pressure or water level response **not** consistent with LOCA conditions.

POTENTIAL LOSS

3. Containment pressure **≥ 50 psig** and rising.

   OR

4. Hydrogen concentration in Containment **≥ 5%.**

   OR

5. a. Containment pressure **≥ 20 psig.**

      AND

   b. Less than one train of Containment Spray operating.

Basis:

The Containment Barrier includes the containment building, its connections up to and including the outboard containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outboard secondary side isolation valve.

Loss Thresholds #1 and #2 Basis:

Rapid unexplained loss of pressure (i.e., not attributable to containment spray or condensation effects) following an initial pressure rise from a primary or secondary high energy line break indicates a loss of containment integrity. Containment pressure and sump levels should rise as a result of mass and energy release into containment from a LOCA. Thus, sump level or pressure not rising indicates containment breach and a loss of containment integrity.

This indicator relies on operator recognition of an unexpected response for the condition and therefore does not have a specific value associated with it. The unexpected response is important because it is the indicator for a containment breach condition.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT3 (cont.)

Basis (cont.):

Potential Loss Threshold #3 Basis:

The pressure is based on the containment design pressure.

Potential Loss Threshold #4 Basis:

If hydrogen concentration reaches or exceeds 5% in an oxygen rich environment, a potentially explosive mixture exists. If the combustible mixture ignites inside containment, loss of the Containment barrier could occur.

Potential Loss Threshold #5 Basis:

This threshold represents a potential loss of containment in that the containment heat removal/depressurization system are either lost or performing in a degraded manner, as indicated by containment pressure greater than the setpoint at which the equipment was supposed to have actuated.

Basis Reference(s):

1. NEI 99-01, Rev 5 Table 5-F-3
2. UFSAR Section 15.6.5.2.1
3. 1/2 BST-5 Containment Unit 1/2
4. NES-G-14.02, Calculation No. BYR99-010 / BRW-99-0017-I
5. Technical Specifications 3.6.6

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT4

Initiating Condition:

Core Exit Thermocouple Readings

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

POTENTIAL LOSS

1. a. Average of the ten highest reading core exit thermocouples (CETCs) is **> 1200° F**

   AND

   b. Functional Restoration procedures **not** effective in **< 15 minutes**.

   OR

2. a. Average of the ten highest reading core exit thermocouples (CETCs) is **> 700° F**

   AND

   b. RVLIS plenum region **= 0%.**

   AND

   c. Functional Restoration procedures **not** effective in **< 15 minutes.**

Basis:

A failed CETC Channel can lead to indication of the CETC ≥ 700° F until the system removes the failed channel from average. Fission product barrier loss or potential loss is based on VALID CETC readings.

The Containment Barrier includes the containment building, its connections up to and including the outboard containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outboard secondary side isolation valve.

Potential Loss Threshold #1 and #2 Basis:

The conditions in these thresholds represent an IMMINENT core melt sequence which, if not corrected, could lead to vessel failure and an increased potential for containment failure. In conjunction with the Core Cooling and RCS Leakage criteria in the Fuel and RCS barrier columns, this threshold would result in the declaration of a General Emergency -- loss of two barriers and the potential loss of a third. If the functional restoration procedures are ineffective, there is no "success" path.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT4 (cont.)

Basis (cont.)

The functional restoration procedures are those emergency operating procedures that address the recovery of the core cooling critical safety functions. The procedure is considered effective if the temperature is decreasing or if the vessel water level is increasing.

Whether or not the procedures will be effective should be apparent within 15 minutes. The Emergency Director should make the declaration as soon as it is determined that the procedures have been, or will be ineffective.

There is no Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev 5 Table 5-F-3
2. 1/2 BST-2 Core Cooling Unit 1/2
3. 1/2 BFR-C.1 Response to Inadequate Core Cooling Unit 1/2
4. 1/2 BFR-C.2 Response to Degraded Core Cooling Unit 1/2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT6

Initiating Condition:

SG Secondary Side Release with Primary to Secondary Leakage

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. RUPTURED S/G is also FAULTED outside of Containment.

   OR

2. a. Primary-to-Secondary leakrate **> 10 gpm.**

      AND

   b. UNISOLABLE steam release from affected S/G to the environment.

Basis:

RUPTURED: in a steam generator, existence of primary-to-secondary leakage of a magnitude sufficient to require or cause a reactor trip and safety injection.

FAULTED: in a steam generator, the existence of secondary side leakage that results in an uncontrolled drop in steam generator pressure or the steam generator being completely depressurized.

UNISOLABLE: is a breach or leak that cannot be promptly isolated.

Promptly allows for actions to be taken to isolate the leak. Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

The Containment Barrier includes the containment building, its connections up to and including the outboard containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outboard secondary side isolation valve.

The loss threshold recognizes that SG tube leakage can represent a bypass of the Containment barrier as well as a loss of the RCS barrier.

Users should realize that the two loss thresholds could be considered redundant. This was recognized during the development process. The inclusion of a threshold that uses Emergency Procedure commonly used terms like “RUPTURED and FAULTED” adds to the ease of the classification process and has been included based on this human factor concern.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT6 (cont.)

Basis (cont.)

This threshold results in an UE for smaller breaks that; (1) do not exceed the normal charging capacity threshold in RCS leak rate barrier Potential Loss threshold, or (2) do not result in ECCS actuation in RCS SG tube rupture barrier Loss threshold. For larger breaks, RCS barrier threshold criteria would result in an Alert. For SG tube ruptures which may involve multiple steam generators or unisolable secondary line breaks, this threshold would exist in conjunction with RCS barrier thresholds and would result in a Site Area Emergency. Escalation to General Emergency would be based on “Loss” or "Potential Loss" of the Fuel Clad Barrier.

Loss Threshold #1 Basis:

This threshold addresses the condition in which a RUPTURED steam generator is also FAULTED. This condition represents a bypass of the RCS and containment barriers and is a subset of the second threshold. In conjunction with RCS leak rate barrier loss threshold, this would always result in the declaration of a Site Area Emergency.

Loss Threshold #2 Basis:

This threshold addresses SG tube leaks that exceed 10 gpm in conjunction with an UNISOLABLE release path to the environment from the affected steam generator. The threshold for establishing the UNISOLABLE secondary side release is intended to be a prolonged release of radioactivity from the RUPTURED steam generator directly to the environment. This could be expected to occur when the main condenser is unavailable to accept the contaminated steam (i.e., SG tube rupture with concurrent loss of off-site power and the RUPTURED steam generator is required for plant cooldown or a stuck open relief valve). If the main condenser is available, there may be releases via air ejectors, gland seal exhausters, and other similar controlled, and often monitored, pathways. These pathways do not meet the intent of an UNISOLABLE release path to the environment. These minor releases are assessed using Abnormal Rad Levels / Radiological Effluent EALs.

Basis Reference(s):

1. NEI 99-01, Rev 5 Table 5-F-3
2. 1/2 BEP-0 Reactor Trip Or Safety Injection Unit 1/2
3. 1/2 BEP-3 Steam Generator Tube Rupture Unit 1/2
4. 1/2 BOA SEC-8 Steam Generator Tube Leak Unit 1/2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT7

Initiating Condition:

Containment Isolation Failure or Bypass

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. Failure of isolation valves in any one line to close.

   AND

2. Direct downstream pathway to the environment exists after a containment isolation signal.

Basis:

The Containment Barrier includes the containment building, its connections up to and including the outboard containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outboard secondary side isolation valve.

Failure of containment isolation valves to isolate with a downstream pathway to the environment is only a concern during an event requiring mitigation by the Containment Barrier. If this condition exists during normal power operations, a Technical Specification Action Statement will address it. However, during events requiring Containment integrity, this will represent a breach of Containment.

This threshold addresses incomplete containment isolation that allows direct release (gaseous or liquid flowpath) to the environment outside of containment (for example into the Auxiliary Bldg, Turbine Bldg or outside atmosphere). It represents a loss of the containment barrier.

This threshold addresses failure of open isolation devices, which should close upon receipt of a manual or automatic containment isolation signal resulting in a radiological release pathway to the environment. The concern is the UNISOLABLE open pathway to the environment. A failure of the ability to close any open isolation valves in any one line indicates a breach of containment integrity.

Leakage into a closed system is to be considered only if the closed system is breached and thereby creates a significant pathway to the environment. Examples include UNISOLABLE containment atmospheric vent paths as well as UNISOLABLE primary systems (RCS). If the primary system leakage outside containment cannot be isolated, a loss of both the RCS and the Containment barriers results. No leakage threshold is specified since leaks outside containment, particularly under dynamic conditions, are difficult to quantify and may manifest themselves with diverse symptoms.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT7 (cont.)

Basis (cont.):

The use of the modifier “direct” in defining the release path discriminates against release paths through interfacing liquid systems. The existence of an in–line charcoal filter does not make a release path indirect since the filter is not effective at removing fission product noble gases. Typical filters have an efficiency of 95-99% removal of iodine. Given the magnitude of the core inventory of iodine, significant releases could still occur. In addition, since the fission product release would be driven by boiling in the reactor vessel, the high humidity in the release stream can be expected to render the filters ineffective in a short period.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev 5 Table 5-F-3
2. NES-G-14.02, Calculation No. BYR99-010 / BRW-99-0017-I
3. UFSAR Fig. 6.3-4

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT8

Initiating Condition:

Containment Radiation Monitoring

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

POTENTIAL LOSS

Containment radiation monitor (AR020 (21)) reading **> 4.40E+03 R/hr**.

Basis:

The Containment Barrier includes the containment building, its connections up to and including the outboard containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outboard secondary side isolation valve.

The Containment radiation monitor value indicates significant fuel damage well in excess of the thresholds associated with both loss of Fuel Clad and loss of RCS barriers.

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.

There is no Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev 5 Table 5-F-3
2. Core Damage Assessment Methodology

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT9

Initiating Condition:

Emergency Director Judgment

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. Any condition in the opinion of the Emergency Director that indicates Loss of the Containment Barrier.

POTENTIAL LOSS

2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment Barrier.

Basis:

The Containment Barrier includes the containment building, its connections up to and including the outboard containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outboard secondary side isolation valve.

These thresholds address any other factors that are to be used by the Emergency Director in determining whether the Containment barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

The Containment barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment barrier status is addressed by Technical Specifications.

Basis Reference(s):

1. NEI 99-01, Rev 5 Table 5-F-3

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG1

Initiating Condition:

Prolonged loss of all Off-site and all On-Site AC power to emergency busses.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to unit ESF busses.

   AND

2. Failure of DG 1A(2A) and DG 1B(2B) emergency diesel generators to supply power to unit ESF busses.

   AND

3. a. Restoration of at least one unit ESF bus in **< 4 hours** is **not** likely.

      OR

   b. **EITHER** of the following:

      - **Core Cooling CSF - RED Path** conditions exist.

        OR

      - **Core Cooling CSF - ORANGE Path** conditions exist.

Basis:

Loss of all AC power to emergency busses compromises all plant safety systems requiring electric power. Prolonged loss of all AC power to emergency busses will lead to loss of fuel clad, RCS, and containment, thus warranting declaration of a General Emergency.

This EAL is specified to assure that in the unlikely event of a prolonged station blackout, timely recognition of the seriousness of the event occurs and that declaration of a General Emergency occurs as early as is appropriate, based on a reasonable assessment of the event trajectory.

The emergency busses of the affected unit can be powered from the unaffected unit through the crosstie breakers. Unit crosstie is considered an adequate source of offsite power when evaluating this EAL.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG1 (cont.)

Basis (cont.):

The likelihood of restoring at least one emergency bus should be based on a realistic appraisal of the situation since a delay in an event classification escalation decision based on only a chance of mitigating the event could result in a loss of valuable time in preparing and implementing public protective actions.

In addition, under these conditions, fission product barrier monitoring capability may be degraded.

Basis Reference(s):

1. NEI 99-01, Rev 5 SG1
2. 20E-0-4001 Station One Line Diagram
3. UFSAR 8.3.1
4. 1/2 BOA ELEC-3 Loss Of 4KV ESF Bus Unit 1/2
5. 1/2 BOA ELEC-4 Loss Of Offsite Power Unit 1/2
6. 1/2 BCA-0.0 Loss Of All AC Power Unit 1/2
7. 1/2 BCA-0.1 Loss Of All AC Power Recovery Without SI Required Unit 1/2
8. 1/2 BCA-0.2 Loss Of All AC Power Recovery With SI Required Unit 1/2
9. 1/2 BCA-0.3 Response To Opposite Unit Loss Of All AC Power Unit 1/2
10. BOP AP-51, Isolating Unit 1 System AUX Transformer 142-1 & 142-2 While Unit Is At Power
11. BOP AP-52, Restoring Unit 1 System AUX Transformer 142-1 & 142-2 During Power Operation
12. BOP AP-53, Isolating Unit 2 System AUX Transformer 242-1 & 242-2 While Unit Is At Power
13. BOP AP-54, Restoring Unit 2 System AUX Transformer 242-1 & 242-2 During Power Operation
14. Safety Evaluations of the Byron Station and Byron Station Responses to the Station Blackout (SBO) Rule (TAC NOS. 68522, 68523 AND 68515, 68516)
15. 1/2 BST-2 Core Cooling Unit 1/2
16. 1/2 BFR-C.1 Response to Inadequate Core Cooling Unit 1/2
17. 1/2 BFR-C.2 Response to Degraded Core Cooling Unit 1/2

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS1

Initiating Condition:

Loss of all Off-site and all On-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to unit ESF busses.

   AND

2. Failure of DG 1A(2A) and DG 1B(2B) emergency diesel generators to supply power to unit ESF busses.

   AND

3. Failure to restore power to at least one unit ESF bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.

Basis:

Loss of all AC power to emergency busses compromises all plant safety systems requiring electric power. Prolonged loss of all AC power to emergency busses will lead to loss of Fuel Clad, RCS, and Containment, thus this event can escalate to a General Emergency.

The emergency busses of the affected unit can be powered from the unaffected unit through the crosstie breakers. Unit crosstie is considered an adequate source of offsite power when evaluating this EAL.

Fifteen minutes was selected as a threshold to exclude momentary losses of off-site power.

Escalation to General Emergency is via Fission Product Barrier Degradation or MG1, "Prolonged Loss of All Off-site Power and Prolonged Loss of All On-site AC Power."

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS1 (cont.)

Basis Reference(s):

1. NEI 99-01, Rev 5 SS1
2. 20E-0-4001 Station One Line Diagram
3. UFSAR 8.3.1
4. 1/2 BOA ELEC-3 Loss Of 4KV ESF Bus Unit 1/2
5. 1/2 BOA ELEC-4 Loss Of Offsite Power Unit 1/2
6. 1/2 BCA-0.0 Loss Of All AC Power Unit 1/2
7. 1/2 BCA-0.1 Loss Of All AC Power Recovery Without SI Required Unit 1/2
8. 1/2 BCA-0.2 Loss Of All AC Power Recovery With SI Required Unit 1/2
9. 1/2 BCA-0.3 Response To Opposite Unit Loss Of All AC Power Unit 1/2
10. BOP AP-51, Isolating Unit 1 System AUX Transformer 142-1 & 142-2 While Unit Is At Power
11. BOP AP-52, Restoring Unit 1 System AUX Transformer 142-1 & 142-2 During Power Operation
12. BOP AP-53, Isolating Unit 2 System AUX Transformer 242-1 & 242-2 While Unit Is At Power
13. BOP AP-54, Restoring Unit 2 System AUX Transformer 242-1 & 242-2 During Power Operation
14. Safety Evaluations of the Byron Station and Byron Station Responses to the Station Blackout (SBO) Rule (TAC NOS. 68522, 68523 AND 68515, 68516)

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA1

Initiating Condition:

AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. AC power capability to unit ESF busses reduced to only one of the following power sources for **≥ 15 minutes**:
   - Affected unit SAT 142-1(242-1)
   - Affected unit SAT 142-2(242-2)
   - Emergency Diesel Generator DG 1A(2A)
   - Emergency Diesel Generator DG 1B(2B)
   - Unit crosstie breakers

   AND

2. Any additional single power source failure will result in unit blackout.

Basis:

Capability: (pertaining to electrical power supplies) is equipment that is available to provide and maintain AC power at the required voltage and frequency for the required load.

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. Another related condition could be the loss of all off-site power and loss of on-site emergency generators with only one train of emergency busses being backfed from the unit main generator, or the loss of on-site emergency generators with only one train of emergency busses being backfed from off-site power. The subsequent loss of this single power source would escalate the event to a Site Area Emergency in accordance with MS1.

Fifteen minutes was selected as a threshold to exclude momentary losses of power.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA1 (cont.)

Basis Reference(s):

1. NEI 99-01, Rev 5 SA5
2. 20E-0-4001 Station One Line Diagram
3. UFSAR 8.3.1
4. 1/2 BOA ELEC-3 Loss Of 4KV ESF Bus Unit 1/2
5. 1/2 BOA ELEC-4 Loss Of Offsite Power Unit 1/2
6. 1/2 BCA-0.0 Loss Of All AC Power Unit 1/2
7. 1/2 BCA-0.1 Loss Of All AC Power Recovery Without SI Required Unit 1/2
8. 1/2 BCA-0.2 Loss Of All AC Power Recovery With SI Required Unit 1/2
9. 1/2 BCA-0.3 Response To Opposite Unit Loss Of All AC Power Unit 1/2
10. BOP AP-51, Isolating Unit 1 System AUX Transformer 142-1 & 142-2 While Unit Is At Power
11. BOP AP-52, Restoring Unit 1 System AUX Transformer 142-1 & 142-2 During Power Operation
12. BOP AP-53, Isolating Unit 2 System AUX Transformer 242-1 & 242-2 While Unit Is At Power
13. BOP AP-54, Restoring Unit 2 System AUX Transformer 242-1 & 242-2 During Power Operation
14. Safety Evaluations of the Byron Station and Byron Station Responses to the Station Blackout (SBO) Rule (TAC NOS. 68522, 68523 AND 68515, 68516)

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU1

Initiating Condition:

Loss of all Off-site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of all off-site AC power to unit ESF busses for **≥ 15 minutes**.

Basis:

Prolonged loss of off-site 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 to emergency busses.

Fifteen minutes was selected as a threshold to exclude momentary losses of off-site power.

Basis Reference(s):

1. NEI 99-01, Rev 5 SU1
2. 20E-0-4001 Station One Line Diagram
3. UFSAR 8.3.1
4. 1/2 BOA ELEC-3 Loss Of 4KV ESF Bus Unit 1/2
5. 1/2 BOA ELEC-4 Loss Of Offsite Power Unit 1/2
6. 1/2 BCA-0.0 Loss Of All AC Power Unit 1/2
7. 1/2 BCA-0.1 Loss Of All AC Power Recovery Without SI Required Unit 1/2
8. 1/2 BCA-0.2 Loss Of All AC Power Recovery With SI Required Unit 1/2
9. 1/2 BCA-0.3 Response To Opposite Unit Loss Of All AC Power Unit 1/2
10. BOP AP-51, Isolating Unit 1 System AUX Transformer 142-1 & 142-2 While Unit Is At Power
11. BOP AP-52, Restoring Unit 1 System AUX Transformer 142-1 & 142-2 During Power Operation
12. BOP AP-53, Isolating Unit 2 System AUX Transformer 242-1 & 242-2 While Unit Is At Power
13. BOP AP-54, Restoring Unit 2 System AUX Transformer 242-1 & 242-2 During Power Operation

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG2

Initiating Condition:

Automatic Trip and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic Reactor Trip was **not** successful as indicated by Reactor Power **≥ 5%**.

   AND

2. Manual actions were **not** successful as indicated by Reactor Power **≥ 5%**.

   AND

3. **EITHER** of the following exists:

   - **Core Cooling CSF – RED Path** conditions exist.

     OR

   - **Heat Sink CSF – RED Path** conditions exist.

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful.

The third condition of this EAL indicates an extreme challenge to the ability to cool the core. In the event either of these challenges exists at a time that the reactor has not been brought below the power associated with the safety system design a core melt sequence exists. In this situation, core degradation can occur rapidly. For this reason, the General Emergency declaration is intended to be anticipatory of the fission product barrier table declaration to permit maximum off-site intervention time.

Basis Reference(s):

1. NEI 99-01, Rev 5 SG2
2. 1/2 BST-1 Subcriticality Unit 1/2
3. 1/2 BST-2 Core Cooling Unit 1/2
4. 1/2 BST-3 Heat Sink Unit 1/2
5. 1/2 BFR-S.1 Response to Nuclear Power Generation/ATWS Unit 1/2
6. 1/2 BFR H.1 Response to Loss of Secondary Heat Sink Unit 1/2
7. 1/2 BFR C.1 Response to Inadequate Core Cooling Unit 1/2

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS2

Initiating Condition:

Automatic Trip fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic Reactor Trip was **not** successful as indicated by Reactor Power **≥ 5%**.

   AND

2. Manual Reactor Trip from Main Control Board was **not** successful as indicated by Reactor Power **≥ 5%**.

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful. A Site Area Emergency is warranted because conditions exist that lead to IMMINENT loss or potential loss of both fuel clad and RCS.

Manual Trip actions taken at the Main Control Board are any set of actions by the reactor operator(s) at which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

Manual Trip actions are not considered successful if action away from the Main Control Board is required to trip the reactor. This EAL is still applicable even if actions taken away from the Main Control Board are successful in shutting the reactor down because the design limits of the fuel may have been exceeded or because of the gross failure of the Reactor Protection System to shutdown the plant.

Escalation of this event to a General Emergency would be due to a prolonged condition leading to an extreme challenge to either core-cooling or heat removal.

Basis Reference(s):

1. NEI 99-01, Rev 5 SS2
2. 1/2 BST-1 Subcriticality Unit 1/2
3. 1/2 BFR-S.1 Response to Nuclear Power Generation/ATWS Unit 1/2
4. 1/2 BOSR 0.1-1,2,3 Unit One(Two) Mode 1, 2, & 3 Shiftly and Daily Operating Surveillance

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA2

Initiating Condition:

Automatic Trip fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic Reactor Trip was **not** successful as indicated by Reactor Power **≥ 5%**.

   AND

2. Manual Reactor Trip from Main Control Board was successful as indicated by Reactor Power **< 5%**.

Basis:

Manual Trip actions taken at the Main Control Board are any set of actions by the reactor operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

This condition indicates failure of the automatic protection system to trip the reactor in response to exceeding reactor protective system setpoints during a plant transient. Associated RPS instrument failures during non-transient plant conditions would be addressed by Technical Specifications. This condition is more than a potential degradation of a safety system in that a front line automatic protection system did not function in response to a plant transient. Thus the plant safety has been compromised because design limits of the fuel may have been exceeded. An Alert is indicated because conditions may exist that lead to potential loss of fuel clad or RCS and because of the failure of the Reactor Protection System to automatically shutdown the plant.

If manual actions taken at the Main Control Board fail to shutdown the reactor, the event would escalate to a Site Area Emergency.

Basis Reference(s):

1. NEI 99-01, Rev 5 SA2
2. 1/2 BST-1 Subcriticality Unit 1/2
3. 1/2 BFR-S.1 Response to Nuclear Power Generation/ATWS Unit 1/2

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU2

Initiating Condition:

Inadvertent criticality.

Operating Mode Applicability:

3, 4

EAL Threshold Values:

UNPLANNED sustained positive startup rate observed on nuclear instrumentation.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

The term “sustained” is used in order to allow exclusion of expected short term positive startup rates from planned fuel bundle or control rod movements during core alteration. These short term positive startup rates are the result of the increase in neutron population due to subcritical multiplication]

This EAL addresses inadvertent criticality events. This EAL excludes inadvertent criticalities that occur during planned reactivity changes associated with reactor startups (e.g., criticality earlier than estimated).

This EAL indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification.

Basis Reference(s):

1. NEI 99-01, Rev 5 SU8
2. 0/1/2 BOSR XZB-R1, Unit 0/1/2 Meter Zone Banding
3. 1/2 BFR-S.1, Response To Nuclear Power Generation/ATWS Unit 1/2
4. Technical Specifications LCO 3.3.1
5. 1/2 BOSR 0.1-4, Unit One(Two) Mode 4 Shiftly And Daily Operating Surveillance
6. 1/2 BGP 100-2 Plant Startup
7. 1/2 BGP 100-2T3 Reactor Startup Flowchart
8. 1/2 BGP 100-6T4 Core Alteration/Fuel Movement Checklist
9. Regulatory Guide 8.12, Criticality Accident Alarm Systems

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS3

Initiating Condition:

Loss of all vital DC power for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of all vital DC power based on **< 108 VDC** on unit 125 VDC battery busses 111(211) and 112(212) for **≥ 15 minutes**.

Basis:

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power will cause core uncovering and loss of containment integrity when there is significant decay heat and sensible heat in the reactor system.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Escalation to a General Emergency would occur by Abnormal Rad Levels/Radiological Effluent, Fission Product Barrier Degradation.

Basis Reference(s):

1. NEI 99-01, Rev 5 SS3
2. UFSAR 8.3.2.1.1
3. 6E-0-4001 Station One Line Diagram
4. BAR 1/2-21-E10 125V DC PNL 111/113 (211/213) VOLT LOW
5. BAR 1/2-22-E10 125V DC PNL 112/114 (212/214) VOLT LOW
6. 1/2 BOA ELEC - 1 Loss of DC Bus Unit 1/2

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS4

Initiating Condition:

Inability to monitor a SIGNIFICANT TRANSIENT in progress.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of **greater than approximately 75%** of the following for **> 15 minutes:**
   - Safety System annunciators (Table M1)

     OR
   - Safety System indications (Table M1)

   AND
2. SIGNIFICANT TRANSIENT in progress (Table M2).

   AND
3. Compensatory indications (computer points) are unavailable.

Table M1 – Safety Systems
• Gen & Aux Power (1/2 PM01J MCB) • Reactor and Chem Volume Control (1/2 PM05J MCB) • Eng. Safety Features (1/2 PM06J MCB) • Process/Area Radiation Monitoring

Table M2 - Significant Transients
• Automatic Turbine Runback **> 25%** thermal reactor power • Electrical load rejection **> 25%** full electrical load • Reactor Trip • Safety Injection Actuation • Thermal power oscillations **> 10%**

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS4 (cont.)

Basis:

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) automatic turbine runback > 25% thermal reactor power, (2) electrical load rejection > 25% full electrical load, (3) Reactor Trip, (4) Safety Injection Actuation, or (5) thermal power oscillations >10%.

This EAL is intended to recognize the threat to plant safety associated with the complete loss of capability of the control room staff to monitor plant response to a SIGNIFICANT TRANSIENT.

"Planned" and “UNPLANNED” actions are not differentiated since the loss of instrumentation of this magnitude is of such significance during a transient that the cause of the loss is not a factor.
Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

A Site Area Emergency is considered to exist if the control room staff cannot monitor safety systems needed for protection of the public while a significant transient is in progress.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS4 (cont.)

Basis (cont):

Indications needed to monitor safety systems necessary for protection of the public must include control room indications; computer generated indications and dedicated annunciation capability. The specific parameters are those used to determine such functions as the ability to shut down the reactor, maintain the core cooled and in a coolable geometry, remove heat from the core, and maintain the reactor coolant system and primary containment.

"Compensatory indications" in this context includes computer based information. This includes all computer systems available for this use.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Basis Reference(s):

1. NEI 99-01, Rev 5 SS6
2. Drawing 20E-0-3372B Auxiliary Building Main Control Room Panel El 451'
3. BAP 300-1A1 At the Controls and Horse-Shoe Areas
4. BOP AN-1 Annunciator System Startup
5. UFSAR E.17
6. BAR 1/2-4-A7, AN SYS PWR SUP TROUBLE
7. BAR 1/2-4-D7, AN SYS GROUND
8. BAR 1/2-4-E7, AN SYS FIELD CONTACT PWR TROUBLE
9. BAR 1/2-4-A6, COMPUTER TROUBLE
10. BAR 1/2-4-B7, SER TROUBLE
11. 1/2 BOA Elect-7, Loss of Annunciators Unit 1/2

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA4

Initiating Condition:

UNPLANNED Loss of safety system annunciation or indication in the control room with EITHER (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**

   - Safety System annunciators (Table M1)

     OR

   - Safety System indications (Table M1)

Table M1 – Safety Systems
• Gen & Aux Power (1/2 PM01J MCB)
• Reactor and Chem Volume Control (1/2 PM05J MCB)
• Eng. Safety Features (1/2 PM06J MCB)
• Process/Area Radiation Monitoring

AND

2. a. SIGNIFICANT TRANSIENT in progress (Table M2).

Table M2 - Significant Transients
• Automatic Turbine Runback **> 25%** thermal reactor power
• Electrical load rejection **> 25%** full electrical load
• Reactor Trip
• Safety Injection Actuation
• Thermal power oscillations **> 10%**

OR

b. Compensatory indications (computer points) are unavailable.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA4 (cont.)

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) automatic turbine runback > 25% thermal reactor power, (2) electrical load rejection > 25% full electrical load, (3) Reactor Trip, (4) Safety Injection Actuation, or (5) thermal power oscillations > 10%.

This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a SIGNIFICANT TRANSIENT.

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

"Compensatory indications" in this context includes computer based information. If both a major portion of the annunciation system and all computer monitoring are unavailable, the Alert is required.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA4 (cont.)

Basis Reference(s):

1. NEI 99-01, Rev 5 SA4
2. Drawing 20E-0-3372B Auxiliary Building Main Control Room Panel El 451'
3. BAP 300-1A1 At the Controls and Horse-Shoe Areas
4. BOP AN-1 Annunciator System Startup
5. UFSAR E.17
6. BAR 1/2-4-A7, AN SYS PWR SUP TROUBLE
7. BAR 1/2-4-D7, AN SYS GROUND
8. BAR 1/2-4-E7, ANS SYS FIELD CONTACT PWR TROUBLE
9. BAR 1/2-4-A6, COMPUTER TROUBLE
10. BAR 1/2-4-B7, SER TROUBLE
11. 1/2 BOA Elect-7, Loss of Annunciators

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU4

Initiating Condition:

UNPLANNED loss of safety system annunciation or indication in the control room for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**

- Safety System annunciators (Table M1)

  OR

- Safety System indications (Table M1)

Table M1 – Safety Systems
• Gen & Aux Power (1/2 PM01J MCB) • Reactor and Chem Volume Control (1/2 PM05J MCB) • Eng. Safety Features (1/2 PM06J MCB) • Process/Area Radiation Monitoring

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment.

Recognition of the availability of computer based indication equipment is considered.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU4 (cont.)

Basis (cont.):

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

Fifteen minutes was selected as a threshold to exclude momentary power losses.

This Unusual Event will be escalated to an Alert based on a concurrent loss of compensatory indications or if a SIGNIFICANT TRANSIENT is in progress during the loss of annunciation or indication.

Basis Reference(s):

1. NEI 99-01, Rev 5 SU3
2. Drawing 20E-0-3372B Auxiliary Building Main Control Room Panel El 451'
3. BAP 300-1A1 At the Controls Area
4. BOP AN-1 Annunciator System Startup
5. UFSAR E.17
6. BAR 1/2-4-A7, AN SYS PWR SUP TROUBLE
7. BAR 1/2-4-D7, AN SYS GROUND
8. BAR 1/2-4-E7, ANS SYS FIELD CONTACT PWR TROUBLE
9. BAR 1/2-4-A6, COMPUTER TROUBLE
10. BAR 1/2-4-B7, SER TROUBLE
11. 1/2 BOA Elect-7, Loss of Annunciators

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU5

Initiating Condition:

RCS leakage.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

1. Unidentified or pressure boundary leakage **> 10 gpm**.

   OR

2. Identified leakage **> 25 gpm**.

Basis:

This EAL is included as an Unusual Event because it may be a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified or pressure boundary leakage was selected as it is observable with normal control room indications. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances).

Relief valve operation should be excluded from this EAL. However, a relief valve that operates and fails to close per design should be considered applicable to this EAL if the relief valve cannot be isolated.

The EAL for identified leakage is set at a higher value due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage. In either case, escalation of this EAL to the Alert level is via Fission Product Barrier.

Basis Reference(s):

1. NEI 99-01, Rev 5 SU5
2. Technical Specifications 3.4.13 & 3.4.14
3. UFSAR. 6.2, 5.2
4. 1/2 BOSR 4.13.1-1 Unit One(Two) Reactor Coolant System Water Inventory Balance 72 Hour Surveillance
5. 1/2 BOL 4.15 LCOAR - RCS Leakage Detection Instrumentation
6. 1/2 BOL 4.13 LCOAR - RCS Operational Leakage
7. 1/2 BOA PRI-1 Excessive Primary Leakage Unit 1/2
8. 1/2 BOSR 0.1-4 Unit One(Two) Mode 4 Shiftly and Daily Operating Surveillance
9. 1/2 BOSR RF-1 Unit One(Two) Containment Floor Drain Monitoring System Non-Routine Surveillance
10. 0/1/2 BOSR XZB-R1, Unit 0/1/2 Meter Zone Banding

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU6

Initiating Condition:

Loss of all On-site or Off-site communications capabilities.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

1. Loss of all Table M3 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table M3 **Offsite** communications capability affecting the ability to perform offsite notifications.

Table M3 - Communications Capability

System	Onsite	Offsite
Radios	X	
Plant page	X	
Plant Telephone System	X	
Commercial Telephones		X
ENS		X
HPN		X
Cellular Phones		X
Satellite Phones		X

Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

Basis Reference(s):

1. NEI 99-01, Rev 5 SU6
2. EP-MW-124-1001 Facilities Inventories And Equipment Tests

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU7

Initiating Condition:

Inability to reach required shutdown within Technical Specification limits.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Plant is **not** brought to required operating mode within Technical Specifications LCO Action Statement Time.

Basis:

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 Unusual Event is required when the plant is not brought 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.

Basis Reference(s):

1. NEI 99-01, Rev 5 SU2
2. Byron Technical Specifications

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA1

Initiating Condition:

Loss of all Off-site and all On-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

5, 6, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to unit ESF busses.

   AND

2. Failure of DG 1A(2A) and DG 1B(2B) emergency diesel generators to supply power to unit ESF busses.

   AND

3. Failure to restore power to at least one unit ESF bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.

Basis:

Loss of all AC power compromises all plant safety systems requiring electric power.

The event can be classified as an Alert when in cold shutdown, refueling, or defueled mode because of the significantly reduced decay heat and lower temperature and pressure, increasing the time to restore one of the emergency busses, relative to that specified for the Site Area Emergency EAL.

Escalating to Site Area Emergency, if appropriate, is by Abnormal Rad Levels / Radiological Effluent EALs.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA1 (cont.)

Basis Reference(s):

1. NEI 99-01, Rev 5 CA3
2. 20E-0-4001 Station One Line Diagram
3. UFSAR 8.3.1
4. 1/2 BOA ELEC-3 Loss Of 4KV ESF Bus Unit 1/2
5. 1/2 BOA ELEC-4 Loss Of Offsite Power Unit 1/2
6. 1/2 BCA-0.0 Loss Of All AC Power Unit 1/2
7. 1/2 BCA-0.1 Loss Of All AC Power Recovery Without SI Required Unit 1/2
8. 1/2 BCA-0.2 Loss Of All AC Power Recovery With SI Required Unit 1/2
9. 1/2 BCA-0.3 Response To Opposite Unit Loss Of All AC Power Unit 1/2
10. BOP AP-51, Isolating Unit 1 System AUX Transformer 142-1 & 142-2 While Unit Is At Power
11. BOP AP-52, Restoring Unit 1 System AUX Transformer 142-1 & 142-2 During Power Operation
12. BOP AP-53, Isolating Unit 2 System AUX Transformer 242-1 & 242-2 While Unit Is At Power
13. BOP AP-54, Restoring Unit 2 System AUX Transformer 242-1 & 242-2 During Power Operation
14. Safety Evaluations of the Byron Station and Byron Station Responses to the Station Blackout (SBO) Rule (TAC NOS. 68522, 68523 AND 68515, 68516)

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU1

Initiating Condition:

AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. AC power capability to unit ESF busses reduced to only one of the following power sources for **≥ 15 minutes**:
   - Affected unit SAT 142-1(242-1)
   - Affected unit SAT 142-2(242-2)
   - Emergency Diesel Generator DG 1A(2A)
   - Emergency Diesel Generator DG 1B(2B)
   - Unit crosstie breakers

   AND

2. Any additional single power source failure will result in unit blackout.

Basis:

Capability: (pertaining to electrical power supplies) is equipment that is available to provide and maintain AC power at the required voltage and frequency for the required load.

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. The subsequent loss of this single power source would escalate the event to an Alert in accordance with CA1.

Fifteen minutes was selected as a threshold to exclude momentary losses of power.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU1 (cont.)

Basis Reference(s):

1. NEI 99-01, Rev 5 CU3
2. 20E-0-4001 Station One Line Diagram
3. UFSAR 8.3.1
4. 1/2 BOA ELEC-3 Loss Of 4KV ESF Bus Unit 1/2
5. 1/2 BOA ELEC-4 Loss Of Offsite Power Unit 1/2
6. 1/2 BCA-0.0 Loss Of All AC Power Unit 1/2
7. 1/2 BCA-0.1 Loss Of All AC Power Recovery Without SI Required Unit 1/2
8. 1/2 BCA-0.2 Loss Of All AC Power Recovery With SI Required Unit 1/2
9. 1/2 BCA-0.3 Response To Opposite Unit Loss Of All AC Power Unit 1/2
10. BOP AP-51, Isolating Unit 1 System AUX Transformer 142-1 & 142-2 While Unit Is At Power
13. BOP AP-52, Restoring Unit 1 System AUX Transformer 142-1 & 142-2 During Power Operation
14. BOP AP-53, Isolating Unit 2 System AUX Transformer 242-1 & 242-2 While Unit Is At Power
13. BOP AP-54, Restoring Unit 2 System AUX Transformer 242-1 & 242-2 During Power Operation
14. Safety Evaluations of the Byron Station and Byron Station Responses to the Station Blackout (SBO) Rule (TAC NOS. 68522, 68523 AND 68515, 68516)

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU2

Initiating Condition:

Inadvertent criticality.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

UNPLANNED sustained positive startup rate observed on nuclear instrumentation.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

The term “sustained” is used in order to allow exclusion of expected short term positive startup rates from planned fuel bundle or control rod movements during core alteration. These short term positive startup rates are the result of the increase in neutron population due to subcritical multiplication]

This EAL addresses criticality events that occur in Cold Shutdown or Refueling modes such as fuel mis-loading events and inadvertent dilution events.

This EAL indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification.

Basis Reference(s):

1. NEI 99-01, Rev 5 CU8
2. 0/1/2 BOSR XZB-R1, Unit 0/1/2 Meter Zone Banding
3. 1/2 BFR-S.1, Response To Nuclear Power Generation/ATWS Unit 1/2
4. Technical Specifications LCO 3.3.1
5. 1/2 BOSR 0.1-4, Unit One(Two) Mode 4 Shiftly And Daily Operating Surveillance
6. 1/2 BGP 100-2 Plant Startup
7. 1/2 BGP 100-2T3 Reactor Startup Flowchart
8. 1/2 BGP 100-6T4 Core Alteration/Fuel Movement Checklist
9. Regulatory Guide 8.12, Criticality Accident Alarm Systems

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU3

Initiating Condition:

Loss of required DC power for 15 minutes or longer.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of required DC power based on **< 108 VDC** on unit 125 VDC battery busses 111(211) and 112(212) for **≥ 15 minutes**.

Basis:

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.

The required busses are the minimum allowed by Technical Specifications for the mode of operation. It is intended that the loss of the operating (operable) train is to be considered. If this loss results in the inability to maintain cold shutdown, the escalation to an Alert will be per CA5.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Basis Reference(s):

1. NEI 99-01, Rev 5 CU7
2. UFSAR 8.3.2.1.1
3. 6E-0-4001 Station One Line Diagram
4. 1/2 BOA ELEC -1 Loss of DC Bus Unit 1/2
5. BAR 1/2-21-E10 125V DC PNL 111/113 (211/213) VOLT LOW
6. BAR 1/2-22-E10 125V DC PNL 112/114 (212/214) VOLT LOW

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU4

Initiating Condition:

Loss of all On-site or Off-site communications capabilities.

Operating Mode Applicability:

5, 6, D

EAL Threshold Values:

1. Loss of all Table C1 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table C1 **Offsite** communications capability affecting the ability to perform offsite notifications.

Table C1 - Communications Capability

System	Onsite	Offsite
Radios	X	
Plant page	X	
Plant Telephone System	X	
Commercial Telephones		X
ENS		X
HPN		X
Cellular Phones		X
Satellite Phones		X

Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

Basis Reference(s):

1. NEI 99-01, Rev 5 CU6
2. EP-MW-124-1001 Facilities Inventories And Equipment Tests

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5

Initiating Condition:

Inability to maintain plant in cold shutdown.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200° F** for **> Table C2 duration**.

Table C2 – RCS Reheat Duration Thresholds

RCS	Containment Closure	Duration
Intact	N/A	60 minutes*
Not Intact	Established	20 minutes*
OR Reduced Inventory (< 397 ft.)	Not Established	0 minutes

* If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then this EAL is **not** applicable.

OR

2. UNPLANNED Reactor Vessel pressure rise **> 10 psig** as a result of temperature rise due to loss of decay heat removal. (This threshold does not apply in solid plant conditions.)

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

RCS is intact when the RCS pressure boundary is in its normal condition for the Cold Shutdown mode of operation (e.g., no freeze seals, etc.).

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5 (cont.)

Basis (cont.):

Threshold #1 Basis:

The RCS Reheat Duration Threshold table addresses complete loss of functions required for core cooling for greater than 60 minutes during refueling and cold shutdown modes when RCS integrity is established. The status of CONTAINMENT CLOSURE in this condition is immaterial given that the RCS is providing a high pressure barrier to fission product release to the environment. The 60 minute time frame should allow sufficient time to restore cooling without there being a substantial degradation in plant safety.

The RCS Reheat Duration Threshold table also addresses the complete loss of functions required for core cooling for greater than 20 minutes during refueling and cold shutdown modes when CONTAINMENT CLOSURE is established but RCS integrity is not established. The allowed 20 minute time frame was included to allow operator action to restore the heat removal function, if possible.

Finally, complete loss of functions required for core cooling during refueling and cold shutdown modes when neither CONTAINMENT CLOSURE nor RCS integrity are established. No delay time is allowed because the evaporated reactor coolant that may be released into the Containment during this heatup condition could also be directly released to the environment.]

The note (*) indicates that this EAL is not applicable if actions are successful in restoring an RCS heat removal system to operation and RCS temperature is being reduced within the specified time frame.

Threshold #2 Basis:

The 10 psig pressure rise due to loss of decay heat removal infers an intact RCS with uncontrolled RCS temperature rise in excess of the Technical Specification cold shutdown limit (200° F) for which CA5 Threshold #1 would permit up to sixty minutes to restore RCS cooling before declaration of an Alert. This EAL therefore covers situations of high decay heat loads, in which the event should be declared without delay.

Escalation to Site Area Emergency would be via CS6 should boiling result in significant RPV level loss leading to core uncovery.

A loss of Technical Specification components alone is not intended to constitute an Alert. The same is true of a momentary UNPLANNED excursion above the Technical Specification cold shutdown temperature limit when the heat removal function is available.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5 (cont.)

Basis Reference(s):

1. NEI 99-01, Rev 5 CA4
2. BOP PC-1 Containment Closure Tracking Capability
3. 1/2 BOSR 4.3.1-1 Reactor Coolant System Pressure Temperature Limit Surveillance
4. 1/2 BGP 100-1 Plant Heatup
5. 1/2 BGP 100-5, Plant Shutdown and Cool Down
6. 1/2 BGP 100-6, Unit 1(Unit 2) Refueling Outage

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU5

Initiating Condition:

UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. An UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200° F.**

   OR

2. Loss of the following for **> 15 minutes:**
   - All RCS temperature indications

     AND
   - All RPV level indications

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL is be a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant.

In cold shutdown the ability to remove decay heat relies primarily on forced cooling flow. Operation of the systems that provide this forced cooling may be jeopardized due to the unlikely loss of electrical power or RCS inventory. Since the RCS usually remains intact in the cold shutdown mode a large inventory of water is available to keep the core covered.

During refueling the level in the RPV will normally be maintained above the RPV flange. Refueling evolutions that decrease water level below the RPV flange are carefully planned and procedurally controlled. Loss of forced decay heat removal at reduced inventory may result in more rapid increases in RCS/RPV temperatures depending on the time since shutdown.

Normal means of core temperature indication and RCS level indication may not be available in the refueling mode. Redundant means of RPV level indication are therefore procedurally installed to assure that the ability to monitor level will not be interrupted. However, if all level and temperature indication were to be lost in either the cold shutdown of refueling modes, Threshold #2 would result in declaration of an Unusual Event if both temperature and level indication cannot be restored within 15 minutes from the loss of both means of indication. Escalation to Alert would be via CA6 based on an inventory loss or CA5 based on exceeding its temperature criteria.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU5 (cont.)

Basis Reference(s):

1. NEI 99-01, Rev 5 CU4
2. Technical Specifications Table 1.1-1
3. 1/2 BOSR 0.1-6 Unit One (Two) Mode 6 Shiftly And Daily Operating Surveillance
4. BOP RH-9 Pump Down of the Refueling Cavity to the RWST
5. BOP RC-4 Reactor Coolant System Drain
6. 1/2 BOSR 3.3.1-1 Unit One (Two) Accident Monitoring Instrumentation Monthly Channel Checks
7. 1/2 BOL 4.15, LCOAR - RCS Leakage Detection Instrumentation
8. 1/2 BOL 4.13, LCOAR - RCS Operational Leakage
9. 1/2 BOSR 4.3.1-1 Reactor Coolant System Pressure / Temperature Limit Surveillance

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6

Initiating Condition:

Loss of RCS/RPV inventory affecting fuel clad integrity with containment challenged.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. RVLIS **< 0% Plenum (390 ft. el.)** for **≥ 30 minutes**.

   OR

   Reactor Vessel Refueling Level Indicators LT-046 and LT-049 **< 392 ft. el.** for **≥ 30 minutes**.

   AND

   b. Any Containment Challenge Indication (Table C4).

   OR

2. a. Reactor Vessel level unknown for **≥ 30 minutes.**

   AND

   b. Loss of Reactor Vessel inventory as indicated by any of the following:

   - Table C3 indication.

     OR

   - Erratic Source Range Neutron Monitor indication.

     OR

   - 1/2 RE-AR011 or 1/2 RE-AR012 Containment Fuel Handling Incident radiation monitors **> 3000 mR/hr**.

   AND

   c. Any Containment Challenge Indication (Table C4)

Table C3 – Indications of RCS Leakage
• UNPLANNED Containment Sump level rise
• UNPLANNED Auxiliary Bldg. Sump level rise
• UNPLANNED Tank level rise
• UNPLANNED rise in RCS makeup
• Observation of leakage or inventory loss

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6 (cont.)

EAL Threshold Values: (cont)

Table C4 – Containment Challenge Indications
• Hydrogen concentration in Containment **≥ 5%** • UNPLANNED rise in containment pressure • CONTAINMENT CLOSURE **not** established.

Basis:

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL represents the inability to restore and maintain Reactor Vessel level to above the top of active fuel with containment challenged. Fuel damage is probable if Reactor Vessel level cannot be restored, as available decay heat will cause boiling, further reducing the Reactor Vessel level. With the CONTAINMENT breached or challenged then the potential for unmonitored fission product release to the environment is high. This represents a direct path for radioactive inventory to be released to the environment. This is consistent with the definition of a General Emergency. The General Emergency is declared on the occurrence of the loss or IMMINENT loss of function of all three barriers.

A number of variables can have a significant impact on heat removal capability challenging the fuel clad barrier. Examples include mid-loop, reduced level/flange level, head in place, cavity flooded, RCS venting strategy, decay heat removal system design, vortexing pre-disposition, steam generator U-tube draining

Analysis indicates that core damage may occur within an hour following continued core uncovery therefore, 30 minutes was conservatively chosen.

If CONTAINMENT CLOSURE is re-established prior to exceeding the 30 minute core uncovery time limit then escalation to GE would not occur.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6 (cont.)

Basis (cont.):

When Reactor Vessel level indication is unavailable, the inventory loss must be detected by erratic Source Range Monitor indication, elevated containment radiation or unexplained rise in tank or sump level. Post-TMI studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and that Source Range Monitors can be used as a tool for making such determinations.

Sump and tank level rises must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

As water level in the RPV lowers, the dose rate above the core will increase. Indication of > 3000 mR/hr is indicative of core uncovery.

Basis Reference(s):

1. NEI 99-01 Rev 5, CG1
2. BOP PC-1, Containment Closure Tracking Capability
3. UFSAR E.17, 6.2, 6.2.5.2.1
4. BOP RH-9 Pump Down of the Refueling Cavity to the RWST
5. BOP RC-4 Reactor Coolant System Drain
6. 1/2 BOSR 0.1-4 Unit One(Two) Mode 4 Shiftly and Daily Operating Surveillance
7. 1/2 BOSR RF-1 Unit One(Two) Containment Floor Drain Monitoring System Non-Routine Surveillance
8. 0/1/2 BOSR XZB-R1, Unit 0/1/2 Meter Zone Banding
9. 1/2 BGP 100-2 Plant Startup
10. BGP 100-6T4 Core Alteration / Fuel Movement Checklist
11. 1/2 BOSR 3.3.1-1 Unit One(Two) Accident Monitoring Instrumentation Monthly Channel Checks
12. 1/2 BFR-C.1, Response to Inadequate Core Cooling Unit 1/2
13. 1/2 BST-5 Containment Unit 1/2
14. NES-G-14.02, Calculation No. BYR99-010 / BRW-99-0017-I
15. EP-EAL-0501, Estimation Of Radiation Monitor Readings Indicating Core Uncovery During Refueling

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6

Initiating Condition:

Loss of RCS/RPV inventory affecting core decay heat removal capability.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. With CONTAINMENT CLOSURE **not** established **EITHER:**
   - RVLIS **< 15% Plenum (392.4 ft. el.)**.

     OR
   - Reactor Vessel Refueling Level Indicators LT-046 and LT-049 **< 393 ft. el.**

   OR

2. With CONTAINMENT CLOSURE established **EITHER:**
   - RVLIS **< 0% Plenum (390 ft. el.)**

     OR
   - Reactor Vessel Refueling Level Indicators LT-046 and LT-049 **< 392 ft. el.**

   OR

3. a. Reactor Vessel level unknown for **≥ 30 minutes.**

      AND

   b. Loss of Reactor Vessel inventory as indicated by any of the following:
      - Table C3 indications.

        OR
      - Erratic Source Range Neutron Monitor indication.

        OR
      - 1/2 RE-AR011 or 1/2 RE-AR012 Containment Fuel Handling Incident radiation monitors **> 3000 mR/hr.**

Table C3 – Indications of RCS Leakage
• UNPLANNED Containment Sump level rise • UNPLANNED Auxiliary Bldg. Sump level rise • UNPLANNED Tank level rise • UNPLANNED rise in RCS makeup • Observation of leakage or inventory loss

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6 (cont)

Basis:

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

Under the conditions specified, a continued drop in RCS/RPV level is indicative of a loss of inventory control. Inventory loss may be due to an RCS breach, pressure boundary leakage, or continued boiling in the Reactor Vessel. Thus, declaration of a Site Area Emergency is warranted.

Escalation to a General Emergency is via CG6 or RG1.

Threshold #1 and #2 Basis:

If a low-pressure boundary to fission product release does not exist (i.e., containment closure is not established), the level associated with this threshold is six inches below the bottom inside diameter of the RCS hot leg vessel penetration. If containment closure is established, a low-pressure boundary to fission product release exists and water level can drop to the top of active fuel before a Site Area Emergency declaration is required.

Threshold #3 Basis:

When Reactor Vessel level indication is unavailable, the inventory loss must be detected by erratic Source Range Monitor indication, elevated containment radiation or unexplained rise in tank or sump level. Post-TMI studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and that Source Range Monitors can be used as a tool for making such determinations.

The 30-minute duration allows sufficient time for actions to be performed to recover inventory control equipment.

As water level in the Reactor Vessel lowers, the dose rate above the core will rise. Indication of > 3000 mR/hr. is indicative of core uncovery.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6 (cont.)

Basis Reference(s):

1. NEI 99-01, Rev 5 CS1
2. UFSAR E.17, 6.2
3. BOP RH-9 Pump Down of the Refueling Cavity to the RWST
4. BOP RC-4 Reactor Coolant System Drain
5. 1/2 BOSR 0.1-4 Unit One (Two) Mode 4 Shiftly and Daily Operating Surveillance
6. 1/2 BOSR RF-1 Unit One (Two) Containment Floor Drain Monitoring System Non-Routine Surveillance
7. 0/1/2 BOSR XZB-R1, Unit 0/1/2 Meter Zone Banding
8. 1/2 BGP 100-2 Plant Startup
9. BGP 100-6T4 Core Alteration / Fuel Movement Checklist
10. 1/2 BOSR 3.3.1-1 Unit One (Two) Accident Monitoring Instrumentation Monthly Channel Checks

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA6

Initiating Condition:

Loss of RCS/RPV inventory.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. Loss of RCS / Reactor Vessel inventory as indicated RVLIS **< 27% Plenum (393 ft. el.)**.

   OR

   b. Loss of RCS / Reactor Vessel inventory as indicated by LT-046 and LT-049 **< 393 ft. el.**

   OR

2. a. RCS / Reactor Vessel level unknown for **≥ 15 minutes.**

   AND

   b. Loss of RCS / Reactor Vessel inventory per Table C3 indications.

Table C3 – Indications of RCS Leakage
• UNPLANNED Containment Sump level rise • UNPLANNED Auxiliary Bldg. Sump level rise • UNPLANNED Tank level rise • UNPLANNED rise in RCS makeup • Observation of leakage or inventory loss

Basis:

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL serves as precursors to a loss of ability to adequately cool the fuel. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further RPV level decrease and potential core uncovery. This condition will result in a minimum emergency classification level of an Alert.

If Reactor vessel level continues to lower then escalation to Site Area Emergency will be via CS6.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA6 (cont.)

Basis (cont.):

Threshold #1 Basis:

The inability to restore and maintain level after reaching this setpoint would be indicative of a failure of the RCS barrier.

Threshold #2 Basis:

When Reactor Vessel level indication is unavailable, the inventory loss must be detected by other means including rise in sump and tank levels, changes in makeup or observation of leakage.

The 15-minute interval for the loss of level indication was chosen because it is half of the Site Area Emergency duration.

Basis Reference(s):

1. NEI 99-01, Rev 5 CA1
2. UFSAR 6.2 & E.17
3. 1/2 BOSR 0.1-4 Unit One(Two) Mode 4 Shiftly and Daily Operating Surveillance
4. 1/2 BOSR RF-1 Unit One(Two) Containment Floor Drain Monitoring System Non-Routine Surveillance
5. 0/1/2 BOSR XZB-R1, Unit 0/1/2 Meter Zone Banding
6. BOP RH-9 Pump Down of the Refueling Cavity to the RWST
7. BOP RC-4 Reactor Coolant System Drain

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU6

Initiating Condition:

RCS leakage.

Operating Mode Applicability:

5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

RCS leakage results in the inability to restore and maintain RCS or Pressurizer level **> procedurally established limit** for **≥ 15 minutes**.

Basis:

This EAL is considered to be a potential degradation of the level of safety of the plant. The inability to maintain or restore level is indicative of loss of RCS inventory.

Relief valve operation should be excluded from this EAL. However, a relief valve that operates and fails to close per design should be considered applicable to this EAL if the relief valve cannot be isolated.

Prolonged loss of RCS Inventory may result in escalation to the Alert emergency classification level via either CA6 or CA5.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU1
2. UFSAR 6.2 & E.17
3. 1/2 BOSR 0.1-4 Unit One (Two) Mode 4 Shiftly and Daily Operating Surveillance
4. 1/2 BOS RF-1 Unit One (Two) Containment Floor Drain Monitoring System Non-Routine Surveillance
5. 0/1/2 BOSR XZB-R1, Unit 0/1/2 Meter Zone Banding
6. BOP RH-9 Pump Down of the Refueling Cavity to the RWST
7. BOP RC-4 Reactor Coolant System Drain

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU7

Initiating Condition:

UNPLANNED loss of RCS/RPV inventory.

Operating Mode Applicability:

6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED Refueling Cavity or Vessel level drop that meets **EITHER**:

   - When controlling level above the Reactor Vessel flange, Refueling Cavity level drop below the Reactor Vessel flange **(400 ft.)** for **≥ 15 minutes**.

     OR

   - When controlling level below the Reactor Vessel flange, vessel level drop below the procedurally established limit for **≥ 15 minutes**.

   OR

2. a. Reactor Vessel level unknown.

   AND

   b. Loss of RCS /Reactor Vessel inventory per Table C3 indications.

Table C3 – Indications of RCS Leakage
• UNPLANNED Containment Sump level rise
• UNPLANNED Auxiliary Bldg. Sump level rise
• UNPLANNED Tank level rise
• UNPLANNED rise in RCS makeup
• Observation of leakage or inventory loss

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU7 (cont.)

Basis (cont.):

This EAL is a precursor of more serious conditions and considered to be a potential degradation of the level of safety of the plant.

Refueling evolutions that lowers RCS water level below the Reactor Vessel flange are carefully planned and procedurally controlled. An UNPLANNED event that results in water level dropping below the RPV flange, or below the planned RCS water level for the given evolution (if the planned RCS water level is already below the Reactor Vessel flange), warrants declaration of a UE due to the reduced RCS inventory that is available to keep the core covered.

The allowance of 15 minutes was chosen because it is reasonable to assume that level can be restored within this time frame using one or more of the redundant means of makeup that should be available. If level cannot be restored in this time frame then it may indicate a more serious condition exists.

Continued loss of RCS Inventory will result in escalation to the Alert emergency classification level via either CA6 or CA5.

Threshold #1 Basis:

This EAL involves a drop in RCS level below the top of the Reactor Vessel flange that continues for 15 minutes due to an UNPLANNED event. This EAL is not applicable to level changes in flooded reactor cavity level, which is addressed by RU2, until such time as the level drop reaches the level of the vessel flange.

If Reactor Vessel level continues to decrease and reaches the Bottom ID of the RCS Loop then escalation to MA8 would be appropriate.

Threshold #2 Basis:

This EAL addresses conditions in the refueling mode when normal means of core temperature indication and RCS level indication may not be available. Redundant means of Reactor Vessel level indication will normally be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that Reactor Vessel inventory loss was occurring by observing other indications such as sump and tank level changes, changes in makeup or observation of leakage. Sump and tank level changes must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

Escalation to the Alert emergency classification level would be via either CA6 or CA5.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU7 (cont)

Basis Reference(s):

1. NEI 99-01, Rev 5 CU2
2. UFSAR 5.2, 6.2
3. 1/2 BOL 4.15 LCOAR - RCS Leakage Detection Instrumentation
4. 1/2 BOA PRI-1 Excessive Primary Plant Leakage Unit 1/2
5. 1/2 BOSR 0.1-6 Unit One(Two) Mode 6 Shiftly and Daily Operating Surveillance
6. 1/2 BOSR RF-1 Unit One(Two) Containment Floor Drain Monitoring System Non-Routine Surveillance
7. BOP RH-9 Pump Down of the Refueling Cavity to the RWST
8. BOP RC-4 Reactor Coolant System Drain

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1

Initiating Condition:

HOSTILE ACTION resulting in loss of physical control of the facility.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Value:

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1).

   OR

2. A HOSTILE ACTION has:

   - Caused failure of Spent Fuel Pool Cooling Systems

     AND

   - IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).

Table H1 - Safety Functions
• Reactivity Control (ability to shut down the reactor and keep it shutdown) • RCS Inventory (ability to cool the core) • Secondary Heat Removal (ability to maintain heat sink)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1 (cont)

Basis: (cont)

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

Threshold #1 Basis

This threshold encompasses conditions under which a HOSTILE ACTION has taken physical control of VITAL AREAS (containing vital equipment or controls of vital equipment) required to maintain any safety function. As a result, there is a loss of one or more of the Table H1 functions and equipment control cannot be transferred to and operated from another location.

If control of the plant equipment necessary to maintain all safety functions can be operated from the Control Room or transferred to another location, then the above EAL threshold is not met.

Threshold #2 Basis

This threshold addresses loss of physical control of spent fuel pool cooling systems if imminent fuel damage is likely because there is freshly off-loaded fuel in the pool. The condition “freshly off-loaded reactor fuel in pool” equates to fuel off-loaded within the last 120 days in NF-AA-309 Special Nuclear Material And Core Component Move Development Sheet.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HG1
2. 0BOA Security-1, Security Threat Unit 0
3. 1/2 BOA PRI-5 Control Room Inaccessibility Unit 1/2
4. SY-AA-101-132, Security Assessment and Response to Unusual Activities
5. Station Security Plan – Appendix C
6. NF-AA-309, Special Nuclear Material And Core Component Move Development Sheet

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS1

Initiating Condition:

HOSTILE ACTION within the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

This condition represents an escalated threat to plant safety above that contained in the Alert in that a HOSTILE FORCE has progressed from the OWNER CONTROLLED AREA to the PROTECTED AREA.

This EAL addresses the contingency for a very rapid progression of events. It is not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack with minimal time available for further preparation or additional assistance to arrive requires Offsite Response Organizations (ORO) readiness and preparation for the implementation of protective measures.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS1 (cont.)

Basis (cont.):

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the PROTECTED AREA. Those events are adequately addressed by other EALs.

Escalation of this emergency classification level, if appropriate, would be based on actual plant status after impact or progression of attack.

Basis Reference(s):

1. NEI 99-01 Rev 5, HS4
2. SY-AA-101-132, Security Assessment and Response to Unusual Activities
3. Station Security Plan – Appendix C
4. 0BOA Security-1, Security Threat Unit 0

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1

Initiating Condition:

HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site.

   OR

2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

OWNER CONTROLLED AREA (OCA): is the property associated with the station owned by the company. Access is normally limited to persons entering for official business.

Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

The fact that the site is under serious attack or is an identified attack target with minimal time available for further preparation or additional assistance to arrive requires a heightened state of readiness and implementation of protective measures that can be effective (such as on-site evacuation, dispersal or sheltering).

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1 (cont)

Basis: (cont)

Threshold #1 Basis

This EAL addresses the immediacy of an expected threat arrival or impact on the site within a relatively short time.

The intent of this EAL is to ensure that notifications for the airliner attack threat are made in a timely manner and that Offsite Response Organizations (ORO) and plant personnel are at a state of heightened awareness regarding the credible threat. Airliner is meant to be a large aircraft with the potential for causing significant damage to the plant.

This EAL is met when a plant receives information regarding an airliner attack threat from NRC and the airliner is within 30 minutes of the plant. Only the plant to which the specific threat is made need declare the Alert.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Threshold #2 Basis

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the OCA. Those events are adequately addressed by other EALs.

Note that this EAL is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA.

Basis Reference(s):

1. NEI 99-01 Rev 5, HA4
2. SY-AA-101-132, Security Assessment and Response to Unusual Activities
3. Station Security Plan – Appendix C
4. 0BOA Security-1, Security Threat Unit 0

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1

Initiating Condition:

Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities.

   OR

2. A validated notification from NRC providing information of an aircraft threat.

   OR

3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

Basis:

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

Security events assessed as HOSTILE ACTIONS are classifiable under HA1, HS1 and HG1.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1 (cont)

Basis: (cont)

A higher initial classification could be made based upon the nature and timing of the security threat and potential consequences. The licensee shall consider upgrading the emergency response status and emergency classification level in accordance with the site's Safeguards Contingency Plan and Emergency Plan.

Threshold #1 Basis

This threshold is included to ensure that appropriate notifications for the security threat are made in a timely manner. This includes information of a credible threat. Only the plant to which the specific threat is made need declare the Notification of an Unusual Event.

The determination of "credible" is made through use of information found in the Station Security Plan or SY-AA-101-132, "Security Assessment and Response to Unusual Activities" procedure.

Threshold #2 Basis

The intent of this EAL is to ensure that notifications for the aircraft threat are made in a timely manner and that Offsite Response Organizations (ORO) and plant personnel are at a state of heightened awareness regarding the credible threat. It is not the intent of this EAL to replace existing non-hostile related EALs involving aircraft.

This EAL is met when a plant receives information regarding an aircraft threat from NRC. Validation is performed by calling the NRC. Only the plant to which the specific threat is made need declare the Unusual Event.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Escalation to Alert emergency classification level would be via HA1 would be appropriate if the threat involves an airliner within 30 minutes of the plant.

Threshold #3 Basis

Reference is made to security force because these individuals are the designated personnel on-site qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the plant Safeguards Contingency Plan.

This threshold is based on Station Security Plan – Appendix C. 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 in some cases under 10 CFR 50.72.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 5, HU4
2. SY-AA-101-132, Security Assessment and Response to Unusual Activities
3. Station Security Plan – Appendix C
4. NRC Safeguards Advisory 10/6/01
5. Letter from Mr. B. A. Boger (NRC) to Ms. Lynette Hendricks (NEI) dated 2/4/02
6. 0BOA Security-1, Security Threat Unit 0

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS2

Initiating Condition:

Control Room evacuation has been initiated and plant control cannot be established.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Control Room evacuation has been initiated.

   AND

2. Control of the plant **cannot** be established per 1/2 BOA PRI-5 Control Room Inaccessibility procedure in **< 15 minutes**.

Basis:

The time period to establish control of the plant starts when either:

a. Control of the plant is no longer maintained in the Main Control Room

   OR

b. The last Operator has left the Main Control Room.

The intent of this EAL is to capture those events where control of the plant cannot be reestablished in a timely manner. In this case, expeditious transfer of control of safety systems has not occurred (although fission product barrier damage may not yet be indicated).

The intent of the EAL is to establish control of important plant equipment and knowledge of important plant parameters in a timely manner. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions. Typically, these safety functions are reactivity control, RCS inventory, and secondary heat removal.

The determination of whether or not control is established at the remote shutdown panel is based on Emergency Director (ED) judgment. The Emergency Director is expected to make a reasonable, informed judgment within the specified time for transfer that the licensee has control of the plant from the remote shutdown panel.

Escalation of this emergency classification level, if appropriate, would be by Fission Product Barrier or Abnormal Rad Levels/Radiological Effluent EALs.

Basis Reference(s):

1. NEI 99-01, Rev 5 HS2
2. 1/2 BOA PRI-5, Control Room Inaccessibility Unit 1/2

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA2

Initiating Condition:

Control Room evacuation has been initiated.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Entry into 1/2 BOA PRI-5, Control Room Inaccessibility procedure for Control Room evacuation.

Basis:

With the control room evacuated, additional support, monitoring and direction through the Technical Support Center and/or other emergency response facilities may be necessary.

Inability to establish plant control from outside the control room will escalate this event to a Site Area Emergency.

Basis Reference(s):

1. NEI 99-01, Rev 5 HA5
2. 1/2 BOA PRI-5, Control Room Inaccessibility Unit 1/2

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3

Initiating Condition:

FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

FIRE or EXPLOSION resulting in any of the following:

- VISIBLE DAMAGE to a Table H2 permanent structure.

  OR

- VISIBLE DAMAGE to safety system equipment contained within a Table H2 area.

  OR

- Control Room indication of degraded safety system equipment performance contained within a Table H2 area.

Table H2 – Vital Areas
• Containment • Auxiliary Building • Fuel Handling Building • Main Steam Tunnels • Essential Service Water Cooling Towers • Condensate Storage Tanks • RWSTs

Basis:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3 (cont.)

Basis (cont.):

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

The areas listed in Table H2 specify specific structures or areas that contain safety system, or component and functions required for safe shutdown of the plant.

VISIBLE DAMAGE is used to identify the magnitude of the FIRE or EXPLOSION and to discriminate against minor FIRES and EXPLOSIONS.

The reference to structures containing safety systems or components is included to discriminate against FIRES or EXPLOSIONS in areas having a low probability of affecting safe operation. The significance here is not that a safety system was degraded but the fact that the FIRE or EXPLOSION was large enough to cause damage to these systems.

An EXPLOSION due to failure of pressurized equipment that does not cause damage to other permanent structures or equipment associated with plant operations does not meet the criteria for declaration under this EAL, but may result in other declaration criteria being met (e.g., when the line is an element of a Fission Product Barrier, or the results in inventory loss).

The use of VISIBLE DAMAGE should not be interpreted as mandating a lengthy damage assessment prior to classification. The declaration of an Alert and the activation of the Technical Support Center will provide the Emergency Director with the resources needed to perform detailed damage assessments.

The Emergency Director also needs to consider any security aspects of the EXPLOSION.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions, Fission Product Barrier or Abnormal Rad Levels / Radiological Effluent EALs.

Basis Reference(s):

1. NEI 99-01, Rev 5 HA2
2. Drawing S-01A Composite Site Plan
3. UFSAR Section 3.02

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3

Initiating Condition:

FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm.

Table H2 – Vital Areas
• Containment • Auxiliary Building • Fuel Handling Building • Main Steam Tunnels • Essential Service Water Cooling Towers • Condensate Storage Tanks • RWSTs

OR

2. EXPLOSION within PROTECTED AREA affecting a Table H2 area.

Basis:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

PROTECTED AREA: An area which normally encompasses all controlled areas within the security protected area fence.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3 (cont.)

Basis (cont.):

This EAL addresses the magnitude and extent of FIRES or EXPLOSIONS that may be potentially significant precursors of damage to safety systems. It addresses the FIRE / EXPLOSION, and not the degradation in performance of affected systems that may result.

As used here, notification is visual observation and report by plant personnel or sensor alarm indication.

For the purposes of declaring an emergency event, the term “extinguished” means no visible flames.

Threshold #1:

The 15 minute time period begins with a credible notification that a FIRE is occurring, or indication of a fire detection system alarm/actuation. Verification of a fire detection system alarm/actuation includes actions that can be taken within the control room or other nearby site specific location to ensure that it is not spurious. An alarm is assumed to be an indication of a FIRE unless it is disproved within the 15 minute period by personnel dispatched to the scene. In other words, a personnel report from the scene may be used to disprove a sensor alarm if received within 15 minutes of the alarm, but shall not be required to verify the alarm.

The intent of this 15 minute duration is to size the FIRE and to discriminate against small FIRES that are readily extinguished (e.g., smoldering waste paper basket). Such fires are excluded from consideration in this threshold since they have no safety consequence.

Threshold #2 Basis:

This EAL addresses only those EXPLOSIONS of sufficient force to damage permanent structures or equipment associated with plant operations within the PROTECTED AREA.

An EXPLOSION due to failure of pressurized equipment that does not cause damage to other permanent structures or equipment associated with plant operations does not meet the criteria for declaration under this EAL, but may result in other declaration criteria being met (e.g., when the line is an element of a Fission Product Barrier, or the results in inventory loss).

No attempt is made to assess the actual magnitude of the damage. The occurrence of the EXPLOSION is sufficient for declaration.

The Emergency director also needs to consider any security aspects of the EXPLOSION, if applicable.

Escalation of this emergency classification level, if appropriate, would be based on HA3.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3 (cont.)

Basis Reference(s):

1. NEI 99-01, Rev 5 HU2
2. Drawing S-01A Composite Site Plan
3. UFSAR Section 3.02
4. BAP-1100, Fire Protection Procedure Series

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4

Initiating Condition:

Natural or destructive phenomena affecting VITAL AREAS.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

1. a. Seismic event **> Operating Basis Earthquake (OBE)** as indicated by seismic check on 0PA02J.

   AND

   b. Confirmed by **EITHER:**

   - Earthquake felt in plant.

     OR

   - National Earthquake Center.

     OR

   - Control Room indication of degraded performance of systems required for the safe shutdown of the plant.

   OR

2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area:

   - Tornado strike

     OR

   - High winds **> 85 mph**

     OR

   - Vehicle crash

     OR

   - Turbine failure-generated PROJECTILES

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont.)

EAL Threshold Values: (cont.)

Table H2 – Vital Areas
• Containment • Auxiliary Building • Fuel Handling Building • Main Steam Tunnels • Essential Service Water Cooling Towers • Condensate Storage Tanks • RWSTs

OR

3. Flooding in the Auxiliary Building that results in **EITHER**:

   a. Degraded safety system performance as indicated in the Control Room.

   OR

   b. Industrial safety hazards (e.g., electric shock) that precludes access to operate or monitor safety equipment.

Basis:

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont.)

Basis (cont.):

These EALs escalate from HU4 in that the occurrence of the event has resulted in VISIBLE DAMAGE to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control room indications of degraded system response or performance. The occurrence of VISIBLE DAMAGE and/or degraded system response is intended to discriminate against lesser events. 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. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction EALs.

Threshold #1 Basis:

This threshold addresses events that may have resulted in a Table H2 area being subjected to forces beyond design limits and thus damage may be assumed to have occurred to plant safety systems.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

Threshold #2 Basis:

This threshold addresses events within the PROTECTED AREA that results in VISIBLE DAMAGE to any Table H2 structure or Control Room indication of degraded performance of a safety system in any Table H2 area:

This threshold addresses the following events:

- Tornado strike.
- High winds.
- Vehicle crashes such as plane, helicopter, train, barge, car or truck crashes. The Emergency director also needs to consider any security aspects of the vehicle crash.
- Threat to safety-related equipment imposed by PROJECTILES generated by main turbine rotating component failures.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont.)

Basis (cont.):

Threshold #3 Basis:

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. The actual component failure or equipment misalignment is addressed by Technical Specifications or plant procedures unless the resulting flooding causes degraded performance of safety systems, or has created industrial safety hazards (e.g., electrical shock) that preclude necessary access to operate or monitor safety equipment. The inability to access, operate or monitor safety equipment represents an actual or substantial potential degradation of the level of safety of the plant.

Flooding as used in this EAL describes a condition where water is entering the room faster than installed equipment is capable of removal, resulting in a rise of water level within the room. Classification of this EAL should not be delayed while corrective actions are being taken to isolate the water source.

Basis (cont.):

1. NEI 99-01, Rev 5 HA1
2. UFSAR Section 2.5.4.9.3, 3.02, 3.3.1.1, and 3.04, Appendix C
3. 0BOA-ENV-4, Earthquake Unit 0
4. Annunciator 0-38-E5 Accelograph Accel High
5. Drawing S-01A Composite Site Plan
6. 1/2 BOA TG-7, Main Generator Excessive Hydrogen Leakage Unit 1/2

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4

Initiating Condition:

Natural or destructive phenomena affecting the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

1. a. Seismic event as indicated by Annunciator 0-38-E5, Accelograph Accel High (0PM01J).

   AND

   b. Confirmed by **EITHER:**

   - Earthquake felt in plant.

     OR

   - National Earthquake Center.

   OR

2. **EITHER** of the following occurring within the PROTECTED AREA boundary:

   - Tornado strike

     OR

   - Sustained **(> 15 minutes)** high winds **> 85 mph**

   OR

3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

   OR

4. Flooding in Auxiliary Building that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont.)

Basis:

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

These EALs are categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

Threshold #1 Basis:

Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

Threshold #2 Basis:

This EAL is based on a tornado striking (touching down) or high winds within the PROTECTED AREA.

Escalation of this emergency classification level, if appropriate, would be based on VISIBLE DAMAGE, or by other in plant conditions, via HA4.

Threshold #3 Basis:

This EAL addresses main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Generator seal damage observed after generator purge does not meet the intent of this EAL because it did not impact normal operation of the plant.

Of major concern is the potential for leakage of combustible fluids (lubricating oils) and gases (hydrogen cooling) to the plant environs. Actual FIRES and flammable gas build up are appropriately classified via HU3 and HU5.

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 this emergency classification level, if appropriate, would be to HA4 based on damage done by PROJECTILES generated by the failure or by the radiological releases. The latter events would be classified by the radiological EALs or Fission Product Barrier.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont.)

Basis (cont.):

Threshold #4 Basis:

The assessment of the potential for flooding to affect safety related equipment is based on the rate of level rise in the area and the ability to terminate the input prior to submerging or spraying the electrical portion of safety related equipment.

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. Minor leaks, such as valve packing or instrument line breaks would not constitute “Flooding.” The Internal Flooding Areas of concern for the Unusual Event declaration are areas that have the potential to affect safety related equipment needed for the current operating mode.

Escalation of this emergency classification level, if appropriate, would be based VISIBLE DAMAGE via HA4, or by other plant conditions.

Basis Reference(s):

1. NEI 99-01, Rev 5 HU1
2. UFSAR Section 2.5.4.9.3, 3.02, 3.3.1.1
3. 0BOA-ENV-4 Earthquake Unit 0
4. Annunciator 0-38-E5 Accelograph Accel High
5. Drawing S-01A Composite Site Plan
6. 1/2 BOA TG-1 Turbine High Vibration, Eccentricity or Differential Expansion Unit 1/2
7. 1/2 BOA TG-7 Main Generator Excessive Hydrogen Leakage Unit 1/2
8. BAR 1/2 PL01J-1-A2 Hydrogen Pressure High or Low

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5

Initiating Condition:

Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Note: If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.

Table H2 – Vital Areas
• Containment • Auxiliary Building • Fuel Handling Building • Main Steam Tunnels • Essential Service Water Cooling Towers • Condensate Storage Tanks • RWSTs

Basis:

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY
HA5 (cont.)

Basis (cont.)

Gases in a VITAL AREA can affect the ability to safely operate or safely shutdown the reactor.

The fact that SCBA may be worn does not eliminate the need to declare the event.

A precautionary area evacuation for the purpose of atmospheric testing does not warrant declaration until test results are obtained unless access is required for operation of operable equipment to maintain safe operations or safely shutdown the reactor. Declaration should not be delayed for confirmation from atmospheric testing if the atmosphere poses an immediate threat to life and health or an immediate threat of severe exposure to gases. This could be based upon documented analysis, indication of personal ill effects from exposure, or operating experience with the hazards such as an inadvertent actuation of installed Cardox fire suppression system.

Station evaluations have shown that, other than the Upper Cable Spreading Room at Byron Station, installed Halon systems by design do not create an IDLH atmosphere when discharged. Therefore, when an installed Halon Fire Suppression system discharge occurs (other than the Upper Cable Spreading Room at Byron Station), an IDLH atmosphere should not be assumed, and declaration of a toxic or asphyxiant IDLH atmosphere must be based on representative sampling of the affected area, unless there are indications of personal ill effects resulting from exposure.

Areas directly associated with a fire that may be considered to have a hazardous environment (due to smoke, design fire suppression system actuation or administrative controls awaiting ventilation and/or testing) do not warrant declaration of an Alert under this EAL but should be evaluated against the fire EALs.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of 19.5%, which can lead to breathing difficulties, unconsciousness or even death.

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. Flammable gases, such as hydrogen and acetylene, are routinely used to maintain plant systems (hydrogen) or to repair equipment/components (acetylene - used in welding). This EAL assumes concentrations of flammable gases which can ignite/support combustion.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions, Fission Product Barrier or Abnormal Rad Levels / Radioactive Effluent EALs.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5 (cont.)

Basis Reference(s):

1. NEI 99-01, Rev 5 HA3
2. Drawing S-01A Composite Site Plan
3. UFSAR Section 3.02
4. ACIT 660892-13, Station Halon Discharge IDLH Evaluation

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU5

Initiating Condition:

Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS.

   OR

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

Basis:

NORMAL PLANT OPERATIONS: Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

This EAL is based on the release of toxic, corrosive, asphyxiant or flammable gases of sufficient quantity to affect NORMAL PLANT OPERATIONS.

The fact that SCBA may be worn does not eliminate the need to declare the event.

This EAL is not intended to require significant assessment or quantification. It assumes an uncontrolled process that has the potential to affect plant operations. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation.

The release may have originated within the Protected Area boundary, or it may have originated offsite and subsequently drifted inside the Protected Area boundary. Offsite events (e.g., tanker truck accident releasing toxic gases, etc.) resulting in the plant being within the evacuation area should also be considered in this EAL because of the adverse affect on NORMAL PLANT OPERATIONS.

Areas directly associated with a fire that may be considered to have a hazardous environment (due to smoke, design fire suppression system actuation or administrative controls awaiting ventilation and/or testing) do not warrant declaration of an Unusual Event under this EAL but should be evaluated against the fire EALs.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU5 (cont.)

Basis: (cont)

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of 19.5%, which can lead to breathing difficulties, unconsciousness or even death.

Escalation of this emergency classification level, if appropriate, would be based on HA5.

Basis Reference(s):

1. NEI 99-01, Rev 5 HU3
2. Drawing S-01A Composite Site Plan

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG6

Initiating Condition:

Other conditions existing which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the General Emergency class.

Basis Reference(s):

1. NEI 99-01, Rev 5 HG2
2. EPA-400, Manual Of Protective Action Guides And Protective Actions For Nuclear Incidents.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS6

Initiating Condition:

Other conditions existing which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency class description for Site Area Emergency.

Basis Reference(s):

1. NEI 99-01, Rev 5 HS3
2. EPA-400, Manual Of Protective Action Guides And Protective Actions For Nuclear Incidents.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA6

Initiating Condition:

Other conditions existing which in the judgment of the Emergency Director warrant declaration of an ALERT.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the Alert emergency class.

Basis Reference(s):

1. NEI 99-01, Rev 5 HA6
2. EPA-400, Manual Of Protective Action Guides And Protective Actions For Nuclear Incidents.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU6

Initiating Condition:

Other conditions existing which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Basis:

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

Basis Reference(s):

1. NEI 99-01, Rev 4 HU5

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

E-HU1

Initiating Condition:

Damage to a loaded cask CONFINEMENT BOUNDARY.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**

Basis:

CONFINEMENT BOUNDARY – is the barrier(s) between areas containing radioactive substances and the environment.

An Unusual Event in this EAL is categorized on the basis of the occurrence of an event of sufficient magnitude that a loaded cask CONFINEMENT BOUNDARY is damaged or violated. This includes classification based on a loaded fuel storage cask CONFINEMENT BOUNDARY loss leading to the degradation of the fuel during storage or posing an operational safety problem with respect to its removal from storage.

Basis Reference(s):

1. NEI 99-01, Rev. 5 E-HU1

Section 4: Emergency Measures

Exelon Nuclear emergency response actions are the same for all nuclear stations and are thus covered by Section E of the Emergency Plan.

4.1 Notification of the Emergency Organization

Standard NARS notifications for the Byron Station are made to the State of Illinois Emergency Management Agency (IEMA). If a General Emergency is the initiating event, the Emergency Director is also responsible for notifying the following offsite agencies:

- Ogle County Sheriff

4.2 Assessment Actions

Throughout each emergency situation, continuing assessment will occur. Assessment actions at Byron Station may include an evaluation of plant conditions; inplant, onsite, and initial offsite radiological measurements; and initial estimates of offsite doses. Core damage information is used to refine dose assessments and confirm or extend initial protective action recommendations. Byron Station utilizes WCAP-14696-A, Revision 1, (1999) as the basis for the methodology for post-accident core damage assessment. This methodology utilizes real-time plant indications. In addition, Byron Station may use samples of plant fluids and atmospheres as inputs to the CDAM (Core Damage Assessment Methodology) program for core damage estimation.

4.3 Protective Actions for the Offsite Public

Protective actions concerning the public within the 10 mile EPZ involve prompt notification, evacuation and sheltering. Prompt notification involves the use of the permanently installed outdoor notification sirens located within the EPZ.

To aid Control Room personnel during a rapidly developing emergency situation, Figure 4-1 "Byron Station (PAR) Determination Flowchart" has been developed based on Section J.10.m of the Exelon Nuclear Standardized Emergency Plan.

4.3.1 Alert and Notification System (ANS) Sirens

The ANS consists of a permanently installed outdoor notification system within a ten mile radius around the station. The ten mile radius around the station is primarily an agricultural area with a population density below 2000 persons per square mile. The ANS as installed consists of mechanical and electronic sirens that will cover this entire area with a minimum sound level of 60 db. Additionally, the ANS will cover the heavily populated areas within the ten mile radius around the station with a minimum sound level of 70 db to ensure complete coverage.

Once the public has tuned to designated radio stations in an emergency, detailed instructional messages will be given to the public. State and local procedures provide for these messages.

4.3.2 Evacuation Time Estimates

The ETE study used population data from the 2010 census which includes parts of two counties in Illinois (Ogle and Winnebago). The evacuation times are based on a detailed consideration of the EPZ roadway network and population distribution. The ETE Study, contained in EP-AA-1002 Addendum 2, Evacuation Time Estimates for the Byron Generating Station Plume Exposure Pathway Emergency Planning Zone, presents evacuation times for daytime and nighttime scenarios under various weather conditions for the evacuation of various areas around the Byron Station, once a decision has been made to evacuate.

4.4 Protective Actions for Onsite Personnel

Byron Station has a siren system to warn personnel of emergency conditions. Upon hearing a continuous two (2) minute siren, all personnel not having emergency assignments have been instructed to assemble in predesignated assembly areas. Refer to Figure 4-2. Station ERO personnel report to the Technical Support Center and Control Room personnel report to the Main Control Room. Radiation Protection, Chemistry and Operations personnel not assigned to the Main Control Room report to the Operational Support Center.

If a site evacuation of non-essential personnel is required by Section J of the Emergency Plan, personnel will be either relocated and monitored at the relocation centers or sent home if there is no release or radiological/safety concerns. The designated relocation centers for Byron Station are:

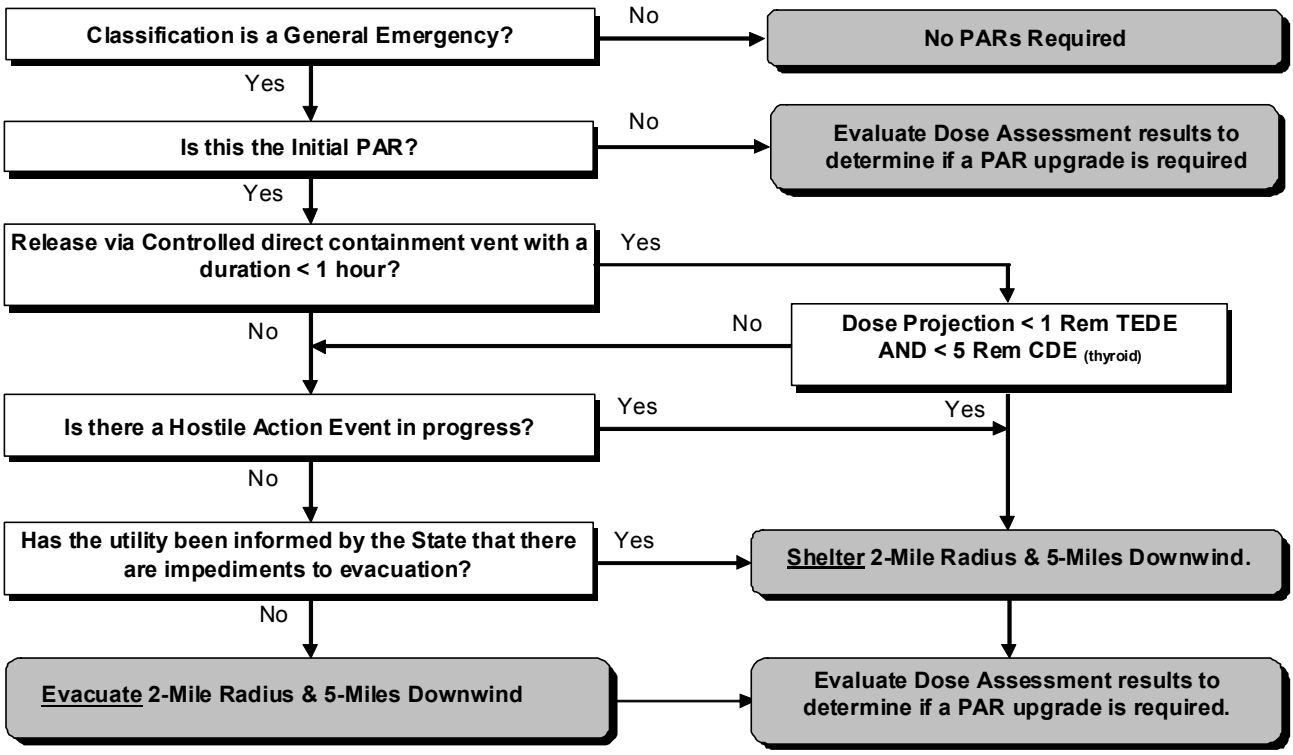
- Morrison Relocation Center, Morrison, Illinois
- Quad Cities Station, Cordova, Illinois

For evacuation routes, refer to EP-AA-113-F-18.

Traffic control for onsite areas will be handled by Byron Station personnel, if necessary.

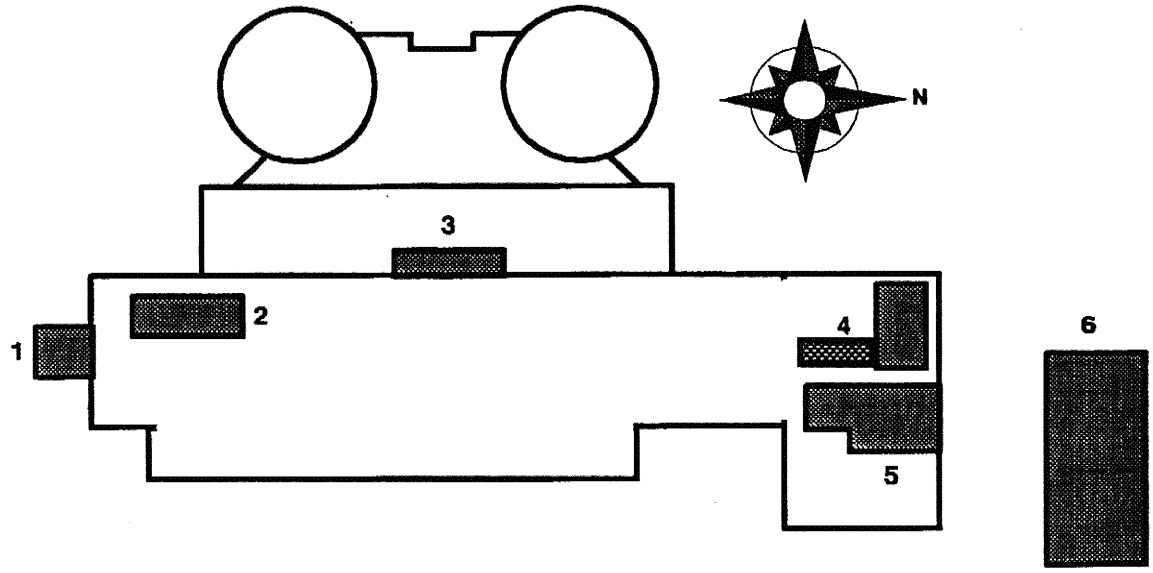
Equipment and personnel would be available at the Morrison Relocation Center and Quad Cities Station for monitoring and decontamination of evacuated personnel. If major decontamination, follow-up, or bioassay samples are necessary, those persons would be sent to Quad Cities Station.

Figure 4-1: Byron Station PAR Determination Flowchart



2 Mile Radius, 5 Miles Downwind			
WD (from)			Subareas
008º	to	068º	19, 20, 23
069º	to	128º	19, 23
129º	to	227º	17, 19, 23
228º	to	288º	19, 23
289º	to	345º	19, 23, 25
346º	to	007º	19, 20, 23, 25

Figure 4-2: Byron Station Assembly Areas and Onsite Emergency Response Facilities



ASSEMBLY AREAS

1. TECHNICAL SUPPORT CENTER (TSC) EL. 451'
2. UNIT ONE TURBINE BLDG. TRACKWAY EL. 401'
3. CONTROL ROOM EL. 451'
4. OPERATIONAL SUPPORT CENTER (OSC) EL. 451'
5. MAINTENANCE SHOP EL. 401'
6. SECURITY GATEHOUSE EL. 401'

Section 5: Emergency Facilities and Equipment

5.1 Emergency Response Facilities

Refer to Figure 4-2 for the location of the Byron Station Control Room, Technical Support Center (TSC), and Operations Support Center (OSC) within the Station's Protected Area boundary.

5.1.1 Station Control Room

The Byron Station Control Room is the initial onsite center of emergency control and is located on the 451' elevation of the Auxiliary Building.

5.1.2 Technical Support Center (TSC)

Byron Station has designated a TSC which exists at the south end of the Turbine Building. The TSC fully meets the requirements of Section H.1.b of the Exelon Nuclear Standardized Emergency Plan.

5.1.3 Operational Support Center (OSC)

Byron Station has designated a primary Operational Support Center. The primary OSC is the Response Center and Meeting Room #1 on the 451' elevation of the Service Building. The OSC conforms to the requirements of Section H.1.c of the 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.

5.1.4 Alternative Facility

The Alternative Facility maintains the capability for staging the TSC/OSC emergency response organization personnel in the event of a hostile action. This alternative facility has the capability for communications with the emergency operations facility, control room, and plant security. The Alternative Facility is located at 919 First Street, Dixon Illinois.

5.2 Assessment Resources

5.2.1 Onsite Meteorological Monitoring Instrumentation

A 250-foot meteorological tower has been erected on the site approximately 3400 feet southwest of the Byron Station reactor building, the major plant structure closest to the tower.

Wind speed, wind direction and temperature are measured at 30 feet and 250 feet above grade level. Temperature difference is determined between the 30-foot and 250-foot levels. A precipitation gauge is utilized to measure rain and snowfall at ground level near the base of the tower.

The onsite meteorological monitoring program is covered in the contract 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.

5.2.1.1 Instrumentation

The meteorological tower is instrumented with equipment that conforms with the recommendations of Regulatory Guide 1.23 and ANSI/ANS 2.5 (1984). The equipment is placed on booms oriented into the generally prevailing wind at the site. Equipment signals are brought to an instrument shack with controlled environmental conditions. The shack at the base of the tower houses the recording equipment, signal conditioners, etc., used to process and re-transmit the data to the end point users.

5.2.1.2 Meteorological Measurement Program During a Disaster

Cooperation between the corporate office and the meteorological contract assures that a timely restoration of any outage can be made. Emergency field visits to the site are made as quickly as possible after detection of a failure.

Should a disaster of sufficient magnitude occur to destroy the tower structure, a contract is maintained to have a temporary tower erected within 72 hours, weather conditions permitting. Further, the meteorological contractor maintains two levels of sensors (wind speed, wind direction and temperature) in a state of readiness for use on the temporary tower.

Additionally, Exelon Nuclear's existing instrumented towers at other nuclear sites provide a high density measurement network with multiple backup opportunities.

Meteorological data are available to the station Control Room, Technical Support Center, and Emergency Operations Facility for use in the Dose Projection Computer Model for estimating the environmental impact of unplanned releases of radioactivity from the station.

5.2.2 Onsite Radiation Monitoring Equipment

The onsite radiation monitoring capability includes an installed process, effluent, and area radiation monitoring system; post accident sampling capability; portable survey instrumentation; counting equipment for radiochemical analysis; and a personnel dosimetry program to record integrated exposure. Some onsite equipment is particularly valuable for accident situations and is described in the following subsections.

5.2.2.1 Radiation Monitoring System

Chapters 11 and 12 of the Byron UFSAR describe the radiation monitoring system (RMS) in detail. The installed RMS is designed to continuously monitor the containment atmosphere, plant effluents, and various inplant locations.

The system includes Control Room readouts and recorders for selected parameters that are monitored and an audible Control Room alarm when predetermined setpoints are exceeded. The system can be subdivided into process/effluent instrumentation and an area monitoring system.

- The process/effluent instrumentation consists of pumps, filter samplers, detectors, and associated electronics to determine noble gas, iodine, and particulate concentrations in plant cubicles or liquid and gaseous effluents. Several monitored effluent pathways have control functions which will terminate the release at a predetermined setpoint. These setpoints are premised on compliance with federal regulations.
- The area monitoring system provides information of existing radiation levels in various areas of the plant to ensure safe occupancy. It is equipped with Control Room and local readout and audible alarms to warn personnel of an increased radiation level.

Some onsite equipment is particularly valuable for accident situations and is described in the following sections.

5.2.2.2 Radiological Noble Gas Effluent Monitoring

Two General Atomic Company wide-range gas monitors (WRGM) are installed for sampling the auxiliary building vent stacks which are the final release points for gaseous effluents. The monitors have a range of 1 x 10-7 uCi/cc to 1 x 105 uCi/cc. Each monitor includes the following:

One isokinetic nozzle located in the vent stack, a sample conditioning skid to filter out radioiodine and particulate activity, the wide range gas detector assembly including three gas detectors of the low, mid, and high ranges, two sample pumps (high flow used in the low range mode and low flow used for the mid/high range), and an auxiliary pump skid which boosts flow when using the mid/high range of the WRGM.

The system also includes a microprocessor which utilizes digital processing techniques to analyze data and control monitor functions. Readouts are available in the control room with associated audible alarms. Two General Atomic Company RD-12 detectors are provided for each of the four main steamlines upstream of the safety and relief valves. The range of the monitor is 10^{-1} mR/hr to 10^{4} mR/hr. The monitors will be mounted external to the main steamline piping and corrections made for the loss of low energy gammas.

5.2.2.3 Radioiodine and Particulate Effluent Monitoring

The General Atomic Company wide range gas monitor includes a sampling rack for collection of the auxiliary building vent stack particulate and radioiodine samples. Filter holders and valves are provided to allow grab sample collection for isotopic analyses in the station's counting rooms. The sampling rack is shielded to minimize personnel exposure. The sampling media will be analyzed by a gamma ray spectrometer which utilizes a gamma spectrometer system detector. In addition, silver zeolite cartridges are available to further reduce the interference of noble gases.

5.2.2.4 High-Range Containment Radiation Monitors

Two high range containment radiation monitors are installed for each operating reactor. The monitors will detect and measure the radiation level within the reactor containment during and following an accident. The range of the monitors is 1 rad/hr to 10^7 Rads/hr.

5.2.2.5 In-plant Iodine Instrumentation

Effective monitoring of increasing iodine levels in buildings under accident conditions will include the use of portable instruments using silver zeolite as a sample media. Auxiliary counting room locations have been identified within the Turbine Building. It is expected that a sample can be obtained and analyzed for iodine content within a two-hour time frame.

5.2.3 Onsite Process Monitors

An adequate monitoring capability exists to properly assess the plant status for all modes of operation and is described in the Byron UFSAR. The operability of the post-accident instrumentation ensures information is available on selected plant parameters to monitor and assess important variables following an accident. Instrumentation is available to monitor the parameters and ranges given in Technical Specifications. Byron Station Emergency Operating Procedures aid personnel in recognizing inadequate core cooling using applicable instrumentation.

5.2.4 Onsite Fire Detection Instrumentation

The fire detection system is designed in accordance with applicable National Fire Protection Association (NFPA) Standards. The system is equipped with electrically supervised ionization smoke and heat detectors to quickly detect any fires and the instrumentation to provide local indication and Control Room annunciation. In addition to the smoke and heat detection systems, each fire protection carbon dioxide, halon, or water system is instrumented to inform the Control Room of its actuation or of system trouble. In the event that a portion of the fire detection instrumentation is inoperable, fire watches in affected areas may be required.

5.2.5 Facilities and Equipment for Offsite Monitoring

Consult Chapter 11 of the station specific Offsite Dose Calculation Manual (ODCM) for the most current location for fixed continuous air samplers and DLR locations. Byron Station maintains a supply of emergency equipment and supplies for offsite monitoring and sampling by environmental field teams.

5.2.6 Site Hydrological Characteristics

The hydrological characteristics of the Byron Station vicinity are described in the Byron UFSAR. The river screen house is the only structure that could be affected by flooding on the Rock River and is designed for a combined event flood, where a combined event flood is defined as a flood on the Rock River having a 1×10^{-6} annual probability of being exceeded at a 90% confidence level. All other Byron Station structures are 161 feet or more above the Probable Maximum Flood level of the Rock River.

The minimum design operating level of the essential service water makeup pumps is 3.8 feet lower than the water level for the 1-day 100 year low flow drought condition. In the unlikely event that emergency make-up water requirements cannot be satisfied by surface water withdrawals from the Rock River, groundwater wells will serve for makeup to the essential service water cooling towers.

Because of the site hydrological characteristics given above, plant operation should not be affected by Rock River water level conditions and therefore, hydrological monitors have not been installed. The Rock River is not used for any public water supply. There are no recorded plans for any future public water supply usage from the Rock River. The nearest surface water users downstream from Byron Station are on the Mississippi River over 115 miles away. This allows for sufficient mixing that makes permanently installed hydrological monitors unnecessary. In performing dose calculations from liquid releases, Byron Station uses a historical average river flow value, Fw, as a parameter in the liquid release model.

5.3 Protective Facilities and Equipment

The principal onsite assembly areas for Byron Station are the Machine Shop on the 401-foot elevation of the Service Building and the Unit #1 Turbine Building track-way. These areas are suitable because:

1. They are large open areas suitable for assembling a large number of people in a short time;
2. They can be easily exited if a site evacuation is deemed necessary following an assembly; and
3. They have a low probability of being affected by a serious accident involving the Reactor and its primary systems.

The offsite relocation centers for Byron Station are discussed in Section 4 of this annex. These locations are suitable, depending on the emergency condition. These locations are owned by Exelon; thus, personnel, supplies, and communications are readily available.

5.4 First Aid and Medical Facilities

Byron Station has an inplant first aid/decontamination room on the 426-foot elevation of the auxiliary building near the station laboratory complex. This room is provided with a sink, a shower, and a supply cabinet. First aid kits, stretchers, sinks, eyewashes, and emergency showers have been placed in strategic locations throughout the station.

Medical treatment given to injured persons at the station is of a "first aid" nature. When more professional care is needed, injured persons are transported to a local hospital or clinic. Rockford Memorial Hospital in Rockford, Illinois is the designated support hospital for handling contaminated injured persons. Provena St. Joseph Medical Center in Joliet, Illinois is the backup medical facility for evaluation and treatment of persons suffering from traumatic injury, medical illness, or radiation exposure and uptake.

Appendix 1: NUREG-0654 Cross-Reference

Annex Section	NUREG-0654
1.0	Part I, Section A
1.1	Part I, Section C
1.2	Part I, Section D
Figure 1-1	Part I, Section D
2.0	Part II, Section A.4
2.1	Part II, Section A.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.m
4.3.1	Part II, Section E.6
4.3.2	Part II, Section J.8
4.4	Part II, Section J.1-5
Figure 4-1	Part II, Section J.10.m
Table 4-2	Part II, Section J.8 & 10.b
Figure 4-2	Part II, Section J.5
4.4	Part II, Section J.2 & 3
5.1	Part II, Section H.1 & G.3
5.2.1	Part II, Section H.5.a & 8
5.2.2	Part II, Section H.5.b & 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
5.2.6	Part II, Section H.5.a & 6.a
5.3	Part II, Section J.1-5
5.4	Part II, Section L.1 & 2

Appendix 2: Station Letters of Agreement

1. Byron Fire Protection District and Rescue – fire protection.
2. Rockford Memorial Hospital – medical services.
3. The Ogle County Sheriff's Office – law enforcement.

ATTACHMENT 5

EP-AA-1003, Revision 23

Exelon Nuclear Radiological Emergency Plan Annex for Clinton Station

EXELON NUCLEAR

RADIOLOGICAL EMERGENCY PLAN ANNEX FOR CLINTON STATION

Table of Contents

REVISION HISTORY

Revision 0; March 2002	Revision 9; November 2006	Revision 18; January 2011
Revision 1; May 2002	Revision 10, April 2007	Revision 19; March 2011
Revision 2; August 2002	Revision 11, October 2007	Revision 20; April 2012
Revision 3; May 2003	Revision 12, March 2008	Revision 21; November 2012
Revision 4; August 2003	Revision 13, December 2008	Revision 22; December 2012
Revision 5; January 2004	Revision 14, March 2009	Revision 23; June 2013
Revision 6, December 2004	Revision 15, March 2010	
Revision 7, May 2005	Revision 16, May 2010	
Revision 8; January 2006	Revision 17, September 2010	

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 Emergency Plan (Emergency Plan) Station Annexes, emergency plan implementing procedures, and associated program administrative documents. The 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 Clinton 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 Emergency Plan.

1.1 Facility Description

The Clinton Station, is located in approximately 6 miles east of Clinton, Illinois, in DeWitt County in Central Illinois. Clinton Station is operated by Exelon Nuclear.

The location can be defined by placing the station in the approximate center of a triangle formed by Bloomington, 22 miles to the north, Decatur, 22 miles to the south, and Champaign, 30 miles to the east. The reactor containment, the focal point for the Station, is located approximately 3 miles northeast of the confluence of the Salt Creek North Fork and the Salt Creek.

The site encompasses about 14,000 acres. This includes the Station of about 150 acres and a man-made, irregular U-shaped cooling reservoir of about 4,895 acres, known as Clinton Lake.

The surrounding area is mostly rural with no major population centers (greater than 25,000 people) or industrial complexes within a 10 mile radius of the Station. Recreational facilities are also limited in the area with Clinton Lake offering the largest variety.

The Clinton Station is a Boiling Water Reactor (BWR), the unit is rated at 3473 MWt. The rated electric output of the unit is 1062 MWe; from the General Electric (GE) turbine generator. The Nuclear Steam System Supplier (NSSS) was GE (Nuclear Energy Division). The entire plant, except for the NSSS, was designed by Sargent & Lundy (S&L) Engineers.

The containment system designed by Sargent & Lundy employs the drywell/pressure suppression features of the BWR-MARK III containment concept. The containment is a right cylindrical, reinforced concrete, steel-lined pressure vessel with a hemispherical dome.

The power generation complex includes several adjacent buildings, including an Auxiliary Building, Control Building (housing the Main Control Room), the Fuel Building, the Turbine Building, Diesel Generator and HVAC Building, the Radwaste Building, and the Service Building. Other buildings such as the gatehouse, circulating water screenhouse, makeup water pump house, warehouses, etc., are also located in the general plant area.

The Circulating Water Screen House located on the Clinton Lake, provides makeup water for the Clinton Station.

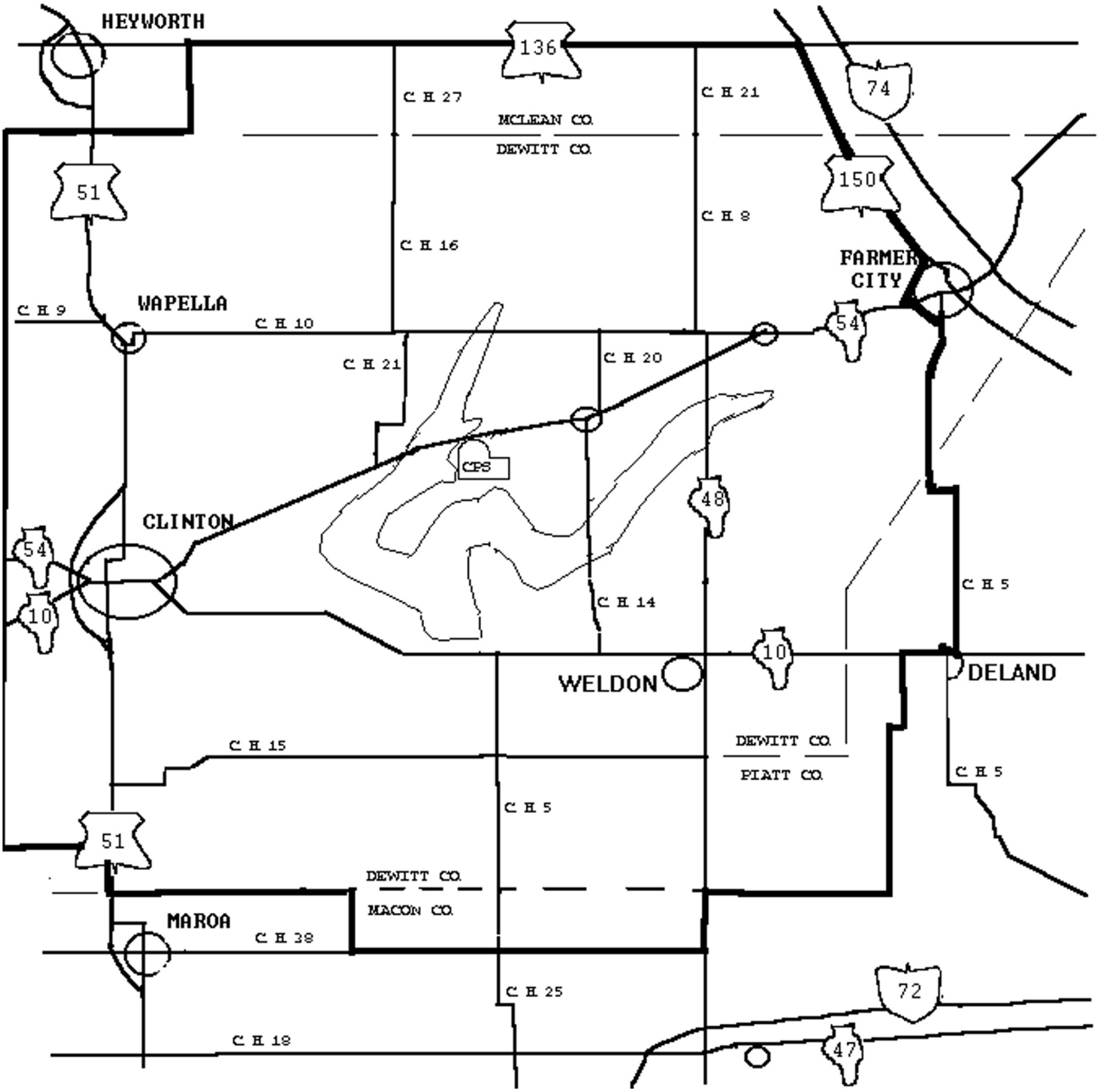
The ultimate heat sink for emergency core cooling is a submerged pond and intake flume of 590 acre-feet capacity that underlies the cooling lake and the natural grade of the site.

The Clinton Station utilizes a single vent stack of approximately 200 feet in height for the release of all gaseous waste. For more specific site location information, refer to the Station USAR.

1.2 Emergency Planning Zones

The plume exposure Emergency Planning Zone (EPZ) for Clinton Station shall be an area surrounding the Station with a radius of about ten miles (exact boundaries are determined by the State of Illinois). Refer to Figure 1-1.
The ingestion pathway EPZ for Clinton Station shall be an area surrounding the Station with a radius of about 50 miles.

Figure 1-1: Clinton Station Location and 10 Mile EPZ



Section 2: Organizational Control of Emergencies

This section describes the Emergency Response Organization (ERO) and its key positions. It outlines the staffing requirements which provide initial emergency response actions and provisions for timely augmentation of on-shift personnel when required. It also describes interfaces among Exelon Nuclear emergency response personnel and specifies the offsite support available to respond to the nuclear generating stations.

2.1 Shift Organization Staffing

Initial response to any emergency is by the normal plant organization present at the site. This organization includes positions that are onsite 24 hours per day and is described in Section B.1 of the Exelon Nuclear Standardized Radiological Emergency Plan. The Normal Shift Organization will be augmented, in an emergency, with designated/additional Emergency Response Organization (ERO) personnel within 60 minutes of notification as specified under Table 2-1. ERO activation is described in Section H.4 of the Exelon Nuclear Standardized Radiological Emergency Plan.

Table 2-1 outlines ERO positions required to meet minimum staffing and full augmentation of the on-shift complement at an Alert or higher classification, and the major tasks assigned to each position. Responsibilities for each position are described in Section B.5 of the Exelon Nuclear Standardized Radiological Emergency Plan.

2.1.1 Incident Assessor

Clinton Station has the option of using an Incident Assessor in these cases where the STA qualification is held by others such as the Shift Manager. Upon declaration of an emergency, the Incident Assessor fulfills the role of the on-shift technical advisor and reports to the Shift Emergency Director (Shift Manager). The Incident Assessor shall function as an advisor to the Shift Manager on matters of safety and act as an on-shift technical advisor, and, if qualified, the Nuclear Engineer. The Incident Assessor is an ERO position that can be filled by an individual who is qualified as the Shift Technical Advisor or Incident Assessor.

As an advisor to the Shift Manager, the Incident Assessor shall have no authority to direct the activities of the shift during an emergency. The Incident Assessor shall be available for briefing individuals who are preparing to assume command authority. The Incident Assessor is required to be present in all modes. The Incident Assessor will be present within the Owner Controlled area when filling the Emergency Plan function.

2.2 Emergency Response Organization Block Diagram

Figures B-1a through B-1d of the Exelon Nuclear Standardized Radiological Emergency Plan illustrates the overall emergency response organization.

2.3 Non-Exelon Nuclear Support Groups

Exelon Nuclear has contractual agreements with several companies whose services would be available in the event of a radiological emergency. These

agencies and their available services are listed in Appendix 3 of the Exelon Nuclear Radiological Emergency Plan.

Emergency response coordination with governmental agencies and other support organizations is discussed in Section A of the Exelon Nuclear Radiological Emergency Plan.

Agreements exist on file at Clinton Station with several support agencies. These agencies and their support roles are listed in Appendix 2, Station Letters of Agreement.

Table 2-1: Minimum Staffing Requirements

Functional Area	Major Tasks	Emergency Positions	Minimum Shift Size	Minimum Staffing *60 Minute Augmentation	Minimum Staffing Other On-Call	Minimum Staffing Full Augmentation
1. Plant Operations/Safe Shutdown and Assessment of Operational Aspects	Control Room Staff	Shift Manager	1			
		Shift Supervisor	1			
		Nuclear Station Operator	2			
		Non-Licensed Operator	1			
2. Emergency Direction and Control	Command and Control	Shift Emergency Director (CR)	1[(a)]			
		Station Emergency Director (TSC)		1		
		Corporate Emergency Director (EOF)		1		
3. Notification & Communication	Emergency Communications	Plant Shift Personnel	1			
		TSC Director (TSC)		1		
		EOF Director (EOF)		1		
		State/Local Communicator		1 (EOF)		1 (TSC)
		ENS Communicator		1 (TSC)		1 (EOF)
		HPN Communicator		1 (EOF)		1 (TSC)
	Plant Status	OPs Communicator (CR/TSC)				2
		Operations Advisor (EOF)				1
	In-Plant Team Control	Damage Control Comm. (CR/TSC/OSC)				3
	Technical Activities	Technical Communicator (TSC)				1
		Technical Advisor (EOF)				1
	Governmental	State Environs Communicator (EOF)				(b)
		EOC Communicator (EOF)				1
		State EOC Liaison (State EOC)				(b)
		County EOC Liaison (County EOC)				(b)
		Regulatory Liaison (EOF)				1
4. Radiological Assessment	Offsite Dose Assessment	RP Personnel	1			
		Dose Assessment Coordinator (EOF)		1		
		Dose Assessor (EOF)				1
		Radiation Controls Coordinator (TSC)				1
	Offsite Surveys	Environmental Coordinator (EOF)		1		
		Field Team Communicator (EOF)				1
		Offsite Field Team Personnel		4		(b)
	Onsite Surveys	Onsite Field Team Personnel		2		(b)
	In-plant Surveys	RP Personnel	1	2		(b)
	Chemistry	Chemistry Personnel	1	1		(b)
	RP Supervisory	Radiation Protection Manager(TSC/EOF)		2		

Functional Area	Major Tasks	Emergency Positions	Minimum Shift Size	Minimum Staffing *60 Minute Augmentation	Minimum Staffing Other On-Call	Full Augmentation
5. Plant System Engineering, Repair, and Corrective Actions	Technical Support	STA or Incident Assessor (CR)	1			
		Technical Manager (TSC)		1		
		Core Thermal/Hydraulic Engineer (TSC)		1		
		Mechanical Engineer (TSC)		1		
		Electrical Engineer (TSC)		1		
		SAMG Decision-Maker (TSC)		1[(a)]		
		SAMG Evaluator (TSC)		2[(a)]		
		Operations Manager (TSC)		1		
		Radiation Controls Engineer (TSC)				1
		Technical Support Manager (EOF)				1
	Repair and Corrective Actions	MM/Non-Licensed Operator (OSC)	1[(a)]	2		(b)
		Electrical/I&C Maintenance (OSC)	1	3		(b)
		Maintenance Manager (TSC)		1		
		OSC Director (OSC)		1		
		Assistant OSC Director (OSC)				1
		OPs Lead & Support Personnel (OSC)				(b)
6. In-Plant Protective Actions	Radiation Protection	RP Personnel	2[(a)]	4		(b)
7. Fire Fighting	--	Fire Brigade[(c)]	5			
8. 1st Aid and Rescue Operations	--	Plant Personnel	2[(a)]			(b)
9. Site Access Control and Personnel Accountability	Security & Accountability	Security Team Personnel	(d)	(d)		
		Security Coordinator (TSC)				1
	EOF Security	Security Coordinator (EOF)				1
10. Resource Allocation and Administration	Logistics	Logistics Manager (EOF)		1		
		Logistics Coordinator (TSC)				1
	Administration	Administrative Coordinator (EOF)				1
		Clerical Staff (TSC/EOF/JIC)				(b)
	Inter Facility Logs	Events Recorder (EOF/JIC)				2
	Facility Support	Computer Specialist (EOF)				1

Functional Area	Major Tasks	Emergency Positions		Minimum Shift Size	Minimum Staffing *60 Minute Augmentation	Minimum Staffing Other On-Call	Full Augmentation
11. Public Information	Media Interface	Corporate Spokesperson	(JIC)			1	
		Rad Protection Spokesperson	(JIC)				1
		Technical Spokesperson	(JIC)				1
	Information Development	Public Information Director				1	
		News Writer					1
	Media Monitoring and Rumor Control	Media Monitoring Staff					(b)
		Rumor Control Staff					(b)
	Facility Operation and Control	JIC Director	(JIC)			1	
		JIC Coordinator	(JIC)				1
		Administrative Coordinator	(JIC)				1
		Access Controls	(JIC)				1
		Facility Support Staff	(JIC)				(b)
		TOTAL:		**16**	**37**	**3**	**32[(b)]**

* Response time is based on optimum travel conditions.

(a) May be provided by personnel assigned other functions.

(b) Personnel numbers depend on the type and extent of the emergency.

(c) Fire Brigade per USAR/Technical Specifications, as applicable.

(d) Function performed by on-shift security personnel.

Section 3: Classification of Emergencies

3.1 General

Section D of the Exelon Nuclear Standardized Emergency Plan divides the types of emergencies into four Emergency Classification Levels (ECLs). The first four are the UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY, and GENERAL EMERGENCY. These ECLs are entered by meeting the Emergency Action Level (EAL) Threshold Values provided in this section of the Annex. The ECLs are escalated from least severe to most severe according to relative threat to the health and safety of the public and emergency workers. Depending on the severity of an event, prior to returning to a standard day-to-day organization, a state or phase called RECOVERY may be entered to provide dedicated resources and organization in support of restoration and communication activities following the termination of the emergency.

UNUSUAL EVENT: Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

ALERT: Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

SITE AREA EMERGENCY: Events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

GENERAL EMERGENCY: Events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

RECOVERY: Recovery can be considered as a phase of the emergency and is entered by meeting emergency termination criteria provided in EP-AA-111 Emergency Classification and Protective Action Recommendations.

An emergency is classified by assessing plant conditions and comparing abnormal conditions to Initiating Conditions and Threshold Values for each Emergency Action Level.

Individuals responsible for the classification of events will refer to the Initiating Condition and Threshold Values on the matrix of the appropriate station Standardized Emergency Plan Annex (this document). This matrix will contain Initiating Conditions, EAL Threshold Values, Mode Applicability Designators, appropriate EAL numbering system, and additional guidance necessary to classify events. It may be provided as a user aid.

The matrix is set up in five Recognition Categories. The first is designated as "R" and relates to Abnormal Radiological Conditions / Abnormal Radiological Effluent Releases. The second is designated as "F" and relates to Fission Product Barrier Degradation. The third is designated as "M" and relates to System Malfunctions. The fourth is designated as "HC" and relates to Cold Shutdown / Refueling System Malfunctions. The fifth is designated as "H" and relates to Hazards and Other Conditions.

The 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.

The Initiating Conditions are coded with a two letter and one number code. The first letter is the Recognition Category designator, the second letter is the Classification Level, “U” for (NOTIFICATION OF) UNUSUAL EVENT, “A” for ALERT, “S” for SITE AREA EMERGENCY and “G” for GENERAL EMERGENCY. The EAL number is a sequential number for that Recognition Category series. All Initiating Conditions that are describing the severity of a common condition (series) will have the same number.

The EAL number may then be used to reference a corresponding page(s), which provides the basis information pertaining to the Initiating Condition:

- Threshold Value
- Mode Applicability
- Basis

Emergency Action Levels are the measurable, observable detailed conditions that must be met in order to classify the event. Classification is not to be made without referencing, comparing and satisfying the Threshold Values specified in the Emergency Action Levels.

A list of definitions is provided as part of this document for terms having specific meaning to the Emergency Action Levels. Site specific definitions are provided for terms with the intent to be used for a particular Initiating Condition/Threshold Value and may not be applicable to other uses of that term at other sites, the Emergency Plan or procedures.

References are also included to documents that were used to develop the EAL Threshold Values.

References to the Emergency Director means the person in Command and Control as defined in the Emergency Plan. Classification of emergencies is a non-delegable responsibility of Command and Control for the onsite facilities with responsibility assigned to the Shift Emergency Director (Control Room Shift Manager) or the Station Emergency Director (TSC). Classification of emergencies remains the responsibility of the applicable onsite facility even after Command and Control is transferred to the Corporate Emergency Director (EOF).

3.2 Classification, Instrumentation and Transient Events

Although the majority of the EALs provide very specific thresholds, the Emergency Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL is IMMINENT. If, in the judgment of the Emergency Director, an IMMINENT situation is at hand, the classification should be made as if the threshold has been exceeded. While this is particularly prudent at the higher emergency classification levels (as the early classification may provide for more effective implementation of protective measures), it is nonetheless applicable to all emergency classification levels.

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 indications, or (3) by direct observation by plant personnel, such that doubt related to the indication's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

Indications used for monitoring and evaluation of plant conditions include the normally used instrumentation, backup or redundant instrumentation, and the use of other parameters that provide information that supports determination if an EAL threshold value has been reached. When an EAL refers to a specific instrument or indication that is determined to be inaccurate or unavailable, then alternate indications shall be used to monitor the specified condition.

During an event that results in changing parameters trending towards an EAL classification, and instrumentation that was available to monitor this parameter becomes unavailable or the parameter goes off scale, the parameter should be assumed to have been exceeded consistent with the trend and the classification made if there are no other direct or indirect means available to determine if the threshold has not been exceeded.

Planned evolutions involve preplanning to address the limitations imposed by the condition, the performance of required surveillance testing, and the implementation of specific controls prior to knowingly entering the condition in accordance with the specific requirements of the site's Technical Specifications. Activities which cause the site to operate beyond that allowed by the site's Technical Specifications, planned or unplanned, may result in an EAL threshold being met or exceeded. Planned evolutions to test, manipulate, repair, perform maintenance or modifications to systems and equipment that result in an EAL

value being met or exceeded are not subject to classification and activation requirements as long as the evolution proceeds as planned and is within the operational limitations imposed by the specific operating license. However, these conditions may be subject to the reporting requirements of 10 CFR 50.72.

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.

Concerning Classification Downgrading Exelon Nuclear policy is that emergency classifications shall not be downgraded to a lower classification. Once declared, the event shall remain in effect until no Classification is warranted or until such time as conditions warrant classification to Recovery.

There may be cases in which a plant condition that exceeded an EAL was not recognized at the time of occurrence but is identified well after the condition has occurred (e.g., as a result of routine log or record review), and the condition no longer exists. In these cases, an emergency should not be declared. Reporting requirements of 10 CFR 50.72 are applicable, the guidance of NUREG-1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73 and the Reportability Reference Manual, should be applied.

3.3 Mode Applicability

The plant-operating mode that existed at the time that the event occurred, prior to any protective system or operator action initiated in response to the condition, is compared to the mode applicability of the EALs. If an event occurs, and a lower or higher plant-operating mode is reached before the emergency classification can be made, the declaration shall be based on the mode that existed at the time the event occurred.

For events that occur in Cold Shutdown or Refueling, escalation is via EALs that have Cold Shutdown or Refueling for mode applicability, even if Hot Shutdown (or a higher mode) is entered during any subsequent heat-up. In particular, the Fission Product Barrier Matrix EALs are applicable only to events that initiate in Hot Shutdown or higher.

If there is a change in Mode following an event declaration, any subsequent events involving EALs outside of the current declaration escalation path will be evaluated on the Mode of the plant at the time the subsequent events occur.

3.4 Emergency Director Judgment

Emergency Director Judgment EALs are provided in the Hazards and Other Condition Affecting Plant Safety section and on the Fission Product Barrier Matrix. Both of the Emergency Director Judgment EALs have specific criteria for when they should be applied.

The Hazards Section Emergency Director Judgment EALs are intended to address unanticipated conditions which are not addressed explicitly by other EALs but warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under specific emergency classifications (UE, Alert, SAE or GE).

The FPB Matrix ED Judgment EALs are intended to include unanticipated conditions, which are not addressed explicitly by any of the other FPB threshold values, but warrant determination because conditions exist that fall under the broader definition for a significant Loss or Potential Loss of the barrier (equal to or greater than the defined FPB threshold values).

3.5 Fission Product Barrier Restoration

Fission Product Barriers (FPBs) are not treated the same as EAL threshold values. Conditions warranting declaration of the loss or potential loss of a Fission Product Barrier may occur resulting in a specific classification. The condition that caused the loss or potential loss declaration could be rectified as the result of Operator action, automatic actions, or designed plant response. Barriers will be considered re-established when there are direct verifiable indications (containment penetration or open valve has been isolated, coolant sample results, etc) that the barrier has been restored and is capable of mitigating future events.

The reestablishment of a fission product barrier does not alter or lower the existing classification. Entry into Termination/Recovery phase is still required for exiting the present classification. However the reestablishment of the barrier should be considered in determining future classifications should plant conditions or events change.

3.6 Definitions

AFFECTING SAFE SHUTDOWN: Event in progress has adversely affected functions that are necessary to bring the plant to and maintain it in the applicable HOT or COLD SHUTDOWN condition. Plant condition applicability is determined by Technical Specification LCOs in effect.

> Example 1: Event causes damage that results in entry into an LCO that requires the plant to be placed in HOT SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is not “AFFECTING SAFE SHUTDOWN.”
>
> Example 2: Event causes damage that results in entry into an LCO that requires the plant to be placed in COLD SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is “AFFECTING SAFE SHUTDOWN.”

BOMB: An explosive device suspected of having sufficient force to damage plant systems or structures.

CIVIL DISTURBANCE: A group of persons violently protesting station operations or activities at the site.

CONFINEMENT BOUNDARY: The barrier(s) between areas containing radioactive substances and the environment.

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and

components as a functional barrier to fission product release under existing plant conditions.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

EXTORTION: An attempt to cause an action at the station by threat of force.

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fire. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTILE FORCE: One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

INTRUSION: A person(s) present in a specified area without authorization. Discovery of a BOMB in a specified area is indication of INTRUSION into that area by a HOSTILE FORCE.

NORMAL LEVELS: Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

NORMAL PLANT OPERATIONS: Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

OPERATING MODES	REACTOR MODE SWITCH POSITION	TEMP
(1) Power Operation:	Run	N/A
(2) Startup:	Refuel [(a)] or Startup/Hot Standby	N/A
(3) Hot Shutdown [(a)]:	Shutdown	> 200° F
(4) Cold Shutdown [(a)]:	Shutdown	≤ 200° F
(5) Refueling [(b)]:	Shutdown or Refuel	N/A
(D) Defueled:	All reactor fuel removed from reactor pressure vessel (full core off load during refueling or extended outage).	

[(a)] All reactor vessel head closure bolts fully tensioned.

[(b)] One or more reactor vessel head closure bolts less than fully tensioned.

Hot Matrix – applies in modes (1), (2), and (3)

Cold Matrix – applies in modes (4), (5), and (D)

OWNER CONTROLLED AREA (OCA): The property associated with the station and owned by the company. Access is normally limited to persons entering for official business.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

SABOTAGE: A deliberate damage, mis-alignment, or mis-operation of plant equipment with the intent to render the equipment inoperable. Equipment found tampered with or damaged due to malicious mischief may NOT meet the definition of SABOTAGE until this determination is made by security supervision.

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) Turbine Trip (2) Reactor Scram (3) ECCS Activation, (4) Recirc. Runback > 25% Reactor Power change, or (5) thermal power oscillations >10% Reactor Power change.

STRIKE ACTION: A work stoppage within the PROTECTED AREA by a body of workers to enforce compliance with demands made on management. The STRIKE ACTION must threaten to interrupt NORMAL PLANT OPERATIONS.

UNISOLABLE: A breach or leak that cannot be promptly isolated.

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

Emergency Action Level Technical Basis Page Index

General		Site Area		Alert		Unusual Event	
EAL	**Pg.**	**EAL**	**Pg.**	**EAL**	**Pg.**	**EAL**	**Pg.**
RG1	3-28	RS1	3-31	RA1	3-34	RU1	3-37
				RA2	3-40	RU2	3-42
				RA3	3-45	RU3	3-46
FG1	3-47	FS1	3-48	FA1	3-49	FU1	3-50

Fuel Clad		RCS		Containment	
FC1	3-51				
FC2	3-52	RC2	3-56	CT2	3-63
		RC3	3-57	CT3	3-64
		RC4	3-58		
FC5	3-54	RC5	3-61	CT5	3-66
				CT6	3-67
FC7	3-55	RC7	3-62	CT7	3-70

MG1	3-71	MS1	3-73	MA1	3-74	MU1	3-76
MG2	3-77	MS2	3-79	MA2	3-80	MU2	3-81
		MS3	3-82				
		MS4	3-83	MA4	3-86	MU4	3-89
						MU5	3-91
						MU6	3-92
						MU7	3-94
				CA1	3-96	CU1	3-97
						CU2	3-99
						CU3	3-100
						CU4	3-101
				CA5	3-103	CU5	3-106
CG6	3-108	CS6	3-111	CA6	3-114	CU6	3-116
						CU7	3-117
HG1	3-120	HS1	3-122	HA1	3-124	HU1	3-126
		HS2	3-129	HA2	3-130		
				HA3	3-131	HU3	3-133
				HA4	3-136	HU4	3-141
				HA5	3-145	HU5	3-147
HG6	3-149	HS6	3-150	HA6	3-151	HU6	3-152

Abnormal Rad Levels / Radiological Effluent

Radiological Effluents

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
RG1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 5 D **EAL Threshold Values:** **Note**: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results. 1. The sum of VALID readings on the HVAC and SGTS Radiation Monitors **> 1.03 E+10 uCi/sec (> 1.03 E+4 Ci/sec)** for **≥ 15 minutes** (as found on Control Room Panels or PPDS – Total Noble Gas Release Rate). **OR** 2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**: a. **> 1000 mRem TEDE** **OR** b. **> 5000 mRem CDE Thyroid** **OR** 3. Field survey results at or beyond Site Boundary indicate **EITHER**: a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**. **OR** b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.	**RS1** Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 5 D **EAL Threshold Values:** **Note**: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results. 1. The sum of VALID readings on the HVAC and SGTS Radiation Monitors **> 1.03 E+09 uCi/sec (> 1.03 E+3 Ci/sec)** for **≥ 15 minutes** (as found on Control Room Panels or PPDS – Total Noble Gas Release Rate). **OR** 2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**: a. **> 100 mRem TEDE** **OR** b. **> 500 mRem CDE Thyroid** **OR** 3. Field survey results at or beyond Site Boundary indicate **EITHER**: a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**. **OR** b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.	**RA1** Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown. 1. VALID reading on any of the following effluent monitors > **200 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 15 minutes**. • Radwaste Effluent Monitor 0RIX-PR040 **OR** • Discharge Permit specified monitor **OR** 2. The sum of VALID readings on the HVAC and SGTS radiation monitors is **> 1.17 E+08 uCi/sec (> 1.17 E+02 Ci/sec)** for **≥ 15 minutes** (as found on Control Room Panels or PPDS – Total Noble Gas Release Rate). **OR** 3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.	**RU1** Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown. 1. VALID reading on any of the following effluent monitors > **2 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 60 minutes**. • Radwaste Effluent Monitor 0RIX-PR040 **OR** • Discharge Permit specified monitor **OR** 2. The sum of VALID readings on the HVAC and SGTS radiation monitors is **> 1.17 E+06 uCi/sec (> 1.17 Ci/sec)** for **≥ 60 minutes** (as found on Control Room Panels or PPDS – Total Noble Gas Release Rate). **OR** 3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Abnormal Rad Levels / Radiological Effluent				
Abnormal Rad Levels		**Table R1 - Fuel Handling Incident Radiation Monitors** • VF (1PR006A-D) • CCP monitors (1PR042A-D) • Main VR (1PR001A-D) • Fuel Transfer VR (1PR008A-D)	**RA2** Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel. 1 2 3 4 5 D **EAL Threshold Values:** 1. VALID reading **> 1000 mR/hr** on any Table R1 Radiation Monitor due to **EITHER**: • Damaged irradiated fuel. **OR** • Water level drop. **OR** 2. Water level drop in the Reactor Refueling Cavity, Spent Fuel Pool, Upper Containment Fuel Storage Pool, Inclined Fuel Transfer System or Fuel Transfer Canal that will result in irradiated fuel becoming uncovered.	**RU2** UNPLANNED rise in plant radiation levels. 1 2 3 4 5 D **EAL Threshold Values:** 1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool, Upper Containment Fuel Storage Pool, Inclined Fuel Transfer System or Fuel Transfer Canal as indicated by: • Refueling Cavity water level **< 22 ft. 8 in.** above the Reactor Vessel Flange. **OR** • Spent Fuel Pool or Upper Containment Fuel Storage Pool water level **< 23 ft**. **OR** • Report of visual observation of a drop in water level in the Refueling Cavity, Spent Fuel Pool, Upper Containment Fuel Storage Pool, Inclined Fuel Transfer System or Fuel Transfer Canal. **AND** b. VALID Area Radiation Monitor reading rise on one or more radiation monitor in Table R1. **OR** 2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.
		Table R2 **Areas Requiring Continuous Occupancy** • Main Control Room • Central Alarm Station - (by survey)	**RA3** Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. 1 2 3 4 5 D **EAL Threshold Values:** Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R2) to maintain plant safety functions.	**RU3** Fuel Clad Degradation. 1 2 3 **EAL Threshold Values:** Fuel clad degradation resulting in **EITHER**: • Offgas post-treatment radiation monitor 1RIX-PR035/41 channel 7 **HI** alarm. **OR** • Specific coolant activity **> 4.0 uCi/gm** Dose Equivalent I-131.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
FG1 Loss of ANY two barriers AND Loss or Potential Loss of third barrier. 1 2 3	**FS1** Loss or Potential Loss of. ANY two barriers. 1 2 3	**FA1** ANY Loss or ANY Potential Loss of either Fuel Clad or RCS. 1 2 3	**FU1** ANY Loss or ANY Potential Loss of Containment. 1 2 3

Sub-Category	FC - Fuel Clad		RC – Reactor Coolant System		CT - Containment	
	Loss	**Potential Loss**	**Loss**	**Potential Loss**	**Loss**	**Potential Loss**
1. Pri Coolant Activity	Coolant activity **> 300 uCi/gm** Dose Equivalent I-131	None	None	None	None	None
2. RPV Water Level →	1. RPV level **cannot** be restored and maintained **> -187 inches**	2. RPV level **cannot** be restored and maintained **> -162 inches** (TAF) **OR** 3. RPV level **cannot** be determined.	1. RPV level **cannot** be restored and maintained **> -162 inches** (TAF) **OR** 2. RPV level **cannot** be determined.	None	None	Plant conditions indicate that Primary Containment Flooding is required.
3. Primary Cont Conditions	None	None	1. Drywell pressure **> 1.68 psig**. **AND** 2. Drywell pressure rise due to RCS leakage.	None	1. Rapid unexplained drop in containment pressure following initial pressure rise. **OR** 2. Containment pressure response **not** consistent with LOCA conditions.	3. Containment pressure **≥ 15 psig** and rising. **OR** 4. a. Drywell hydrogen concentration **≥ 9%.** **OR** b. Containment hydrogen concentration **≥ SAG-2 Fig. R, Deflagration Limit.** **OR** 5. Heat Capacity Limit (EOP-6, Fig. P) exceeded.
4. RCS Leak Rate →	None	None	1. UNISOLABLE Main Steam Line (MSL), Feedwater, RWCU or RCIC line break. **OR** 2 Emergency RPV Depressurization is required.	3. RCS leakage **> 50 gpm** inside the drywell or containment. **OR** 4. UNISOLABLE primary system leakage outside containment resulting in **EITHER:** • Secondary Containment area temperature **> EOP-8 Maximum Normal** operating levels. **OR** • Secondary Containment radiation level **> EOP-8 Maximum Normal** operating levels.	None	None
5. Pri Cont Rad Monitoring	1. Drywell radiation monitor reading **> 260 R/hr (> 2.60 E+02 R/hr)**. **OR** 2. Containment radiation monitor reading > **41.3 R/hr (> 4.13E+01 R/hr)**.	None	1. Drywell radiation monitor reading **> 100 R/hr**. **OR** 2. Containment radiation monitor reading **> 33 R/hr.**	None	None	1. Drywell radiation monitor reading **> 590 R/hr (> 5.90 E+02 R/hr)**. **OR** 2. Containment radiation monitor reading **> 97 R/hr (> 9.70E+01 R/hr)**.
6. Primary Cont Isolation Failure or Bypass	None	None	None	None	1. a. Failure of isolation valves in any one line to close. **AND** b. Direct downstream pathway to the environment exists after a primary containment isolation signal. **OR** 2. Intentional venting/purging of Primary Containment per EOPs or SAMGs due to accident conditions. **OR** 3. UNISOLABLE primary system leakage outside containment resulting in **EITHER:** • Secondary Containment area temperature **> EOP-8, Maximum Safe** operating levels. **OR** • Secondary Containment area radiation level **> EOP-8, Maximum Safe** operating levels.	None
7. ED Judgment	1. Any condition in the opinion of the Emergency Director that indicates Loss of the Fuel Clad Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Fuel Clad Barrier.	1. Any condition in the opinion of the Emergency Director that indicates Loss of the RCS Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the RCS Barrier.	1. Any condition in the opinion of the Emergency Director that indicates Loss of the Containment Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment Barrier.

System Malfunction

Loss of AC Power

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
MG1 Prolonged loss of all Off-Site power and all On-Site AC power to emergency busses. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to vital busses 1A1 and 1B1. **AND** 2. Failure of DG 1A and DG 1B emergency diesel generators to supply power to vital busses 1A1 and 1B1. **AND** 3. a. Restoration of at least one vital bus (excluding Division III) in **< 4 hours** is **not** likely. **OR** b. RPV level **cannot** be determined to be **> - 162 inches** (TAF).	**MS1** Loss of all Off-Site and all On-Site AC power to emergency busses for 15 minutes or longer. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to vital busses 1A1 and 1B1. **AND** 2. Failure of DG 1A and DG 1B emergency diesel generators to supply power to vital busses 1A1 and 1B1. **AND** 3. Failure to restore power to at least one vital bus (excluding Division III) in **< 15 minutes** from the time of loss of both offsite and onsite AC power.	**MA1** AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. AC power capability to vital busses (1A1, 1B1) reduced to only one of the following power sources for **≥ 15 minutes**: • Emergency Reserve Auxiliary Transformer (ERAT). • Reserve Auxiliary Transformer B (RAT B). • Emergency Diesel Generator DG 1A. • Emergency Diesel Generator DG 1B. **AND** 2. Any additional single power source failure will result in station blackout.	**MU1** Loss of all Off-Site AC power to busses for 15 minutes or longer. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of all off-site AC power to vital busses 1A1 and 1B1 for **≥ 15 minutes**.

RPS Failure /Inadvertent Criticality

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
MG2 Automatic Scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists. 1 2 **EAL Threshold Values:** 1. Automatic scram was **not** successful as indicated by Reactor Power **> 5%.** **AND** 2. Manual scram/ARI actions were **not** successful as indicated by Reactor Power **> 5%.** **AND** 3. **EITHER** of the following exists: • RPV level **cannot** be restored and maintained **> - 187 inches**. **OR** • Heat Capacity Limit (EOP-6, Fig. P) exceeded.	**MS2** Automatic Scram fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor. 1 2 **EAL Threshold Values:** 1. Automatic scram was **not** successful as indicated by Reactor Power **> 5%.** **AND** 2. Manual scram/ARI actions were **not** successful from the Reactor Console as indicated by Reactor Power **> 5%.**	**MA2** Automatic Scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor. 1 2 **EAL Threshold Values:** 1. Automatic scram was **not** successful as indicated by Reactor Power **> 5%**. **AND** 2. Manual scram/ARI actions were successful from Reactor Console as indicated by Reactor Power **≤ 5%**.	**MU2** Inadvertent criticality. 3 **EAL Threshold Values:** UNPLANNED sustained positive period observed on nuclear instrumentation.

Modes: 1 – Power Operation, 2 – Startup, 3 –Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Exelon Nuclear
HOT MATRIX

		GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction					
DC Power			**MS3** Loss of all vital DC power for 15 minutes or longer. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of all vital DC power based on **< 108 VDC** on 125 VDC battery busses 1A and 1B for **≥ 15 minutes**.		
Annunciators			**MS4** Inability to monitor a SIGNIFICANT TRANSIENT in progress. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1) **AND** 2. SIGNIFICANT TRANSIENT in progress (Table M2). **AND** 3. Compensatory indications (computer points) are unavailable.	**MA4** UNPLANNED Loss of safety system annunciation or indication in the control room with EITHER (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1) **AND** 2. a. SIGNIFICANT TRANSIENT in progress (Table M2). **OR** b. Compensatory indications (computer points) are unavailable.	**MU4** UNPLANNED loss of safety system annunciation or indication in the control room for 15 minutes or longer. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1)
			Table M1 - Safety Systems • ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring	**Table M2 - Significant Transients** • Turbine trip • Reactor scram • ECCS actuation • Recirc Runback >25% power change • Thermal power oscillations > 10 % Reactor Power change	

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

HOT MATRIX

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
RCS Leak				**MU5** RCS leakage. 1 2 3 **EAL Threshold Values:** 1. Unidentified or pressure boundary leakage into the Drywell **> 10 gpm**. **OR** 2. Identified leakage into the Drywell **> 25 gpm**.
Communications		**Table M3 - Communications Capability** System / Onsite / Offsite Plant Radio System: X / Plant Paging System: X / Sound Power Phones: X / PCS phones: X / X All Telephone Lines (commercial and microwave): X / X ENS: / X Satellite Phones: / X HPN: / X Cellular Phones: / X		**MU6** Loss of all On-site or Off-site communications capabilities. 1 2 3 **EAL Threshold Values:** 1. Loss of all Table M3 **Onsite** communications capability affecting the ability to perform routine operations. **OR** 2. Loss of all Table M3 **Offsite** communications capability affecting the ability to perform offsite notifications.
T. S. Time				**MU7** Inability to reach required shutdown within Technical Specification limits. 1 2 3 **EAL Threshold Values:** Plant is **not** brought to required operating mode within Technical Specifications LCO Action Statement Time.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Hazards and Other Conditions Affecting Plant Safety

Security

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
HG1 HOSTILE ACTION resulting in loss of physical control of the facility. 1 2 3 4 5 D **EAL Threshold Values:** 1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1). **OR** 2. A HOSTILE ACTION has: • Caused failure of Spent Fuel Pool Cooling Systems **AND** • IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).	**HS1** HOSTILE ACTION within the PROTECTED AREA. 1 2 3 4 5 D **EAL Threshold Values:** A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.	**HA1** HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. 1 2 3 4 5 D **EAL Threshold Values:** 1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site. **OR** 2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.	**HU1** Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant. 1 2 3 4 5 D **EAL Threshold Values:** 1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities. **OR** 2. A validated notification from NRC providing information of an aircraft threat. **OR** 3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

C. R. Evacuation

Table H1 - Safety Functions

- Reactivity Control (ability to shut down the reactor and keep it shutdown)
- RCS Inventory (ability to cool the core)
- Decay Heat Removal (ability to maintain heat sink)

HS2 Control Room evacuation has been initiated and plant control cannot be established. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Control Room evacuation has been initiated. **AND** 2. Control of the plant **cannot** be established per CPS 4003.01 in **< 15 minutes**.	**HA2** Control Room evacuation has been initiated. 1 2 3 4 5 D **EAL Threshold Values:** Entry into CPS 4003.01 for Control Room evacuation.	

Fire / Explosion

Table H2 – Vital Areas

- Containment
- Auxiliary Building
- Fuel Building
- Control Building (excluding Chem Lab)
- Diesel Generator & HVAC Building
- Screenhouse

	HA3 FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown. 1 2 3 4 5 D **EAL Threshold Values:** FIRE or EXPLOSION resulting in any of the following: • VISIBLE DAMAGE to a Table H2 permanent structure. **OR** • VISIBLE DAMAGE to safety system equipment contained within a Table H2 area. **OR** • Control Room indication of degraded safety system equipment performance contained within a Table H2 area.	**HU3** FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm. **OR** 2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Hazards and Other Conditions Affecting Plant Safety

Natural / Destructive Phenomena

Table H2 - Vital Areas

- Containment
- Auxiliary Building
- Fuel Building
- Control Building (excluding Chem Lab)
- Diesel Generator & HVAC Building
- Screenhouse

Table H3 – Internal Flooding Areas

- HPCS Room
- LPCS Room
- A RHR Room
- B RHR Room
- C RHR Room
- RCIC Room
- Div 1 SX Room
- Div 2 SX Room
- Div 3 SX Room

GENERAL EMERGENCY

SITE AREA EMERGENCY

ALERT

HA4 Natural and destructive phenomena affecting VITAL AREAS [1][2][3][4][5][D]

EAL Threshold Values:

1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by seismic instrumentation **> 0.10 g**.

   AND

   b. Confirmed by **EITHER**:

   - Earthquake felt in plant.

     OR

   - National Earthquake Center.

     OR

   - Control Room indication of degraded performance of systems required for the safe shutdown of the plant.

   OR

2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area:

   - Tornado strike

     OR

   - High winds **> 85 mph**

     OR

   - Vehicle crash

     OR

   - Turbine failure-generated PROJECTILES

   OR

3. Flooding in any Table H3 area that results in **ANY** of the following:

   a. Degraded safety system performance as indicated in the Control Room.

   OR

   b. Industrial safety hazards (e.g., electric shock) that precludes access necessary to operate or monitor safety equipment.

   OR

   c. Water level **> EOP-8, Maximum Safe** operating levels.

   OR

4. Abnormal lake level, as indicated by High lake level **> 697 ft**.

UNUSUAL EVENT

HU4 Natural and destructive phenomena affecting the PROTECTED AREA. [1][2][3][4][5][D]

EAL Threshold Values:

1 a. Seismic event as indicated by seismic instrumentation **> 0.02g**.

AND

b. Confirmed by **EITHER**:

- Earthquake felt in plant.

  OR

- National Earthquake Center.

OR

2. **EITHER** of the following occurring within the PROTECTED AREA boundary:

   - Tornado strike

     OR

   - Sustained **(> 15 minutes)** high winds **> 85 mph**.

   OR

3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

   OR

4. Flooding in any Table H3 area that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

   OR

5. Abnormal lake level, as indicated by High lake level **> 696 ft**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Exelon Nuclear
HOT MATRIX

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Toxic / Flammable Gas	**Table H2 - Vital Areas** • Containment • Auxiliary Building • Fuel Building • Control Building (excluding Chem Lab) • Diesel Generator & HVAC Building • Screenhouse		**HA5** Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event. Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.	**HU5** Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS. 1 2 3 4 5 D **EAL Threshold Values:** 1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS. **OR** 2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.
Judgment	**HG6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**HS6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	**HA6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an ALERT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**HU6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

HOT MATRIX

This Page Intentionally Left Blank

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Abnormal Rad Levels / Radiological Effluent			
Radiological Effluents			
RG1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 5 D **EAL Threshold Values:** **Note**: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results. 1. The sum of VALID readings on the HVAC and SGTS Radiation Monitors **> 1.03 E+10 uCi/sec (> 1.03 E+4 Ci/sec)** for **≥ 15 minutes** (as found on Control Room Panels or PPDS – Total Noble Gas Release Rate). **OR** 2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**: a. **> 1000 mRem TEDE** **OR** b. **> 5000 mRem CDE Thyroid** **OR** 3. Field survey results at or beyond Site Boundary indicate **EITHER**: a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**. **OR** b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.	**RS1** Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 5 D **EAL Threshold Values:** **Note**: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results. 1. The sum of VALID readings on the HVAC and SGTS Radiation Monitors **> 1.03 E+09 uCi/sec (> 1.03 E+3 Ci/sec)** for **≥ 15 minutes** (as found on Control Room Panels or PPDS – Total Noble Gas Release Rate). **OR** 2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**: a. **> 100 mRem TEDE** **OR** b. **> 500 mRem CDE Thyroid** **OR** 3. Field survey results at or beyond Site Boundary indicate **EITHER**: a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**. **OR** b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation**.**	**RA1** Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown. 1. VALID reading on any of the following effluent monitors > **200 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 15 minutes**. • Radwaste Effluent Monitor 0RIX-PR040 **OR** • Discharge Permit specified monitor **OR** 2. The sum of VALID readings on the HVAC and SGTS radiation monitors is **> 1.17 E+08 uCi/sec (> 1.17 E+02 Ci/sec)** for **≥ 15 minutes** (as found on Control Room Panels or PPDS – Total Noble Gas Release Rate). **OR** 3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.	**RU1** Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown. 1. VALID reading on any of the following effluent monitors > **2 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 60 minutes**. • Radwaste Effluent Monitor 0RIX-PR040 **OR** • Discharge Permit specified monitor **OR** 2. The sum of VALID readings on the HVAC and SGTS radiation monitors is > **1.17 E+06 uCi/sec (> 1.17 Ci/sec)** for **≥ 60 minutes** (as found on Control Room Panels or PPDS – Total Noble Gas Release Rate). **OR** 3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Abnormal Rad Levels / Radiological Effluent			
Abnormal Rad Levels	**Table R1 - Fuel Handling Incident Radiation Monitors** • VF (1PR006A-D) • CCP monitors (1PR042A-D) • Main VR (1PR001A-D) • Fuel Transfer VR (1PR008A-D)	**RA2** Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel. 1 2 3 4 5 D **EAL Threshold Values:** 1. VALID reading **> 1000 mR/hr** on any Table R1 Radiation Monitor due to **EITHER**: • Damaged irradiated fuel. **OR** • Water level drop. **OR** 2. Water level drop in the Reactor Refueling Cavity, Spent Fuel Pool, Upper Containment Fuel Storage Pool, Inclined Fuel Transfer System or Fuel Transfer Canal that will result in irradiated fuel becoming uncovered.	**RU2** UNPLANNED rise in plant radiation levels. 1 2 3 4 5 D **EAL Threshold Values:** 1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool, Upper Containment Fuel Storage Pool, Inclined Fuel Transfer System or Fuel Transfer Canal as indicated by: • Refueling Cavity water level **< 22 ft. 8 in.** above the Reactor Vessel Flange. **OR** • Spent Fuel Pool or Upper Containment Fuel Storage Pool water level **< 23 ft**. **OR** • Report of visual observation of a drop in water level in the Refueling Cavity, Spent Fuel Pool, Upper Containment Fuel Storage Pool, Inclined Fuel Transfer System or Fuel Transfer Canal. **AND** b. VALID Area Radiation Monitor reading rise on one or more radiation monitor in Table R1. **OR** 2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.
	Table R2 **Areas Requiring Continuous Occupancy** • Main Control Room • Central Alarm Station - (by survey)	**RA3** Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. 1 2 3 4 5 D **EAL Threshold Values:** Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R2) to maintain plant safety functions.	

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Cold Shutdown / Refueling System Malfunctions				
Loss of AC Power			**CA1** Loss of all Off-Site and all On-Site AC power to emergency busses for 15 minutes or longer. 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to vital busses 1A1 and 1B1. **AND** 2. Failure of DG 1A and DG 1B emergency diesel generators to supply power to vital busses 1A1 and 1B1. **AND** 3. Failure to restore power to at least one vital bus (excluding Division III) in **< 15 minutes** from the time of loss of both offsite and onsite AC power.	**CU1** AC power capibilty to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout. 4 5 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. AC power capability to vital busses (1A1, 1B1) reduced to only one of the following power sources for **≥ 15 minutes**: • Emergency Reserve Auxiliary Transformer (ERAT). • Reserve Auxiliary Transformer B (RAT B). • Emergency Diesel Generator DG 1A. • Emergency Diesel Generator DG 1B. **AND** 2. Any additional single power source failure will result in station blackout.
Inadvertent Criticality				**CU2** Inadvertent criticality. 4 5 **EAL Threshold Values:** UNPLANNED sustained positive period observed on nuclear instrumentation.
DC Power				**CU3** Loss of required DC power for 15 minutes or longer. 4 5 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of required DC power based on **< 108 VDC** on 125 VDC battery busses 1A and 1B for **≥ 15 minutes**.

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Cold Shutdown / Refueling System Malfunctions				
Communications			**Table C1 - Communications Capability** System / Onsite / Offsite Plant Radio System: X / Plant Paging System: X / Sound Power Phones: X / PCS phones: X / X All Telephone Lines (commercial and microwave): X / X ENS: / X Satellite Phones: / X HPN: / X Cellular Phones: / X	**CU4** Loss of all On-site or Off-site communications capabilities. 4 5 D **EAL Threshold Values:** 1. Loss of all Table C1 **Onsite** communications capability affecting the ability to perform routine operations. **OR** 2. Loss of all Table C1 **Offsite** communications capability affecting the ability to perform offsite notifications.
Heat Sink		**Table C2 – RCS Reheat Duration Thresholds** RCS / Containment Closure / Duration Intact / N/A / 60 minutes* Not Intact / Established / 20 minutes* Not Intact / Not Established / 0 minutes *If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then EAL Threshold #1 is **not** applicable.	**CA5** Inability to maintain plant in cold shutdown. 4 5 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200°F** for **> Table C2 duration**. **OR** 2. UNPLANNED RPV pressure rise **> 10 psig** as a result of temperature rise due to loss of decay heat removal.	**CU5** UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV. 4 5 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200°F**. **OR** 2. Loss of the following for **≥ 15 minutes:** • All RCS temperature indications **AND** • All RPV level indications

Cold Shutdown / Refueling System Malfunctions

RCS Leakage / Inventory

GENERAL EMERGENCY

CG6 Loss of RPV inventory affecting fuel clad integrity with containment challenged. [4] [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. RPV level **< -162 inches (TAF)** for **≥ 30 minutes**.
   AND
   b. Any Containment Challenge Indication (Table C4).
   OR
2. a. RPV level unknown for **≥ 30 minutes.**
   AND
   b. Loss of RPV inventory as indicated by any of the following:
   - Table C3 indication.
     OR
   - Erratic Source Range Monitor indication.
     OR
   - Containment High Range Monitors 1RIX-CM061 or 1RIX-CM062 **> 3 R/hr**.

   AND
   c. Any Containment Challenge Indication (Table C4)

Table C4 – Containment Challenge Indications

- Drywell Hydrogen concentration **≥ 9%**.
- Containment hydrogen concentration ≥ **SAG-2 Fig. R, Deflagration Limit.**
- UNPLANNED rise in containment pressure
- CONTAINMENT CLOSURE **not** established.
- Any Secondary Containment radiation monitor **> EOP-8 Table U Maximum Safe** operating level.

SITE AREA EMERGENCY

CS6 Loss of RPV inventory affecting core decay heat removal capability. [4] [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. With CONTAINMENT CLOSURE **not** established, RPV level **< - 51.5 inches**.
   OR
2. With CONTAINMENT CLOSURE established, RPV level **< - 162 inches (TAF).**
   OR
3. a. RPV level unknown for **≥ 30 minutes.**
   AND
   b. Loss of RPV inventory as indicated by any of the following:
   - Table C3 indications.
     OR
   - Erratic Source Range Neutron Monitor indication.
     OR
   - Containment High Range Monitors 1RIX-CM061 or 1RIX-CM062 **> 3 R/hr**.

ALERT

CA6 Loss of RPV inventory. [4] [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. RPV level **< - 45.5 inches**.
   OR
2. a. RPV level unknown for **≥ 15 minutes**.
   AND
   b. Loss of RPV inventory per Table C3 indications.

Table C3 – Indications of RCS Leakage

- UNPLANNED floor or equipment sump level rise
- UNPLANNED Suppression Pool level rise
- UNPLANNED vessel make-up rise
- Observation of leakage or Inventory loss

UNUSUAL EVENT

CU6 RCS leakage. [4]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

RCS leakage results in the inability to restore and maintain RPV level **> Level 3 (8.9 inches)** for **≥ 15 minutes**.

CU7 UNPLANNED loss of RPV inventory. [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED Reactor Cavity or Vessel level drop that meets **EITHER**:
   - When controlling level above the RPV flange, Reactor Cavity level drop below the RPV flange (**< 204 inches** Shutdown Range) for **≥ 15 minutes**.
     OR
   - When controlling level below the RPV flange, vessel level drop below the procedurally established limit **≥ 15 minutes**.

   OR
2. a. RPV level unknown.
   AND
   b. Loss of RPV inventory per Table C3 indications.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Exelon Nuclear
COLD SHUTDOWN / REFUELING MATRIX

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Security	**HG1** HOSTILE ACTION resulting in loss of physical control of the facility. 1 2 3 4 5 D **EAL Threshold Values:** 1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1). **OR** 2. A HOSTILE ACTION has: • Caused failure of Spent Fuel Pool Cooling Systems **AND** • IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).	**HS1** HOSTILE ACTION within the PROTECTED AREA. 1 2 3 4 5 D **EAL Threshold Values:** A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.	**HA1** HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. 1 2 3 4 5 D **EAL Threshold Values:** 1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site. **OR** 2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.	**HU1** Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant. 1 2 3 4 5 D **EAL Threshold Values:** 1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities. **OR** 2. A validated notification from NRC providing information of an aircraft threat. **OR** 3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.
C. R. Evacuation	**Table H1 - Safety Functions** • Reactivity Control (ability to shut down the reactor and keep it shutdown) • RCS Inventory (ability to cool the core) • Decay Heat Removal (ability to maintain heat sink)	**HS2** Control Room evacuation has been initiated and plant control cannot be established. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Control Room evacuation has been initiated. **AND** 2. Control of the plant **cannot** be established per CPS 4003.01 in **< 15 minutes**.	**HA2** Control Room evacuation has been initiated. 1 2 3 4 5 D **EAL Threshold Values:** Entry into CPS 4003.01 for Control Room evacuation.	
Fire / Explosion		**Table H2 – Vital Areas** • Containment • Auxiliary Building • Fuel Building • Control Building (excluding Chem Lab) • Diesel Generator & HVAC Building • Screenhouse	**HA3** FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown. 1 2 3 4 5 D **EAL Threshold Values:** FIRE or EXPLOSION resulting in any of the following: • VISIBLE DAMAGE to a Table H2 permanent structure. **OR** • VISIBLE DAMAGE to safety system equipment contained within a Table H2 area. **OR** • Control Room indication of degraded safety system equipment performance contained within a Table H2 area.	**HU3** FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm. **OR** 2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

COLD SHUTDOWN / REFUELING MATRIX
COLD SHUTDOWN / REFUELING MATRIX

Exelon Nuclear
COLD SHUTDOWN / REFUELING MATRIX

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Natural / Destructive Phenomena	**Table H2 - Vital Areas** • Containment • Auxiliary Building • Fuel Building • Control Building (excluding Chem Lab) • Diesel Generator & HVAC Building • Screenhouse **Table H3 – Internal Flooding Areas** • HPCS Room • LPCS Room • A RHR Room • B RHR Room • C RHR Room • RCIC Room • Div 1 SX Room • Div 2 SX Room • Div 3 SX Room		**HA4** Natural and destructive phenomena affecting VITAL AREAS 1 2 3 4 5 D **EAL Threshold Values:** 1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by seismic instrumentation **> 0.10 g**. **AND** b. Confirmed by **EITHER**: • Earthquake felt in plant. **OR** • National Earthquake Center. **OR** • Control Room indication of degraded performance of systems required for the safe shutdown of the plant. **OR** 2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area: • Tornado strike **OR** • High winds **> 85 mph** **OR** • Vehicle crash **OR** • Turbine failure-generated PROJECTILES **OR** 3. Flooding in any Table H3 area that results in **ANY** of the following: a. Degraded safety system performance as indicated in the Control Room. **OR** b. Industrial safety hazards (e.g., electric shock) that precludes access necessary to operate or monitor safety equipment. **OR** c. Water level **> EOP-8, Maximum Safe** operating levels. **OR** 4. Abnormal lake level, as indicated by High lake level **> 697 ft**.	**HU4** Natural and destructive phenomena affecting the PROTECTED AREA. 1 2 3 4 5 D **EAL Threshold Values:** 1 a. Seismic event as indicated by seismic instrumentation **> 0.02g**. **AND** b. Confirmed by **EITHER**: • Earthquake felt in plant. **OR** • National Earthquake Center. **OR** 2. **EITHER** of the following occurring within the PROTECTED AREA boundary: • Tornado strike **OR** • Sustained **(> 15 minutes)** high winds **> 85 mph**. **OR** 3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals. **OR** 4. Flooding in any Table H3 area that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode. **OR** 5. Abnormal lake level, as indicated by High lake level **> 696 ft**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

COLD SHUTDOWN / REFUELING MATRIX
COLD SHUTDOWN / REFUELING MATRIX

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Toxic / Flammable Gas	**Table H2 - Vital Areas** • Containment • Auxiliary Building • Fuel Building • Control Building (excluding Chem Lab) • Diesel Generator & HVAC Building • Screenhouse		**HA5** Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event. Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.	**HU5** Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS. 1 2 3 4 5 D **EAL Threshold Values:** 1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS. **OR** 2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.
Judgment	**HG6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**HS6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	**HA6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an ALERT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**HU6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

COLD SHUTDOWN / REFUELING MATRIX

COLD SHUTDOWN / REFUELING MATRIX

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RG1

Initiating Condition:

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the HVAC and SGTS Radiation Monitors **> 1.03 E+10 uCi/sec (> 1.03 E+4 Ci/sec)** for **≥ 15 minutes** (as found on Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of **EITHER**:

   a. **> 1000 mRem TEDE**

      OR

   b. **> 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond the site boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**.

      OR

   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RG1 (cont)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed the EPA Protective Action Guides (PAGs). Public protective actions will be necessary. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public and likely involve fuel damage.

While these failures are addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

Threshold #1 Basis:

The site-specific monitors listed include effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading threshold is not, the results from dose assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency-implementing procedures call for the timely performance of dose assessments using actual meteorology and release information. If the results of dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading threshold.

Threshold #2 Basis:

The "site boundary" is the nearest distance from potential release points at which protective actions would be required for members of the public.

Threshold #3 Basis:

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. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption on sample media followed by field analysis are used for determining the iodine (CDE) thyroid value.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RG1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 AG1
2. EP-AA-112-500, Emergency Environmental Monitoring
3. ODCM Section 6.3.1, Gaseous Effluents and Total Dose
4. CPS 3315.03, Radiation Monitoring (AR/PR)
5. CPS 4979.01, Abnormal Release of Airborne Radioactivity
6. EP-EAL-0603 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values Clinton Station

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RS1

Initiating Condition:

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

NOTE: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the HVAC and SGTS Radiation Monitors **> 1.03 E+09 uCi/sec (> 1.03 E+3 Ci/sec)** for **≥ 15 minutes** (as found on Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of **EITHER**:

   a. **> 100 mRem TEDE**

      OR

   b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond the site boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.

      OR

   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RS1 (cont)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed 10% of the EPA Protective Action Guides (PAGs). Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

While these failures are addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

Threshold #1 Basis:

The site specific monitors listed include effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading threshold is not, the results from dose assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency-implementing procedures call for the timely performance of dose assessments using actual meteorology and release information. If the results of dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading threshold.

Threshold #2 Basis:

The "site boundary" is the nearest distance from potential release points at which Protective Actions would be required for members of the public.

Threshold #3 Basis:

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. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption on sample media followed by field analysis are used for determining the iodine (CDE) thyroid value.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RS1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 AS1
2. EP-AA-112-500, Emergency Environmental Monitoring
3. ODCM Section 6.3.1, Gaseous Effluents
4. CPS 3315.03, Radiation Monitoring (AR/PR)
5. CPS 4979.01, Abnormal Release of Airborne Radioactivity
6. EP-EAL-0603 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values Clinton Station

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RA1

Initiating Condition:

Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors **> 200 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 15 minutes**.

   - Radwaste Effluent Monitor 0RIX-PR040

     OR

   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the HVAC and SGTS radiation monitors is **> 1.17 E+08 uCi/sec (> 1.17 E+02 Ci/sec)** for **≥ 15 minutes** (as found on Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RA1 (cont)

Basis (cont):

This EAL addresses an actual or substantial potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in RU1 and RA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases are not to be prorated or averaged. For example, a release exceeding 600 times ODCM for 5 minutes does not meet the threshold

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

Threshold #1 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

The effluent monitors listed are those normally used for planned discharges. If a discharge is performed using a different flowpath or effluent monitor other than those listed (e.g., a portable or temporary effluent monitor), then the declaration criteria will be based on the monitor specified in the Discharge Permit.

Threshold #2 Basis:

This threshold is intended for effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

Threshold #3 Basis:

This threshold addresses uncontrolled releases that are detected by sample analyses, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river/lake water systems, etc.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RA1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 AA1
2. ODCM Section 6.3.1, Gaseous Effluents
3. ODCM Section 6.3.2, Liquid Effluents
4. CPS 3315.03, Radiation Monitoring (AR/PR)
5. CPS 4979.01, Abnormal Release of Airborne Radioactivity
6. CPS 4979.05, Abnormal Release of Radioactive Liquids
7. USAR Section 11.5.2.2.6, Liquid Radwaste Discharge Radiation Monitor
8. USAR Figure 2.1-7, CPS Restricted Area
9. EP-EAL-0603 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values Clinton Station

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RU1

Initiating Condition:

Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors **> 2 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 60 minutes**.

   - Radwaste Effluent Monitor 0RIX-PR040

     OR

   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the HVAC and SGTS radiation monitors is > **1.17 E+06 uCi/sec (> 1.17 Ci/sec)** for **≥ 60 minutes** (as found on Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates in excess of **2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RU1 (cont)

Basis (cont):

This EAL addresses a potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in RU1 and RA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases are not to be prorated or averaged. For example, a release exceeding 4 times ODCM for 30 minutes does not meet the threshold.

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

Threshold #1 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

The effluent monitors listed are those normally used for planned discharges. If a discharge is performed using a different flowpath or effluent monitor other than those listed (e.g., a portable or temporary effluent monitor), then the declaration criteria will be based on the monitor specified in the Discharge Permit.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RU1 (cont)

Basis (cont):

Threshold #2 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL.

This threshold is intended for effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

Threshold #3 Basis:

This threshold addresses uncontrolled releases that are detected by sample analyses, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river/lake water systems, etc.

Basis Reference(s):

1. NEI 99-01, Rev. 5 AU1
2. ODCM Section 6.3.1, Gaseous Effluents
3. ODCM Section 6.3.2, Liquid Effluents
4. CPS 3315.03, Radiation Monitoring (AR/PR)
5. CPS 4979.01, Abnormal Release of Airborne Radioactivity
6. CPS 4979.05, Abnormal Release of Radioactive Liquids
7. USAR Section 11.5.2.2.6, Liquid Radwaste Discharge Radiation Monitor
8. EP-EAL-0603 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values Clinton Station

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RA2

Initiating Condition:

Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. VALID reading **> 1000 mR/hr** on any Table R1 Radiation Monitors due to **EITHER**:

   - Damage to irradiated fuel

     OR

   - Water level drop

Table R1 - Fuel Handling Incident Radiation Monitors
• VF (1PR006A-D) • CCP monitors (1PR042A-D) • Main VR (1PR001A-D) • Fuel Transfer VR (1PR008A-D)

   OR

2. Water level drop in the Reactor Refueling Cavity, Spent Fuel Pool, Upper Containment Fuel Storage Pool, Inclined Fuel Transfer System or Fuel Transfer Canal that will result in irradiated fuel becoming uncovered.

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses increases in radiation dose rates within plant buildings, and may be a precursor to a radioactivity release to the environment. These events represent a loss of control over radioactive material and represent an actual or substantial potential degradation in the level of safety of the plant.

These events escalate from RU2 in that fuel activity has been released, or is anticipated due to fuel heatup. This EAL applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RA2 (cont)

Basis (cont):

Threshold #1 Basis:

This EAL addresses radiation monitor indications of fuel uncovery and/or fuel damage.

Uncovering spent fuel represents a substantial degradation of the level of safety of the plant and warrants an Alert classification. Visual observation of spent fuel uncovery represents a major ALARA concern in that radiation levels could exceed 10,000 R/hr on the refuel bridge when fuel uncovery begins. The value of 1000 mR/hr was conservatively chosen for classification purposes.

Radiation monitor readings are used to provide indication of fuel uncovery and/or fuel damage. High monitor readings associated with the transfer or relocation of a source, stored in or near the pool or readings responding to a planned evolution such as removal of the reactor head or equipment relocation are not classified under this threshold since the reading would not be indicative of fuel uncovery and/or fuel damage.

Dropping heavy loads onto the spent fuel can cause significant damage to the spent fuel and an Alert is also warranted under these conditions provided that the above radiation monitor threshold readings are reached.

Escalation of this emergency classification level, if appropriate, would be based on RS1 or RG1.

Threshold #2 Basis:

Once Spent Fuel Pool water level drops below the low level alarm setpoint, further drops can be monitored only by visual observation unless the Spent Fuel Pool is in communication with the Refueling Cavity.

If available, video cameras may allow remote observation. Depending on available level instrumentation, the declaration threshold may need to be based on indications of water makeup rate.

Basis Reference(s):

1. NEI 99-01, Rev. 5 AA2
2. USAR 1.2.2.4.11.3
3. Technical Specifications 3.7.7
4. CPS 4011.02, Spent Fuel Pool Abnormal Water Level Drop
5. MA-CL-716-102, Reactor Disassembly

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RU2

Initiating Condition:

UNPLANNED rise in plant radiation levels.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool, Upper Containment Fuel Storage Pool, Inclined Fuel Transfer System or Fuel Transfer Canal as indicated by:

   - Refueling Cavity water level **< 22 ft. 8 in.** above the Reactor Vessel Flange.

     OR

   - Spent Fuel Pool or Upper Containment Fuel Storage Pool water level **< 23 ft**.

     OR

   - Report of visual observation of a drop in water level in the Refueling Cavity, Spent Fuel Pool, Upper Containment Fuel Storage Pool, Inclined Fuel Transfer System or Fuel Transfer Canal.

   AND

   b. VALID Area Radiation Monitor reading rise on one or more radiation monitors in Table R1.

Table R1 - Fuel Handling Incident Radiation Monitors
• VF (1PR006A-D) • CCP monitors (1PR042A-D) • Main VR (1PR001A-D) • Fuel Transfer VR (1PR008A-D)

   OR

2. UNPLANNED VALID Area Radiation Monitor reading or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RU2 (cont)

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

NORMAL LEVELS: Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

This EAL addresses increased radiation levels as a result of water level decreases above irradiated fuel or events that have resulted, or may result, in UNPLANNED increases in radiation dose rates within plant buildings. These radiation increases represent a loss of control over radioactive material and represent a potential degradation in the level of safety of the plant.

Threshold #1 Basis:

Level indications may include installed or temporary water level instrumentation. If available, video cameras may allow remote observation for determining water level changes.

This EAL addresses unplanned lowering of level in the refueling pathway and a corresponding rise in refuel floor radiation readings. For events in Refuel mode where the water level drops with no corresponding rise in refuel floor radiation readings classification would be via CU7. This event escalates to an Alert per RA2 if irradiated fuel outside the reactor vessel is uncovered.

Threshold #2 Basis:

This EAL addresses increases in plant radiation levels that represent a loss of control of radioactive material resulting in a potential degradation in the level of safety of the plant.

This EAL excludes radiation level increases that result from planned activities such as use of radiographic sources and movement of radioactive waste materials. A specific list of ARMs is not required, as it would restrict the applicability of the threshold. The intent is to identify loss of control of radioactive material in any monitored area. Survey results are not required for confirmation of area radiation monitor readings but are applicable to areas where area radiation monitors do not have sufficient range to indicate a rise by a factor of 1000 over NORMAL LEVELS.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RU2 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 AU2
2. RP-AA-203, Exposure Control and Authorization
3. Technical Specifications 3.7.7
4. CPS 4011.02, Spent Fuel Pool Abnormal Water Level Drop
5. USAR Figure 3.8-31
6. USAR Table 7.1-13
7. USAR 9.1.4.2.10
8. MA-CL-716-102, Reactor Disassembly

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RA3

Initiating Condition:

Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R2) to maintain plant safety functions.

Table R2 – Areas Requiring Continuous Occupancy
• Main Control Room (1RIX-AR035) • Central Alarm Station (by survey)

Basis:

This EAL addresses increased radiation levels that impact continued operation in areas requiring continuous occupancy to maintain safe operation or to perform a safe shutdown.

The cause and/or magnitude of the increase in radiation levels is not a concern of this EAL. The Emergency Director must consider the source or cause of the increased radiation levels and determine if any other EAL may be involved.

Areas requiring continuous occupancy include Main Control Room and the Central Alarm Station (CAS).

Basis Reference(s):

1. NEI 99-01, Rev. 5 AA3
2. USAR Table 12.3-2
3. USAR Appendix F, Fire Protection Safe Shutdown Analysis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RU3

Initiating Condition:

Fuel clad degradation.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Fuel clad degradation resulting in **EITHER**:

- Offgas post-treatment radiation monitor 1RIX-PR035/41 channel 7 **HI** alarm.

  OR

- Specific coolant activity **> 4.0 uCi/gm** Dose Equivalent I-131.

Basis:

This EAL is included because it is a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant.

Escalation of this EAL to the Alert level is via the Fission Product Barriers.

Threshold #1 Basis:

Conditions that cause the monitor to alarm that are not related to fuel clad degradation should not result in the declaration of an Unusual Event.

This threshold addresses site-specific radiation monitor readings that provide indication of a degradation of fuel clad integrity.

Threshold #2 Basis:

An Unusual Event is only warranted when actual fuel clad damage is the cause of the elevated coolant sample (as determined by laboratory confirmation). Fuel clad damage should be assumed to be the cause of elevated Reactor Coolant activity unless another cause is known.

This threshold addresses coolant samples exceeding coolant technical specifications for transient iodine spiking limits.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU4
2. Technical Specifications 3.4.8
3. USAR 3.7.5
4. CPS 3215.01, Off-Gas (OG)
5. CPS 5140.46, AR/PR Annunciator - Off Gas Post-Treat PRM #1 - 1RIX-PR035
6. CPS 5140.47, AR/PR Annunciator - Off Gas Post-Treat PRM #2 - 1RIX-PR041
7. CPS 4004.02, Loss of Vacuum

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FG1

Initiating Condition:

Loss of ANY two barriers AND Loss or Potential Loss of the third barrier.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the General Emergency classification level each barrier is weighted equally.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FS1

Initiating Condition:

Loss or Potential Loss of ANY two barriers.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the Site Area Emergency classification level, each barrier is weighted equally.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FA1

Initiating Condition:

ANY Loss or ANY Potential Loss of either Fuel Clad or RCS.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the Alert classification level, Fuel Cladding and RCS barriers are weighted more heavily than the Containment barrier. Unlike the Containment barrier, loss or potential loss of either the Fuel Cladding or RCS barrier may result in the relocation of radioactive materials or degradation of core cooling capability. Note that the loss or potential loss of Containment barrier in combination with loss or potential loss of either Fuel Cladding or RCS barrier results in declaration of a Site Area Emergency under EAL FS1.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FU1

Initiating Condition:

ANY Loss or ANY Potential Loss of Containment.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

The Primary Containment Barrier includes the drywell, respective interconnecting paths, and other connections up to and including the outermost containment isolation valves. Containment Barrier thresholds are used primarily as discriminators for escalation from an Alert to a Site Area Emergency or a General Emergency.

The Containment Barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (i.e., Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment Barrier status is addressed by Technical Specifications.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FC1

Initiating Condition:

Primary Coolant Activity Level

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

Coolant activity **> 300 uCi/gm** Dose Equivalent I-131.

Basis:

300 uCi/gm Dose Equivalent I-131 is well above that expected for iodine spikes and corresponds to less than 5% fuel clad damage. This amount of radioactivity indicates significant clad damage and thus the Fuel Clad Barrier is considered lost.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. CPS 4010.01, Reactor Coolant High Activity

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FC2

Initiating Condition:

Reactor Vessel Water Level

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. RPV level **cannot** be restored and maintained **> -187 inches**.

POTENTIAL LOSS

2. RPV level **cannot** be restored and maintained **> -162 inches** (TAF).

   OR

3. RPV level **cannot** be determined.

Basis:

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the SAMG program.

Determination of “restore and maintained” is based on the actions driven by Emergency Operating Procedures to restore level. The inability to reverse the RPV level lowering trend after lining up injection sources and injecting, including the use of low pressure systems following an Emergency Depressurization would warrant classification.

Loss Threshold #1 Basis:

This corresponds to the level used in EOPs to indicate challenge of core cooling.

Potential Loss Thresholds #2 and #3 Basis:

This threshold is the same as the RCS barrier Loss threshold and corresponds to the water level at the top of the active fuel. Thus, this threshold indicates a Potential Loss of the Fuel Clad barrier and a Loss of RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

Since the loss of ability to determine if adequate core cooling is being provided presents a significant challenge to the fuel clad barrier, a potential loss of the fuel clad barrier is specified.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FC2 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. 4401.01, EOP-1 RPV Control
3. 4404.01, EOP-1 ATWS RPV Control
4. 4403.01, EOP-2 RPV Flooding
5. Clinton Power Station Severe Accident Guidelines Technical Bases
6. STA/IA Guide/1005.09M002
7. Clinton Power Station Emergency Operating Procedures Technical Bases
8. 4000.01, Abnormal RPV Water Level

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FC5

Initiating Condition:

Primary Containment Radiation Monitoring

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. Drywell radiation monitor reading **> 260 R/hr (> 2.60 E+02 R/hr)**.

   OR

2. Containment radiation monitor reading **> 41.3 R/hr (> 4.13E+01 R/hr)**.

Basis

The Drywell/Containment radiation monitor reading is a value, which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the drywell.

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 Loss threshold. Thus, this threshold indicates a loss of both Fuel Clad barrier and RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. Core Damage Assessment Methodology

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FC7

Initiating Condition:

Emergency Director Judgment.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. Any condition in the opinion of the Emergency Director that indicates Loss of the Fuel Clad Barrier.

POTENTIAL LOSS

2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Fuel Clad Barrier.

Basis:

These thresholds address 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 threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

Basis Reference(s):

1. NEI 99-01, Rev. 4 Table 5-F-2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC2

Initiating Condition:

Reactor Vessel Water Level

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. RPV level **cannot** be restored and maintained **> -162 inches** (TAF).

   OR

2. RPV level **cannot** be determined.

Basis:

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the SAMG program.

Determination of “restore and maintained” is based on the actions driven by Emergency Operating Procedures to restore level. The inability to reverse the RPV level lowering trend after lining up injection sources and injecting, including the use of low pressure systems following an Emergency Depressurization would warrant classification.

This threshold is the same as Fuel Clad Barrier Potential Loss threshold and corresponds to a challenge to core cooling. Thus, this threshold indicates a Loss of RCS barrier and Potential Loss of Fuel Clad barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. 4401.01, EOP-1 RPV Control
3. Clinton Power Station Emergency Operating Procedures Technical Bases, Section
4. 4001.01, Reactor Coolant Leakage

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC3

Initiating Condition:

Primary Containment Conditions

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. Drywell pressure **> 1.68 psig.**

   AND

2. Drywell pressure rise due to RCS leakage.

Basis:

The primary containment pressure is based on the drywell high pressure set point which indicates a LOCA by automatically initiating ECCS.

The second threshold focuses the fission product barrier loss threshold on a failure of the RCS instead of the non-LOCA malfunctions that may adversely affect primary containment pressure. Pressures of this magnitude can be caused by non-LOCA events such as a loss of drywell cooling or inability to control primary containment vent/purge.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. 4401.01, EOP-1 RPV Control
3. 4402.01, EOP-6 Primary Containment Control
4. Clinton Power Station EOP Technical Bases
5. Technical Specifications Table 3.3.1.1-1
6. Technical Specifications Table 3.3.5.1-1
7. 4001.01, Reactor Coolant Leakage

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC4

Initiating Condition:

RCS Leak Rate

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. UNISOLABLE Main Steam Line (MSL), Feedwater, RWCU or RCIC line break.

   OR

2 Emergency RPV Depressurization is required.

POTENTIAL LOSS

3. RCS leakage **> 50 gpm** inside the drywell or containment.

   OR

4. UNISOLABLE primary system leakage outside containment resulting in **EITHER:**

   - Secondary Containment area temperature **> EOP-8 Maximum Normal** operating levels.

     OR

   - Secondary Containment radiation level **> EOP-8 Maximum Normal** operating levels.

Basis:

UNISOLABLE – is a breach or leak that cannot be promptly isolated.

Promptly allows for actions to be taken to isolate the leak. Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

Loss Thresholds #1 Basis :

An UNISOLABLE MSL break is a breach of the RCS barrier. Thus, this threshold is included for consistency with the Alert emergency classification level.

Other large high-energy line breaks such as Feedwater, RWCU, or RCIC that are UNISOLABLE also represent a significant loss of the RCS barrier and should be considered for purposes of classification.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC4 (cont)

Basis (cont):

Classification of a system break over system leakage is based on information available to the Control Room from the event. Indications that should be considered are:

- Reports describing magnitude of steam or water release.
- Use of system high flow alarms / indications, if available,
- Significant changes in makeup requirements,
- Abnormal reactor water level changes in response to the event.

The use of the above indications provides the Control Room the bases to determine that the on going event is more significant than the indications that would be expected from system leakage and therefore should be considered a system break.

Loss Thresholds #2 Basis:

Plant symptoms requiring Emergency RPV Depressurization per the EOPs are indicative of a loss of the RCS barrier. If Emergency RPV depressurization is required, the plant operators are directed to open safety relief valves (SRVs) and keep them open. Even though the RCS is being vented into the suppression pool, a loss of the RCS should be considered to exist due to the diminished effectiveness of the RCS pressure barrier to a release of fission products beyond its boundary.

Potential Loss Threshold #3 Basis:

This threshold is based on leakage 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 uncovery is not a significant concern for a 50 gpm leak, however, break propagation leading to significantly larger loss of inventory is possible.

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.

If primary system leak rate information is unavailable, other indicators of RCS leakage should be used.

Potential Loss Threshold #4 Basis:

Potential loss of RCS based on primary system leakage outside the primary containment is determined from site specific temperature or area radiation Maximum Normal setpoints in the areas of the main steam line tunnel, RCIC, etc., which indicate a direct path from the RCS to areas outside primary containment.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC4 (cont)

Basis (cont):

The indicators reaching the threshold values and confirmed to be caused by unisolable RCS leakage warrant an Alert classification. An unisolable leak which is indicated by a Maximum Safe setpoint escalates to a Site Area Emergency when combined with Containment Barrier Loss threshold (after a containment isolation) and a General Emergency when the Fuel Clad Barrier criteria is also exceeded.

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 outside Primary Containment 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 Secondary Containment, an unexpected rise in Feedwater flowrate, or unexpected Main Turbine Control Valve closure) may indicate that a primary system is discharging outside Primary Containment.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. M05-1002, Main steam
3. USAR 5.2.5
4. USAR Tables 5.2-9a and 5.2-9b
5. 9043.06, Drywell Floor Drain Sump Flow Test 00PS404
6. 9443.01, Drywell Equipment Drain Sump Flow E31-N578 Channel Cal 01PS274
7. 4406.01, EOP-8 Secondary Containment Control
8. Clinton Power Station Emergency Operating Procedures Technical Bases, Section 10
9. USAR Figure 6.2-132

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC5

Initiating Condition:

Primary Containment Radiation Monitoring

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

1. Drywell radiation monitor reading **> 100 R/hr**.

   OR

2. Containment radiation monitor reading **> 33 R/hr.**

Basis:

The Drywell / Containment Radiation monitor reading is a value, which indicates the release of reactor coolant to the primary containment.

This reading is less than that specified for Fuel Clad barrier Loss. Thus, this threshold would be indicative of a RCS leak only. If the radiation monitor reading increased to that value specified by Fuel Clad Barrier threshold, fuel damage would also be indicated.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. Calc. EP-EAL-0611

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC7

Initiating Condition:

Emergency Director Judgment.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. Any condition in the opinion of the Emergency Director that indicates Loss of the RCS Barrier.

POTENTIAL LOSS

2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the RCS Barrier.

Basis:

These thresholds address 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 threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT2

Initiating Condition:

Reactor Vessel Water Level.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

POTENTIAL LOSS

Plant conditions indicate that Primary Containment flooding is required.

Basis:

There is no Loss threshold associated with this item.

The potential loss requirement for Primary Containment Flooding indicates adequate core cooling cannot be established and maintained and that core melt is possible. Entry into Severe Accident Management Guidelines is a logical escalation in response to the inability to maintain adequate core cooling.

The condition in this potential loss threshold represents a potential core melt sequence which, if not corrected, could lead to vessel failure and increased potential for containment failure. In conjunction with Reactor Vessel water level “Loss” thresholds in the Fuel Clad and RCS barrier columns, this threshold will result in the declaration of a General Emergency -- loss of two barriers and the potential loss of a third.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. Clinton Power Station Severe Accident Guidelines Technical Bases
3. STA/IA Guide/1005.09M002

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT3

Initiating Condition:

Primary Containment Conditions

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. Rapid unexplained drop in containment pressure following initial pressure rise.

   OR

2. Containment pressure response **not** consistent with LOCA conditions.

POTENTIAL LOSS

3. Containment pressure **≥ 15 psig** and rising.

   OR

4. a. Drywell hydrogen concentration **≥ 9%.**

      OR

   b. Containment hydrogen concentration **≥ SAG-2, Deflagration Limit.**

   OR

5. Heat Capacity Limit (EOP-6, Fig. P) exceeded.

Basis:

Loss Threshold #1 and #2 Basis

Rapid unexplained drop in pressure (i.e., not attributable to drywell spray or condensation effects) following an initial pressure rise from a high energy line break indicates a loss of containment integrity. Primary containment pressure should rise as a result of mass and energy release into containment from a LOCA. Thus, primary containment pressure not rising under these conditions indicates a loss of containment integrity.

This indicator relies on operator recognition of an unexpected response for the condition and therefore does not have a specific value associated with it. The unexpected response is important because it is the indicator for a containment breach condition.

Potential Loss Threshold #3 Basis:

Drywell pressure is based on the primary containment design pressure.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT3 (cont)

Basis (cont):

Potential Loss Threshold #4 Basis:

Explosive mixtures in the primary containment are assumed to be elevated concentrations of hydrogen or exceeding SAG-2 Deflagration Limit

Potential Loss Threshold #5 Basis:

The Heat Capacity Limit is a function of RPV pressure, suppression pool temperature and suppression pool water level. It is utilized to preclude failure of the containment and equipment in the containment necessary for the safe shutdown of the plant and therefore, the inability to maintain plant parameters below the limit constitutes a potential loss of containment.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. USAR 6.2.1.1.3
3. USAR Table 1.3-4
4. CPS 4402.01, EOP-6 Primary Containment Control
5. SAG2
6. Clinton Power Station Emergency Operating Procedures Technical Bases, Sections 9 and 12

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT5

Initiating Condition:

Primary Containment Radiation Monitoring

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

POTENTIAL LOSS

1. Drywell radiation monitor reading **> 590 R/hr (> 5.90 E+02 R/hr)**.

   OR

2. Containment radiation monitor reading **> 97 R/hr (> 9.70E+01 R/hr)**.

Basis:

The Drywell / Containment radiation monitor reading is a value that indicates significant fuel damage well in excess of that required for loss of RCS and Fuel Clad.

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.

There is no Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. Core Damage Assessment Methodology

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT6

Initiating Condition:

Primary Containment Isolation Failure or Bypass

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. a. Failure of isolation valves in any one line to close.

   AND

   b. Direct downstream pathway to the environment exists after a primary containment isolation signal.

   OR

2. Intentional venting/purging of Primary Containment per EOPs or SAGs due to accident conditions.

   OR

3. UNISOLABLE primary system leakage outside containment resulting in **EITHER:**

   - Secondary Containment area temperature **> EOP-8, Maximum Safe** operating levels.

     OR

   - Secondary Containment radiation level **> EOP-8, Maximum Safe** operating levels.

Basis:

UNISOLABLE – is a breach or leak that cannot be promptly isolated.

Promptly allows for actions to be taken to isolate the leak. Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

These thresholds address incomplete containment isolation that allows direct release to the environment.

Loss Threshold #1 Basis

This threshold addresses failure of open isolation devices, which should close upon receipt of a manual or automatic containment isolation signal resulting in a significant radiological release pathway to the environment. The concern is the unisolable open pathway to the environment. A failure of the ability to isolate any one line indicates a breach of primary containment integrity.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT6 (cont)

Basis (cont):

Failure of containment isolation valves to isolate with a downstream pathway to the environment following an automatic or manual isolation signal is only a concern during an event requiring mitigation by the Primary Containment barrier. If this condition exists during normal Power Operation, a Technical Specification Action Statement will address it. However, during events requiring Primary Containment integrity, this will represent a breach of Primary Containment.

The use of the modifier “direct” in defining the release path discriminates against release paths through interfacing liquid systems. The existence of an in–line charcoal filter does not make a release path indirect since the filter is not effective at removing fission product noble gases. Typical filters have an efficiency of 95-99% removal of iodine. Given the magnitude of the core inventory of iodine, significant releases could still occur. In addition, since the fission product release would be driven by boiling in the reactor vessel, the high humidity in the release stream can be expected to render the filters ineffective in a short period.

Leakage into a closed system is to be considered only if the closed system is breached and thereby creates a significant pathway to the environment. Examples include unisolable Main Steamline, RCIC steamline breaks, unisolable RWCU system breaks, and unisloable containment atmosphere vent paths. Minor release paths such as instrument and sample lines are not considered under this threshold.

Examples of “downstream pathway to the Environment” could be through Turbine/Condenser, or direct release to the Turbine Building or Secondary Containment.

Loss Threshold #2 Basis:

EOPs may direct containment isolation valve logic(s) to be intentionally bypassed, regardless of radioactivity release rates. Under these conditions with a valid containment isolation signal, the containment should also be considered lost if containment venting is actually performed.

Intentional venting of primary containment for primary containment pressure or combustible gas control per EOPs to the secondary containment and/or the environment is considered a loss of containment. Containment venting for pressure control when not in an accident situation should not be considered.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT6 (cont)

Basis (cont):

Loss Threshold #3 Basis:

The presence of area radiation or temperature above Maximum Safe Operating setpoints indicating unisolable primary system leakage outside the primary containment are addressed after a containment isolation. The indicators should be confirmed to be caused by RCS 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 outside Primary Containment 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 Secondary Containment, an unexpected rise in Feedwater flowrate, or unexpected Main Turbine Control Valve closure) may indicate that a primary system is discharging outside Primary Containment.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. CPS 4402.01, EOP-6 Primary Containment Control
3. SAG-2
4. Clinton Power Station Emergency Operating Procedures Technical Bases, Sections 8 and 9
5. 4406.01, EOP-8 Secondary Containment Control
6. Clinton Power Station Emergency Operating Procedures Technical Bases, Section 10
7. USAR Figure 6.2-132

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT7

Initiating Condition:

Emergency Director Judgment.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. Any condition in the opinion of the Emergency Director that indicates Loss of the Containment Barrier.

POTENTIAL LOSS

2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment Barrier.

Basis:

These thresholds address any other factors that are to be used by the Emergency Director in determining whether the Containment barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

The Containment barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment barrier status is addressed by Technical Specifications.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MG1

Initiating Condition:

Prolonged loss of all Off-Site and all On-Site AC power to emergency busses.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to vital busses 1A1 and 1B1.

   AND

2. Failure of DG 1A and DG 1B emergency diesel generators to supply power to vital busses 1A1 and 1B1.

   AND

3. a. Restoration of at least one vital bus (excluding Division III) in **< 4 hours** is **not** likely.

      OR

   b. RPV level **cannot** be determined to be **> -162 inches** (TAF).

Basis:

Loss of all AC power to emergency busses 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 to emergency busses will lead to loss of fuel clad, RCS, and containment, thus warranting declaration of a General Emergency.

This EAL is specified to assure that in the unlikely event of a prolonged station blackout, timely recognition of the seriousness of the event occurs and that declaration of a General Emergency occurs as early as is appropriate, based on a reasonable assessment of the event trajectory.

The likelihood of restoring at least one emergency bus should be based on a realistic appraisal of the situation since a delay in an event classification escalation decision based on only a chance of mitigating the event could result in a loss of valuable time in preparing and implementing public protective actions.

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the SAMG program.

In addition, under these conditions, fission product barrier monitoring capability may be degraded.

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MG1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 SG1
2. USAR Figure 8.3-1
3. USAR Section 8.1.5
4. USAR Section 8.3.1
5. CPS 4200.01, Loss of AC
6. Safety Evaluation By The Office Of Nuclear Reactor Regulation Related To Station Blackout, 10 CFR 50.63 Illinois Power Company, et al Clinton Power Station, Unit 1 Docket No. 50-461
7. CPS 4401.01, EOP-1 RPV Control

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MS1

Initiating Condition:

Loss of all Off-Site and all On-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to vital busses 1A1 and 1B1.

   AND

2. Failure of DG 1A and DG 1B emergency diesel generators to supply power to vital busses 1A1 and 1B1.

   AND

3. Failure to restore power to at least one vital bus (excluding Division III) in **< 15 minutes** from the time of loss of both offsite and onsite AC power.

Basis:

Loss of all AC power to emergency busses 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 to emergency busses will lead to loss of Fuel Clad, RCS, and Containment, thus this event can escalate to a General Emergency.

Fifteen minutes was selected as a threshold to exclude momentary losses of off-site power.

Escalation to General Emergency is via Fission Product Barrier Degradation or MG1, "Prolonged Loss of All Off-Site Power and Prolonged Loss of All On-Site AC Power."

Basis Reference(s):

1. NEI 99-01, Rev. 5 SS1
2. USAR Figure 8.3-1
3. USAR Section 8.1.5
4. USAR Section 8.3.1
5. CPS 4200.01, Loss of AC
6. Safety Evaluation By The Office Of Nuclear Reactor Regulation Related To Station Blackout, 10 CFR 50.63 Illinois Power Company, et al Clinton Power Station, Unit 1 Docket No. 50-461

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MA1

Initiating Condition:

AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. AC power capability to vital busses (1A1, 1B1) reduced to only one of the following power sources for **≥ 15 minutes**:
   - Emergency Reserve Auxiliary Transformer (ERAT).
   - Reserve Auxiliary Transformer B (RAT B).
   - Emergency Diesel Generator DG 1A.
   - Emergency Diesel Generator DG 1B.

   AND

2. Any additional single power source failure will result in station blackout.

Basis:

Capability: (pertaining to electrical power supplies) is equipment that is available to provide and maintain AC power at the required voltage and frequency for the required load.

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. Another related condition could be the loss of all off-site power and loss of on-site emergency generators with only one train of emergency busses being backfed from the unit main generator, or the loss of on-site emergency generators with only one train of emergency busses being backfed from off-site power. The subsequent loss of this single power source would escalate the event to a Site Area Emergency in accordance with MS1.

Fifteen minutes was selected as a threshold to exclude momentary losses of power.

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MA1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 SA5
2. USAR Figure 8.3-1
3. USAR Section 8.1.5
4. USAR Section 8.3.1
5. CPS 4200.01, Loss of AC
6. Safety Evaluation By The Office Of Nuclear Reactor Regulation Related To Station Blackout, 10 CFR 50.63 Illinois Power Company, et al Clinton Power Station, Unit 1 Docket No. 50-461

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MU1

Initiating Condition:

Loss of all Off-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of all off-site AC power to vital busses 1A1 and 1B1 for **≥ 15 minutes**.

Basis:

Prolonged loss of off-site 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 to emergency busses.

Fifteen minutes was selected as a threshold to exclude momentary losses of off-site power.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU1
2. USAR Figure 8.3-1
3. USAR Section 8.1.5
4. USAR Section 8.3.1
5. CPS 4200.01, Loss of AC

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MG2

Initiating Condition:

Automatic Scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic scram was **not** successful as indicated by Reactor Power **> 5%.**

   AND

2. Manual scram/ARI actions were **not** successful as indicated by Reactor Power **> 5%.**

   AND

3. **EITHER** of the following exists:

   - RPV level **cannot** be restored and maintained **> -187 inches**.

     OR

   - Heat Capacity Limit (EOP-6, Fig. P) exceeded.

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful.

The third condition of this EAL indicates an extreme challenge to the ability to cool the core as indicated when RPV level cannot be restored and maintained above the Minimum Steam Cooling RPV Water Level or a challenge to Containment for energy transfer from the RPV as indicated by exceeding the Heat Capacity Limit. RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the SAMG program.

In the event either of these challenges exists at a time that the reactor has not been brought below the power associated with the safety system design a core melt sequence exists. In this situation, core degradation can occur rapidly. For this reason, the General Emergency declaration is intended to be anticipatory of the fission product barrier table declaration to permit maximum off-site intervention time.

Determination of “restore and maintained” is based on the actions driven by Emergency Operating Procedures to restore level. The inability to reverse the RPV level lowering trend after lining up injection sources and injecting, including the use of low pressure systems following an Emergency Depressurization would warrant classification.

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MG2 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 SG2
2. CPS 4100.01, Reactor scram
3. CPS 4401.01, EOP-1 RPV Control
4. CPS 4404.01, EOP-1A ATWS RPV Control
5. CPS 3304.02, Rod Control and Information System (RC&IS)
6. CPS 4402.01, EOP-6 Primary Containment Control
7. Clinton Power Station Emergency Operating Procedures Technical Bases, Sections 4, 5, 8 and 12

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MS2

Initiating Condition:

Automatic Scram fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic scram was **not** successful as indicated by Reactor Power **> 5%.**

   AND

2. Manual scram/ARI actions were **not** successful from the Reactor Console as indicated by Reactor Power **> 5%.**

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful. A Site Area Emergency is warranted because conditions exist that lead to IMMINENT loss or potential loss of both fuel clad and RCS.

Manual actions taken at the reactor control console are any set of actions by the reactor operator(s) at which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

Manual actions are not considered successful if action away from the reactor control console is required to scram the reactor. This EAL is still applicable even if actions taken away from the reactor control console are successful in shutting the reactor down because the design limits of the fuel may have been exceeded or because of the gross failure of the Reactor Protection System to shutdown the plant.

Escalation of this event to a General Emergency would be due to a prolonged condition leading to an extreme challenge to either core-cooling or heat removal.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SS2
2. CPS 4100.01, Reactor scram
3. CPS 4401.01, EOP-1 RPV Control
4. CPS 4404.01, EOP-1A ATWS RPV Control
5. CPS 3304.02, Rod Control and Information System (RC&IS)
6. CPS 4402.01, EOP-6 Primary Containment Control
7. Clinton Power Station Emergency Operating Procedures Technical Bases, Sections 4, 5, 8 and 12

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MA2

Initiating Condition:

Automatic Scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic scram was **not** successful as indicated by Reactor Power **> 5%**.

   AND

2. Manual scram/ARI actions were successful from Reactor Console as indicated by Reactor Power **≤ 5%**.

Basis:

Manual actions taken at the reactor control console are any set of actions by the reactor operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

This condition indicates failure of the automatic protection system to scram the reactor in response to exceeding reactor protective system setpoints during a plant transient. Associated RPS instrument failures during non-transient plant conditions would be addressed by Technical Specifications. This condition is more than a potential degradation of a safety system in that a front line automatic protection system did not function in response to a plant transient. Thus the plant safety has been compromised because design limits of the fuel may have been exceeded. An Alert is indicated because conditions may exist that lead to potential loss of fuel clad or RCS and because of the failure of the Reactor Protection System to automatically shutdown the plant.

If manual actions taken at the reactor control console fail to shutdown the reactor, the event would escalate to a Site Area Emergency.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SA2
2. Technical Specifications Table 3.3.1.1-1
3. CPS 4100.01, Reactor scram
4. CPS 4401.01, EOP-1 RPV Control
5. CPS 4404.01, EOP-1A ATWS RPV Control
6. CPS 3304.02, Rod Control and Information System (RC&IS)

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MU2

Initiating Condition:

Inadvertent criticality.

Operating Mode Applicability:

3

EAL Threshold Values:

UNPLANNED sustained positive period observed on nuclear instrumentation.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL addresses inadvertent criticality events. This EAL excludes inadvertent criticalities that occur during planned reactivity changes associated with reactor startups (e.g., criticality earlier than estimated). This condition can be identified using period monitors. The term “sustained“ is used in order to allow exclusion of expected short term positive periods from planned control rod movements. Escalation would be by the Fission Product Barrier.

This EAL indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU8
2. Technical Specifications Table 3.3.1.2-1
3. USAR Table 7.1-13
4. USAR 7.7.1.22
5. USAR Table 7.7-2
6. CPS 3306.01, Source/Intermediate Range Monitors (SRM/IRM)

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MS3

Initiating Condition:

Loss of all vital DC power for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of all vital DC power based on **< 108 VDC** on 125 VDC battery busses 1A and 1B for **≥ 15 minutes**.

Basis:

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power will cause core uncovering and loss of containment integrity when there is significant decay heat and sensible heat in the reactor system.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Escalation to a General Emergency would occur by Abnormal Rad Levels/Radiological Effluent, Fission Product Barrier Degradation.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SS3
2. USAR 8.3.2
3. USAR Figure 8.3-7
4. USAR Table 8.3-5
5. USAR 8.3.2.1.1
6. CPS 4201.01, Loss of DC Power
7. Technical Specifications B3.8.4

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MS4

Initiating Condition:

Inability to monitor a SIGNIFICANT TRANSIENT in progress.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**
   - Safety System annunciators (Table M1)

     OR

   - Safety System indications (Table M1)

Table M1 – Safety Systems
• ECCS • Containment Isolation • Reactor Scram Process/Area Radiation Monitoring

   AND

2. SIGNIFICANT TRANSIENT in progress (Table M2).

Table M2 - Significant Transients
• Turbine trip • Reactor Scram • ECCS activation • Recirc. Runback **> 25%** Reactor Power change • Thermal power oscillations **> 10 %** Reactor Power change

   AND

3. Compensatory indications (computer points) are unavailable.

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MS4 (cont)

Basis:

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) Turbine Trip (2) Reactor Scram (3) ECCS Activation, (4) Recirc. Runback > 25% Reactor Power change, or (5) thermal power oscillations > 10% Reactor Power change.

This EAL is intended to recognize the threat to plant safety associated with the complete loss of capability of the control room staff to monitor plant response to a SIGNIFICANT TRANSIENT.

"Planned" and “UNPLANNED” actions are not differentiated since the loss of instrumentation of this magnitude is of such significance during a transient that the cause of the loss is not an ameliorating factor.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

Control room annunciators are powered mainly from 1H13-P630 and 1H13-P850. A total loss of P630 power would cause a loss of greater than 75% of safety system annunciators. A total loss of P850 power would not cause a loss of greater than 75% of safety system annunciators and would need to be evaluated based on present plant conditions. Partial loss of annunciators due to causes other than a loss of P630 or P850 would also have to be evaluated for impact based on present plant conditions.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

A Site Area Emergency is considered to exist if the control room staff cannot monitor safety systems needed for protection of the public while a significant transient is in progress.

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MS4 (cont)

Basis (cont):

Indications needed to monitor safety systems necessary for protection of the public must include control room indications; computer generated indications and dedicated annunciation capability. The specific parameters are those used to determine such functions as the ability to shut down the reactor, maintain the core cooled and in a coolable geometry, remove heat from the core, and maintain the reactor coolant system and primary containment.

"Compensatory indications" in this context includes computer based information. This includes all computer systems available for this use.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SS6
2. CPS 4401.01, EOP-1 RPV Control
3. CPS 4402.01, EOP-6 Primary Containment Control
4. USAR 7.7.1.26
5. CPS 3512.01, Display Control system (DCS/CX) & Performance Monitoring System
6. SPDS-DD-102, Safety Parameter Display System

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MA4

Initiating Condition:

UNPLANNED Loss of safety system annunciation or indication in the control room with EITHER (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**

   - Safety System annunciators (Table M1)

     OR

   - Safety System indications (Table M1)

Table M1 – Safety Systems
• ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring

AND

2. a. SIGNIFICANT TRANSIENT in progress (Table M2).

Table M2 - Significant Transients
• Turbine trip • Reactor Scram • ECCS activation • Recirc. Runback **> 25%** Reactor Power change • Thermal power oscillations **> 10 %** Reactor Power change

OR

b. Compensatory indications (computer points) are unavailable.

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MA4 (cont)

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) Turbine Trip (2) Reactor Scram (3) ECCS Activation, (4) Recirc. Runback > 25% Reactor Power change, or (5) thermal power oscillations > 10% Reactor Power change

This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a SIGNIFICANT TRANSIENT.

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

Control room annunciators are powered mainly from 1H13-P630 and 1H13-P850. A total loss of P630 power would cause a loss of greater than 75% of safety system annunciators. A total loss of P850 power would not cause a loss of greater than 75% of safety system annunciators and would need to be evaluated based on present plant conditions. Partial loss of annunciators due to causes other than a loss of P630 or P850 would also have to be evaluated for impact based on present plant conditions.

It is further recognized that plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MA4 (cont)

Basis Reference(s):

"Compensatory indications" in this context includes computer based information. If both a major portion of the annunciation system and all computer monitoring are unavailable, the Alert is required.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

This Alert will be escalated to a Site Area Emergency if the operating crew cannot monitor the transient in progress due to a concurrent loss of compensatory indications with a SIGNIFICANT TRANSIENT in progress during the loss of annunciation or indication.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SA4
2. USAR 7.7.1.26
3. CPS 3512.01, Display Control system (DCS/CX) & Performance Monitoring System
4. SPDS-DD-102, Safety Parameter Display System

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MU4

Initiating Condition:

UNPLANNED loss of safety system annunciation or indication in the control room for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**

- Safety System annunciators (Table M1)

  OR

- Safety System indications (Table M1)

Table M1 – Safety Systems
• ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment.

Recognition of the availability of computer based indication equipment is considered.

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MU4 (cont)

Basis (cont):

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions.

Control room annunciators are powered mainly from 1H13-P630 and 1H13-P850. A total loss of P630 power would cause a loss of greater than 75% of safety system annunciators. A total loss of P850 power would not cause a loss of greater than 75% of safety system annunciators and would need to be evaluated based on present plant conditions. Partial loss of annunciators due to causes other than a loss of P630 or P850 would also have to be evaluated for impact based on present plant conditions.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

Fifteen minutes was selected as a threshold to exclude momentary power losses.

This Unusual Event will be escalated to an Alert based on a concurrent loss of compensatory indications or if a SIGNIFICANT TRANSIENT is in progress during the loss of annunciation or indication.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU3
2. USAR 7.7.1.26
3. CPS 3512.01, Display Control system (DCS/CX) & Performance Monitoring System
4. SPDS-DD-102, Safety Parameter Display System

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MU5

Initiating Condition:

RCS leakage.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

1. Unidentified or pressure boundary leakage into the Drywell **> 10 gpm**.

   OR

2. Identified leakage into the Drywell **> 25 gpm**.

Basis:

This EAL is included as an Unusual Event because it may be a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified or pressure boundary leakage was selected as it is observable with normal control room indications. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances).

Relief valve operation should be excluded from this EAL.

The EAL for identified leakage is set at a higher value due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage. In either case, escalation of this EAL to the Alert level is via Fission Product Barrier.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU5
2. USAR 5.2.5.1
3. CPS 9043.06, Drywell Floor Drain Sump Flow Test 00PS404
4. CPS 9443.01, Drywell Equipment Drain Sump Flow E31-N578 Channel Cal 01PS274
5. CPS 4401.01, EOP-1 RPV Control
6. CPS 4001.01, Reactor Coolant Leakage
7. Clinton Power Station Emergency Operating Procedures Technical Bases, Section 12
8. ITS 3.4.5

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MU6

Initiating Condition:

Loss of all On-site or Off-site communications capabilities.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

1. Loss of all Table M3 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table M3 **Offsite** communications capability affecting the ability to perform offsite notifications.

Table M3 - Communications Capability

System	Onsite	Offsite
Plant Radio System	X	
Plant Paging System	X	
Sound Power Phones	X	
PCS phones	X	X
All Telephone Lines (commercial and microwave)	X	X
ENS		X
Satellite Phones		X
HPN		X
Cellular Phones		X

Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MU6 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU6
2. EP-MW-124-1001, Facilities Inventories and Equipment Tests
3. UFSAR Section 9.5.2

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MU7

Initiating Condition:

Inability to reach required shutdown within Technical Specification limits.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Plant is **not** brought to required operating mode within Technical Specifications LCO Action Statement time.

Basis:

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 Unusual Event is required when the plant is not brought 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**.**

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU2
2. Clinton Technical Specifications

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CA1

Initiating Condition:

Loss of all Off-site and all On-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to vital busses 1A1 and 1B1.

   AND

2. Failure of DG 1A and DG 1B emergency diesel generators to supply power to vital busses 1A1 and 1B1.

   AND

3. Failure to restore power to at least one vital bus (excluding Division III) in **< 15 minutes** from the time of loss of both offsite and onsite AC power.

Basis:

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.

The event can be classified as an Alert when in cold shutdown, refueling, or defueled mode because of the significantly reduced decay heat and lower temperature and pressure, increasing the time to restore one of the emergency busses, relative to that specified for the Site Area Emergency EAL.

Escalating to Site Area Emergency, if appropriate, is by Abnormal Rad Levels / Radiological Effluent EALs.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CA1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 CA3
2. USAR Figure 8.3-1
3. USAR Section 8.1.5
4. USAR Section 8.3.1
5. CPS 4200.01, Loss of AC
6. Safety Evaluation By The Office Of Nuclear Reactor Regulation Related To Station Blackout, 10 CFR 50.63 Illinois Power Company, et al Clinton Power Station, Unit1 Docket No. 50-461

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU1

Initiating Condition:

AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. AC power capability to vital busses (1A1, 1B1) reduced to only one of the following power sources for **≥ 15 minutes**:
   - Emergency Reserve Auxiliary Transformer (ERAT).
   - Reserve Auxiliary Transformer B (RAT B).
   - Emergency Diesel Generator DG 1A.
   - Emergency Diesel Generator DG 1B.

   AND

2. Any additional single power source failure will result in station blackout.

Basis:

Capability: (pertaining to electrical power supplies) is equipment that is available to provide and maintain AC power at the required voltage and frequency for the required load.

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. The subsequent loss of this single power source would escalate the event to an Alert in accordance with MA2.

Fifteen minutes was selected as a threshold to exclude momentary losses of power.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU3
2. USAR Figure 8.3-1
3. USAR Section 8.1.5
4. USAR Section 8.3.1
5. CPS 4200.01, Loss of AC
6. Safety Evaluation By The Office Of Nuclear Reactor Regulation Related To Station Blackout, 10 CFR 50.63 Illinois Power Company, et al Clinton Power Station, Unit 1 Docket No. 50-461

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU2

Initiating Condition:

Inadvertent criticality.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

UNPLANNED sustained positive period observed on nuclear instrumentation.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL also addresses criticality events that occur in Cold Shutdown or Refueling modes such as fuel mis-loading events. This condition can be identified using period monitors. The term “sustained” is used in order to allow exclusion of expected short term positive periods from planned fuel bundle or control rod movements during core alteration.

This EAL indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU8
2. Technical Specifications Table 3.3.1.2-1
3. USAR Table 7.1-13
4. USAR 7.7.1.22
5. USAR Table 7.7-2
6. CPS 3306.01, Source/Intermediate Range Monitors (SRM/IRM)

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU3

Initiating Condition:

Loss of required DC power for 15 minutes or longer.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of required DC power based on **< 108 VDC** on 125 VDC battery busses 1A and 1B for **≥ 15 minutes**.

Basis:

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.

The required busses are the minimum allowed by Technical Specifications for the mode of operation. It is intended that the loss of the operating (operable) train is to be considered. If this loss results in the inability to maintain cold shutdown, the escalation to an Alert will be per CA5.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU7
2. USAR 8.3.2
3. USAR Figure 8.3-7
4. USAR Table 8.3-5
5. USAR 8.3.2.1.1
6. CPS 4201.01, Loss of DC Power
7. Technical Specifications B3.8.4

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU4

Initiating Condition:

Loss of all On-site or Off-site communications capabilities.

Operating Mode Applicability:

4, 5, D

EAL Threshold Values:

1. Loss of all Table C1 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table C1 **Offsite** communications capability affecting the ability to perform offsite notifications.

Table C1 - Communications Capability

System	Onsite	Offsite
Plant Radio System	X	
Plant Paging System	X	
Sound Power Phones	X	
PCS phones	X	X
All Telephone Lines (commercial and microwave)	X	X
ENS		X
Satellite Phones		X
HPN		X
Cellular Phones		X

Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU4 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU6
2. EP-MW-124-1001, Facilities Inventories and Equipment Tests
3. UFSAR Section 9.5.2

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CA5

Initiating Condition:

Inability to maintain plant in cold shutdown.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200° F** for **> Table C2 duration**.

Table C2 – RCS Reheat Duration Thresholds

RCS	Containment Closure	Duration
Intact	N/A	60 minutes*
Not Intact	Established	20 minutes*
	Not Established	0 minutes

*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then this EAL is **not** applicable.

OR

2. UNPLANNED RPV pressure rise **> 10 psig** as a result of temperature rise due to loss of decay heat removal.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

RCS is intact when the RCS pressure boundary is in its normal condition for the Cold Shutdown mode of operation (e.g., no freeze seals or main steam line nozzle plugs, etc.).

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CA5 (cont)

Basis (cont):

Threshold #1 Basis:

The RCS Reheat Duration Threshold table addresses complete loss of functions required for core cooling for greater than 60 minutes during refueling and cold shutdown modes when RCS integrity is established. The status of CONTAINMENT CLOSURE in this condition is immaterial given that the RCS is providing a high pressure barrier to fission product release to the environment. The 60 minute time frame should allow sufficient time to restore cooling without there being a substantial degradation in plant safety.

The RCS Reheat Duration Threshold table also addresses the complete loss of functions required for core cooling for greater than 20 minutes during refueling and cold shutdown modes when CONTAINMENT CLOSURE is established but RCS integrity is not established. The allowed 20 minute time frame was included to allow operator action to restore the heat removal function, if possible.

Finally, complete loss of functions required for core cooling during refueling and cold shutdown modes when neither CONTAINMENT CLOSURE nor RCS integrity are established. No delay time is allowed because the evaporated reactor coolant that may be released into the Containment during this heatup condition could also be directly released to the environment.

The note (*) indicates that this EAL is not applicable if actions are successful in restoring an RCS heat removal system to operation and RCS temperature is being reduced within the specified time frame.

Threshold #2 Basis:

The 10 psig pressure rise due to loss of decay heat removal infers an intact RCS with uncontrolled RPV temperature rise in excess of the Technical Specification cold shutdown limit (200° F) for which CA5 Threshold #1 would permit up to sixty minutes to restore RCS cooling before declaration of an Alert. This EAL therefore covers situations of high decay heat loads, in which the event should be declared without delay.

Escalation to Site Area Emergency would be via CS6 should boiling result in significant RPV level loss leading to core uncovery.

A loss of Technical Specification components alone is not intended to constitute an Alert. The same is true of a momentary UNPLANNED excursion above the Technical Specification cold shutdown temperature limit when the heat removal function is available.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CA5 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 CA4
2. Technical Specifications 3.6.1.1
3. Technical Specifications 3.6.4.1
4. OU-AA-103, Shutdown Safety Management Program
5. CPS 3002.01, Heatup and Pressurization
6. CPS 3002.01C003, MODE 3 Checklist
7. CPS 4006.01, Loss of Shutdown Cooling
8. CPS 9000.06, Reactor Coolant and Vessel Metal/Pressure/Temperature Limit Logs
9. CPS 9433.13, ECCS Reactor Steam Dome Pressure B21-N097A(B) Channel 6 Calibration

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU5

Initiating Condition:

UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200° F**.

   OR

2. Loss of the following for **> 15 minutes:**
   - All RCS temperature indications.

     AND

   - All RPV level indications.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL is be a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant.

In cold shutdown the ability to remove decay heat relies primarily on forced cooling flow. Operation of the systems that provide this forced cooling may be jeopardized due to the unlikely loss of electrical power or RCS inventory. Since the RCS usually remains intact in the cold shutdown mode a large inventory of water is available to keep the core covered.

During refueling the level in the RPV will normally be maintained above the RPV flange. Refueling evolutions that decrease water level below the RPV flange are carefully planned and procedurally controlled. Loss of forced decay heat removal at reduced inventory may result in more rapid increases in RCS/RPV temperatures depending on the time since shutdown.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU5 (cont)

Basis (cont):

Normal means of core temperature indication and RCS level indication may not be available in the refueling mode. Redundant means of RPV level indication are therefore procedurally installed to assure that the ability to monitor level will not be interrupted. However, if all level and temperature indication were to be lost in either the cold shutdown of refueling modes, Threshold #2 would result in declaration of an Unusual Event if both temperature and level indication cannot be restored within 15 minutes from the loss of both means of indication. Escalation to Alert would be via CA6 based on an inventory loss or CA5 based on exceeding its temperature criteria.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU4
2. Technical Specifications Table 1.1-1
3. CPS 4401.01, EOP-1 RPV Control
4. Clinton Power Station Emergency Operating Procedures Technical Bases, Section 12
5. CPS 4411.07, RPV Level Instrumentation
6. MA-CL-716-102, Reactor Disassembly
7. CPS 3002.01, Heatup and Pressurization
8. CPS 9000.06, Reactor Coolant and Vessel Metal/Pressure/Temperature Limit Logs

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CG6

Initiating Condition:

Loss of RPV inventory affecting fuel clad integrity with containment challenged.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. RPV level **< -162 inches (TAF)** for **≥ 30 minutes**.

   AND

   b. Any Containment Challenge Indication (Table C4).

   OR

2. a. RPV level unknown for **≥ 30 minutes.**

   AND

   b. Loss of RPV inventory as indicated by any of the following:

   - Table C3 indication.

     OR

   - Erratic Source Range Monitor indication.

     OR

   - Containment High Range Monitors 1RIX-CM061 or 1RIX-CM062 **> 3 R/hr**.

   AND

   c. Any Containment Challenge Indication (Table C4)

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise
• UNPLANNED Suppression Pool level rise
• UNPLANNED vessel make up rate rise
• Observation of leakage or inventory loss

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CG6 (cont)

EAL Threshold Values: (cont)

Table C4 – Containment Challenge Indications
• Drywell Hydrogen concentration **≥ 9%**. • Containment hydrogen concentration ≥ **SAG-2 Fig. R, Deflagration Limit.** • UNPLANNED rise in containment pressure • CONTAINMENT CLOSURE **not** established. • Any Secondary Containment radiation monitor **> EOP-8 Table U Maximum Safe** operating level. •

Basis:

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the SAMG program.

This EAL represents the inability to restore and maintain RPV level to above the top of active fuel with containment challenged. Fuel damage is probable if RPV level cannot be restored, as available decay heat will cause boiling, further reducing the RPV level. With the CONTAINMENT breached or challenged then the potential for unmonitored fission product release to the environment is high. This represents a direct path for radioactive inventory to be released to the environment. This is consistent with the definition of a General Emergency. The General Emergency is declared on the occurrence of the loss or IMMINENT loss of function of all three barriers.

A number of variables can have a significant impact on heat removal capability challenging the fuel clad barrier. Examples include initial vessel level and shutdown heat removal system design.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CG6 (cont)

Basis (cont):

Analysis indicates that core damage may occur within an hour following continued core uncovery therefore, 30 minutes was conservatively chosen.

If CONTAINMENT CLOSURE is re-established prior to exceeding the 30 minute core uncovery time limit then escalation to a General Emergency would not occur.

When RPV level indication is unavailable, the inventory loss must be detected by erratic Source Range Monitor indication, elevated drywell radiation or unexplained rise in drywell floor or equipment drain sump pumpout rate. Post-TMI studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and that Source Range Monitors can be used as a tool for making such determinations.

As water level in the RPV lowers, the dose rate above the core will rise. Indication of > 3 R/hr is indicative of core uncovery (i.e. level at TAF).

Basis Reference(s):

1. NEI 99-01, Rev. 5 CG1
2. CPS 4401.01, EOP-1 RPV Control
3. CPS 4402.01, EOP-6 Primary Containment Control
4. Clinton Power Station Emergency Operating Procedures Technical Bases, Sections 9, 10 and 12
5. CPS 4406.01, EOP-8 Secondary Containment Control
6. USAR Figure 6.2-132
7. USAR Table 1.3-4
8. Technical Specifications 3.6.1.1
9. Technical Specifications 3.6.4.1
10. OU-AA-103, Shutdown Safety Management Program
11. Clinton Power Station Emergency Operating Procedures Technical Bases
12. CPS 4411.07, RPV Level Instrumentation
13. CPS 3306.01, Source/Intermediate Range Monitors (SRM/IRM)

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CS6

Initiating Condition:

Loss of RPV inventory affecting core decay heat removal capability.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. With CONTAINMENT CLOSURE **not** established, RPV level **< - 51.5 inches**.

   OR

2. With CONTAINMENT CLOSURE established, RPV level **< - 162 inches (TAF).**

   OR

3. a. RPV level unknown for **≥ 30 minutes.**

      AND

   b. Loss of RPV inventory as indicated by any of the following:

      - Table C3 indications.

        OR

      - Erratic Source Range Monitor indication.

        OR

      - Containment High Range Monitors 1RIX-CM061 or 1RIX-CM062 **> 3 R/hr**.

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise
• UNPLANNED Suppression Pool level rise
• UNPLANNED vessel make up rate rise
• Observation of leakage or inventory loss

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CS6 (cont)

Basis (cont):

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the SAMG program.

Under the conditions specified, a continued drop in RCS/RPV level is indicative of a loss of inventory control. Inventory loss may be due to an RCS breach, pressure boundary leakage, or continued boiling in the RPV. Thus, declaration of a Site Area Emergency is warranted.

Escalation to a General Emergency is via CG6 or RG1.

Threshold #1 and #2 Basis:

If a low-pressure boundary to fission product release does not exist (i.e., without containment closure established), the RPV level associated with this threshold is six inches below the low-low ECCS actuation setpoint. If containment closure is established, a low-pressure boundary to fission product release exists and RPV level can drop to the top of active fuel before a Site Area Emergency declaration is required. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further RPV level drop and potential core uncovery.

Threshold #3 Basis:

When RPV level indication is unavailable, the inventory loss must be detected by erratic Source Range Monitor indication, elevated drywell radiation or unexplained rise in drywell floor or equipment drain sump pumpout rate. Post-TMI studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and that Source Range Monitors can be used as a tool for making such determinations.

The 30-minute duration allows sufficient time for actions to be performed to recover inventory control equipment.

As water level in the RPV lowers, the dose rate above the core will rise. Indication of > 3 R/hr. is indicative of core uncovery (i.e. level at TAF).

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CS6 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 CS1
2. Technical Specifications Table 3.3.5.1-1
3. ORM Attachment 2-7, Table 5
4. CPS 4401.01, EOP-1 RPV Control
5. Clinton Power Station Emergency Operating Procedures Technical Bases, Section 12
6. CPS 4411.07, RPV Level Instrumentation
7. USAR 5.2.5.1
8. CPS 9043.06, Drywell Floor Drain Sump Flow Test 00PS404
9. CPS 9443.01, Drywell Equipment Drain Sump Flow E31-N578 Channel Cal 01PS274
10. CPS 3306.01, Source/Intermediate Range Monitors (SRM/IRM)
11. Technical Specifications 3.6.1.1
12. Technical Specifications 3.6.4.1
13. OU-AA-103, Shutdown Safety Management Program
14. CPS 3002.01, Heatup and Pressurization

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CA6

Initiating Condition:

Loss of RPV inventory.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. RPV level **< - 45.5 inches**.

   OR

2. a. RPV level unknown for **≥ 15 minutes**.

      AND

   b. Loss of RPV inventory per Table C3 indications.

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise • UNPLANNED Suppression Pool level rise • UNPLANNED vessel make up rate rise • Observation of leakage or inventory loss

Basis:

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL serves as precursors to a loss of ability to adequately cool the fuel. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further RPV level decrease and potential core uncovery. This condition will result in a minimum emergency classification level of an Alert.

If RPV level continues to lower then escalation to Site Area Emergency will be via CS6.

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the SAMG program.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CA6 (cont)

Basis (cont):

Threshold #1 Basis:

The inability to restore and maintain level after reaching this setpoint would be indicative of a failure of the RCS barrier.

Threshold #2 Basis:

When RPV level indication is unavailable, the inventory loss must be detected by other means including rise in sump pumpout rates, changes in makeup or observation of leakage.

The 15-minute interval for the loss of level indication was chosen because it is half of the Site Area Emergency duration.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CA1
2. Technical Specifications Table 3.3.5.1-1
3. ORM Attachment 2-7, Table 5
4. CPS 4401.01, EOP-1 RPV Control
5. CPS Emergency Operating Procedures Technical Bases, Section 12
6. CPS 4411.07, RPV Level Instrumentation
7. USAR 5.2.5.1
8. CPS 9043.06, Drywell Floor Drain Sump Flow Test 00PS404
9. CPS 9443.01, Drywell Equipment Drain Sump Flow E31-N578 Channel Cal

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU6

Initiating Condition:

RCS leakage.

Operating Mode Applicability:

4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

RCS leakage results in the inability to restore and maintain RPV level **> Level 3 (8.9 inches)** for **≥ 15 minutes.**

Basis:

This EAL is considered to be a potential degradation of the level of safety of the plant. The inability to maintain or restore level is indicative of loss of RCS inventory.

Prolonged loss of RCS Inventory may result in escalation to the Alert emergency classification level via either CA6 or CA5.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU1
2. Technical Specifications Table 3.3.5.1-1
3. ORM Attachment 2-7, Table 5
4. CPS 4100.01, Reactor SCRAM.
4. CPS 4401.01, EOP-1 RPV Control
5. CPS Emergency Operating Procedures Technical Bases, Section 12
6. CPS 4411.07, RPV Level Instrumentation
7. USAR 5.2.5.1
8. CPS 9043.06, Drywell Floor Drain Sump Flow Test 00PS404
9. CPS 9443.01, Drywell Equipment Drain Sump Flow E31-N578 Channel Cal

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU7

Initiating Condition:

UNPLANNED loss of RPV inventory.

Operating Mode Applicability:

5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED Refueling Cavity or Vessel level drop that meets **EITHER**:

   - When controlling level above the RPV flange, Refueling Cavity level drop below the RPV flange (**< 204 inches** Shutdown Range) for **≥ 15 minutes**.

     OR

   - When controlling level below the RPV flange, vessel level drop below the procedurally established limit for **≥ 15 minutes**.

   OR

2. a. RPV level unknown.

   AND

   b. Loss of RPV inventory per Table C3 indications.

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise • UNPLANNED Suppression Pool level rise • UNPLANNED vessel make up rate rise • Observation of leakage or inventory loss

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU7 (cont)

Basis (cont):

This EAL is a precursor of more serious conditions and considered to be a potential degradation of the level of safety of the plant.

Refueling evolutions that lowers RCS water level below the RPV flange are carefully planned and procedurally controlled. An UNPLANNED event that results in water level dropping below the RPV flange, or below the planned RCS water level for the given evolution (if the planned RCS water level is already below the RPV flange), warrants declaration of a UE due to the reduced RCS inventory that is available to keep the core covered.

The allowance of 15 minutes was chosen because it is reasonable to assume that level can be restored within this time frame using one or more of the redundant means of makeup that should be available. If level cannot be restored in this time frame then it may indicate a more serious condition exists.

Continued loss of RCS Inventory will result in escalation to the Alert emergency classification level via either CA6 or CA5.

Threshold #1 Basis:

This EAL involves a drop in RCS level below the top of the RPV flange that continues for 15 minutes due to an UNPLANNED event. This EAL is not applicable to level changes in flooded reactor cavity level, which is addressed by RU2, until such time as the level drop reaches the level of the vessel flange.

If RPV level continues to lower and reaches the Low-Low ECCS Actuation Setpoint then escalation to MA8 would be appropriate.

Threshold #2 Basis:

This EAL addresses conditions in the refueling mode when normal means of core temperature indication and RCS level indication may not be available. Redundant means of RPV level indication will normally be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that RPV inventory loss was occurring by observing other indications such as sump level changes, changes in makeup or observation of leakage. Sump level changes must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

Escalation to the Alert emergency classification level would be via either CA6 or CA5.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU7 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU2
2. CPS 4401.01, EOP-1 RPV Control
3. Clinton Power Station Emergency Operating Procedures Technical Bases, Section12
4. CPS 4411.07, RPV Level Instrumentation
5. MA-CL-716-102, Reactor Disassembly
6. Technical Specifications Table 3.3.5.1-1
7. USAR Figure 3.8-31
8. USAR Table 7.1-13

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1

Initiating Condition:

HOSTILE ACTION resulting in loss of physical control of the facility.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Value:

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1).

   OR

2. A HOSTILE ACTION has:

   - Caused failure of Spent Fuel Pool Cooling Systems

     AND

   - IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).

Table H1 - Safety Functions
• Reactivity Control (ability to shut down the reactor and keep it shutdown) • RCS Inventory (ability to cool the core) • Decay Heat Removal (ability to maintain heat sink)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1 (cont)

Basis:

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

Threshold #1 Basis

This threshold encompasses conditions under which a HOSTILE ACTION has taken physical control of VITAL AREAS (containing vital equipment or controls of vital equipment) required to maintain any safety function. As a result, there is a loss of one or more of the Table H1 functions and equipment control cannot be transferred to and operated from another location.

If control of the plant equipment necessary to maintain all safety functions can be operated from the Control Room or transferred to another location, then the above EAL threshold is not met.

Threshold #2 Basis

This threshold addresses loss of physical control of spent fuel pool cooling systems if imminent fuel damage is likely because there is freshly off-loaded fuel in the pool. The condition “freshly off-loaded reactor fuel in pool” equates to fuel off-loaded within the last 120 days in NF-AA-309 Special Nuclear Material And Core Component Move Sheet Development.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HG1
2. CPS 4003.01, Remote Shutdown
3. SY-AA-101-132, Security Assessment and Response to Unusual Activities
4. Station Security Plan – Appendix C
5. NF-AA-309, Special Nuclear Material And Core Component Move Sheet Development

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS1

Initiating Condition:

HOSTILE ACTION within the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

This condition represents an escalated threat to plant safety above that contained in the Alert in that a HOSTILE FORCE has progressed from the OWNER CONTROLLED AREA to the PROTECTED AREA.

This EAL addresses the contingency for a very rapid progression of events. It is not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack with minimal time available for further preparation or additional assistance to arrive requires Offsite Response Organizations (ORO) readiness and preparation for the implementation of protective measures.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS1 (cont)

Basis (cont):

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the PROTECTED AREA. Those events are adequately addressed by other EALs.

Escalation of this emergency classification level, if appropriate, would be based on actual plant status after impact or progression of attack.

Basis Reference(s):

1. NEI 99-01 Rev 5, HS4
2. SY-AA-101-132, Security Assessment and Response to Unusual Activities
3. Station Security Plan – Appendix C

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1

Initiating Condition:

HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site.

   OR

2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

OWNER CONTROLLED AREA (OCA): is the property associated with the station owned by the company. Access is normally limited to persons entering for official business.

Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

The fact that the site is under serious attack or is an identified attack target with minimal time available for further preparation or additional assistance to arrive requires a heightened state of readiness and implementation of protective measures that can be effective (such as on-site evacuation, dispersal or sheltering).

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1 (cont)

Basis: (cont)

Threshold #1 Basis

This EAL addresses the immediacy of an expected threat arrival or impact on the site within a relatively short time.

The intent of this EAL is to ensure that notifications for the airliner attack threat are made in a timely manner and that Offsite Response Organizations (ORO) and plant personnel are at a state of heightened awareness regarding the credible threat. Airliner is meant to be a large aircraft with the potential for causing significant damage to the plant.

This EAL is met when a plant receives information regarding an airliner attack threat from NRC and the airliner is within 30 minutes of the plant. Only the plant to which the specific threat is made need declare the Alert.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Threshold #2 Basis

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the OCA. Those events are adequately addressed by other EALs.

Note that this EAL is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA.

Basis Reference(s):

1. NEI 99-01 Rev 5, HA4
2. SY-AA-101-132, Security Assessment and Response to Unusual Activities
3. Station Security Plan – Appendix C

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1

Initiating Condition:

Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities.

   OR

2. A validated notification from NRC providing information of an aircraft threat.

   OR

3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

Basis:

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

Security events assessed as HOSTILE ACTIONS are classifiable under HA1, HS1 and HG1.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1 (cont)

Basis: (cont)

A higher initial classification could be made based upon the nature and timing of the security threat and potential consequences. The licensee shall consider upgrading the emergency response status and emergency classification level in accordance with the site's Safeguards Contingency Plan and Emergency Plan.

Threshold #1 Basis

This threshold is included to ensure that appropriate notifications for the security threat are made in a timely manner. This includes information of a credible threat. Only the plant to which the specific threat is made need declare the Notification of an Unusual Event.

The determination of "credible" is made through use of information found in the Station Security Plan or SY-AA-101-132, "Security Assessment and Response to Unusual Activities" procedure.

Threshold #2 Basis

The intent of this EAL is to ensure that notifications for the aircraft threat are made in a timely manner and that Offsite Response Organizations (ORO) and plant personnel are at a state of heightened awareness regarding the credible threat. It is not the intent of this EAL to replace existing non-hostile related EALs involving aircraft.

This EAL is met when a plant receives information regarding an aircraft threat from NRC. Validation is performed by calling the NRC. Only the plant to which the specific threat is made need declare the Unusual Event.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Escalation to Alert emergency classification level would be via HA1 would be appropriate if the threat involves an airliner within 30 minutes of the plant.

Threshold #3 Basis

Reference is made to security force because these individuals are the designated personnel on-site qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the plant Safeguards Contingency Plan.

This threshold is based on Station Security Plan – Appendix C. 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 in some cases under 10 CFR 50.72.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 5, HU4
2. SY-AA-101-132, Security Assessment and Response to Unusual Activities
3. Station Security Plan – Appendix C
4. NRC Safeguards Advisory 10/6/01
5. Letter from Mr. B. A. Boger (NRC) to Ms. Lynette Hendricks (NEI) dated 2/4/02

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS2

Initiating Condition:

Control Room evacuation has been initiated and plant control cannot be established.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Control Room evacuation has been initiated.

   AND

2. Control of the plant **cannot** be established per CPS 4003.01 in **< 15 minutes**.

Basis:

The time period to establish control of the plant starts when either:

a. Control of the plant is no longer maintained in the Main Control Room

   OR

b. The last Operator has left the Main Control Room.

The intent of this EAL is to capture those events where control of the plant cannot be reestablished in a timely manner. In this case, expeditious transfer of control of safety systems has not occurred (although fission product barrier damage may not yet be indicated).

The intent of the EAL is to establish control of important plant equipment and knowledge of important plant parameters in a timely manner. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions. Typically, these safety functions are reactivity control (ability to shutdown the reactor and maintain it shutdown), reactor water level (ability to cool the core), and decay heat removal (ability to maintain a heat sink).

The determination of whether or not control is established at the remote shutdown panel is based on Emergency Director (ED) judgment. The Emergency Director is expected to make a reasonable, informed judgment within the specified time for transfer that the licensee has control of the plant from the remote shutdown panel.

Escalation of this emergency classification level, if appropriate, would be by Fission Product Barrier or Abnormal Rad Levels/Radiological Effluent EALs.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HS2
2. CPS 4003.01, Remote Shutdown

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA2

Initiating Condition:

Control Room evacuation has been initiated.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Entry into CPS 4003.01 for Control Room evacuation.

Basis:

With the control room evacuated, additional support, monitoring and direction through the Technical Support Center and/or other emergency response facilities may be necessary.

Inability to establish plant control from outside the control room will escalate this event to a Site Area Emergency.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HA5
2. CPS 4003.01 Control Room Evacuation

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3

Initiating Condition:

FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

FIRE or EXPLOSION resulting in any of the following:

- VISIBLE DAMAGE to Table H2 permanent structures.

  OR

- VISIBLE DAMAGE to safety system equipment contained within a Table H2 area.

  OR

- Control Room indication of degraded safety system equipment performance contained within a Table H2 area.

Table H2 – Vital Areas
• Containment • Auxiliary Building • Fuel Building • Control Building (excluding Chem Lab) • Diesel Generator & HVAC Building • Screenhouse

Basis:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3 (cont)

Basis (cont):

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

The areas listed in Table H2 specify specific structures or areas that contain safety system, or component and functions required for safe shutdown of the plant.

VISIBLE DAMAGE is used to identify the magnitude of the FIRE or EXPLOSION and to discriminate against minor FIRES and EXPLOSIONS.

The reference to structures containing safety systems or components is included to discriminate against FIRES or EXPLOSIONS in areas having a low probability of affecting safe operation. The significance here is not that a safety system was degraded but the fact that the FIRE or EXPLOSION was large enough to cause damage to these systems.

An EXPLOSION due to failure of pressurized equipment that does not cause damage to other permanent structures or equipment associated with plant operations does not meet the criteria for declaration under this EAL, but may result in other declaration criteria being met (e.g., when the line is an element of a Fission Product Barrier, or the results in inventory loss).

The use of VISIBLE DAMAGE should not be interpreted as mandating a lengthy damage assessment prior to classification. The declaration of an Alert and the activation of the Technical Support Center will provide the Emergency Director with the resources needed to perform detailed damage assessments.

The Emergency Director also needs to consider any security aspects of the EXPLOSION.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions, Fission Product Barrier or Abnormal Rad Levels / Radiological Effluent EALs.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HA2
2. USAR Appendix F

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3

Initiating Condition:

FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm.

Table H2 – Vital Areas
• Containment • Auxiliary Building • Fuel Building • Control Building (excluding Chem Lab) • Diesel Generator & HVAC Building • Screenhouse

OR

2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

Basis:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

PROTECTED AREA: An area which normally encompasses all controlled areas within the security protected area fence.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3 (cont)

Basis (cont):

This EAL addresses the magnitude and extent of FIRES or EXPLOSIONS that may be potentially significant precursors of damage to safety systems. It addresses the FIRE / EXPLOSION, and not the degradation in performance of affected systems that may result.

As used here, notification is visual observation and report by plant personnel or sensor alarm indication.

For the purposes of declaring an emergency event, the term “extinguished” means no visible flames.

Thresholds #1:

The 15 minute time period begins with a credible notification that a FIRE is occurring, or indication of a fire detection system alarm/actuation. Verification of a fire detection system alarm/actuation includes actions that can be taken within the control room or other nearby site specific location to ensure that it is not spurious. An alarm is assumed to be an indication of a FIRE unless it is disproved within the 15 minute period by personnel dispatched to the scene. In other words, a personnel report from the scene may be used to disprove a sensor alarm if received within 15 minutes of the alarm, but shall not be required to verify the alarm.

The intent of this 15 minute duration is to size the FIRE and to discriminate against small FIRES that are readily extinguished (e.g., smoldering waste paper basket). Such fires are excluded from consideration in this threshold since they have no safety consequence.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3 (cont)

Basis (cont):

Threshold #2 Basis:

This EAL addresses only those EXPLOSIONS of sufficient force to damage permanent structures or equipment associated with plant operations within the PROTECTED AREA.

An EXPLOSION due to failure of pressurized equipment that does not cause damage to other permanent structures or equipment associated with plant operations does not meet the criteria for declaration under this EAL, but may result in other declaration criteria being met (e.g., when the line is an element of a Fission Product Barrier, or the results in inventory loss).

No attempt is made to assess the actual magnitude of the damage. The occurrence of the EXPLOSION is sufficient for declaration.

The Emergency director also needs to consider any security aspects of the EXPLOSION, if applicable.

Escalation of this emergency classification level, if appropriate, would be based on HA3.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HU2
2. USAR Figure 1.2-3, Principal Station Structure
3. USAR Appendix F

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4

Initiating Condition:

Natural and destructive phenomena affecting VITAL AREAS.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by seismic instrumentation **> 0.10 g**.

   AND

   b. Confirmed by **EITHER**:

   - Earthquake felt in plant.

     OR

   - National Earthquake Center.

     OR

   - Control Room indication of degraded performance of systems required for the safe shutdown of the plant.

   OR

2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area:

   - Tornado strike

     OR

   - High winds **> 85 mph**

     OR

   - Vehicle crash

     OR

   - Turbine failure-generated PROJECTILES

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

EAL Threshold Value(s) (cont):

Table H2 – Vital Areas
• Containment • Auxiliary Building • Fuel Building • Control Building (excluding Chem Lab) • Diesel Generator & HVAC Building • Screenhouse

OR

3. Flooding in any Table H3 area that results in **ANY** of the following:
   a. Degraded safety system performance as indicated in the Control Room.

      OR

   b. Industrial safety hazards (e.g., electric shock) that precludes access necessary to operate or monitor safety equipment.

      OR

   c. Water level **> EOP-8, Maximum Safe** operating levels.

Table H3 – Internal Flooding Areas
• HPCS Room • LPCS Room • A RHR Room • B RHR ROOM • C RHR Room • RCIC Room • Div 1 SX Room • Div 2 SX Room • Div 3 SX Room

OR

4. Abnormal lake level, as indicated by High lake level **> 697 ft**.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

Basis:

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

These EALs escalate from HU4 in that the occurrence of the event has resulted in VISIBLE DAMAGE to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control room indications of degraded system response or performance. The occurrence of VISIBLE DAMAGE and/or degraded system response is intended to discriminate against lesser events. 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. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction EALs.

Threshold #1 Basis:

This threshold addresses events that may have resulted in a Table H2 area being subjected to forces beyond design limits and thus damage may be assumed to have occurred to plant safety systems.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

Basis (cont):

Threshold #2 Basis:

This threshold addresses events within the PROTECTED AREA that results in VISIBLE DAMAGE to any Table H2 structure or Control Room indication of degraded performance of a safety system in any Table H2 area:

This threshold addresses the following events:

- Tornado strike.
- High winds.
- Vehicle crashes such as plane, helicopter, train, barge, car or truck crashes. The Emergency director also needs to consider any security aspects of the vehicle crash.
- Threat to safety-related equipment imposed by PROJECTILES generated by main turbine rotating component failures.

Threshold #3 Basis:

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. The actual component failure or equipment misalignment is addressed by Technical Specifications or plant procedures unless the resulting flooding causes degraded performance of safety systems, or has created industrial safety hazards (e.g., electrical shock) that preclude necessary access to operate or monitor safety equipment. The inability to access, operate or monitor safety equipment represents an actual or substantial potential degradation of the level of safety of the plant.

Flooding as used in this EAL describes a condition where water is entering the room faster than installed equipment is capable of removal, resulting in a rise of water level within the room. Classification of this EAL should not be delayed while corrective actions are being taken to isolate the water source.

Threshold #4 Basis:

Lake level rising above 697 ft el. exceeds the 100-year flood elevation. Prior to reaching this level, electrical equipment in the intake structure is deenergized and an orderly plant shutdown conducted. If not already shutdown prior to this elevation, a rapid shutdown is ordered and electrical equipment in the screen house deenergized.

A dam failure may result in failure of the 345-KV Rising and Latham power lines, threatening the availability of this offsite AC power supply.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 HA1
2. USAR 2.5.2, 3.3.1.1, 3.7, D3.6.4 and Appendix F
3. CPS 4301.01, Earthquake
4. CPS 4303.02, Abnormal Lake Level
5. CPS 4304.01, Flooding
6. Sargent & Lundy Report SL-4576 “Internal Flooding - Safe Shutdown Analysis and INPO SOER No. 85-5 Comparison Evaluation Report,” Clinton Power Station, January 31, 1990

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4

Initiating Condition:

Natural and destructive phenomena affecting the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1 a. Seismic event as indicated by seismic instrumentation **> 0.02g**.

AND

b. Confirmed by **EITHER**:

- Earthquake felt in plant.

  OR

- National Earthquake Center.

OR

2. **EITHER** of the following occurring within the PROTECTED AREA boundary:

- Tornado strike

  OR

- Sustained **(> 15 minutes)** high winds **> 85 mph**.

OR

3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

OR

4. Flooding in any Table H3 area that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

Table H3 – Internal Flooding Areas
• HPCS Room • LPCS Room • A RHR Room • B RHR ROOM • C RHR Room • RCIC Room • Div 1 SX Room • Div 2 SX Room • Div 3 SX Room

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont)

EAL Threshold Values: (cont)

OR

5. Abnormal lake level, as indicated by High lake level **> 696 ft**.

Basis:

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

These EALs are categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

Threshold #1 Basis:

Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

Threshold #2 Basis:

This EAL is based on a tornado striking (touching down) or high winds within the PROTECTED AREA.

Escalation of this emergency classification level, if appropriate, would be based on VISIBLE DAMAGE, or by other in plant conditions, via HA4.

Threshold #3 Basis:

This EAL addresses main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Generator seal damage observed after generator purge does not meet the intent of this EAL because it did not impact normal operation of the plant.

Of major concern is the potential for leakage of combustible fluids (lubricating oils) and gases (hydrogen cooling) to the plant environs. Actual FIRES and flammable gas build up are appropriately classified via HU3 and HU5.

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 this emergency classification level, if appropriate, would be to HA4 based on damage done by PROJECTILES generated by the failure or by the radiological releases. The latter events would be classified by the radiological EALs or Fission Product Barrier.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont)

Basis (cont):

Threshold #4 Basis:

The assessment of the potential for flooding to affect safety related equipment is based on the rate of level rise in the area and the ability to terminate the input prior to submerging or spraying the electrical portion of safety related equipment.

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. Minor leaks, such as valve packing or instrument line breaks would not constitute "Flooding." The Internal Flooding Areas of concern for the Unusual Event declaration are those Table H3 areas that have the potential to affect safety related equipment needed for the current operating mode.

Escalation of this emergency classification level, if appropriate, would be based VISIBLE DAMAGE via HA4, or by other plant conditions.

Threshold #5 Basis:

A lake level of 696 ft el. is one foot below the 100-year flood elevation and represents a decision point; based on rate of lake level rise, and expected level crest, to shutdown the plant in order to assure safe plant shutdown (MODE 3) prior to lake level reaching 697 ft.

A dam failure may result in failure of the 345-KV Rising and Latham power lines, threatening the availability of this offsite AC power supply. If there is potential for dam failure, the dam tender should be performing inspections per the CPS Main Dam - EAP Section 2.4 criteria. In addition, the following actions may be required:

- Ensure the Brokow line is available.
- Restore all DGs to available status.
- Shift safety-related busses to the 138-KV source.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 HU1
2. USAR 2.5.2
3. USAR 3.7
4. CPS 4301.01, Earthquake
5. USAR 3.3.1.1
6. USAR Appendix F
7. USAR Figure 2.1-7 Sheet 2
8. CPS 4303.02, Abnormal Lake Level
9. USAR D3.6.4
10. CPS 4304.01, Flooding
11. Sargent & Lundy Report SL-4576 “Internal Flooding - Safe Shutdown Analysis and INPO SOER No. 85-5 Comparison Evaluation Report,” Clinton Power Station, January 31, 1990

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5

Initiating Condition:

Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.

Table H2 – Vital Areas
• Containment • Auxiliary Building • Fuel Building • Control Building (excluding Chem Lab) • Diesel Generator & HVAC Building • Screenhouse

Basis:

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5 (cont)

Basis (cont)

Gases in a VITAL AREA can affect the ability to safely operate or safely shutdown the reactor.

The fact that SCBA may be worn does not eliminate the need to declare the event.

A precautionary area evacuation for the purpose of atmospheric testing does not warrant declaration until test results are obtained unless access is required for operation of operable equipment to maintain safe operations or safely shutdown the reactor. Declaration should not be delayed for confirmation from atmospheric testing if the atmosphere poses an immediate threat to life and health or an immediate threat of severe exposure to gases. This could be based upon documented analysis, indication of personal ill effects from exposure, or operating experience with the hazards such as an inadvertent actuation of installed Cardox fire suppression system.

Station evaluations have shown that installed Halon systems by design do not create an IDLH atmosphere when discharged. Therefore, when an installed Halon Fire Suppression system discharge occurs, an IDLH atmosphere should not be assumed, and declaration of a toxic or asphyxiant IDLH atmosphere must be based on representative sampling of the affected area, unless there are indications of personal ill effects resulting from exposure.

Areas directly associated with a fire that may be considered to have a hazardous environment (due to smoke, design fire suppression system actuation or administrative controls awaiting ventilation and/or testing) do not warrant declaration of an Alert under this EAL but should be evaluated against the fire EALs.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of 19.5%, which can lead to breathing difficulties, unconsciousness or even death.

An uncontrolled release of flammable gasses 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. Flammable gasses, such as hydrogen and acetylene, are routinely used to maintain plant systems (hydrogen) or to repair equipment/components (acetylene - used in welding). This EAL assumes concentrations of flammable gasses which can ignite/support combustion.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions, Fission Product Barrier or Abnormal Rad Levels / Radioactive Effluent EALs.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HA3
2. USAR Appendix F
3. ACIT 660892-14, Station Halon Discharge IDLH Evaluation

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU5

Initiating Condition:

Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS.

   OR

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

Basis:

NORMAL PLANT OPERATIONS: Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

This EAL is based on the release of toxic, corrosive, asphyxiant or flammable gases of sufficient quantity to affect NORMAL PLANT OPERATIONS.

The fact that SCBA may be worn does not eliminate the need to declare the event.

This EAL is not intended to require significant assessment or quantification. It assumes an uncontrolled process that has the potential to affect plant operations. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation.

The release may have originated within the Protected Area boundary, or it may have originated offsite and subsequently drifted inside the Protected Area boundary. Offsite events (e.g., tanker truck accident releasing toxic gases, etc.) resulting in the plant being within the evacuation area should also be considered in this EAL because of the adverse affect on NORMAL PLANT OPERATIONS.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU5 (cont)

Basis: (cont)

Areas directly associated with a fire that may be considered to have a hazardous environment (due to smoke, design fire suppression system actuation or administrative controls awaiting ventilation and/or testing) do not warrant declaration of an Unusual Event under this EAL but should be evaluated against the fire EALs.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of 19.5%, which can lead to breathing difficulties, unconsciousness or even death.

Escalation of this emergency classification level, if appropriate, would be based on HA5.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HU3
2. USAR Appendix F

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG6

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the General Emergency class.

Basis Reference(s):

1. NEI 99-01, Rev 5 HG2

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS6

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a Site Area Emergency.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels that exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency class description for Site Area Emergency.

Basis Reference(s):

1. NEI 99-01, Rev 5 HS3

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA6

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the Alert emergency class.

Basis Reference(s):

1. NEI 99-01, Rev 5 HA6

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU6

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Unusual Event.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Basis:

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

Basis Reference(s):

1. NEI 99-01, Rev 5 HU5

Section 4: Emergency Measures

4.1 Notification of the Emergency Organization

Standard NARS notifications for the Clinton Station are made to the State of Illinois Emergency Management Agency (IEMA). If a General Emergency is the initiating event, the Emergency Director is also responsible for notifying the following local agencies:

- DeWitt County Sheriff /ESDA

4.2 Assessment Actions

Throughout each emergency situation, continuing assessment will occur. Assessment actions at Clinton Station may include an evaluation of plant conditions; inplant, onsite, and initial offsite radiological measurements; and initial estimates of offsite doses.

Core damage information is used to refine dose assessments and confirm or extend initial protective action recommendations. Clinton Station utilizes NEDC-33045P-A, Revision 0, (2001) as the basis for the methodology for post-accident core damage assessment. This methodology utilizes real-time plant indications. In addition Clinton Station may use samples of plant fluids and atmospheres as inputs to the CDAM (Core Damage Assessment Methodology) program for core damage estimation.

4.3 Protective Actions for the Offsite Public

Protective actions concerning the public within the 10 mile EPZ involve prompt notification, evacuation and sheltering. Prompt notification involves primarily the use of the permanently installed outdoor notification sirens located within the EPZ.

To aid Main Control Room personnel during a rapidly developing emergency situation, Figure 4-1, "Protective Action Recommendation (PAR) Determination Flowchart for Clinton Station" has been developed based on Section J.10 of the Exelon Nuclear Radiological Emergency Plan.

4.3.1 Alert and Notification System (ANS) Sirens

The alert and notification system consists of a permanently installed outdoor notification system within the zero (0) to ten (10) mile radius around the station. The zero (0) to ten (10) mile radius around the station is primarily an agricultural area with a population density below 2000 persons per square mile. The alert and notification system as installed consists of mechanical and electronic sirens that will cover this entire area with a minimum sound level of 60 db. Additionally, the prompt notification system will cover the heavily populated areas within the zero (0) to ten (10) mile radius around the station with a minimum sound level of 70 db to ensure complete coverage.

Once the public has tuned to designated radio stations in an emergency, detailed instructional messages will be given to the public. State and local procedures provide for these messages.

4.3.2 Evacuation Time Estimates

The ETE study used population data from the 2010 census which includes parts of four counties in Illinois (DeWitt, Macon, McLean, and Piatt). The evacuation times are based on a detailed consideration of the EPZ roadway network and population distribution. The ETE Study, contained in EP-AA-1003 Addendum 2, Evacuation Time Estimates for the Clinton Power Station Plume Exposure Pathway Emergency Planning Zone, presents evacuation times for daytime and nighttime scenarios under various weather conditions for the evacuation of various areas around the Clinton Station, once a decision has been made to evacuate.

4.4 Protective Actions for Onsite Personnel

Clinton Station has a plant alarm system to warn personnel of emergency conditions. Upon hearing a continuous two (2) minute alarm, or receiving notification by other means of communication, all personnel not having emergency assignments have been instructed to assemble in a predesignated assembly area. The onsite assembly areas (Figure 4-2) are located in the:

- Service Building 1st floor, and
- 762' elevation of the Radwaste Building.

Accountability of site personnel is accomplished by the Station Security force.

If a site evacuation of non-essential personnel is required, personnel will be released to their homes or relocated and monitored at one of the following designated relocation centers for CPS are:

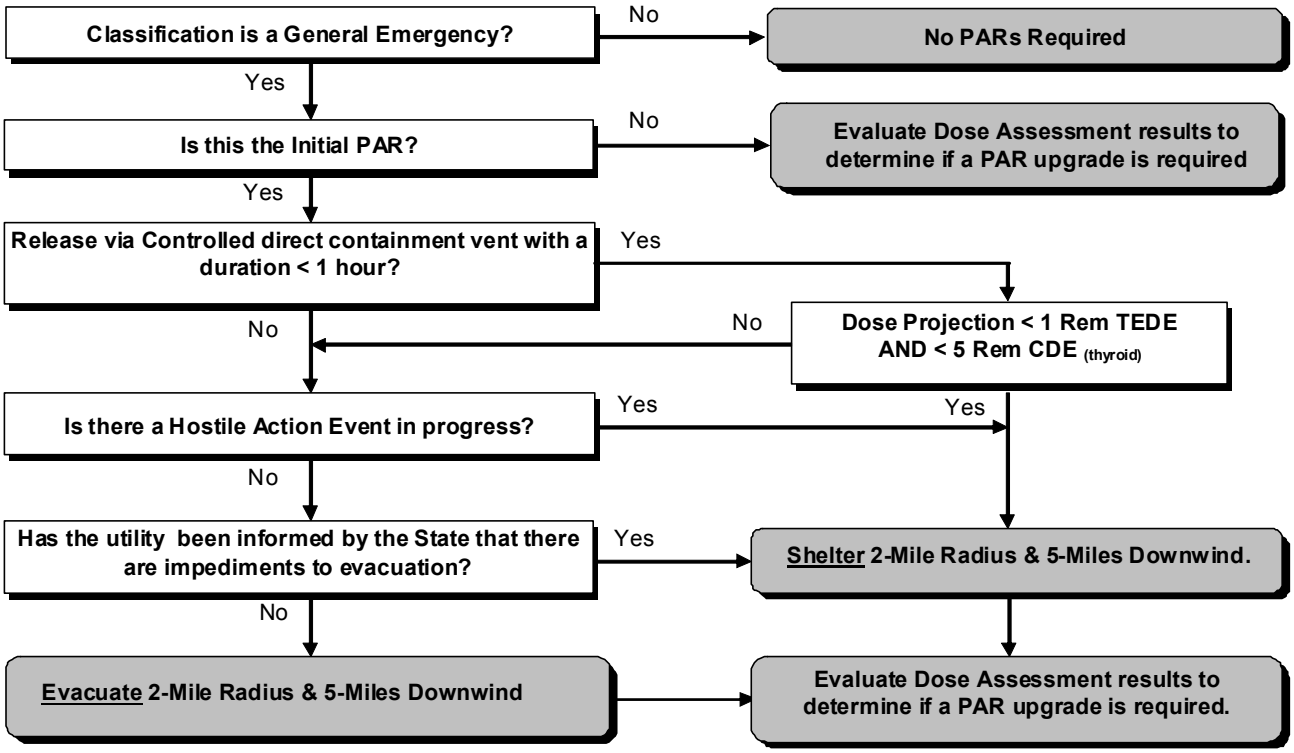
- ISU Horton Field House, Normal, Illinois
- Monticello High School, Monticello, Illinois
- Richland Community College, Decatur, Illinois

For evacuation routes, refer to EP-AA-113-F-22.

Traffic control for onsite areas will be the responsibility of the Station Security force. When a site evacuation is imminent, the Station Security force will post guards as necessary to assist in the evacuation.

Equipment and personnel would be available at all three locations for monitoring and decontamination of evacuated personnel. If major decontamination, follow-up or bioassay samples are necessary, those persons would be sent to either the Dresden or Braidwood Stations.

Figure 4-1: Clinton Station PAR Determination Flowchart



2 Mile Radius, 5 Miles Downwind			
WD (from)			Subareas
000º	to	360º	1

Section 5: Emergency Facilities and Equipment

5.1 Emergency Response Facilities

5.1.1 Station Main Control Room

The Main Control Room is the initial onsite center of emergency control and is located on the 800 foot elevation of the Control Building.

5.1.2 Technical Support Center (TSC)

Clinton Station has a designated TSC on the first floor of the Nuclear Training Building on the east side of the site. Standard air sampling equipment is used to monitor air-borne radioactivity levels in the TSC. The TSC fully meets the requirements of Section H.1.b of the E-Plan.

5.1.3 Operational Support Center (OSC)

A designated Operational Support Center (OSC) is located in the Outage Control Center (OCC) in the Admin Building. The OSC conforms to the requirements of Section H.1.c of the Exelon Nuclear Radiological Emergency Plan and is the location 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 that the OSC has to be abandoned, OSC personnel and functions shall be relocated to the RP Office area on the 737' elevation of the Radwaste Building.

5.1.4 Alternative Facility

The Alternative Facility maintains the capability for staging the TSC/OSC emergency response organization personnel in the event of a hostile action. This alternative facility has the capability for communications with the emergency operations facility, control room, and plant security. The Alternative Facility is located at Maroa Fire Hall, 308 East Washington Street, Maroa Illinois.

5.2 Assessment Resources

5.2.1 Onsite Meteorological Monitoring Instrumentation

Clinton Station shall maintain meteorological instrumentation to ensure that sufficient meteorological data is available. This system shall provide measurements and calculations for the following parameters:

- Wind direction and speed at the 10-meter and 60-meter levels
- Standard deviation of wind direction fluctuations at all measured levels
- Vertical temperature difference for at least one layer (50 meters)
- Ambient temperature (10 meters and 60 meters)
- Dew point temperature (10 meters)
- Pasquill stability class used for diffusion estimates

A tower 199 feet high with two levels of instrumentation has been erected with the base at 735 feet above mean sea level. There are no trees, tall obstructions or significant topographical features in the immediate vicinity of the tower.

The tower is instrumented at the 33 foot (10 meter) and 198 foot (60 meter) levels. Heating and ventilation are thermostatically controlled in the equipment building located at the base of the tower to provide a controlled environment for the signal translating equipment.

Meteorological parameters measured are transmitted to the 781-foot level of the control building via a dedicated telephone line. There the signals are received and converted to electrical signals, and fed individually to a microprocessor and chart recorders. The microprocessor is part of the CPS Process Radiation Monitoring System. This system calculates 10-minute averages of the meteorological parameters, and stores hourly averages on floppy disk. The meteorological system shall be equipped with instrumentation and operated by procedures to maximize the availability of meteorological data.

An emergency generator with auto-transfer switch has been installed to supply electric service upon loss of the distribution circuit. Surge suppressors have been installed on the power circuits at the tower and the equipment building. Recorders shall be located in the Main Control Room. Digital information shall be available through CRT output in the Main Control Room, TSC, and EOF. A magnetic tape or other electronic medium shall be in use to archive the data. The capability shall exist for retrieving meteorological data for input to the dose assessment model should any component of the data acquisition system fail.

A backup meteorological tower is located at the CPS site and is instrumented at the 33 foot (10 meter) level. The meteorological parameters measured are wind speed and wind direction. Sigma Theta is calculated from the changes in wind direction. All three of these variables are available in the Main Control Room envelope on a computer display.

Administrative arrangements have been made with the National Weather Service (NWS) office in Lincoln, Illinois, to provide CPS with meteorological measurements and forecast information on a 24-hour basis, if requested. This letter of agreement is maintained on file. These measurements are representative of CPS meteorology due to the homogeneity of the local terrain. Thus, the NWS data will serve as a back-up to the meteorological data measurements.

5.2.2 Onsite Radiation Monitoring Equipment

Clinton Station shall maintain various radiological monitoring systems that will monitor processes, areas and effluents. The constant air monitors (CAM) shall provide ambient air monitoring for detecting airborne particulate radiation, iodine, and noble gases in Station areas or cubicles. Area radiation monitoring (ARM) instruments provide a local visual and audible alarm if their high radiation set points are exceeded. The process

radiation monitors (PRM) provide monitoring of Station HVAC exhaust, standby gas treatment, pre- and post-treatment air ejector off-gas, Station service water, shutdown service water, and liquid radwaste discharge effluents. These radiological monitoring systems ensure that sufficient radiological data are available for estimating the danger to personnel and the public as a result of an incident or abnormal occurrence. Further, an alarm and/or automatic action is initiated when the setpoint of the equipment is exceeded. Portable survey instruments are identified in Table 12.5.2 of the USAR and are available for in-plant and offsite monitoring.

A computer network located in the Main Control Room provides an operator interface with select field units of the RMS. The Central Server of the computer network polls select field units and provides the radiation/radioactivity levels, alarm status, and monitor status to other computers within this network.

Hardwired input from the Accident Range system stack monitors provide radiological control alarm status information to the SPDS display for purposes of concise monitoring of this critical safety function.

5.2.2.1 Area Radiation Monitoring System (AR System)

These are three types of area radiation monitors (ARM) in the AR system:

1) Analog ARM
2) Fixed digital ARM
3) Portable digital ARM

5.2.2.2 Analog Area Radiation Monitors

There are analog ARMs on each of the fuel handling platforms and on the containment polar crane. Each monitor has a single GM detector. These monitors are independent from the rest of the RMS and are provided for the operators' safety. There are also associated interlocks on the lifting mechanisms on the fuel handling platforms.

5.2.2.3 Fixed Digital Area Radiation Monitor

There are numerous fixed ARMs throughout the Station utilizing GM detectors. ARMs have a range of 10^{-1} to 2.2 x 10^{+3} mR/hr. The microprocessor associated with each ARM is designed to accept input from a second, high range detector with a range from to 10 to 10^{+4} R/hr. These additional, high range detectors can be added, as necessary. Select micro-processors communicate directly with the Main Control Room RMS Unit. Local indication and annunciation are also provided on each individual microprocessor. All ARMs have integral battery power backup which can provide eight hours of operation.

5.2.2.4 Portable Digital Area Radiation Monitor

The portable digital ARMs are identical to the fixed digital ARMs. An ARM can be used as a stand alone monitor as long as a 120 VAC power supply is available. The portable ARMs can be tied into the communication network and communicate directly with the CR RMS Computer Network.

5.2.2.5 Process Radiation Monitoring System (PR System)

Certain Station processes are monitored to detect radiation/radioactivity in excess of acceptable limits. The PR system consists of 4 types of monitors:

a) off-line liquid sampling monitors

b) off-line gas sampling monitors

c) constant air monitors (CAM)

d) ventilation duct monitors

5.2.2.6 Off-line Liquid Sampling Monitors

The off-line liquid sampling monitors monitor process lines which are either direct release paths to the environment or are used to detect inter-system leakage. The detector is a sodium iodide gamma scintillator. The monitors draw a sample of the process liquid, measure the radioactivity, and normally return the sample to the process stream. The monitors provide local and remote indication of radioactivity levels in the process streams and provide alarms when predetermined levels are exceeded.

5.2.2.7 Off-line Gas Sampling Monitor

The off-line gas sampling monitor functions in the same manner as a liquid monitor except the sampled media is a gas from the process stream. The monitor utilizes a GM detector. The pretreatment air ejector off-gas monitor is an example of a monitor in the PR system that falls into this category. This monitor monitors the air ejector off-gas system downstream of the air ejectors and prior to the charcoal adsorbers.

5.2.2.8 Constant Air Monitors (CAM)

There are two types of CAMs,

a) Fixed digital CAM

b) Portable digital CAM

CAMs are provided to monitor the ambient air surrounding the monitor or to monitor gases in a ventilation duct or process stream. Each CAM contains a fixed particulate filter, iodine collection charcoal cartridge and the associated equipment to draw and maintain a constant sample flow. Each CAM, with the exception of the standby gas treatment system (SGTS) PRM and the common station heating, ventilation, air conditioning (HVAC) exhaust PRM, and Post Treat Off Gas PRM contain the following detectors:

a) Three detectors for measuring airborne radioactivity:
   1) Particulate: beta-scintillation detector
   2) Iodine: sodium iodide gamma-scintillation detector, gain stabilized
   3) Noble gas: beta-scintillation detector

b) Two detectors measuring background radiation for subsequent subtraction for the appropriate channels:
   1) Gamma (external): GM tube detector
   2) Alpha (naturally occurring Rn and Th): alpha - scintillation detector

The SGTS, HVAC, and Post Treat Off Gas PRM contains an additional noble gas channel.

The ventilation air discharge from various buildings is continuously monitored for radioactivity in the air. The two gaseous discharge paths are the common station HVAC and SGTS stack. The monitoring of these effluents provides a record of the gross radioactivity discharged through these paths into the environs. Post treat monitors provide a record of gross radioactivity downstream of the charcoal bed.

The portable digital CAMs are identical to the fixed digital CAMs with the exception of a strip chart recorder and communication capability.

5.2.2.9 Ventilation Duct Monitors

With the exception of Main Control Room Air Intake PRM, the ventilation duct monitors monitor gross gamma radioactivity in the ventilation system. Each ventilation duct monitor consists of four directionally shielded GM tubes oriented such that they monitor the radiation level inside the ducts. Each GM tube has its own microprocessor. An alarm by one channel in each division initiates an isolation signal if radiation levels exceed a predetermined value.

The Main Control Room Air Intake PRM has two unshielded GM detectors on each of the air intakes. With the above exception, the Main Control Room Air Intake PRMs are identical to the remainder of the ventilation duct monitors. The Main Control Room habitability is discussed in the USAR.

5.2.2.10 Main Steam Line Radiation Monitors (MSLRM)

The main steam lines located in the steam tunnel (downstream of outer isolation valves) between the nuclear reactor and the main turbine are monitored continuously for gamma radiation for the purpose of detecting increased radiation levels caused by gross fuel failures This system is separate from the PR system.

5.2.2.11 Primary Containment Atmosphere Monitoring (High-Range Gross Gamma Radiation Monitoring and Hydrogen Monitoring)

The gross gamma monitoring subsystem, consisting of two high range (1 R/hr to 10^8 R/hr) radiation detectors, in both the containment and drywell, for monitoring gamma radiation resulting from the gross release of fission products from the reactor fuel. Each subsystem has two redundant channels of instrumentation that are physically separated and electrically independent. Each channel provides a local measurement and transmits the signals to the Main Control Room where a permanent record is made on seismically qualified recorders.

The purpose of the containment atmosphere monitoring system is to assess the degree of core damage during a beyond design-basis accident and confirm that random or deliberate ignition has taken place. The hydrogen monitoring system provides the signals necessary to indicate and alarm high hydrogen concentration in the containment and drywell resulting from radiolytic and chemical phenomena associated with an accident condition. If an explosive mixture that could threaten containment integrity exists during a beyond design-basis accident, then other severe accident management strategies, such as purging and/or venting, would need to be considered. The hydrogen monitors are provided to implement these severe accident management strategies.

5.2.2.12 Station Survey and Counting Equipment

The Station Counting Room contains Germanium gamma spectrometer systems and gas-flow proportional counters for alpha and beta analysis. An alternate power supply for the Counting Room is provided from an essential power bus. Additionally, during emergency situations, samples may be taken to an alternate facility.

5.2.3 Onsite Process Monitors

There are many methods available to Control Room personnel to monitor critical reactor and Station parameters. These parameters, regardless where they are monitored, can be used by Control Room personnel to assess abnormal Station conditions and, based on these indications and their trained judgment, declare and classify emergencies as conditions dictate. A description of the process monitors used to initiate emergency conditions is found below:

a) Vessel Pressure - Reactor vessel pressure is monitored and indicated in four ranges:

1. For monitoring vessel pressure during normal operating conditions

   Range: 0-1200 psig

2. Narrow range monitoring of reactor pressure during power operations

   Range: 850-1050 psig

3. Wide range monitoring of reactor pressure during pressure transients

   Range: 0-1500 psig

4. Narrow range monitoring of reactor pressure during accident/transient conditions.

   Range: 0-300 psig

b) Vessel Temperature - The reactor vessel temperature is measured in four areas:

1. Vessel Bottom Head
2. Vessel Head Flange
3. Bottom Head Drain
4. Shell Flange

c) Reactor Water Level - There are five ranges available to measure reactor water level. The five types of reactor water level instrumentation are described below:

1. Narrow Range
   (a) Range: 0" to +60"
   (b) Used for feedwater control level inputs and is most precise indication of normal water level.
   (c) Calibrated to read correctly at normal operating temperature and pressure.
2. Wide Range
   (a) Range: -160" to +60"
   (b) Provides ECCS and Reactor Protection System actuation and/or trip signals.
   (c) Calibrated at normal operating temperature and pressure.
3. Shutdown Range
   (a) Range: 0" to +400"
   (b) Used for following level during flood up.
   (c) Calibrated to read correctly when cold (120F) and 0 psig.
4. Upset Range
   (a) Range: 0" to +180"
   (b) Used following abnormal level increases during transient conditions.
   (c) Calibrated to read correctly at normal operating temperature and pressure.

5. Fuel Zone

   (a) Range: Information Scale, -150" to +50" (Referenced to the top of active fuel); Second Scale Common Referenced to Wide Range, -310" to –110".

   (b) Used by operators during accident/transients to take emergency operating procedure actions.

d) Flow Rates - Flow rates are monitored at many points in the reactor. The following is a list of critical flow rates available to the operator:

Recirculation Loop Flow	Total Steam Line Flow
Total Core Flow	ECCS Injection Flows
Steam Line Flow	Feedwater Flow

e) Containment/Drywell Temperature and Pressure - Temperature and pressure data for the containment and drywell are available to the Main Control Room operators.

5.2.4 Onsite Fire Detection Instrumentation

The fire protection system is designed to provide an adequate supply of water or other chemicals to points throughout the plant where fire protection may be required. Diversified fire-alarm and fire-suppression type systems are selected to suit the particular areas being protected or the hazards which could be encountered. The fire protection water is drawn from the ultimate heat sink that is sized to include 900,000 gallons of water for fire protection. The fire protection system consists of two 100% capacity diesel-driven fire pumps (primary fire protection system water supply), one connection to the plant service water, a dedicated pressure maintenance jockey pump, and the associated piping, valves, and hydrants.

Chemical fire-fighting systems, such as CO2 and Halon 1301, are also provided in areas, where water systems are not practical to suppress fires. Appropriate instrumentation and controls are provided for the proper operation of the fire detection, annunciation, and fire-fighting systems.

The fire-protection system is discussed in detail in USAR Subsection 9.5.1 and in the Clinton Station Fire Protection Evaluation Report, located in the USAR, Appendix E.

5.2.5 Facilities and Equipment for Offsite Monitoring

Consult the station specific Offsite Dose Calculation Manual (ODCM) for the most current location for fixed continuous air samplers and Dosimeter of Legal Record (DLR) locations. These fixed air samplers and DLR locations are maintained by Clinton Power Station personnel.

5.2.6 Site Hydrological Characteristics

The hydrological characteristics of the Clinton Station vicinity are described in Section 2.4 of the USAR. The site is located 6 miles east of the city of Clinton, DeWitt County in central Illinois. The site and its environs consist primarily of the generating station, Clinton Lake, woodlands, pasture land, cultivated farmland, and the recreational areas. The condenser cooling water is provided from the U-shaped cooling lake (Clinton Lake) that has been formed by construction of a dam just downstream from the confluence of North Fork of Salt Creek with Salt Creek. Clinton Lake has a surface area at normal lake level (690 feet mean sea level) of approximately 4895 acres with an average depth of about 15.6 feet. Clinton Lake is totally within the site property boundary. The station facilities and the 3.4-mile discharge flume occupy about 150 acres and 130 acres, respectively. The station is located between the two fingers of the lake with a station grade elevation of 736 feet and plant floor elevation of 737 feet. The station circulating water screen house is located on the North Fork finger of the lake with the circulating water discharging back into the Salt Creek finger through a discharge flume.

5.2.6.1 Flood Design Considerations

The cooling lake is designed to withstand the effects of a probable maximum storm occurring over the entire drainage basin above the dam site.

Results of the hydrologic analyses discussed in USAR Subsections 2.4.3 and 2.4.8 show that a probable maximum flood runoff into the lake routed through the spillways will raise the lake water level to elevation 708.8 feet at the dam site. The backwater effect along the North Fork finger will raise the probable maximum flood water level at the station site to elevation 708.9 feet. Superimposing the wind wave effect due to a sustained 40 mph wind acting on the probable maximum water level will result in wave run-up elevations of 711.9 feet and 713.8 feet for significant waves and maximum (1%) waves, respectively, at the station site. The station's Seismic Category I structures with grade elevation of 736 feet will not be affected by the probable maximum flood design conditions. The circulating water screen house is designed to withstand the effects of probable maximum flood.

The maximum run-up elevation at the dam for significant waves due to a sustained 40 mph wind acting on the probable maximum water level is elevation 711.0 feet. The top of the dam is at elevation 711.8 feet. In the Salt Creek basin, there are no existing or proposed dams upstream from the Clinton Station; therefore flood waves induced from dam failures that affect the safety-related structures are considered impossible.

Massive landslide from the valley walls into the cooling lake caused by a seismic disturbance is not possible because of lack of susceptible topographic and geological features. Thick glacial till available in the site precludes the possibility of massive landslides that can produce flood waves greater in magnitude than the probable maximum flood conditions and coincident wind wave effects.

Flooding due to tsunami is not possible at the site.

Based on considerations and studies made, the probable maximum flood condition in the lake is considered the controlling event. All the safety-related structures are protected against this event.

5.3 Protective Facilities and Equipment

The on-site assembly area is the Service Building 1st floor and the 762' elevation of the Radwaste Building as described in Section 4 of this Annex.

5.4 First Aid and Medical Facilities

Clinton Power Station has an inplant decontamination room located on the 737' of the Radwaste building. This room is provided with a sink and shower for decontamination purposes.

First aid kits, stretchers, sinks, eyewashes, and emergency showers have been placed in strategic locations throughout the station.

Medical treatment given to injured persons at the station is of a "first aid" nature. When more professional care is needed, injured persons are transported to a local hospital or clinic. John Warner Hospital in Clinton, Illinois is the primary supporting medical facility for injured persons who are contaminated with radioactivity. Decatur Memorial Hospital in Decatur, Illinois is the supporting Trauma Center for injured persons who are contaminated with radioactivity.

Decatur Memorial Hospital in Decatur (a Level 1 trauma center) is the backup medical facility for ill/injured persons suffering from severe spinal injuries or who have received an acute overexposure, where blood chemistry must be monitored and/or the possibilities of radiation sickness exist.

Appendix 1: NUREG-0654 Cross-Reference

Annex Section	NUREG-0654	Annex Section	NUREG-0654
1.0	Part I, Section A	Figure 4-1	Part II, Section J.10.m
1.1	Part I, Section C	Figure 4-2	Part II, Section J.8
1.2	Part I, Section D	Figure 4-3	Part II, Section J.5
1.3	Part II, Section A.1	4.4	Part II, Section J.2 & 3
Figure 1-1	Part I, Section D	Table 4-1	Part II, Section J.10.b
2.0	Part II, Section A.4	5.1	Part II, Section H.1 & G.3
2.1	Part II, Section A.3	5.2.1	Part II, Section H.5.a & 8
		5.2.2	Part II, Section H.5.b & I.2
3.0	Part II, Section D	5.2.3	Part II, Section H.5.c
		5.2.4	Part II, Section H.5.d
4.1	Part II, Section E.1 & J.7	5.2.5	Part II, Section H.6.b & 7
4.2	Part II, Section I.2 & 3	5.2.6	Part II, Section H.5.a & 6.a
4.3	Part II, Section J.10.m	5.3	Part II, Section J.1-5
4.3.1	Part II, Section E.6	5.4	Part II, Section L.1 & 2
4.3.2	Part II, Section J.8		
4.4	Part II, Section J.1-5		

Appendix 2: Station Letters of Agreement

1. DeWitt County Sheriff's Office - law enforcement
2. John Warner Hospital of Clinton - medical services
3. Decatur Memorial Hospital - medical services
4. Clinton Fire Department - fire protection
5. DeWitt County EMS - ambulance services
6. Sargent & Lundy – technical services
7. Horton Field House – relocation center
8. Monticello High School – relocation center
9. Richland Community College – relocation center
10. National Weather Service – weather forecasts
11. Maroa Countryside Fire Protection District – property lease

ATTACHMENT 6

EP-AA-1004, Revision 33

Exelon Nuclear Radiological Emergency Plan Annex for Dresden Station

EXELON NUCLEAR

RADIOLOGICAL EMERGENCY PLAN ANNEX FOR DRESDEN STATION

Table of Contents

Section **Page**

APPENDIXES

ADDENDUMS

REVISION HISTORY

Revision 0; July 1980	Revision 15; September 12, 2002	
Revision 1; April 1981	Revision 16; July 31, 2003	
Revision 2; June 1982	Revision 17; August 27, 2003	
Revision 3; September 1984	Revision 18, December 2004	
Revision 4; March 1986	Revision 19, May 2005	
Revision 5; February 1987	Revision 20, December 2005	
Revision 6; January 1991	Revision 21, November 2006	
Revision 6a; July 1992	Revision 22, February 2007	
Revision 6b; August 1992	Revision 23, October 2007	
Revision 6c; November 1992	Revision 24, March 2008	
Revision 6d; April 1993	Revision 25, October 2008	
Revision 6e; December 1993	Revision 26, March 2010	
Revision 6f; January 1994	Revision 27, October 2010	
Revision 6g; January 1995	Revision 28, March 2011	
Revision 6i; February 1996	Revision 29, June 2012	
Revision 6j; June 1996	Revision 30, September 2012	
Revision 6k; January 1997	Revision 31, November 2012	
Revision 6l; February 1997	Revision 32, December 2012	
Revision 6m; May 1997	Revision 33, June 2013	
Revision 6n; January 5, 1998		
Revision 6p; August 14, 1998		
Revision 7; May 13, 1999		
Revision 8; February 11, 2000		
Revision 9; May 22, 2000		
Revision 10; January 8, 2001		
Revision 11; May 3, 2001		
Revision 12; October 8, 2001		
Revision 13; October 31, 2001		
Revision 14; January 3, 2002		

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 Emergency Plan (Emergency Plan), Station Annexes, Emergency Plan Implementing Procedures, and associated program administrative documents. The 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 Dresden 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 Emergency Plan.

1.1 Facility Description

Dresden Station, Units 1, 2 and 3, is located in the Goose Lake Township of Grundy County in northeastern Illinois. Unit 1 is in permanent shutdown (see Figure 1-1).

The plant consists of three Boiling Water Reactor (BWR) Nuclear Steam Supply Systems (NSSS) and turbine generators provided by General Electric Company. Unit 1 is a dual cycle boiling water reactor designed for a power output of 700 MWt and has officially been retired as of August 31, 1984. Units 2 and 3 are equipped with nuclear steam supply systems (NSSS) designed for a power output of 2957 MWt.

The station property consists of a 953 acre tract of land with boundaries generally following the Illinois River to the north, the Kankakee River on the south and east and the Elgin, Joliet and Eastern Railway right-of-way on the west. Exelon is the sole owner of the 953 acre tract subject only to an easement of the U.S. Government for an access road to Dresden Island Lock and Dam maintained and operated by the U.S. Corps. of Engineers. This road traverses the site from north to south ~ 0.8 mile west of the plant.

In addition to ownership of the 953 acre tract, Exelon Nuclear also leases approximately 17 acres in two narrow strips of river frontage located near the northeast corner of the site from the State of Illinois. The terms of the lease provide that these "buffer" strips shall remain idle.

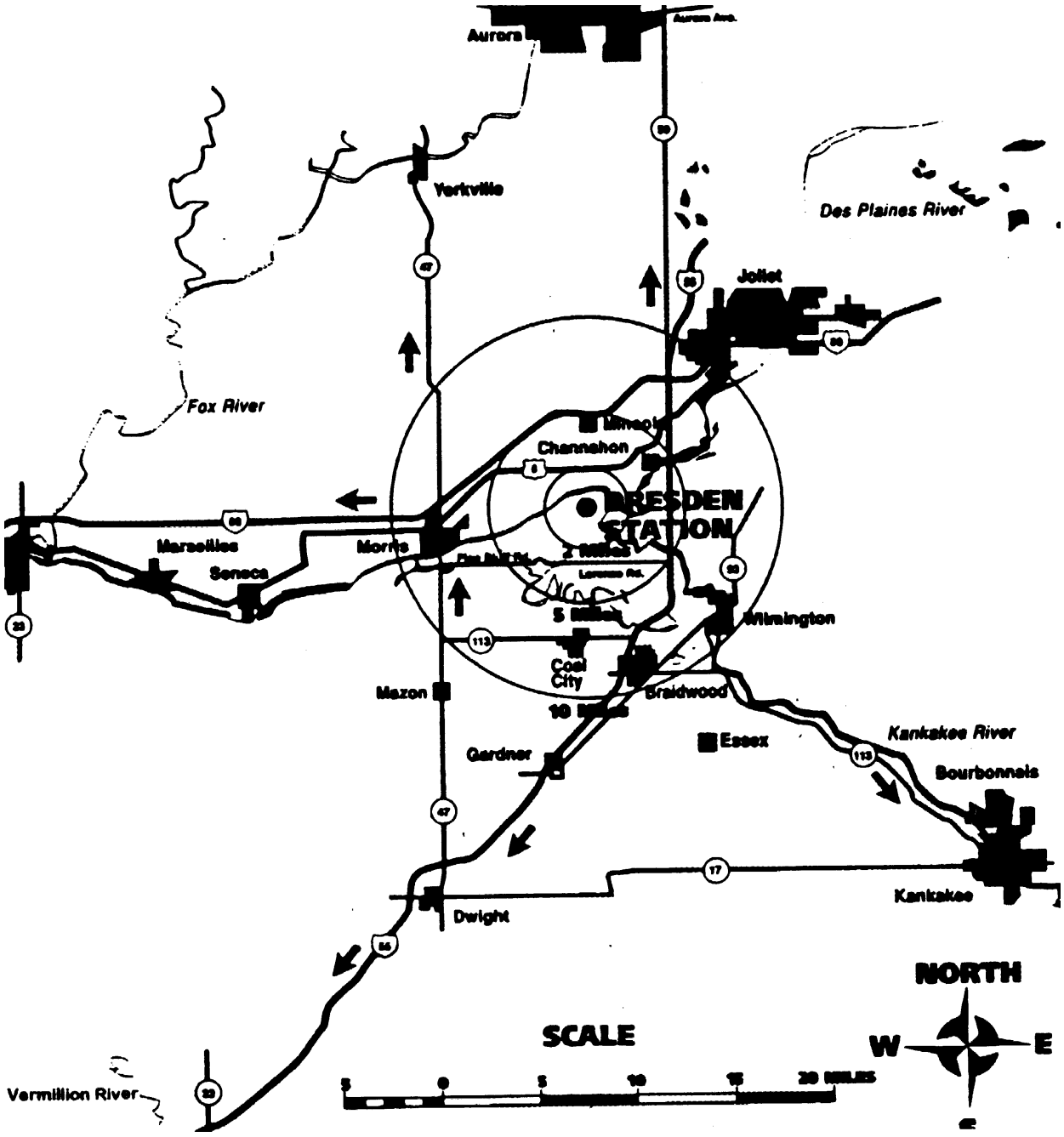
For more specific site location information, refer to the Station UFSAR.

1.2 Emergency Planning Zone

The plume exposure Emergency Planning Zone (EPZ) for Dresden Station is an area surrounding the Station with a radius of about ten miles. (Exact boundaries are determined by the State of Illinois). Refer to Figure 1-1.

The ingestion pathway EPZ for Dresden Station is an area surrounding the station with a radius of about 50 miles.

Figure 1-1: Dresden Station Location and 10 Mile EPZ



Section 2: Organizational Control of Emergencies

This section describes the Emergency Response Organization (ERO) and its key positions. It outlines the staffing requirements which provide initial emergency response actions and provisions for timely augmentation of on-shift personnel when required. It also describes interfaces among Exelon Nuclear emergency response personnel and specifies the offsite support available to respond to the nuclear generating stations.

2.1 Shift Organization Staffing

Initial response to any emergency is by the normal plant organization present at the site. This organization includes positions that are onsite 24 hours per day and is described in Section B.1 of the Exelon Nuclear Standardized Radiological Emergency Plan. The Normal Shift Organization will be augmented, in an emergency, with designated/additional Emergency Response Organization (ERO) personnel within 60 minutes of notification as specified under Table 2-1. ERO activation is described in Section H.4 of the Exelon Nuclear Standardized Radiological Emergency Plan.

Table 2-1 outlines ERO positions required to meet minimum staffing and full augmentation of the on-shift complement at an Alert or higher classification, and the major tasks assigned to each position. Responsibilities for each position are described in Section B.5 of the Exelon Nuclear Standardized Radiological Emergency Plan.

2.2 Emergency Response Organization Block Diagram

Figures B-1a through B-1d of the Exelon Nuclear Standardized Radiological Emergency Plan illustrates the overall emergency response organization.

2.3 Non-Exelon Nuclear Support Groups

Exelon Nuclear has contractual agreements with several companies whose services would be available in the event of a radiological emergency. These agencies and their available services are listed in Appendix 3 of the Emergency Plan.

Emergency response coordination with governmental agencies and other support organizations is discussed in Section A of the Emergency Plan.

Agreements exist on file at Dresden Station with several support agencies. These agencies and their support roles are listed in Appendix 2, Station Letters of Agreement.

Table 2-1: Minimum Staffing Requirements

Functional Area	Major Tasks	Emergency Positions	Minimum Shift Size	Minimum Staffing *60 Minute Augmentation	Minimum Staffing Other On-Call	Minimum Staffing Full Augmentation
1. Plant Operations/Safe Shutdown and Assessment of Operational Aspects	Control Room Staff	Shift Manager	1			
		Shift Supervisor	2			
		Nuclear Station Operator	4			
		Non-Licensed Operator	3			
2. Emergency Direction and Control	Command and Control	Shift Emergency Director (CR)	1[(a)]			
		Station Emergency Director (TSC)		1		
		Corporate Emergency Director (EOF)		1		
3. Notification & Communication	Emergency Communications	Plant Shift Personnel	1			
		TSC Director (TSC)		1		
		EOF Director (EOF)		1		
		State/Local Communicator		1 (EOF)		1 (TSC)
		ENS Communicator		1 (TSC)		1 (EOF)
		HPN Communicator		1 (EOF)		1 (TSC)
	Plant Status	OPs Communicator (CR/TSC)				2
		Operations Advisor (EOF)				1
	In-Plant Team Control	Damage Control Comm. (CR/TSC/OSC)				3
	Technical Activities	Technical Communicator (TSC)				1
		Technical Advisor (EOF)				1
	Governmental	State Environs Communicator (EOF)				(b)
		EOC Communicator (EOF)				1
		State EOC Liaison (State EOC)				(b)
		County EOC Liaison (County EOC)				(b)
		Regulatory Liaison (EOF)				1
4. Radiological Assessment	Offsite Dose Assessment	RP Personnel	1			
		Dose Assessment Coordinator (EOF)		1		
		Dose Assessor (EOF)				1
		Radiation Controls Coordinator (TSC)				1
	Offsite Surveys	Environmental Coordinator (EOF)		1		
		Field Team Communicator (EOF)				1
		Offsite Field Team Personnel		4		(b)
	Onsite Surveys	Onsite Field Team Personnel		2		(b)
	In-plant Surveys	RP Personnel	1	2		(b)
	Chemistry	Chemistry Personnel	1	1		(b)
	RP Supervisory	Radiation Protection Manager(TSC/EOF)		2		

Functional Area	Major Tasks	Emergency Positions	Minimum Shift Size	Minimum Staffing *60 Minute Augmentation	Minimum Staffing Other On-Call	Full Augmentation
5. Plant System Engineering, Repair, and Corrective Actions	Technical Support	STA / Incident Assessor (CR)	1			
		Technical Manager (TSC)		1		
		Core Thermal/Hydraulic Engineer (TSC)		1		
		Mechanical Engineer (TSC)		1		
		Electrical Engineer (TSC)		1		
		SAMG Decision-Maker (TSC)		1[(a)]		
		SAMG Evaluator (TSC)		2[(a)]		
		Operations Manager (TSC)		1		
		Radiation Controls Engineer (TSC)				1
		Technical Support Manager (EOF)				1
	Repair and Corrective Actions	Mechanical Maintenance (OSC)	1[(a)]	2		(b)
		Electrical/I&C Maintenance (OSC)	1[(a)]	3		(b)
		Maintenance Manager (TSC)		1		
		OSC Director (OSC)		1		
		Assistant OSC Director (OSC)				1
		OPs Lead & Support Personnel (OSC)				(b)
6. In-Plant Protective Actions	Radiation Protection	RP Personnel	2[(a)]	4		(b)
7. Fire Fighting	--	Fire Brigade[(c)]	5			
8. 1st Aid and Rescue Operations	--	Plant Personnel	2[(a)]			(b)
9. Site Access Control and Personnel Accountability	Security & Accountability	Security Team Personnel	(d)	(d)		
		Security Coordinator (TSC)				1
	EOF Security	Security Coordinator (EOF)				1
10. Resource Allocation and Administration	Logistics	Logistics Manager (EOF)		1		
		Logistics Coordinator (TSC)				1
	Administration	Administrative Coordinator (EOF)				1
		Clerical Staff (TSC/EOF/JIC)				(b)
	Inter Facility Logs	Events Recorder (EOF/JIC)				2
	Facility Support	Computer Specialist (EOF)				1

Functional Area	Major Tasks	Emergency Positions		Minimum Shift Size	Minimum Staffing *60 Minute Augmentation	Minimum Staffing Other On-Call	Full Augmentation
11. Public Information	Media Interface	Corporate Spokesperson	(JIC)			1	
		Rad Protection Spokesperson	(JIC)				1
		Technical Spokesperson	(JIC)				1
	Information Development	Public Information Director				1	
		News Writer					1
	Media Monitoring and Rumor Control	Media Monitoring Staff					(b)
		Rumor Control Staff					(b)
	Facility Operation and Control	JIC Director	(JIC)			1	
		JIC Coordinator	(JIC)				1
		Administrative Coordinator	(JIC)				1
		Access Controls	(JIC)				1
		Facility Support Staff	(JIC)				(b)
		TOTAL:		**20**	**37**	**3**	**32[(b)]**

* Response time is based on optimum travel conditions.

(a) May be provided by personnel assigned other functions.

(b) Personnel numbers depend on the type and extent of the emergency.

(c) Fire Brigade per FSAR/Technical Specifications, as applicable.

(d) Function performed by on-shift security personnel.

Section 3: Classification of Emergencies

3.1 General

Section D of the Exelon Nuclear Standardized Emergency Plan divides the types of emergencies into four Emergency Classification Levels (ECLs). The first four are the UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY, and GENERAL EMERGENCY. These ECLs are entered by meeting the Emergency Action Level (EAL) Threshold Values provided in this section of the Annex. The ECLs are escalated from least severe to most severe according to relative threat to the health and safety of the public and emergency workers. Depending on the severity of an event, prior to returning to a standard day-to-day organization, a state or phase called RECOVERY may be entered to provide dedicated resources and organization in support of restoration and communication activities following the termination of the emergency.

UNUSUAL EVENT: Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

ALERT: Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

SITE AREA EMERGENCY: Events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

GENERAL EMERGENCY: Events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

RECOVERY: Recovery can be considered as a phase of the emergency and is entered by meeting emergency termination criteria provided in EP-AA-111 Emergency Classification and Protective Action Recommendations.

An emergency is classified by assessing plant conditions and comparing abnormal conditions to Initiating Conditions and Threshold Values for each Emergency Action Level.

Individuals responsible for the classification of events will refer to the Initiating Condition and Threshold Values on the matrix of the appropriate station Standardized Emergency Plan Annex (this document). This matrix will contain Initiating Conditions, EAL Threshold Values, Mode Applicability Designators, appropriate EAL numbering system, and additional guidance necessary to classify events. It may be provided as a user aid.

The matrix is set up in six Recognition Categories. The first is designated as "R" and relates to Abnormal Radiological Conditions / Abnormal Radiological Effluent Releases. The second is designated as "F" and relates to Fission Product Barrier Degradation. The third is designated as "M" and relates to hot condition System Malfunctions. The fourth is designated as "C" and relates to Cold Shutdown / Refueling System Malfunctions. The fifth is designated as "H" and relates to Hazards and Other Conditions. The sixth is designated "E-H" and relates to ISFSI Malfunctions.

The 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.

The Initiating Conditions are coded with a two letter and one number code. The first letter is the Recognition Category designator, the second letter is the Classification Level, “U” for (NOTIFICATION OF) UNUSUAL EVENT, “A” for ALERT, “S” for SITE AREA EMERGENCY and “G” for GENERAL EMERGENCY. The EAL number is a sequential number for that Recognition Category series. All Initiating Conditions that are describing the severity of a common condition (series) will have the same number.

The EAL number may then be used to reference a corresponding page(s), which provides the basis information pertaining to the Initiating Condition:

- Threshold Value
- Mode Applicability
- Basis

Emergency Action Levels are the measurable, observable detailed conditions that must be met in order to classify the event. Classification is not to be made without referencing, comparing and satisfying the Threshold Values specified in the Emergency Action Levels.

A list of definitions is provided as part of this document for terms having specific meaning to the Emergency Action Levels. Site specific definitions are provided for terms with the intent to be used for a particular Initiating Condition/Threshold Value and may not be applicable to other uses of that term at other sites, the Emergency Plan or procedures.

References are also included to documents that were used to develop the EAL Threshold Values.

References to the Emergency Director means the person in Command and Control as defined in the Emergency Plan. Classification of emergencies is a non-delegable responsibility of Command and Control for the onsite facilities with responsibility assigned to the Shift Emergency Director (Control Room Shift Manager) or the Station Emergency Director (TSC). Classification of emergencies remains the responsibility of the applicable onsite facility even after Command and Control is transferred to the Corporate Emergency Director (EOF).

3.2 Classification, Instrumentation and Transient Events

Although the majority of the EALs provide very specific thresholds, the Emergency Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL is IMMINENT. If, in the judgment of the Emergency Director, an IMMINENT situation is at hand, the classification should be made as if the threshold has been exceeded. While this is particularly prudent at the higher emergency classification levels (as the early classification may provide for more effective implementation of protective measures), it is nonetheless applicable to all emergency classification levels.

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 indications, or (3) by direct observation by plant personnel, such that doubt related to the indication's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

Indications used for monitoring and evaluation of plant conditions include the normally used instrumentation, backup or redundant instrumentation, and the use of other parameters that provide information that supports determination if an EAL threshold value has been reached. When an EAL refers to a specific instrument or indication that is determined to be inaccurate or unavailable, then alternate indications shall be used to monitor the specified condition.

During an event that results in changing parameters trending towards an EAL classification, and instrumentation that was available to monitor this parameter becomes unavailable or the parameter goes off scale, the parameter should be assumed to have been exceeded consistent with the trend and the classification made if there are no other direct or indirect means available to determine if the threshold has not been exceeded.

Planned evolutions involve preplanning to address the limitations imposed by the condition, the performance of required surveillance testing, and the implementation of specific controls prior to knowingly entering the condition in accordance with the specific requirements of the site's Technical Specifications. Activities which cause the site to operate beyond that allowed by the site's Technical Specifications, planned or unplanned, may result in an EAL threshold being met or exceeded. Planned evolutions to test, manipulate, repair, perform maintenance or modifications to systems and equipment that result in an EAL value being met or exceeded are not subject to classification and activation requirements as long as the evolution proceeds as planned and is within the operational limitations imposed by the specific operating license. However, these conditions may be subject to the reporting requirements of 10 CFR 50.72.

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.

Concerning Classification Downgrading Exelon Nuclear policy is that emergency classifications shall not be downgraded to a lower classification. Once declared, the event shall remain in effect until no Classification is warranted or until such time as conditions warrant classification to Recovery.

There may be cases in which a plant condition that exceeded an EAL was not recognized at the time of occurrence but is identified well after the condition has occurred (e.g., as a result of routine log or record review), and the condition no longer exists. In these cases, an emergency should not be declared. Reporting requirements of 10 CFR 50.72 are applicable, the guidance of NUREG-1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73 and the Reportability Reference Manual, should be applied.

3.3 Mode Applicability

The plant-operating mode that existed at the time that the event occurred, prior to any protective system or operator action initiated in response to the condition, is compared to the mode applicability of the EALs. If an event occurs, and a lower or higher plant-operating mode is reached before the emergency classification can be made, the declaration shall be based on the mode that existed at the time the event occurred.

For events that occur in Cold Shutdown or Refueling, escalation is via EALs that have Cold Shutdown or Refueling for mode applicability, even if Hot Shutdown (or a higher mode) is entered during any subsequent heat-up. In particular, the Fission Product Barrier Matrix EALs are applicable only to events that initiate in Hot Shutdown or higher.

If there is a change in Mode following an event declaration, any subsequent events involving EALs outside of the current declaration escalation path will be evaluated on the Mode of the plant at the time the subsequent events occur.

3.4 Emergency Director Judgment

Emergency Director Judgment EALs are provided in the Hazards and Other Condition Affecting Plant Safety section and on the Fission Product Barrier Matrix. Both of the Emergency Director Judgment EALs have specific criteria for when they should be applied.

The Hazards Section Emergency Director Judgment EALs are intended to address unanticipated conditions which are not addressed explicitly by other EALs but warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under specific emergency classifications (UE, Alert, SAE or GE).

The FPB Matrix ED Judgment EALs are intended to include unanticipated conditions, which are not addressed explicitly by any of the other FPB threshold values, but warrant determination because conditions exist that fall under the broader definition for a significant Loss or Potential Loss of the barrier (equal to or greater than the defined FPB threshold values).

3.5 Fission Product Barrier Restoration

Fission Product Barriers (FPBs) are not treated the same as EAL threshold values. Conditions warranting declaration of the loss or potential loss of a Fission Product Barrier may occur resulting in a specific classification. The condition that caused the loss or potential loss declaration could be rectified as the result of Operator action, automatic actions, or designed plant response. Barriers will be considered re-established when there are direct verifiable indications (containment penetration or open valve has been isolated, coolant sample results, etc) that the barrier has been restored and is capable of mitigating future events.

The reestablishment of a fission product barrier does not alter or lower the existing classification. Entry into Termination/Recovery phase is still required for exiting the present classification. However the reestablishment of the barrier should be considered in determining future classifications should plant conditions or events change.

3.6 Definitions

AFFECTING SAFE SHUTDOWN: Event in progress has adversely affected functions that are necessary to bring the plant to and maintain it in the applicable HOT or COLD SHUTDOWN condition. Plant condition applicability is determined by Technical Specification LCOs in effect.

Example 1: Event causes damage that results in entry into an LCO that requires the plant to be placed in HOT SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is not “AFFECTING SAFE SHUTDOWN.”

Example 2: Event causes damage that results in entry into an LCO that requires the plant to be placed in COLD SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is “AFFECTING SAFE SHUTDOWN.”

BOMB: An explosive device suspected of having sufficient force to damage plant systems or structures.

CIVIL DISTURBANCE: A group of persons violently protesting station operations or activities at the site.

CONFINEMENT BOUNDARY: The barrier(s) between areas containing radioactive substances and the environment.

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

EXTORTION: An attempt to cause an action at the station by threat of force.

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fire. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTILE FORCE: One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

INTRUSION: A person(s) present in a specified area without authorization. Discovery of a BOMB in a specified area is indication of INTRUSION into that area by a HOSTILE FORCE.

INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI): A complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage.

NORMAL LEVELS: Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

NORMAL PLANT OPERATIONS: Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

OPERATING MODES	REACTOR MODE SWITCH POSITION	TEMP
(1) Power Operation:	Run	N/A
(2) Startup:	Refuel [(a)] or Startup/Hot Standby	N/A
(3) Hot Shutdown [(a)]:	Shutdown	> 212° F
(4) Cold Shutdown [(a)]:	Shutdown	≤ 212° F
(5) Refueling [(b)]:	Shutdown or Refuel	N/A
(D) Defueled:	All reactor fuel removed from reactor pressure vessel (full core off load during refueling or extended outage).	

[(a)] All reactor vessel head closure bolts fully tensioned.

[(b)] One or more reactor vessel head closure bolts less than fully tensioned.

Hot Matrix – applies in modes (1), (2), and (3)

Cold Matrix – applies in modes (4), (5), and (D)

OWNER CONTROLLED AREA (OCA): The property associated with the station and owned by the company. Access is normally limited to persons entering for official business.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

SABOTAGE: A deliberate damage, mis-alignment, or mis-operation of plant equipment with the intent to render the equipment inoperable. Equipment found tampered with or damaged due to malicious mischief may NOT meet the definition of SABOTAGE until this determination is made by security supervision.

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) Turbine Trip (2) Reactor Scram (3) ECCS Activation, (4) Recirc. Runback > 25% Reactor Power change, or (5) thermal power oscillations >10% Reactor Power change.

STRIKE ACTION: A work stoppage within the PROTECTED AREA by a body of workers to enforce compliance with demands made on management. The STRIKE ACTION must threaten to interrupt NORMAL PLANT OPERATIONS.

UNISOLABLE: A breach or leak that cannot be promptly isolated.

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

Emergency Action Level Technical Basis Page Index

General		Site Area		Alert		Unusual Event	
EAL	**Pg.**	**EAL**	**Pg.**	**EAL**	**Pg.**	**EAL**	**Pg.**
RG1	3-30	RS1	3-33	RA1	3-36	RU1	3-39
				RA2	3-42	RU2	3-45
				RA3	3-48	RU3	3-49
FG1	3-50	FS1	3-51	FA1	3-52	FU1	3-53

Fuel Clad		RCS		Containment	
FC1	3-54				
FC2	3-55	RC2	3-59	CT2	3-66
		RC3	3-60	CT3	3-67
		RC4	3-61		
FC5	3-57	RC5	3-64	CT5	3-69
				CT6	3-70
FC7	3-58	RC7	3-65	CT7	3-73

MG1	3-74	MS1	3-76	MA1	3-78	MU1	3-80
MG2	3-81	MS2	3-83	MA2	3-84	MU2	3-85
		MS3	3-86				
		MS4	3-87	MA4	3-90	MU4	3-93
						MU5	3-95
						MU6	3-96
						MU7	3-98
				CA1	3-99	CU1	3-101
						CU2	3-103
						CU3	3-104
						CU4	3-105
				CA5	3-107	CU5	3-110
CG6	3-112	CS6	3-115	CA6	3-118	CU6	3-120
						CU7	3-121
HG1	3-124	HS1	3-126	HA1	3-128	HU1	3-130
		HS2	3-133	HA2	3-134		
				HA3	3-135	HU3	3-137
				HA4	3-140	HU4	3-145
				HA5	3-149	HU5	3-152
HG6	3-154	HS6	3-155	HA6	3-156	HU6	3-157
						E-HU1	3-158

Exelon Nuclear
HOT MATRIX

Abnormal Rad Levels / Radiological Effluent

Radiological Effluents

GENERAL EMERGENCY

RG1 Offsite dose resulting from an 1 2 3 4 5 D actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Unit 2/3 Rx Bldg and Unit 2/3 Chimney SPINGs **> 7.90 E+09 uCi/sec** for **≥ 15 minutes** (as determined by DOP 1700-10 or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 1000 mRem TEDE**
      OR
   b. **> 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**.
      OR
   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

SITE AREA EMERGENCY

RS1 Offsite dose resulting from an 1 2 3 4 5 D actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Unit 2/3 Rx Bldg and Unit 2/3 Chimney SPINGs **> 7.90 E+08 uCi/sec** for **≥ 15 minutes** (as determined by DOP 1700-10 or PPDS – Total Noble Gas Release Rate.)

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 100 mRem TEDE**
      OR
   b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.
      OR
   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation**.**

ALERT

RA1 Any release of gaseous or 1 2 3 4 5 D liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer.

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **200 times alarm setpoint** established by a current radioactivity discharge permit for ≥ **15 minutes**.
   - Radwaste Effluent Monitor 2/3-2001-948
     OR
   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Unit 2/3 Rx Bldg and Unit 2/3 Chimney SPINGs **> 9.02 E+07 uCi/sec** for **≥ 15 minutes** (as determined by DOP 1700-10 or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.

UNUSUAL EVENT

RU1 Any release of gaseous or 1 2 3 4 5 D liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer.

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **2 times alarm setpoint** established by a current radioactivity discharge permit for ≥ **60 minutes**.
   - Radwaste Effluent Monitor 2/3-2001-948
     OR
   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Unit 2/3 Rx Bldg and Unit 2/3 Chimney SPINGs **> 9.02 E+05 uCi/sec** for **≥ 60 minutes**. (as determined by DOP 1700-10 or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Abnormal Rad Levels / Radiological Effluent

Abnormal Rad Levels

GENERAL EMERGENCY

SITE AREA EMERGENCY

Table R1 - Refuel Floor ARMs

- Refuel Floor High Range ARM Station #2(4)
- Fuel Pool Radiation Monitor

Table R2
Areas Requiring Continuous Occupancy

- Main Control Room (Unit 2 ARM Station #22)
- Central Alarm Station - (by survey)

ALERT

RA2 Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel. [1][2][3][4][5][D]

EAL Threshold Values:

1. VALID reading **> 1000 mR/hr** on any Table R1 Radiation Monitor due to **EITHER**:
   - Damaged irradiated fuel.
   OR
   - Water level drop.

   OR
2. Water level drop in the Reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal that will result in irradiated fuel becoming uncovered.

RA3 Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. [1][2][3][4][5][D]

EAL Threshold Values:

Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R2) to maintain plant safety functions.

UNUSUAL EVENT

RU2 UNPLANNED rise in plant radiation levels. [1][2][3][4][5][D]

EAL Threshold Values:

1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by:
   - Refueling Cavity water level **< 466 in.** (Refuel Outage Reactor Vessel and Cavity Level Instrument LI 2(3)-263-114).
   OR
   - Spent Fuel Pool water level **< 19 ft.** above the fuel (**33 ft. 9 in.** indicated level).
   OR
   - Report of visual observation of a drop in water level in the Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal.

   AND

   b. VALID Area Radiation Monitor reading rise on one or more radiation monitor in Table R1.

   OR
2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.

RU3 Fuel Clad Degradation. [1][2][3]

EAL Threshold Values:

Fuel clad degradation resulting in **EITHER**:

- Offgas system radiation monitor **HI-HI** alarm.
OR
- Specific coolant activity **> 4.0 uCi/gm** Dose Equivalent I-131.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Fission Product Barrier Matrix — Hot Matrix

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
FG1 Loss of ANY two barriers AND Loss or Potential Loss of third barrier. 1 2 3	**FS1** Loss or Potential Loss of ANY two barriers. 1 2 3	**FA1** ANY Loss or ANY Potential Loss of either Fuel Clad or RCS. 1 2 3	**FU1** ANY Loss or ANY Potential Loss of Containment. 1 2 3

Sub-Category	FC - Fuel Clad		RC – Reactor Coolant System		CT - Containment	
	Loss	**Potential Loss**	**Loss**	**Potential Loss**	**Loss**	**Potential Loss**
1. Pri Coolant Activity	Coolant activity **> 300 uCi/gm** Dose Equivalent I-131	None	None	None	None	None
2.RPV Water Level	1. RPV level **cannot** be restored and maintained **> – 164 inches.**	2. RPV level **cannot** be restored and maintained **> – 143 inches.** (TAF). **OR** 3. RPV level **cannot** be determined.	1. RPV level **cannot** be restored and maintained **> –143 inches**. (TAF). **OR** 2. RPV level **cannot** be determined.	None	None	Plant conditions indicate that Primary Containment Flooding is required.
3. Primary Cont Conditions	None	None	1. Drywell pressure **> 2.0 psig**. **AND** 2. Drywell pressure rise due to RCS leakage.	None	1. Rapid unexplained drop in Drywell Pressure following initial pressure rise. **OR** 2. Drywell pressure response **not** consistent with LOCA conditions.	3. Drywell pressure **≥ 62 psig** and rising. **OR** 4. a. Drywell or torus hydrogen concentration **≥ 6%.** **AND** b. Drywell or torus oxygen concentration **≥ 5%.** **OR** 5. Heat Capacity Limit (DEOP 200-1 Fig. M) exceeded.
4. RCS Leak Rate	None	None	1. UNISOLABLE Main Steam Line (MSL), Isolation Condenser, HPCI, Feedwater, or RWCU line break. **OR** 2 Emergency RPV Depressurization is required.	3. RCS leakage **> 50 gpm** inside the drywell. **OR** 4. UNISOLABLE primary system leakage outside drywell resulting in **EITHER:** • Secondary Containment area temperatures **> DEOP 300-1, Maximum Normal** operating levels. **OR** • Secondary Containment radiation levels **> DEOP 300-1, Maximum Normal** operating levels.	None	None
5. Pri Cont Rad Monitoring	Drywell radiation monitor reading **> 6.70E+02 R/hr**.	None	Drywell Radiation monitor reading **> 100 R/hr.**	None	None	Drywell radiation monitor reading **> 1.60 E+03 R/hr**.
6. Primary Cont Isolation Failure or Bypass	None	None	None	None	1. a. Failure of isolation valves in any one line to close. **AND** b. Direct downstream pathway to the environment exists after a primary containment isolation signal. **OR** 2. Intentional venting/purging of Primary Containment per EOPs or SAMGs due to accident conditions. **OR** 3. UNISOLABLE primary system leakage outside drywell resulting in **EITHER:** • Secondary Containment area temperatures **> DEOP 300-1, Maximum Safe** operating levels. **OR** • Secondary Containment radiation levels **> DEOP 300-1, Maximum Safe** operating levels.	None
7. ED Judgment.	1. Any condition in the opinion of the Emergency Director that indicates Loss of the Fuel Clad Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Fuel Clad Barrier.	1. Any condition in the opinion of the Emergency Director that indicates Loss of the RCS Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the RCS Barrier.	1. Any condition in the opinion of the Emergency Director that indicates Loss of the Containment Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment Barrier.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

System Malfunction

Loss of AC Power

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
MG1 Prolonged loss of all offsite power and all On-Site AC power to emergency busses. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to unit ECCS busses. **AND** 2. Failure of DG 2(3), shared DG 2/3 and SBO DG 2(3) emergency diesel generators to supply power to unit ECCS busses. **AND** 3. a. Restoration of at least one unit ECCS bus in **< 4 hours** is **not** likely. **OR** b. RPV level **cannot** be determined to be **> - 143 inches** (TAF).	**MS1** Loss of all Off-site and all On-Site AC power to emergency busses for 15 minutes or longer. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to unit ECCS busses. **AND** 2. Failure of DG 2(3), shared DG 2/3 and SBO DG 2(3) emergency diesel generators to supply power to unit ECCS busses. **AND** 3. Failure to restore power to at least one ECCS bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.	**MA1** AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. AC power capability to unit ECCS busses reduced to only one of the following power sources for **≥ 15 minutes**: • Reserve auxiliary transformer TR-22(TR-32) • Unit auxiliary transformer TR-21(TR-31) • Unit Emergency Diesel Generator DG 2(3) • Shared Emergency Diesel Generator DG 2/3 • Station Blackout Diesel Generator SBO DG 2(3) • Unit crosstie breakers **AND** 2. Any additional single power source failure will result in a unit blackout.	**MU1** Loss of all Off-site AC power to busses for 15 minutes or longer. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of all off-site AC power to unit ECCS busses for **≥ 15 minutes**.

RPS Failure / Inadvertent Criticality

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
MG2 Automatic Scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists. 1 2 **EAL Threshold Values:** 1. Automatic scram was **not** successful as indicated by Reactor Power **> 6%.** **AND** 2. Manual scram/ARI actions were **not** successful as indicated by Reactor Power **> 6%.** **AND** 3. **EITHER** of the following exists: • RPV level **cannot** be restored and maintained **> - 164 inches**. **OR** • Heat Capacity Limit (DEOP 200-1 Fig. M) exceeded.	**MS2** Automatic Scram fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor. 1 2 **EAL Threshold Values:** 1. Automatic scram was **not** successful as indicated by Reactor Power **> 6%.** **AND** 2. Manual scram/ARI actions were **not** successful from the Reactor Console as indicated by Reactor Power **> 6%.**	**MA2** Automatic Scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor. 1 2 **EAL Threshold Values:** 1. Automatic scram was **not** successful as indicated by Reactor Power **> 6%.** **AND** 2. Manual scram/ARI actions were successful from Reactor Console as indicated by Reactor Power **≤ 6%.**	**MU2** Inadvertent criticality. 3 **EAL Threshold Values:** UNPLANNED sustained positive period observed on nuclear instrumentation.

Modes: 1 – Power Operation, 2 – Startup, 3 –Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Exelon Nuclear
HOT MATRIX

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
DC Power		**MS3** Loss of all vital DC power for 15 minutes or longer. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of all vital DC power based on **< 105 VDC** on 125 VDC battery busses #2 and #3 for **≥ 15 minutes**.		
Annunciators		**MS4** Inability to monitor a SIGNIFICANT TRANSIENT in progress. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1) **AND** 2. SIGNIFICANT TRANSIENT in progress (Table M2). **AND** 3. Compensatory indications (computer points) are unavailable.	**MA4** UNPLANNED Loss of safety system annunciation or indication in the control room with EITHER (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1) **AND** 2. a. SIGNIFICANT TRANSIENT in progress (Table M2). **OR** b. Compensatory indications (computer points) are unavailable.	**MU4** UNPLANNED loss of safety system annunciation or indication in the control room for 15 minutes or longer. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1)
		Table M1 - Safety Systems • ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring	**Table M2 - Significant Transients** • Turbine trip • Reactor scram • ECCS actuation • Recirc Runback >25% power change • Thermal power oscillations > 10 % Reactor Power change	

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

HOT MATRIX

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
RCS Leak				**MU5** RCS leakage. 1 2 3 **EAL Threshold Values:** 1. Unidentified or pressure boundary leakage into the Drywell **> 10 gpm**. **OR** 2. Identified leakage into the Drywell **> 25 gpm**.
Communications		**Table M3 - Communications Capability** System / Onsite / Offsite Plant Radio System: X Plant Paging System: X Sound Power Phones: X In-Plant Telephones: X All telephone lines (commercial and microwave): Offsite X ENS: Offsite X Satellite Phones: Offsite X HPN: Offsite X Cellular Phones: Offsite X		**MU6** Loss of all On-site or Off-site communications capabilities. 1 2 3 **EAL Threshold Values:** 1. Loss of all Table M3 **Onsite** communications capability affecting the ability to perform routine operations. **OR** 2. Loss of all Table M3 **Offsite** communications capability affecting the ability to perform offsite notifications.
T. S. Time				**MU7** Inability to reach required shutdown within Technical Specification limits. 1 2 3 **EAL Threshold Values:** Plant is **not** brought to required operating mode within Technical Specifications LCO Action Statement Time.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Hazards and Other Conditions Affecting Plant Safety

Security

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
HG1 HOSTILE ACTION resulting in loss of physical control of the facility. 1 2 3 4 5 D **EAL Threshold Values:** 1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1). **OR** 2. A HOSTILE ACTION has: • Caused failure of Spent Fuel Pool Cooling Systems **AND** • IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).	**HS1** HOSTILE ACTION within the PROTECTED AREA. 1 2 3 4 5 D **EAL Threshold Values:** A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.	**HA1** HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. 1 2 3 4 5 D **EAL Threshold Values:** 1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site. **OR** 2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.	**HU1** Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant. 1 2 3 4 5 D **EAL Threshold Values:** 1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities. **OR** 2. A validated notification from NRC providing information of an aircraft threat. **OR** 3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

C. R. Evacuation

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Table H1 - Safety Functions • Reactivity Control (ability to shut down the reactor and keep it shutdown) • RCS Inventory (ability to cool the core) • Decay Heat Removal (ability to maintain heat sink)	**HS2** Control Room evacuation has been initiated and plant control cannot be established. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Control Room evacuation has been initiated. **AND** 2. Control of the plant **cannot** be established per DSSP 0100-CR in **< 30 minutes**.	**HA2** Control Room evacuation has been initiated. 1 2 3 4 5 D **EAL Threshold Values:** Entry into DSSP 0100-CR for Control Room evacuation.	

Fire / Explosion

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
	Table H2 – Vital Areas • Reactor Building • Aux Electric Room • Control Room • Diesel Generator Rooms • 4-KV ECCS Switchgear Area • Battery Rooms • CRD & CCSW Pump Rooms • Turbine Building Cable Tunnel • Turbine Building Safe Shutdown Areas • Crib House	**HA3** FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown. 1 2 3 4 5 D **EAL Threshold Values:** FIRE or EXPLOSION resulting in any of the following: • VISIBLE DAMAGE to a Table H2 permanent structure. **OR** • VISIBLE DAMAGE to safety system equipment contained within a Table H2 area. **OR** • Control Room indication of degraded safety system equipment performance contained within a Table H2 area.	**HU3** FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm. **OR** 2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Exelon Nuclear
HOT MATRIX

Hazards and Other Conditions Affecting Plant Safety

Natural / Destructive Phenomena

Table H2 – Vital Areas

- Reactor Building
- Aux Electric Room
- Control Room
- Diesel Generator Rooms
- 4-KV ECCS Switchgear Area
- Battery Rooms
- CRD & CCSW Pump Rooms
- Turbine Building Cable Tunnel
- Turbine Building Safe Shutdown Areas
- Crib House

Table H3 – Internal Flooding Areas

- Condenser Pits
- Condensate pump Rooms
- Containment Cooling Service Water Vaults
- Crib House
- East Corner Room
- West Corner Room

GENERAL EMERGENCY

SITE AREA EMERGENCY

ALERT

HA4 Natural and destructive phenomena affecting VITAL AREAS [1][2][3][4][5][D]

EAL Threshold Values:

1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by seismic instrumentation:
   - **> 0.10 g** (Channel 1 or 3)
   - **OR**
   - **> 0.067 g** (Channel 2)

   AND

   b. Confirmed by **EITHER:**
   - Earthquake felt in plant.
   - **OR**
   - National Earthquake Center.
   - **OR**
   - Control Room indication of degraded performance of systems required for the safe shutdown of the plant.

   OR

2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area:
   - Tornado strike
   - **OR**
   - High winds **> 100 mph**
   - **OR**
   - Vehicle crash
   - **OR**
   - Turbine failure-generated PROJECTILES

   OR

3. Flooding in any Table H3 area that results in **ANY** of the following:
   - Degraded safety system performance as indicated in the Control Room.
   - **OR**
   - Industrial safety hazards (e.g., electric shock) that preclude access necessary to operate or monitor safety equipment.
   - **OR**
   - Water level **> DEOP 300-1, Maximum Safe**.

   OR

4. Abnormal River level, as indicated by **EITHER**:
   - High river water level **> 513 ft**.
   - **OR**
   - Low river water level **< 501 ft. 6 in.**

UNUSUAL EVENT

HU4 Natural and destructive phenomena affecting the PROTECTED AREA. [1][2][3][4][5][D]

EAL Threshold Values:

1. Seismic event identified by any **TWO** of the following:
   - Earthquake felt in plant.
   - **OR**
   - Seismic event confirmed by station seismic monitor procedure.
   - **OR**
   - National Earthquake Center.

   OR

2. **EITHER** of the following occurring within the PROTECTED AREA boundary:
   - Tornado strike
   - **OR**
   - Sustained **(> 15 minutes)** high winds **> 100 mph**

   OR

3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

   OR

4. Flooding in any Table H3 area that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

   OR

5. Abnormal River level, as indicated by **EITHER**:
   a. High river level **> 509 ft.**

   OR

   b. Report of substantial reduction in river level by site personnel and confirmation by the Corp. of Engineers that Dresden Lock and Dam has failed.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

HOT MATRIX

Exelon Nuclear
HOT MATRIX

Hazards and Other Conditions Affecting Plant Safety

Toxic / Flammable Gas

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Table H2 - Vital Areas • Reactor Building • Aux Electric Room • Control Room • Diesel Generator Rooms • 4-KV ECCS Switchgear Area • Battery Rooms • CRD & CCSW Pump Rooms • Turbine Building Cable Tunnel • Turbine Building Safe Shutdown Areas • Crib House		**HA5** Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event. Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.	**HU5** Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS. 1 2 3 4 5 D **EAL Threshold Values:** 1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS. **OR** 2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.

Judgment

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
HG6 Other conditions existing which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**HS6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	**HA6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an ALERT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**HU6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

HOT MATRIX

HOT MATRIX HOT MATRIX

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
ISFSI Malfunction				
ISFSI				**E-HU1** Damage to a loaded cask CONFINEMENT BOUNDARY 1 2 3 4 5 D **EAL Threshold Values:** Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

HOT MATRIX HOT MATRIX

This Page Intentionally Left Blank

Abnormal Rad Levels / Radiological Effluent

Radiological Effluents

GENERAL EMERGENCY

RG1 Offsite dose resulting from an 1 2 3 4 5 D actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Unit 2/3 Rx Bldg and Unit 2/3 Chimney SPINGs **> 7.90 E+09 uCi/sec** for **≥ 15 minutes** (as determined by DOP 1700-10 or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 1000 mRem TEDE**
      OR
   b. **> 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**.
      OR
   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

SITE AREA EMERGENCY

RS1 Offsite dose resulting from an 1 2 3 4 5 D actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Unit 2/3 Rx Bldg and Unit 2/3 Chimney SPINGs **> 7.90 E+08 uCi/sec** for **≥ 15 minutes** (as determined by DOP 1700-10 or PPDS – Total Noble Gas Release Rate.)

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 100 mRem TEDE**
      OR
   b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.
      OR
   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation**.**

ALERT

RA1 Any release of gaseous or 1 2 3 4 5 D liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer.

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **200 times alarm setpoint** established by a current radioactivity discharge permit for ≥ **15 minutes**.
   - Radwaste Effluent Monitor 2/3-2001-948
     OR
   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Unit 2/3 Rx Bldg and Unit 2/3 Chimney SPINGs **> 9.02 E+07 uCi/sec** for **≥ 15 minutes** (as determined by DOP 1700-10 or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.

UNUSUAL EVENT

RU1 Any release of gaseous or 1 2 3 4 5 D liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer.

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **2 times alarm setpoint** established by a current radioactivity discharge permit for ≥ **60 minutes**.
   - Radwaste Effluent Monitor 2/3-2001-948
     OR
   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Unit 2/3 Rx Bldg and Unit 2/3 Chimney SPINGs **> 9.02 E+05 uCi/sec** for **≥ 60 minutes**. (as determined by DOP 1700-10 or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Abnormal Rad Levels / Radiological Effluent				
Abnormal Rad Levels		**Table R1 - Refuel Floor ARMs** • Refuel Floor High Range ARM Station #2(4) • Fuel Pool Radiation Monitor	**RA2** Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel. 1 2 3 4 5 D **EAL Threshold Values:** 1. VALID reading **> 1000 mR/hr** on any Table R1 Radiation Monitor due to **EITHER**: • Damaged irradiated fuel. **OR** • Water level drop. **OR** 2. Water level drop in the Reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal that will result in irradiated fuel becoming uncovered.	**RU2** UNPLANNED rise in plant radiation levels. 1 2 3 4 5 D **EAL Threshold Values:** 1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by: • Refueling Cavity water level **< 466 in.** (Refuel Outage Reactor Vessel and Cavity Level Instrument LI 2(3)-263-114). **OR** • Spent Fuel Pool water level **< 19 ft.** above the fuel (**33 ft. 9 in.** indicated level). **OR** • Report of visual observation of a drop in water level in the Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal. **AND** b. VALID Area Radiation Monitor reading rise on one or more radiation monitor in Table R1. **OR** 2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.
		Table R2 **Areas Requiring Continuous Occupancy** • Main Control Room (Unit 2 ARM Station #22) • Central Alarm Station - (by survey)	**RA3** Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. 1 2 3 4 5 D **EAL Threshold Values:** Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R2) to maintain plant safety functions.	

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

COLD SHUTDOWN / REFUELING MATRIX

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS				
Loss of AC Power			**CA1** Loss of all Off-site and all On-Site AC power to emergency busses for 15 minutes or longer. 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to unit ECCS busses. **AND** 2. Failure of DG 2(3), shared DG 2/3 and SBO DG 2(3) emergency diesel generators to supply power to unit ECCS busses. **AND** 3. Failure to restore power to at least one ECCS bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.	**CU1** AC power capibilty to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout. 4 5 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. AC power capability to unit ECCS busses reduced to only one of the following power sources for **≥ 15 minutes**: • Reserve auxiliary transformer TR-22(TR-32) • Unit auxiliary transformer TR-21(TR-31) • Unit Emergency Diesel Generator DG 2(3) • Shared Emergency Diesel Generator DG 2/3 • Station Blackout Diesel Generator SBO DG 2(3) • Unit crosstie breakers **AND** 2. Any additional single power source failure will result in a unit blackout.
Inadvertent Criticality				**CU2** Inadvertent criticality. 4 5 **EAL Threshold Values:** UNPLANNED sustained positive period observed on nuclear instrumentation.
DC Power				**CU3** Loss of required DC power for 15 minutes or longer. 4 5 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of required DC power based on **< 105 VDC** on unit 125 VDC battery buses #2 and #3 for **≥ 15 minutes**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS				
Communications			**Table C1 - Communications Capability** System / Onsite / Offsite Plant Radio System: X Plant Paging System: X Sound Power Phones: X In-Plant Telephones: X All telephone lines (commercial and microwave): X ENS: X Satellite Phones: X HPN: X Cellular Phones: X	**CU4** Loss of all On-site or Off-site communications capabilities. 4 5 D **EAL Threshold Values:** 1. Loss of all Table C1 **Onsite** communications capability affecting the ability to perform routine operations. **OR** 2. Loss of all Table C1 **Offsite** communications capability affecting the ability to perform offsite notifications.
Heat Sink		**Table C2 – RCS Reheat Duration Thresholds** RCS / Containment Closure / Duration Intact / N/A / 60 minutes* Not Intact / Established / 20 minutes* Not Intact / Not Established / 0 minutes *If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then EAL Threshold #1 is **not** applicable.	**CA5** Inability to maintain plant in cold shutdown. 4 5 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 212°F** for **> Table C2 duration**. **OR** 2. UNPLANNED RPV pressure rise **> 10 psig** as a result of temperature rise due to loss of decay heat removal.	**CU5** UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV. 4 5 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 212°F**. **OR** 2. Loss of the following for **> 15 minutes:** • All RCS temperature indications **AND** • All RPV level indications

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

COLD SHUTDOWN / REFUELING MATRIX

COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

RCS Leakage / Inventory

GENERAL EMERGENCY

CG6 Loss of RPV inventory affecting fuel clad integrity with containment challenged. [4] [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. RPV level **< - 143 inches (TAF)** for **≥ 30 minutes**.
   AND
   b. Any Containment Challenge Indication (Table C4).
   OR
2. a. RPV level unknown for **≥ 30 minutes.**
   AND
   b. Loss of RPV inventory as indicated by any of the following:
   - Table C3 indication.
     OR
   - Erratic Source Range Monitor indication.
     OR
   - Refuel Floor Hi Range ARM **> 3000 mR/hr**.

   AND
   c. Any Containment Challenge Indication (Table C4)

Table C4 – Containment Challenge Indications

- Primary Containment Hydrogen concentration **≥ 6%** Oxygen **≥ 5%**.
- UNPLANNED rise in containment pressure
- CONTAINMENT CLOSURE **not** established.
- Any Secondary Containment radiation monitors reading **> DEOP 300-1 Maximum Safe** operating level.

SITE AREA EMERGENCY

CS6 Loss of RPV inventory affecting core decay heat removal capability. [4] [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. With CONTAINMENT CLOSURE **not** established, RPV level **< - 60 inches**.
   OR
2. With CONTAINMENT CLOSURE established, RPV level **< - 143 inches (TAF) .**
   OR
3. a. RPV level unknown for **≥ 30 minutes.**
   AND
   b. Loss of RPV inventory as indicated by any of the following:
   - Table C3 indications.
     OR
   - Erratic Source Range Neutron Monitor indication.
     OR
   - Refuel Floor Hi Range ARM **> 3000 mR/hr**.

ALERT

CA6 Loss of RPV inventory. [4] [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. RPV level **< - 54 inches**.
   OR
2. a. RPV level unknown for **≥ 15 minutes**.
   AND
   b. Loss of RPV inventory per Table C3 indications.

Table C3 – Indications of RCS Leakage

- UNPLANNED floor or equipment sump level rise
- UNPLANNED Torus level rise
- UNPLANNED vessel make-up rise
- Observation of leakage or Inventory loss

UNUSUAL EVENT

CU6 RCS leakage. [4]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

RCS leakage results in the inability to restore and maintain RPV level **> 0 inches** for **≥ 15 minutes**.

CU7 UNPLANNED loss of RPV inventory. [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED Reactor Cavity or Vessel level drop that meets **EITHER**:
   - When controlling level above the RPV flange, Reactor Cavity level drop below the RPV flange for **≥ 15 minutes**.
     OR
   - When controlling level below the RPV flange, vessel level drop below the procedurally established limit **≥ 15 minutes**.

   OR
2. a. RPV level unknown.
   AND
   b.Loss of RPV inventory per Table C3 indications.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Security	**HG1** HOSTILE ACTION resulting in loss of physical control of the facility. 1 2 3 4 5 D **EAL Threshold Values:** 1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1). **OR** 2. A HOSTILE ACTION has: • Caused failure of Spent Fuel Pool Cooling Systems **AND** • IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).	**HS1** HOSTILE ACTION within the PROTECTED AREA. 1 2 3 4 5 D **EAL Threshold Values:** A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.	**HA1** HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. 1 2 3 4 5 D **EAL Threshold Values:** 1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site. **OR** 2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.	**HU1** Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant. 1 2 3 4 5 D **EAL Threshold Values:** 1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities. **OR** 2. A validated notification from NRC providing information of an aircraft threat. **OR** 3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.
C. R. Evacuation	**Table H1 - Safety Functions** • Reactivity Control (ability to shut down the reactor and keep it shutdown) • RCS Inventory (ability to cool the core) • Decay Heat Removal (ability to maintain heat sink)	**HS2** Control Room evacuation has been initiated and plant control cannot be established. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Control Room evacuation has been initiated. **AND** 2. Control of the plant **cannot** be established per DSSP 0100-CR in **< 30 minutes**.	**HA2** Control Room evacuation has been initiated. 1 2 3 4 5 D **EAL Threshold Values:** Entry into DSSP 0100-CR for Control Room evacuation.	
Fire / Explosion		**Table H2 – Vital Areas** • Reactor Building • Aux Electric Room • Control Room • Diesel Generator Rooms • 4-KV ECCS Switchgear Area • Battery Rooms • CRD & CCSW Pump Rooms • Turbine Building Cable Tunnel • Turbine Building Safe Shutdown Areas • Crib House	**HA3** FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown. 1 2 3 4 5 D **EAL Threshold Values:** FIRE or EXPLOSION resulting in any of the following: • VISIBLE DAMAGE to a Table H2 permanent structure. **OR** • VISIBLE DAMAGE to safety system equipment contained within a Table H2 area. **OR** • Control Room indication of degraded safety system equipment performance contained within a Table H2 area.	**HU3** FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm. **OR** 2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

COLD SHUTDOWN / REFUELING MATRIX

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Natural / Destructive Phenomena	**Table H2 – Vital Areas** • Reactor Building • Aux Electric Room • Control Room • Diesel Generator Rooms • 4-KV ECCS Switchgear Area • Battery Rooms • CRD & CCSW Pump Rooms • Turbine Building Cable Tunnel • Turbine Building Safe Shutdown Areas • Crib House **Table H3 – Internal Flooding Areas** • Condenser Pits • Condensate pump Rooms • Containment Cooling Service Water Vaults • Crib House • East Corner Room • West Corner Room		**HA4** Natural and destructive phenomena affecting VITAL AREAS [1][2][3][4][5][D] **EAL Threshold Values:** 1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by seismic instrumentation: • **> 0.10 g** (Channel 1 or 3) **OR** • **> 0.067 g** (Channel 2) **AND** b. Confirmed by **EITHER:** • Earthquake felt in plant. **OR** • National Earthquake Center. **OR** • Control Room indication of degraded performance of systems required for the safe shutdown of the plant. **OR** 2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area: • Tornado strike **OR** • High winds **> 100 mph** **OR** • Vehicle crash **OR** • Turbine failure-generated PROJECTILES **OR** 3. Flooding in any Table H3 area that results in **ANY** of the following: • Degraded safety system performance as indicated in the Control Room. **OR** • Industrial safety hazards (e.g., electric shock) that preclude access necessary to operate or monitor safety equipment. **OR** • Water level **> DEOP 300-1, Maximum Safe**. **OR** 4. Abnormal River level, as indicated by **EITHER**: • High river water level **> 513 ft**. **OR** • Low river water level **< 501 ft. 6 in.**	**HU4** Natural and destructive phenomena affecting the PROTECTED AREA. [1][2][3][4][5][D] **EAL Threshold Values:** 1. Seismic event identified by any **TWO** of the following: • Earthquake felt in plant. **OR** • Seismic event confirmed by station seismic monitor procedure. **OR** • National Earthquake Center. **OR** 2. **EITHER** of the following occurring within the PROTECTED AREA boundary: • Tornado strike **OR** • Sustained **(> 15 minutes)** high winds **> 100 mph** **OR** 3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals. **OR** 4. Flooding in any Table H3 area that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode. **OR** 5. Abnormal River level, as indicated by **EITHER**: a. High river level **> 509 ft.** **OR** b. Report of substantial reduction in river level by site personnel and confirmation by the Corp. of Engineers that Dresden Lock and Dam has failed.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Toxic / Flammable Gas	**Table H2 - Vital Areas** • Reactor Building • Aux Electric Room • Control Room • Diesel Generator Rooms • 4-KV ECCS Switchgear Area • Battery Rooms • CRD & CCSW Pump Rooms • Turbine Building Cable Tunnel • Turbine Building Safe Shutdown Areas • Crib House		**HA5** Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event. Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.	**HU5** Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS. 1 2 3 4 5 D **EAL Threshold Values:** 1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS. **OR** 2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.
Judgment	**HG6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**HS6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	**HA6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an ALERT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**HU6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
ISFSI Malfunction				
ISFSI				**E-HU1** Damage to a loaded cask CONFINEMENT BOUNDARY 1 2 3 4 5 D **EAL Threshold Values:** Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

RG1

Initiating Condition:

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

NOTE: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Unit 2/3 Rx Bldg and Unit 2/3 Chimney SPINGs **> 7.90 E+09 uCi/sec** for **≥ 15 minutes** (as determined by DOP 1700-10 or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of **EITHER**:

   a. **> 1000 mRem TEDE**

      OR

   b. **> 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond site boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**.

      OR

   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

RG1 (cont)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed the EPA Protective Action Guides (PAGs). Public protective actions will be necessary. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public and likely involve fuel damage.

While these failures are addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

Threshold #1 Basis:

The site-specific monitors listed include effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading threshold is not, the results from dose assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency-implementing procedures call for the timely performance of dose assessments using actual meteorology and release information. If the results of dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading threshold.

Threshold #2 Basis:

The "site boundary" is the nearest distance from potential release points at which protective actions would be required for members of the public.

Threshold #3 Basis:

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. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption on sample media followed by field analysis are used for determining the iodine (CDE) thyroid value.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

RG1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 AG1
2. EP-AA-112-500 Emergency Environmental Monitoring
3. ODCM Section 12.4 Gaseous Effluents and Total Dose
4. DOP 1700-10, Obtaining And Calculating A Gaseous Release Rate From the Unit 2/3 Chimney, Unit 1 Chimney and Unit 2/3 combined Reactor Vent Using the Eberline Control Terminal
5. EP-EAL-0604 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values Dresden Station
6. DEOP 300-2, Radioactivity Release Control

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

RS1

Initiating Condition:

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

NOTE: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Unit 2/3 Rx Bldg and Unit 2/3 Chimney SPINGs **> 7.90 E+08 uCi/sec** for **≥ 15 minutes** (as determined by DOP 1700-10 or PPDS – Total Noble Gas Release Rate.)

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of **EITHER**:

   a. **> 100 mRem TEDE**

      OR

   b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond the site boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.

      OR

   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

RS1 (cont)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed 10% of the EPA Protective Action Guides (PAGs). Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

While these failures are addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

Threshold #1 Basis:

The site specific monitors listed include effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading threshold is not, the results from dose assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency-implementing procedures call for the timely performance of dose assessments using actual meteorology and release information. If the results of dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading threshold.

Threshold #2 Basis:

The "site boundary" is the nearest distance from potential release points at which Protective Actions would be required for members of the public.

Threshold #3 Basis:

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. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption on sample media followed by field analysis are used for determining the iodine (CDE) thyroid value.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

RS1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 AS1
2. EP-AA-112-500 Emergency Environmental Monitoring
3. ODCM Section 12.4 Gaseous Effluents
4. DOP 1700-10, Obtaining And Calculating A Gaseous Release Rate From the Unit 2/3 Chimney, Unit 1 Chimney and Unit 2/3 combined Reactor Vent Using the Eberline Control Terminal
5. EP-EAL-0604 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values Dresden Station
6. DEOP 300-2, Radioactivity Release Control

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

RA1

Initiating Condition:

Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitor **> 200 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 15 minutes**.

   - Radwaste Effluent Monitor 2/3-2001-948

     OR

   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Unit 2/3 Rx Bldg and Unit 2/3 Chimney SPINGs **> 9.02 E+07 uCi/sec** for **≥ 15 minutes** (as determined by DOP 1700-10 or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates **> 200 times ODCM** Limit with a release duration of **≥ 15 minutes**.

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

RA1 (cont)

Basis (cont):

This EAL addresses an actual or substantial potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in RU1 and RA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases are not to be prorated or averaged. For example, a release exceeding 600 times ODCM for 5 minutes does not meet the threshold

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

Threshold #1 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

The effluent monitors listed are those normally used for planned discharges. If a discharge is performed using a different flowpath or effluent monitor other than those listed (e.g., a portable or temporary effluent monitor), then the declaration criteria will be based on the monitor specified in the Discharge Permit.

Threshold #2 Basis:

This threshold is intended for effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

RA1 (cont)

Basis (cont):

Threshold #3 Basis:

This threshold addresses uncontrolled releases that are detected by sample analyses, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

Basis Reference(s):

1. NEI 99-01, Rev. 5 AA1
2. ODCM Section 12.3 Liquid Effluents
3. ODCM Section 12.4 Gaseous Effluents
4. DOP 1700-10, Obtaining And Calculating A Gaseous Release Rate From the Unit 2/3 Chimney, Unit 1 Chimney and Unit 2/3 combined Reactor Vent Using the Eberline Control Terminal
5. UNIT 2/3 DAN 2223-6 A-12 "2/3 RADWASTE DISCHARGE HIGH RADIATION"
6. UNIT 2/3 DOP 2000-110, Radioactive Waste Discharge to River With the Off-Stream Liquid Effluent Monitor Operable
7. UNIT 2/3 DOP 2000-109, Waste Surge Tank Batching for a Radwaste River Discharge
8. Structural Drawing B-01A Composite Site Plan Dresden Station Units 1, 2 & 3
9. EP-EAL-0604 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values Dresden Station
10. DEOP 300-2, Radioactivity Release Control

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

RU1

Initiating Condition:

Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitor **> 2 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 60 minutes**.

   - Radwaste Effluent Monitor 2/3-2001-948

     OR

   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Unit 2/3 Rx Bldg and Unit 2/3 Chimney SPINGs **> 9.02 E+05 uCi/sec** for **≥ 60 minutes**. (as determined by DOP 1700-10 or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

RU1 (cont)

Basis (cont):

This EAL addresses a potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in RU1 and RA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases are not to be prorated or averaged. For example, a release exceeding 4 times ODCM for 30 minutes does not meet the threshold.

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

Threshold #1 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

The effluent monitors listed are those normally used for planned discharges. If a discharge is performed using a different flowpath or effluent monitor other than those listed (e.g., a portable or temporary effluent monitor), then the declaration criteria will be based on the monitor specified in the Discharge Permit.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

RU1 (cont)

Basis: (cont)

Threshold #2 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL.

This threshold is intended for effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

Threshold #3 Basis:

This threshold addresses uncontrolled releases that are detected by sample analyses, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

Basis Reference(s):

1. NEI 99-01, Rev. 5 AU1
2. ODCM Section 12.3 Liquid Effluents
3. ODCM Section 12.4 Gaseous Effluents
4. DOP 1700-10, Obtaining And Calculating A Gaseous Release Rate From the Unit 2/3 Chimney, Unit 1 Chimney and Unit 2/3 combined Reactor Vent Using the Eberline Control Terminal
5. UNIT 2/3 DAN 2223-6 A-12 "2/3 RADWASTE DISCHARGE HIGH RADIATION"
6. UNIT 2/3 DOP 2000-110, Radioactive Waste Discharge to River With the Off-Stream Liquid Effluent Monitor Operable
7. UNIT 2/3 DOP 2000-109, Waste Surge Tank Batching for a Radwaste River Discharge
8. EP-EAL-0604 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values Dresden Station
9. DEOP 300-2, Radioactivity Release Control

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

RA2

Initiating Condition:

Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. VALID reading **> 1000 mR/hr** on any Table R1 Radiation Monitor due to **EITHER**:

   - Damage to irradiated fuel

     OR

   - Water level drop

Table R1 - Fuel Handling Incident Radiation Monitors
• Refuel Floor High Range ARM Station #2(4) • Fuel Pool Radiation Monitor

   OR

2. Water level drop in the Reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal that will result in irradiated fuel becoming uncovered.

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses increases in radiation dose rates within plant buildings, and may be a precursor to a radioactivity release to the environment. These events represent a loss of control over radioactive material and represent an actual or substantial potential degradation in the level of safety of the plant.

These events escalate from RU2 in that fuel activity has been released, or is anticipated due to fuel heatup. This EAL applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

RA2 (cont)

Basis (cont):

Threshold #1 Basis:

This EAL addresses radiation monitor indications of fuel uncovery and/or fuel damage.

Uncovering spent fuel represents a substantial degradation of the level of safety of the plant and warrants an Alert classification. Visual observation of spent fuel uncovery represents a major ALARA concern in that radiation levels could exceed 10,000 R/hr on the refuel bridge when fuel uncovery begins. The value of 1000 mR/hr was conservatively chosen for classification purposes.

Radiation monitor readings are used to provide indication of fuel uncovery and/or fuel damage. High monitor readings associated with the transfer or relocation of a source, stored in or near the pool or readings responding to a planned evolution such as removal of the reactor head or equipment relocation are not classified under this threshold since the reading would not be indicative of fuel uncovery and/or fuel damage.

Dropping heavy loads onto the spent fuel can cause significant damage to the spent fuel and an Alert is also warranted under these conditions provided that the above radiation monitor threshold readings are reached.

Escalation of this emergency classification level, if appropriate, would be based on RS1 or RG1.

Threshold #2 Basis:

Once Spent Fuel Pool water level drops below the refuel floor elevation, further drops can be monitored only by visual observation unless the Spent Fuel Pool is in communication with the Refueling Cavity.

If available, video cameras may allow remote observation. Depending on available level instrumentation, the declaration threshold may need to be based on indications of water makeup rate.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

RA2 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 AA2
2. DAN 902(3)-3 C-16(E-16) Reactor Building Fuel Pool Hi Radiation
3. DAN 902(3)-3 B-1 Refuel Floor Hi Radiation
4. DAN 902(3)-3 A-3(F-14) Reactor building Vent Hi-Hi Radiation
5. UFSAR 9.1
6. DAN 902(3)-4 D-24 Fuel Pool Skimmer Tank Level Lo
7. DIP 0260-01 Refuel Outage Reactor Vessel and Cavity Level Instrumentation
8. DFP 0850-01 Water Level Loss in SFP or Cavity
9. DOP 1900-03 Reactor Cavity, Dryer/Separator Storage Pit and Fuel Pool Level Control

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

RU2

Initiating Condition:

UNPLANNED rise in plant radiation levels.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by:

   - Refueling Cavity water level **< 466 in.** (Refuel Outage Reactor Vessel and Cavity Level Instrument LI 2(3)-263-114).

     OR

   - Spent Fuel Pool water level **< 19 ft.** above the fuel (**33 ft. 9 in.** indicated level).

     OR

   - Report of visual observation of a drop in water level in the Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal.

   AND

   b. VALID Area Radiation Monitor reading rise on one or more radiation monitors in Table R1.

Table R1 - Fuel Handling Incident Radiation Monitors
• Refuel Floor High Range ARM Station #2(4) • Fuel Pool Radiation Monitor

   OR

2. UNPLANNED VALID Area Radiation Monitor reading or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

RU2 (cont)

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

NORMAL LEVELS: Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

This EAL addresses increased radiation levels as a result of water level decreases above irradiated fuel or events that have resulted, or may result, in UNPLANNED increases in radiation dose rates within plant buildings. These radiation increases represent a loss of control over radioactive material and represent a potential degradation in the level of safety of the plant.

Threshold #1 Basis:

Level indications may include installed or temporary water level instrumentation. If available, video cameras may allow remote observation for determining water level changes.

This EAL addresses unplanned lowering of level in the refueling pathway and a corresponding rise in refuel floor radiation readings. For events in Refuel mode where the water level drops with no corresponding rise in refuel floor radiation readings classification would be via CU7. This event escalates to an Alert per RA2 if irradiated fuel outside the reactor vessel is uncovered.

Threshold #2 Basis:

This EAL addresses increases in plant radiation levels that represent a loss of control of radioactive material resulting in a potential degradation in the level of safety of the plant.

This EAL excludes radiation level increases that result from planned activities such as use of radiographic sources and movement of radioactive waste materials. A specific list of ARMs is not required, as it would restrict the applicability of the threshold. The intent is to identify loss of control of radioactive material in any monitored area. Survey results are not required for confirmation of area radiation monitor readings but are applicable to areas where area radiation monitors do not have sufficient range to indicate a rise by a factor of 1000 over NORMAL LEVELS.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

RU2 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 AU2
2. RP-AA-203 Exposure Control and Authorization
3. Technical Specifications 3.7.8
4. Technical Specifications 3.9.6
5. UFSAR 9.1
6. DAN 902(3)-4 D-24 Fuel Pool Skimmer Tank Level Lo
7. DIP 0260-01 Refuel Outage Reactor Vessel and Cavity Level Instrumentation
8. DFP 0850-01 Water Level Loss in SFP or Cavity
9. DOP 1900-03 Reactor Cavity, Dryer/Separator Storage Pit and Fuel Pool Level Control
10. DGP 02-02, Reactor Vessel Slow Fill
11. DAN 902(3)-3 C-16(E-16) Reactor Building Fuel Pool Hi Radiation
12. DAN 902(3)-3 B-1 Refuel Floor Hi Radiation
13. DAN 902(3)-3 A-3(F-14) Reactor building Vent Hi-Hi Radiation

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

RA3

Initiating Condition:

Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R2) to maintain plant safety functions.

Table R2 – Areas Requiring Continuous Occupancy
• Main Control Room (Unit 2 ARM Station #22) • Central Alarm Station (by survey)

Basis:

This EAL addresses increased radiation levels that impact continued operation in areas requiring continuous occupancy to maintain safe operation or to perform a safe shutdown.

The cause and/or magnitude of the increase in radiation levels is not a concern of this EAL. The Emergency Director must consider the source or cause of the increased radiation levels and determine if any other EAL may be involved.

Areas requiring continuous occupancy include Main Control Room and the Central Alarm Station (CAS).

Basis Reference(s):

1. NEI 99-01, Rev. 5 AA3
2. DOP 1800-01 Area Radiation Monitors
3. FSAR Section 3.2 Classification of Structures, Components and Systems
4. General Arrangement Drawings M-3, M-4, M-4A, M-5 and M-10
5. DEOP 300-2, Radioactivity Release Control

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

RU3

Initiating Condition:

Fuel clad degradation.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Fuel clad degradation resulting in **EITHER**:

- Offgas system radiation monitor **HI-HI** alarm.

  OR

- Specific coolant activity **> 4.0 uCi/gm** Dose Equivalent I-131.

Basis:

This EAL is included because it is a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant.

Escalation of this EAL to the Alert level is via the Fission Product Barriers.

Threshold #1 Basis:

Conditions that cause the monitor to alarm that are not related to fuel clad degradation should not result in the declaration of an Unusual Event.

This threshold addresses site-specific radiation monitor readings that provide indication of a degradation of fuel clad integrity.

Threshold #2 Basis:

An Unusual Event is only warranted when actual fuel clad damage is the cause of the elevated coolant sample (as determined by laboratory confirmation). Fuel clad damage should be assumed to be the cause of elevated Reactor Coolant activity unless another cause is known.

This threshold addresses coolant samples exceeding coolant technical specifications for transient iodine spiking limits.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU4
2. Technical Specifications 3.4.6, RCS Specific Activity
3. DAN 902(3)-3 C-2(D-2) Off Gas Rad Monitor Hi-Hi
4. Technical Specifications 3.7.6, Main Condenser Offgas
5. DGA 16 Coolant High Activity/Fuel Element Failure

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FG1

Initiating Condition:

Loss of ANY two barriers AND Loss or Potential Loss of the third barrier.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the General Emergency classification level each barrier is weighted equally.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-1

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FS1

Initiating Condition:

Loss or Potential Loss of ANY two barriers.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the Site Area Emergency classification level, each barrier is weighted equally.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-1

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FA1

Initiating Condition:

ANY Loss or ANY Potential Loss of either Fuel Clad or RCS.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the Alert classification level, Fuel Cladding and RCS barriers are weighted more heavily than the Containment barrier. Unlike the Containment barrier, loss or potential loss of either the Fuel Cladding or RCS barrier may result in the relocation of radioactive materials or degradation of core cooling capability. Note that the loss or potential loss of Containment barrier in combination with loss or potential loss of either Fuel Cladding or RCS barrier results in declaration of a Site Area Emergency under EAL FS1.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-1

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FU1

Initiating Condition:

ANY Loss or ANY Potential Loss of Containment.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

The Primary Containment Barrier includes the drywell, respective interconnecting paths, and other connections up to and including the outermost containment isolation valves. Containment Barrier thresholds are used primarily as discriminators for escalation from an Alert to a Site Area Emergency or a General Emergency.

The Containment Barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (i.e., Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment Barrier status is addressed by Technical Specifications.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-1

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FC1

Initiating Condition:

Primary Coolant Activity Level.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

Coolant activity **> 300 uCi/gm** Dose Equivalent I-131.

Basis:

300 uCi/gm Dose Equivalent I-131 is well above that expected for iodine spikes and corresponds to less than 5% fuel clad damage. This amount of radioactivity indicates significant clad damage and thus the Fuel Clad Barrier is considered lost.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. DGA-16, Coolant High Activity / Fuel Element Failure

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FC2

Initiating Condition:

Reactor Vessel Water Level

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. RPV level **cannot** be restored and maintained **> – 164 inches.**

POTENTIAL LOSS

2. RPV level **cannot** be restored and maintained **> – 143 inches.** (TAF).

   OR

3. RPV level **cannot** be determined.

Basis:

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the Technical Support Guidelines.

Determination of “restore and maintained” is based on the actions driven by Emergency Operating Procedures to restore level. The inability to reverse the RPV level lowering trend after lining up injection sources and injecting, including the use of low pressure systems following an Emergency Depressurization would warrant classification.

Loss Threshold #1 Basis:

This corresponds to the level used in EOPs to indicate challenge of core cooling.

Potential Loss Thresholds #2 and #3 Basis:

This threshold is the same as the RCS barrier Loss threshold and corresponds to the water level at the top of the active fuel. Thus, this threshold indicates a Potential Loss of the Fuel Clad barrier and a Loss of RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

Since the loss of ability to determine if adequate core cooling is being provided presents a significant challenge to the fuel clad barrier, a potential loss of the fuel clad barrier is specified.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FC2 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. DEOP 100 RPV Control
3. DEOP 400-5 Failure to Scram
4. DEOP 400-1 RPV Flooding
5. DEOP 0010-00 Guidelines for Use of Dresden Emergency Operating Procedures and Severe Accident Management Guidelines
6. Technical Support Guidelines

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FC5

Initiating Condition:

Primary Containment Radiation Monitoring

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

Drywell radiation monitor reading **> 6.70E+02 R/hr**.

Basis:

The Drywell radiation monitor reading is a value, which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the drywell.

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 Loss threshold. Thus, this threshold indicates a loss of both Fuel Clad barrier and RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. Core Damage Assessment Methodology

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FC7

Initiating Condition:

Emergency Director Judgment.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. Any condition in the opinion of the Emergency Director that indicates Loss of the Fuel Clad Barrier.

POTENTIAL LOSS

2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Fuel Clad Barrier.

Basis:

These thresholds address 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 threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC2

Initiating Condition:

Reactor Vessel Water Level

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. RPV level **cannot** be restored and maintained **> –143 inches**. (TAF).

   OR

2. RPV level **cannot** be determined.

Basis:

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the Technical Support Guidelines.

Determination of “restore and maintained” is based on the actions driven by Emergency Operating Procedures to restore level. The inability to reverse the RPV level lowering trend after lining up injection sources and injecting, including the use of low pressure systems following an Emergency Depressurization would warrant classification.

This threshold is the same as Fuel Clad Barrier Potential Loss threshold and corresponds to a challenge to core cooling. Thus, this threshold indicates a Loss of RCS barrier and Potential Loss of Fuel Clad barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. DEOP100 RPV Control
3. DEOP 0010-00 Guidelines for Use of Dresden Emergency Operating Procedures and Severe Accident Management Guidelines
4. Technical Support Guidelines

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC3

Initiating Condition:

Primary Containment Conditions

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. Drywell pressure **> 2.0 psig**.

   AND

2. Drywell pressure rise due to RCS leakage.

Basis:

The primary containment pressure is based on the drywell high pressure set point which indicates a LOCA by automatically initiating ECCS.

The second threshold focuses the fission product barrier loss threshold on a failure of the RCS instead of the non-LOCA malfunctions that may adversely affect primary containment pressure. Pressures of this magnitude can be caused by non-LOCA events such as a loss of drywell cooling or inability to control primary containment vent/purge.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. Technical Specifications Table 3.3.5.1-1
3. DAN 902(3)-5 D-11
4. DEOP 100 RPV Control
5. DEOP 200-1 Primary Containment Control

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC4

Initiating Condition:

RCS Leak Rate

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. UNISOLABLE Main Steam Line (MSL), Isolation Condenser, HPCI, Feedwater, or RWCU line break.

   OR

2 Emergency RPV Depressurization is required.

POTENTIAL LOSS

3. RCS leakage **> 50 gpm** inside the drywell.

   OR

4. UNISOLABLE primary system leakage outside drywell resulting in **EITHER:**

   - Secondary Containment area temperatures **> DEOP 300-1, Maximum Normal** operating levels.

     OR

   - Secondary Containment radiation levels **> DEOP 300-1, Maximum Normal** operating levels.

Basis:

UNISOLABLE – is a breach or leak that cannot be promptly isolated.

Promptly allows for actions to be taken to isolate the leak. Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

Loss Thresholds #1 Basis :

An UNISOLABLE MSL break is a breach of the RCS barrier. Thus, this threshold is included for consistency with the Alert emergency classification level.

Other large high-energy line breaks such as HPCI, Feedwater, RWCU, or Isolation Condenser that are UNISOLABLE also represent a significant loss of the RCS barrier and should be considered for purposes of classification.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC4 (cont)

Basis (cont):

Classification of a system break over system leakage is based on information available to the Control Room from the event. Indications that should be considered are:

- Reports describing magnitude of steam or water release.
- Use of system high flow alarms / indications, if available,
- Significant changes in makeup requirements,
- Abnormal reactor water level changes in response to the event.

The use of the above indications provides the Control Room the bases to determine that the on going event is more significant than the indications that would be expected from system leakage and therefore should be considered a system break.

Loss Thresholds #2 Basis:

Plant symptoms requiring Emergency RPV Depressurization per the EOPs are indicative of a loss of the RCS barrier. If Emergency RPV depressurization is required, the plant operators are directed to open safety relief valves (SRVs) and keep them open. Even though the RCS is being vented into the torus, a loss of the RCS should be considered to exist due to the diminished effectiveness of the RCS pressure barrier to a release of fission products beyond its boundary.

Potential Loss Threshold #3 Basis:

This threshold is based on leakage 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 uncovery is not a significant concern for a 50 gpm leak, however, break propagation leading to significantly larger loss of inventory is possible.

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.

If primary system leak rate information is unavailable, other indicators of RCS leakage should be used.

Potential Loss Threshold #4 Basis:

Potential loss of RCS based on primary system leakage outside the primary containment is determined from site specific temperature or area radiation Maximum Normal setpoints in the areas of the main steam line tunnel, main turbine generator, HPCI, etc., which indicate a direct path from the RCS to areas outside primary containment.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC4 (cont)

Basis: (cont)

The indicators reaching the threshold values and confirmed to be caused by unisolable RCS leakage warrant an Alert classification. An unisolable leak which is indicated by a Maximum Safe setpoint escalates to a Site Area Emergency when combined with Containment Barrier Loss threshold (after a containment isolation) and a General Emergency when the Fuel Clad Barrier criteria is also exceeded.

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.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. M-12, M-345, Main steam piping
3. Technical Specifications 3.4.4 RCS Operational LEAKAGE
4. Technical Specifications Section 3.4.5, RCS Leakage Detection Instrumentation
5. DAN 902(3)-4 A-17 DRYWELL EQUIP SUMP LVL HI-HI
6. DAN 902(3)-4 H-18 DRYWELL FLOOR DRN SUMP LVL HI-HI
7. DOA 0040-01 SLOW LEAK
8. DOP 2000-24 DRYWELL SUMP OPERATION
9. DEOP 300-1, Secondary Containment Control
10. UFSAR Section 5.2.5

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC5

Initiating Condition:

Primary Containment Radiation Monitoring

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

Drywell Radiation monitor reading **> 100 R/hr.**

Basis:

The Drywell Radiation monitor reading is a value, which indicates the release of reactor coolant to the primary containment.

This reading is less than that specified for Fuel Clad barrier Loss. Thus, this threshold would be indicative of a RCS leak only. If the radiation monitor reading increased to that value specified by Fuel Clad Barrier threshold, fuel damage would also be indicated.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. Calc. EP-EAL-0611

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC7

Initiating Condition:

Emergency Director Judgment.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. Any condition in the opinion of the Emergency Director that indicates Loss of the RCS Barrier.

POTENTIAL LOSS

2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the RCS Barrier.

Basis:

These thresholds address 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 threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT2

Initiating Condition:

Reactor Vessel Water Level

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

POTENTIAL LOSS

Plant conditions indicate that Primary Containment Flooding is required.

Basis:

There is no Loss threshold associated with this item.

The potential loss requirement for Primary Containment Flooding indicates adequate core cooling cannot be established and maintained and that core melt is possible. Entry into Severe Accident Management Guidelines is a logical escalation in response to the inability to maintain adequate core cooling.

The condition in this potential loss threshold represents a potential core melt sequence which, if not corrected, could lead to vessel failure and increased potential for containment failure. In conjunction with Reactor Vessel water level “Loss” thresholds in the Fuel Clad and RCS barrier columns, this threshold will result in the declaration of a General Emergency -- loss of two barriers and the potential loss of a third.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. DEOP 100 RPV Control
3. DEOP 400-5 Failure to Scram
4. DEOP 400-1 RPV Flooding
4. Severe Accident Management Guidelines

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT3

Initiating Condition:

Primary Containment Conditions

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. Rapid unexplained drop in Drywell Pressure following initial pressure rise.

   OR

2. Drywell pressure response **not** consistent with LOCA conditions.

POTENTIAL LOSS

3. Drywell pressure **≥ 62 psig** and rising.

   OR

4. a. Drywell or torus hydrogen concentration **≥ 6%.**

      AND

   b. Drywell or torus oxygen concentration **≥ 5%.**

   OR

5. Heat Capacity Limit (DEOP 200-1 Fig. M) exceeded.

Basis:

Loss Threshold #1 and #2 Basis

Rapid unexplained drop in pressure (i.e., not attributable to drywell spray or condensation effects) following an initial pressure rise from a high energy line break indicates a loss of containment integrity. Primary containment pressure should rise as a result of mass and energy release into containment from a LOCA. Thus, primary containment pressure not rising under these conditions indicates a loss of containment integrity.

This indicator relies on operator recognition of an unexpected response for the condition and therefore does not have a specific value associated with it. The unexpected response is important because it is the indicator for a containment breach condition.

Potential Loss Threshold #3 Basis:

Drywell pressure is based on the primary containment design pressure.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT3 (cont)

Basis (cont):

Potential Loss Threshold #4 Basis:

Explosive mixtures in the primary containment are assumed to be elevated concentrations of hydrogen and oxygen.

Potential Loss Threshold #5 Basis:

The Heat Capacity Limit is a function of torus temperature and water level. It is utilized to preclude failure of the containment and equipment in the containment necessary for the safe shutdown of the plant and therefore, the inability to maintain plant parameters below the limit constitutes a potential loss of containment.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. UFSAR 6.2.1.3.2.1
3. UFSAR Table 6.2-3
4. UFSAR 15.6.5
5. UFSAR 6.2.1.1
6. DEOP 200-1 Primary Containment Control
7. DEOP 200-2 Hydrogen Control

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT5

Initiating Condition:

Primary Containment Radiation Monitoring

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

POTENTIAL LOSS

Drywell radiation monitor reading **> 1.60 E+03 R/hr**.

Basis:

The Drywell radiation monitor reading is a value that indicates significant fuel damage well in excess of that required for loss of RCS and Fuel Clad.

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.

There is no Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. Core Damage Assessment Methodology

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT6

Initiating Condition:

Primary Containment Isolation Failure or Bypass

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. a. Failure of isolation valves in any one line to close.

   AND

   b. Direct downstream pathway to the environment exists after a primary containment isolation signal.

   OR

2. Intentional venting/purging of Primary Containment per EOPs or SAMGs due to accident conditions.

   OR

3. UNISOLABLE primary system leakage outside drywell resulting in **EITHER:**

   - Secondary Containment area temperatures **> DEOP 300-1, Maximum Safe** operating levels.

     OR

   - Secondary Containment radiation levels **> DEOP 300-1, Maximum Safe** operating levels.

Basis:

UNISOLABLE – is a breach or leak that cannot be promptly isolated.

Promptly allows for actions to be taken to isolate the leak. Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

These thresholds address incomplete containment isolation that allows direct release to the environment.

Loss Threshold #1 Basis

This threshold addresses failure of open isolation devices, which should close upon receipt of a manual or automatic containment isolation signal resulting in a significant radiological release pathway to the environment. The concern is the unisolable open pathway to the environment. A failure of the ability to isolate any one line indicates a breach of primary containment integrity.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT6 (cont)

Basis (cont):

Failure of containment isolation valves to isolate with a downstream pathway to the environment following an automatic or manual isolation signal is only a concern during an event requiring mitigation by the Primary Containment barrier. If this condition exists during normal Power Operation, a Technical Specification Action Statement will address it. However, during events requiring Primary Containment integrity, this will represent a breach of Primary Containment.

The use of the modifier “direct” in defining the release path discriminates against release paths through interfacing liquid systems. The existence of an in–line charcoal filter does not make a release path indirect since the filter is not effective at removing fission product noble gases. Typical filters have an efficiency of 95-99% removal of iodine. Given the magnitude of the core inventory of iodine, significant releases could still occur. In addition, since the fission product release would be driven by boiling in the reactor vessel, the high humidity in the release stream can be expected to render the filters ineffective in a short period.

Leakage into a closed system is to be considered only if the closed system is breached and thereby creates a significant pathway to the environment. Examples include unisolable Main Steamline, HPCI steamline breaks, unisolable RWCU system breaks, and unisloable containment atmosphere vent paths. Minor release paths such as instrument and sample lines are not considered under this threshold.

Examples of “downstream pathway to the Environment” could be through Turbine/Condenser, or direct release to the Turbine or Reactor Building.

Loss Threshold #2 Basis:

EOPs may direct containment isolation valve logic(s) to be intentionally bypassed, regardless of radioactivity release rates. Under these conditions with a valid containment isolation signal, the containment should also be considered lost if containment venting is actually performed.

Intentional venting of primary containment for primary containment pressure or combustible gas control per EOPs to the secondary containment and/or the environment is considered a loss of containment. Containment venting for pressure control when not in an accident situation should not be considered.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT6 (cont)

Basis (cont):

Loss Threshold #3 Basis:

The presence of area radiation or temperature above Maximum Safe Operating setpoints indicating unisolable primary system leakage outside the primary containment are addressed after a containment isolation. The indicators should be confirmed to be caused by RCS 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.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. DEOP 200-1 Primary Containment Control
3. DEOP 200-2 Hydrogen Control
4. DEOP 500-4 Containment Venting
5. DEOP 300-1 Secondary Containment Control

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT7

Initiating Condition:

Emergency Director Judgment

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. Any condition in the opinion of the Emergency Director that indicates Loss of the Containment barrier.

POTENTIAL LOSS

2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment barrier.

Basis:

These thresholds address any other factors that are to be used by the Emergency Director in determining whether the Containment barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

The Containment barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment barrier status is addressed by Technical Specifications.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MG1

Initiating Condition:

Prolonged loss of all Off-site and all On-Site AC power to emergency busses.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to unit ECCS busses.

   AND

2. Failure of DG 2(3), shared DG 2/3 and SBO DG 2(3) emergency diesel generators to supply power to unit ECCS busses.

   AND

3. a. Restoration of at least one unit ECCS bus in **< 4 hours** is **not** likely.

      OR

   b. RPV level **cannot** be determined to be **> - 143 inches** (TAF).

Basis:

Loss of all AC power to emergency busses compromises all plant safety systems requiring electric power including ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all AC power to emergency busses will lead to loss of fuel clad, RCS, and containment, thus warranting declaration of a General Emergency.

This EAL is specified to assure that in the unlikely event of a prolonged station blackout, timely recognition of the seriousness of the event occurs and that declaration of a General Emergency occurs as early as is appropriate, based on a reasonable assessment of the event trajectory.

The likelihood of restoring at least one emergency bus should be based on a realistic appraisal of the situation since a delay in an event classification escalation decision based on only a chance of mitigating the event could result in a loss of valuable time in preparing and implementing public protective actions.

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the Technical Support Guidelines.

In addition, under these conditions, fission product barrier monitoring capability may be degraded.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MG1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 SG1
2. UFSAR 8.3
3. 12E-2302A, Station Key Diagram 4160V and 480V Switchgears Part 1
4. DOA-6400-01, 138-kV System and 345-kV Alternate Supply Failure
5. DOA 6500-01 4-KV Bus Failure
6. UFSAR Fig. 9.5-14 Single-Line Electrical Diagram of Station Blackout Generator Ties to Plant Auxiliary Electric System
7. UFSAR 9.5.9
8. DOP 6620-05, Powering Unit 2(3) 4-KV Busses via the SBO D/G 2(3)
9. DGA-12 Partial or Complete Loss of AC Power
10. DEOP100 RPV Control
11. DEOP 0010-00 Guidelines for Use of Dresden Emergency Operating Procedures and Severe Accident Management Guidelines

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MS1

Initiating Condition:

Loss of all Off-site and all On-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to unit ECCS busses.

   AND

2. Failure of DG 2(3), shared DG 2/3 and SBO DG 2(3) emergency diesel generators to supply power to unit ECCS busses.

   AND

3. Failure to restore power to at least one ECCS bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.

Basis:

Loss of all AC power to emergency busses compromises all plant safety systems requiring electric power including ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all AC power to emergency busses will lead to loss of Fuel Clad, RCS, and Containment, thus this event can escalate to a General Emergency.

Fifteen minutes was selected as a threshold to exclude momentary losses of off-site power.

Escalation to General Emergency is via Fission Product Barrier Degradation or MG1, "Prolonged Loss of All Off-site Power and Prolonged Loss of All On-site AC Power."

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MS1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 SS1
2. UFSAR 8.3
3. 12E-2302A, Station Key Diagram 4160V and 480V Switchgears Part 1
4. DOA-6400-01, 138-kV System and 345-kV Alternate Supply Failure
5. DOA 6500-01 4KV Bus Failure
6. UFSAR Fig. 9.5-14 Single-Line Electrical Diagram of Station Blackout Generator Ties to Plant Auxiliary Electric System
7. UFSAR 9.5.9
8. DOP 6620-05, Powering Unit 2(3) 4KV Busses via the SBO D/G 2(3)
9. DGA-12 Partial or Complete Loss of AC Power

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MA1

Initiating Condition:

AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. AC power capability to unit ECCS busses reduced to only one of the following power sources for **≥ 15 minutes**:
   - Reserve auxiliary transformer TR-22(TR-32)
   - Unit auxiliary transformer TR-21(TR-31)
   - Unit Emergency Diesel Generator DG 2(3)
   - Shared Emergency Diesel Generator DG 2/3
   - Station Blackout Diesel Generator SBO DG 2(3)
   - Unit crosstie breakers

   AND

2. Any additional single power source failure will result in unit blackout.

Basis:

Capability: (pertaining to electrical power supplies) is equipment that is available to provide and maintain AC power at the required voltage and frequency for the required load.

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. Another related condition could be the loss of all off-site power and loss of on-site emergency generators with only one train of emergency busses being backfed from the unit main generator, or the loss of on-site emergency generators with only one train of emergency busses being backfed from off-site power. The subsequent loss of this single power source would escalate the event to a Site Area Emergency in accordance with MS1.

Fifteen minutes was selected as a threshold to exclude momentary losses of power.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MA1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 SA5
2. UFSAR 8.3
3. 12E-2302A, Station Key Diagram 4160V and 480V Switchgears Part 1
4. DOA-6400-01, 138 KV System and 345 KV Alternate Supply Failure
5. DOA 6500-01 4KV Bus Failure
6. UFSAR Fig. 9.5-14 Single-Line Electrical Diagram of Station Blackout Generator Ties to Plant Auxiliary Electric System
7. UFSAR 9.5.9 Station Blackout System
8. DOP 6620-05, Powering Unit 2(3) 4KV Busses via the SBO D/G 2(3)
9. DGA-12 Partial or Complete Loss of AC Power

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MU1

Initiating Condition:

Loss of all Off-site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of all off-site AC power to unit ECCS busses for **≥ 15 minutes**.

Basis:

Prolonged loss of off-site 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 to emergency busses.

Fifteen minutes was selected as a threshold to exclude momentary losses of off-site power.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU1
2. UFSAR 8.3
3. 12E-2302A, Station Key Diagram 4160V and 480V Switchgears Part 1
4. DOA-6400-01, 138 kV System and 345 kV Alternate Supply Failure
5. DOA 6500-01 4kV Bus Failure
6. UFSAR Fig. 9.5-14 Single-Line Electrical Diagram of Station Blackout Generator Ties to Plant Auxiliary Electric System
7. UFSAR 9.5.9
8. DOP 6620-05, Powering Unit 2(3) 4kV Busses via the SBO D/G 2(3)
9. DGA-12 Partial or Complete Loss of AC Power

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MG2

Initiating Condition:

Automatic Scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic scram was **not** successful as indicated by Reactor Power **> 6%.**

   AND

2. Manual scram/ARI actions were **not** successful as indicated by Reactor Power **> 6%.**

   AND

3. **EITHER** of the following exists:

   - RPV level **cannot** be restored and maintained **> – 164 inches**.

     OR

   - Heat Capacity Limit (DEOP 200-1 Fig. M) exceeded.

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful.

The third condition of this EAL indicates an extreme challenge to the ability to cool the core as indicated when RPV level cannot be restored and maintained above the Minimum Steam Cooling RPV Water Level or a challenge to Containment for energy transfer from the RPV as indicated by exceeding the Heat Capacity Limit. RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the Technical Support Guidelines.

In the event either of these challenges exists at a time that the reactor has not been brought below the power associated with the safety system design a core melt sequence exists. In this situation, core degradation can occur rapidly. For this reason, the General Emergency declaration is intended to be anticipatory of the fission product barrier table declaration to permit maximum off-site intervention time.

Determination of “restore and maintained” is based on the actions driven by Emergency Operating Procedures to restore level. The inability to reverse the RPV level lowering trend after lining up injection sources and injecting, including the use of low pressure systems following an Emergency Depressurization would warrant classification.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MG2 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 SG2
2. DEOP 100 RPV Control
3. DEOP 400-5 Failure to Scram
4. DEOP 200-1 Primary Containment Control
5. Technical Support Guidelines

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MS2

Initiating Condition:

Automatic Scram fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic scram was **not** successful as indicated by Reactor Power **> 6%.**

   AND

2. Manual scram/ARI actions were **not** successful from the Reactor Console as indicated by Reactor Power **> 6%.**

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful. A Site Area Emergency is warranted because conditions exist that lead to IMMINENT loss or potential loss of both fuel clad and RCS.

Manual actions taken at the reactor control console are any set of actions by the reactor operator(s) at which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

Manual actions are not considered successful if action away from the reactor control console is required to scram the reactor. This EAL is still applicable even if actions taken away from the reactor control console are successful in shutting the reactor down because the design limits of the fuel may have been exceeded or because of the gross failure of the Reactor Protection System to shutdown the plant.

Escalation of this event to a General Emergency would be due to a prolonged condition leading to an extreme challenge to either core-cooling or heat removal.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SS2
2. DEOP 100 RPV Control
3. DEOP 400-5 Failure to Scram
4. DEOP 200-1 Primary Containment Control

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MA2

Initiating Condition:

Automatic Scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic scram was **not** successful as indicated by Reactor Power **> 6%**.

   AND

2. Manual scram/ARI actions were successful from Reactor Console as indicated by Reactor Power **≤ 6%**.

Basis:

Manual actions taken at the reactor control console are any set of actions by the reactor. operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

This condition indicates failure of the automatic protection system to scram the reactor in response to exceeding reactor protective system setpoints during a plant transient. Associated RPS instrument failures during non-transient plant conditions would be addressed by Technical Specifications. This condition is more than a potential degradation of a safety system in that a front line automatic protection system did not function in response to a plant transient. Thus the plant safety has been compromised because design limits of the fuel may have been exceeded. An Alert is indicated because conditions may exist that lead to potential loss of fuel clad or RCS and because of the failure of the Reactor Protection System to automatically shutdown the plant.

If manual actions taken at the reactor control console fail to shutdown the reactor, the event would escalate to a Site Area Emergency.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SA2
2. Technical Specifications Table 3.3.1.1-1
3. DEOP 100 RPV Control
4. DEOP 400-5 Failure to Scram

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MU2

Initiating Condition:

Inadvertent criticality.

Operating Mode Applicability:

3

EAL Threshold Values:

UNPLANNED sustained positive period observed on nuclear instrumentation.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL addresses inadvertent criticality events. This EAL excludes inadvertent criticalities that occur during planned reactivity changes associated with reactor startups (e.g., criticality earlier than estimated). This condition can be identified using period monitors. The term “sustained“ is used in order to allow exclusion of expected short term positive periods from planned control rod movements. Escalation would be by the Fission Product Barrier.

This EAL indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU8
2. Technical Specifications 3.3.1.2
3. DOS 0700-01 SRM Functional Test
4. DAN 902(3)-5 E-4 SRM Short Period

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MS3

Initiating Condition:

Loss of all vital DC power for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of all vital DC power based on **< 105 VDC** on 125 VDC battery busses #2 and #3 for **≥ 15 minutes**.

Basis:

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power will cause core uncovering and loss of containment integrity when there is significant decay heat and sensible heat in the reactor system.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Escalation to a General Emergency would occur by Abnormal Rad Levels/Radiological Effluent, Fission Product Barrier Degradation.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SS3
2. UFSAR 8.3.2
3. DOA 6900-02(3) Failure of Unit 2(3) 125 VDC Power Supply
4. Technical Specification B.3.8.4, DC Power Sources - Operating

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MS4

Initiating Condition:

Inability to monitor a SIGNIFICANT TRANSIENT in progress.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**
   - Safety System annunciators (Table M1)
     OR
   - Safety System indications (Table M1)

Table M1 – Safety Systems
• ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring

AND

2. SIGNIFICANT TRANSIENT in progress (Table M2).

Table M2 – Significant Transients
• Turbine trip • Reactor scram • ECCS actuation • Recirc. Runback **> 25%** Reactor Power change • Thermal power oscillations **> 10 %** Reactor Power change

AND

3. Compensatory indications (computer points) are unavailable.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MS4 (cont)

Basis:

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) Turbine Trip (2) Reactor Scram (3) ECCS Activation, (4) Recirc. Runback > 25% Reactor Power change, or (5) thermal power oscillations > 10% Reactor Power change.

This EAL is intended to recognize the threat to plant safety associated with the complete loss of capability of the control room staff to monitor plant response to a SIGNIFICANT TRANSIENT.

"Planned" and “UNPLANNED” actions are not differentiated since the loss of instrumentation of this magnitude is of such significance during a transient that the cause of the loss is not a factor.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

A Site Area Emergency is considered to exist if the control room staff cannot monitor safety systems needed for protection of the public while a significant transient is in progress.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MS4 (cont)

Basis (cont):

Indications needed to monitor safety systems necessary for protection of the public must include control room indications; computer generated indications and dedicated annunciation capability. The specific parameters are those used to determine such functions as the ability to shut down the reactor, maintain the core cooled and in a coolable geometry, remove heat from the core, and maintain the reactor coolant system and primary containment.

"Compensatory indications" in this context includes computer based information. This includes all computer systems available for this use.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SS6
2. DEOP 100 RPV Control
3. DEOP 200-1 Primary Containment Control
4. UFSAR 7.5.2
5. UFSAR 7.5.3
6. DOP 9900-201 Restarting the Process Computer
7. DOP 9900-205 Safety Parameter Display System (SPDS)

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MA4

Initiating Condition:

UNPLANNED Loss of safety system annunciation or indication in the control room with EITHER (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**
   - Safety System annunciators (Table M1)

     OR
   - Safety System indications (Table M1)

Table M1 – Safety Systems
• ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring

AND

2. a. SIGNIFICANT TRANSIENT in progress (Table M2).

Table M2 – Significant Transients
• Turbine trip • Reactor scram • ECCS actuation • Recirc. Runback **> 25%** Reactor Power change • Thermal power oscillations **> 10 %** Reactor Power change

OR

b. Compensatory indications (computer points) are unavailable.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MA4 (cont)

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) Turbine Trip (2) Reactor Scram (3) ECCS Activation, (4) Recirc. Runback > 25% Reactor Power change, or (5) thermal power oscillations > 10% Reactor Power change

This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a SIGNIFICANT TRANSIENT.

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

"Compensatory indications" in this context includes computer based information. If both a major portion of the annunciation system and all computer monitoring are unavailable, the Alert is required.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

This Alert will be escalated to a Site Area Emergency if the operating crew cannot monitor the transient in progress due to a concurrent loss of compensatory indications with a SIGNIFICANT TRANSIENT in progress during the loss of annunciation or indication.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MA4 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 SA4
2. UFSAR 7.5.2
3. UFSAR 7.5.3
4. DOP 9900-201 Restarting the Process Computer
5. DOP 9900-205 Safety Parameter Display System (SPDS)

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MU4

Initiating Condition:

UNPLANNED loss of safety system annunciation or indication in the control room for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**

- Safety System annunciators (Table M1)

  OR

- Safety System indications (Table M1)

Table M1 – Safety Systems
• ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment.

Recognition of the availability of computer based indication equipment is considered.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MU4 (cont)

Basis (cont):

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

Fifteen minutes was selected as a threshold to exclude momentary power losses.

This Unusual Event will be escalated to an Alert based on a concurrent loss of compensatory indications or if a SIGNIFICANT TRANSIENT is in progress during the loss of annunciation or indication.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU3
2. UFSAR 7.5.2
3. UFSAR 7.5.3
4. DOP 9900-201 Restarting the Process Computer
5. DOP 9900-205 Safety Parameter Display System (SPDS)

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MU5

Initiating Condition:

RCS leakage.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

1. Unidentified or pressure boundary leakage into the Drywell **> 10 gpm**.

   OR

2. Identified leakage into the Drywell **> 25 gpm**.

Basis:

This EAL is included as an Unusual Event because it may be a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified or pressure boundary leakage was selected as it is observable with normal control room indications. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances).

Relief valve operation should be excluded from this EAL.

The EAL for identified leakage is set at a higher value due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage. In either case, escalation of this EAL to the Alert level is via Fission Product Barrier.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU5
2. UFSAR 5.2.5
3. Technical Specifications 3.4.4
4. Technical Specifications 3.4.5
5. Unit 2(3) Appendix A Unit NSO Daily Surveillance Log
6. DAN 902(3)-4 A-17 Drywell Equip Sump Lvl HI-HI
7. DAN 902(3)-4 H-18 Drywell Floor Drn Sump Lvl HI-HI
8. DOA 0040-01 Slow Leak
9. DOP 2000-24 Drywell Sump Operation
10. DGP 02-02 Reactor Vessel Slow Fill

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MU6

Initiating Condition:

Loss of all On-site or Off-site communications capabilities.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

1. Loss of all Table M3 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table M3 **Offsite** communications capability affecting the ability to perform offsite notifications.

Table M3 – Communications Capability

System	Onsite	Offsite
Plant Radio System	X	
Plant Paging System	X	
Sound Power Phones	X	
In-Plant Telephones	X	
All telephone lines (commercial and microwave)		X
ENS		X
Satellite Phones		X
HPN		X
Cellular Phones		X

Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MU6 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU6
2. EP-MW-124-1001 Facilities Inventories and Equipment Tests
3. UFSAR 9.5.2
4. DOA 0010-14 Loss of Off-Site Telephone Communication Systems

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

MU7

Initiating Condition:

Inability to reach required shutdown within Technical Specification limits.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Plant is **not** brought to required operating mode within Technical Specifications LCO Action Statement time.

Basis:

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 Unusual Event is required when the plant is not brought 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**.**

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU2
2. Dresden Technical Specifications

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA1

Initiating Condition:

Loss of all Off-site and all On-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to unit ECCS busses.

   AND

2. Failure of DG 2(3), shared DG 2/3 and SBO DG 2(3) emergency diesel generators to supply power to unit ECCS busses.

   AND

3. Failure to restore power to at least one unit ECCS bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.

Basis:

Loss of all AC power compromises all plant safety systems requiring electric power including ECCS, Containment Heat Removal, Spent Fuel Heat Removal and the Ultimate Heat Sink.

The event can be classified as an Alert when in cold shutdown, refueling, or defueled mode because of the significantly reduced decay heat and lower temperature and pressure, increasing the time to restore one of the emergency busses, relative to that specified for the Site Area Emergency EAL.

Escalating to Site Area Emergency, if appropriate, is by Abnormal Rad Levels / Radiological Effluent EALs.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 CA3
2. UFSAR 8.3
3. 12E-2302A, Station Key Diagram 4160V and 480V Switchgears Part 1
4. DOA-6400-01, 138 KV System and 345 KV Alternate Supply Failure
5. DOA 6500-01 4KV Bus Failure
6. UFSAR Fig. 9.5-14
7. UFSAR 9.5.9
8. DOP 6620-05, Powering Unit 2(3) 4KV Busses via the SBO D/G 2(3)
9. DGA-12 Partial or Complete Loss of AC Power

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU1

Initiating Condition:

AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. AC power capability to unit ECCS busses reduced to only one of the following power sources for **≥ 15 minutes**:
   - Reserve auxiliary transformer TR-22(TR-32)
   - Unit auxiliary transformer TR-21(TR-31)
   - Unit Emergency Diesel Generator DG 2(3)
   - Shared Emergency Diesel Generator DG 2/3
   - Station Blackout Diesel Generator SBO DG 2(3)
   - Unit crosstie breakers

   AND

2. Any additional single power source failure will result in unit blackout.

Basis:

Capability: (pertaining to electrical power supplies) is equipment that is available to provide and maintain AC power at the required voltage and frequency for the required load.

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. The subsequent loss of this single power source would escalate the event to an Alert in accordance with CA1.

Fifteen minutes was selected as a threshold to exclude momentary losses of power.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU3
2. UFSAR 8.3
3. 12E-2302A, Station Key Diagram 4160V and 480V Switchgears Part 1
4. DOA-6400-01, 138 KV System and 345 KV Alternate Supply Failure
5. DOA 6500-01 4KV Bus Failure
6. UFSAR Fig. 9.5-14 Single-Line Electrical Diagram of Station Blackout Generator Ties to Plant Auxiliary Electric System
7. UFSAR 9.5.9 Station Blackout System
8. DOP 6620-05, Powering Unit 2(3) 4KV Busses via the SBO D/G 2(3)
9. DGA-12 Partial or Complete Loss of AC Power

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU2

Initiating Condition:

Inadvertent criticality.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

UNPLANNED sustained positive period observed on nuclear instrumentation.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL also addresses criticality events that occur in Cold Shutdown or Refueling modes such as fuel mis-loading events. This condition can be identified using period monitors. The term “sustained” is used in order to allow exclusion of expected short term positive periods from planned fuel bundle or control rod movements during core alteration.

This EAL indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU8
2. Technical Specifications 3.3.1.2
3. DOS 0700-01 SRM Functional Test
4. DAN 902(3)-5 E-4 SRM Short Period

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU3

Initiating Condition:

Loss of required DC power for 15 minutes or longer.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of required DC power based on **< 105 VDC** on unit 125 VDC battery buses #2 and #3 for **≥ 15 minutes**.

Basis:

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.

The required busses are the minimum allowed by Technical Specifications for the mode of operation. It is intended that the loss of the operating (operable) train is to be considered. If this loss results in the inability to maintain cold shutdown, the escalation to an Alert will be per CA5.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU7
2. UFSAR 8.3.2
3. DOA 6900-02(3) Failure of Unit 2(3) 125 VDC Power Supply
4. Technical Specification B.3.8.4, DC Power Sources – Operating

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU4

Initiating Condition:

Loss of all On-site or Off-site communications capabilities.

Operating Mode Applicability:

4, 5, D

EAL Threshold Values:

1. Loss of all Table C1 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table C1 **Offsite** communications capability affecting the ability to perform offsite notifications.

Table C1 - Communications Capability

System	Onsite	Offsite
Plant Radio System	X	
Plant Paging System	X	
Sound Power Phones	X	
In-Plant Telephones	X	
All telephone lines (commercial and microwave)		X
ENS		X
Satellite Phones		X
HPN		X
Cellular Phones		X

Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU4 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU6
2. EP-MW-124-1001 Facilities Inventories and Equipment Tests
3. UFSAR 9.5.2
4. DOA 0010-14 Loss of Off-Site Telephone Communication Systems

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5

Initiating Condition:

Inability to maintain plant in cold shutdown.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 212° F** for **> Table C2 duration**.

Table C2 – RCS Reheat Duration Thresholds		
RCS	**Containment Closure**	**Duration**
Intact	N/A	60 minutes*
Not Intact	Established	20 minutes*
	Not Established	0 minutes
*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then this EAL is **not** applicable.		

OR

2. UNPLANNED RPV pressure rise **> 10 psig** as a result of temperature rise due to loss of decay heat removal.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

RCS is intact when the RCS pressure boundary is in its normal condition for the Cold Shutdown mode of operation (e.g., no freeze seals or main steam line nozzle plugs, etc.).

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5 (cont)

Basis (cont):

Threshold #1 Basis:

The RCS Reheat Duration Threshold table addresses complete loss of functions required for core cooling for greater than 60 minutes during refueling and cold shutdown modes when RCS integrity is established. The status of CONTAINMENT CLOSURE in this condition is immaterial given that the RCS is providing a high pressure barrier to fission product release to the environment. The 60 minute time frame should allow sufficient time to restore cooling without there being a substantial degradation in plant safety.

The RCS Reheat Duration Threshold table also addresses the complete loss of functions required for core cooling for greater than 20 minutes during refueling and cold shutdown modes when CONTAINMENT CLOSURE is established but RCS integrity is not established. The allowed 20 minute time frame was included to allow operator action to restore the heat removal function, if possible.

Finally, complete loss of functions required for core cooling during refueling and cold shutdown modes when neither CONTAINMENT CLOSURE nor RCS integrity are established. No delay time is allowed because the evaporated reactor coolant that may be released into the Containment during this heatup condition could also be directly released to the environment.]

The note (*) indicates that this EAL is not applicable if actions are successful in restoring an RCS heat removal system to operation and RCS temperature is being reduced within the specified time frame.

Threshold #2 Basis:

The 10 psig pressure rise due to loss of decay heat removal infers an intact RCS with uncontrolled RPV temperature rise in excess of the Technical Specification cold shutdown limit (212° F) for which CA5 Threshold #1 would permit up to sixty minutes to restore RCS cooling before declaration of an Alert. This EAL therefore covers situations of high decay heat loads, in which the event should be declared without delay.

Escalation to Site Area Emergency would be via MS8 should boiling result in significant RPV level loss leading to core uncovery.

A loss of Technical Specification components alone is not intended to constitute an Alert. The same is true of a momentary UNPLANNED excursion above the Technical Specification cold shutdown temperature limit when the heat removal function is available.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 CA4
2. Technical Specifications 3.6.1.1
3. Technical Specifications 3.6.4.1
4. OU-AA-103 Shutdown Safety Management Program
5. DGP 02-01 Unit Shutdown
6. DOA 0201-04 Loss of Vessel Flange, Shell, or Recirculation (Recirc) Loop Temperature Recorders During Heatup or Cooldown
7. DGP 02-02 Reactor Vessel Slow Fill
8. DIS 0263-19 Reactor Wide Range Pressure Transmitter Calibration Eq. Maintenance Inspection

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU5

Initiating Condition:

UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 212°F**.

   OR

2. Loss of the following for **> 15 minutes:**
   - All RCS temperature indications.

     AND

   - All RPV level indications.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL is be a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant.

In cold shutdown the ability to remove decay heat relies primarily on forced cooling flow. Operation of the systems that provide this forced cooling may be jeopardized due to the unlikely loss of electrical power or RCS inventory. Since the RCS usually remains intact in the cold shutdown mode a large inventory of water is available to keep the core covered.

During refueling the level in the RPV will normally be maintained above the RPV flange. Refueling evolutions that decrease water level below the RPV flange are carefully planned and procedurally controlled. Loss of forced decay heat removal at reduced inventory may result in more rapid increases in RCS/RPV temperatures depending on the time since shutdown.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU5 (cont)

Basis (cont):

Normal means of core temperature indication and RCS level indication may not be available in the refueling mode. Redundant means of RPV level indication are therefore procedurally installed to assure that the ability to monitor level will not be interrupted. However, if all level and temperature indication were to be lost in either the cold shutdown of refueling modes, Threshold #2 would result in declaration of an Unusual Event if both temperature and level indication cannot be restored within 15 minutes from the loss of both means of indication. Escalation to Alert would be via CA6 based on an inventory loss or CA5 based on exceeding its temperature criteria.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU4
2. Technical Specifications Table 1.1-1
3. DGP 02-01 UNIT SHUTDOWN
4. DOA 0201-04, Loss of Vessel Flange, Shell, or Recirculation (Recirc) Loop Temperature Recorders During Heatup or Cooldown
5. DGP 02-02 Reactor Vessel Slow Fill
6. DEOP 0010-00 Guidelines for Use or Dresden Emergency Operating Procedures and Severe Accident Management Guidelines
7. DEOP 100 RPV Control, Table A
8. DIP 0260-01 Refuel Outage Reactor Vessel and Cavity Level Instrumentation

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6

Initiating Condition:

Loss of RPV inventory affecting fuel clad integrity with containment challenged.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. RPV level **< -143 inches (TAF)** for **≥ 30 minutes**.

   AND

   b. Any Containment Challenge Indication (Table C4).

   OR

2. a. RPV level unknown for **≥ 30 minutes.**

   AND

   b. Loss of RPV inventory as indicated by any of the following:

   - Table C3 indication.

     OR

   - Erratic Source Range Monitor indication.

     OR

   - Refuel Floor Hi Range ARM **> 3000 mR/hr**.

   AND

   c. Any Containment Challenge Indication (Table C4)

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise
• UNPLANNED Torus level rise
• UNPLANNED vessel make up rate rise
• Observation of leakage or inventory loss

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6 (cont)

EAL Threshold Values: (cont)

Table C4 – Containment Challenge Indications
• Primary Containment Hydrogen concentration **≥ 6%** and Oxygen **≥ 5%**. • UNPLANNED rise in containment pressure • CONTAINMENT CLOSURE **not** established. • Any Secondary Containment radiation monitor **> DEOP 300-1 Maximum Safe** operating level.

Basis:

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the Technical Support Guidelines.

This EAL represents the inability to restore and maintain RPV level to above the top of active fuel with containment challenged. Fuel damage is probable if RPV level cannot be restored, as available decay heat will cause boiling, further reducing the RPV level. With the CONTAINMENT breached or challenged then the potential for unmonitored fission product release to the environment is high. This represents a direct path for radioactive inventory to be released to the environment. This is consistent with the definition of a General Emergency. The General Emergency is declared on the occurrence of the loss or IMMINENT loss of function of all three barriers.

A number of variables can have a significant impact on heat removal capability challenging the fuel clad barrier. Examples include initial vessel level and shutdown heat removal system design.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6 (cont)

Basis (cont):

Analysis indicates that core damage may occur within an hour following continued core uncovery therefore, 30 minutes was conservatively chosen.

If CONTAINMENT CLOSURE is re-established prior to exceeding the 30 minute core uncovery time limit then escalation to a General Emergency would not occur.

When RPV level indication is unavailable, the inventory loss must be detected by erratic Source Range Monitor indication, elevated drywell radiation or unexplained rise in drywell floor or equipment drain sump pumpout rate. Post-TMI studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and that Source Range Monitors can be used as a tool for making such determinations.

As water level in the RPV lowers, the dose rate above the core will rise. Indication of > 3000 mR/hr is indicative of core uncovery (i.e. level at TAF).

Basis Reference(s):

1. NEI 99-01, Rev. 5 CG1
2. DEOP 100 RPV Control
3. Technical Specifications 3.3.1.2
4. DOS 0700-01 SRM Functional Test
5. DAN 902(3)-5 E-4 SRM Short Period
6. DEOP 200-1 Primary Containment Control
7. DEOP 200-2 Hydrogen Control
8. DEOP 300-1 Secondary Containment Control
9. USAR Table 6.2-1
10. EP-EAL-0501

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6

Initiating Condition:

Loss of RPV inventory affecting core decay heat removal capability.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. With CONTAINMENT CLOSURE **not** established, RPV level **< - 60 inches**.

   OR

2. With CONTAINMENT CLOSURE established, RPV level **< -143 inches (TAF).**

   OR

3. a. RPV level unknown for **≥ 30 minutes.**

      AND

   b. Loss of RPV inventory as indicated by any of the following:

      - Table C3 indications.

        OR

      - Erratic Source Range Neutron Monitor indication.

        OR

      - Refuel Floor Hi Range ARM **> 3000 mR/hr**.

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise
• UNPLANNED Torus level rise
• UNPLANNED vessel make up rate rise
• Observation of leakage or inventory loss

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6 (cont)

Basis:

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the Technical Support Guidelines.

Under the conditions specified, a continued drop in RCS/RPV level is indicative of a loss of inventory control. Inventory loss may be due to an RCS breach, pressure boundary leakage, or continued boiling in the RPV. Thus, declaration of a Site Area Emergency is warranted.

Escalation to a General Emergency is via CG6 or RG1.

Threshold #1 and #2 Basis:

If a low-pressure boundary to fission product release does not exist (i.e., without containment closure established), the RPV level associated with this threshold is six inches below the low-low ECCS actuation setpoint. If containment closure is established, a low-pressure boundary to fission product release exists and RPV level can drop to the top of active fuel before a Site Area Emergency declaration is required. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further RPV level drop and potential core uncovery.

Threshold #3 Basis:

When RPV level indication is unavailable, the inventory loss must be detected by erratic Source Range Monitor indication, elevated drywell radiation or unexplained rise in drywell floor or equipment drain sump pumpout rate. Post-TMI studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and that Source Range Monitors can be used as a tool for making such determinations.

The 30-minute duration allows sufficient time for actions to be performed to recover inventory control equipment.

As water level in the RPV lowers, the dose rate above the core will rise. Indication of > 3000 mR/hr. is indicative of core uncovery (i.e. level at TAF).

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 CS1
2. Technical Specifications Table 3.3.5.1 1
3. UFSAR 5.2.5
4. DEOP 0010-00 Guidelines for Use or Dresden Emergency Operating Procedures and Severe Accident Management Guidelines
5. DEOP 100 RPV Control
6. Unit 2(3) Appendix A Unit NSO Daily Surveillance Log
7. DAN 902(3)-4 A-17 Drywell Equip Sump Lvl HI-HI
8. DAN 902(3)-4 H-18 Drywell Floor Drn Sump Lvl HI-HI
9. DOA 0040-01 Slow Leak
10. DOP 2000-24 Drywell Sump Operation
11. Technical Specifications 3.3.1.2

12 DOS 0700-01 SRM Functional Test

13. DAN 902(3)-5 E-4 SRM Short Period

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA6

Initiating Condition:

Loss of RPV inventory.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. RPV level **< - 54 inches**.

   OR

2. a. RPV level unknown for **≥ 15 minutes**.

      AND

   b. Loss of RPV inventory per Table C3 indications.

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise • UNPLANNED Torus level rise • UNPLANNED vessel make up rate rise • Observation of leakage or inventory loss

Basis:

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL serves as precursors to a loss of ability to adequately cool the fuel. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further RPV level decrease and potential core uncovery. This condition will result in a minimum emergency classification level of an Alert.

If RPV level continues to lower then escalation to Site Area Emergency will be via CS6.

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the Technical Support Guidelines.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA6 (cont)

Basis (cont):

Threshold #1 Basis:

The inability to restore and maintain level after reaching this setpoint would be indicative of a failure of the RCS barrier.

Threshold #2 Basis:

When RPV level indication is unavailable, the inventory loss must be detected by other means including rise in sump pumpout rates, changes in makeup or observation of leakage.

The 15-minute interval for the loss of level indication was chosen because it is half of the Site Area Emergency duration.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CA1
2. Technical Specifications Table 3.3.5.1 1
3. UFSAR 5.2.5
4. DEOP 0010-00 Guidelines for Use or Dresden Emergency Operating Procedures and Severe Accident Management Guidelines
5. DEOP 100 RPV Control
6. Unit 2(3) Appendix A Unit NSO Daily Surveillance Log
7. DAN 902(3)-4 A-17 Drywell Equip Sump Lvl HI-HI
8. DAN 902(3)-4 H-18 Drywell Floor Drn Sump Lvl HI-HI
9. DOA 0040-01 Slow Leak
10. DOP 2000-24 Drywell Sump Operation

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU6

Initiating Condition:

RCS leakage.

Operating Mode Applicability:

4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

RCS leakage results in the inability to restore and maintain RPV level **> 0 inches** for **≥ 15 minutes.**

Basis:

This EAL is considered to be a potential degradation of the level of safety of the plant. The inability to maintain or restore level is indicative of loss of RCS inventory.

Prolonged loss of RCS Inventory may result in escalation to the Alert emergency classification level via either CA6 or CA5.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU1
2. Technical Specifications Table 3.3.5.1-1
3. UFSAR 5.2.5
4. DEOP 0010-00 Guidelines for Use or Dresden Emergency Operating Procedures and Severe Accident Management Guidelines
5. DEOP 100 RPV Control
6. Unit 2(3) Appendix A Unit NSO Daily Surveillance Log
7. DAN 902(3)-4 A-17 Drywell Equip Sump Lvl HI-HI
8. DAN 902(3)-4 H-18 Drywell Floor Drn Sump Lvl HI-HI
9. DOA 0040-01 Slow Leak
10. DOP 2000-24 Drywell Sump Operation

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU7

Initiating Condition:

UNPLANNED loss of RPV inventory.

Operating Mode Applicability:

5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED Refueling Cavity or Vessel level drop that meets **EITHER**:

   - When controlling level above the RPV flange, Refueling Cavity level drop below the RPV flange for **≥ 15 minutes**.

     OR

   - When controlling level below the RPV flange, vessel level drop below the procedurally established limit for **≥ 15 minutes**.

   OR

2. a. RPV level unknown.

   AND

   b. Loss of RPV inventory per Table C3 indications.

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise
• UNPLANNED Torus level rise
• UNPLANNED vessel make up rate rise
• Observation of leakage or inventory loss

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU7 (cont)

Basis (cont):

This EAL is a precursor of more serious conditions and considered to be a potential degradation of the level of safety of the plant.

Refueling evolutions that lowers RCS water level below the RPV flange are carefully planned and procedurally controlled. An UNPLANNED event that results in water level dropping below the RPV flange, or below the planned RCS water level for the given evolution (if the planned RCS water level is already below the RPV flange), warrants declaration of a UE due to the reduced RCS inventory that is available to keep the core covered.

The allowance of 15 minutes was chosen because it is reasonable to assume that level can be restored within this time frame using one or more of the redundant means of makeup that should be available. If level cannot be restored in this time frame then it may indicate a more serious condition exists.

Continued loss of RCS Inventory will result in escalation to the Alert emergency classification level via either CA6 or CA5.

Threshold #1 Basis:

This EAL involves a drop in RCS level below the top of the RPV flange that continues for 15 minutes due to an UNPLANNED event. This EAL is not applicable to level changes in flooded reactor cavity level, which is addressed by RU2, until such time as the level drop reaches the level of the vessel flange.

If RPV level continues to lower and reaches the Low-Low ECCS Actuation Setpoint then escalation to MA8 would be appropriate.

Threshold #2 Basis:

This EAL addresses conditions in the refueling mode when normal means of core temperature indication and RCS level indication may not be available. Redundant means of RPV level indication will normally be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that RPV inventory loss was occurring by observing other indications such as sump level changes, changes in makeup or observation of leakage. Sump level changes must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

Escalation to the Alert emergency classification level would be via either CA6 or CA5.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU7 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU2
2. UFSAR 5.2.5
3. Technical Specifications 3.4.4
4. Technical Specifications 3.4.5
5. Unit 2(3) Appendix A Unit NSO Daily Surveillance Log
6. DAN 902(3)-4 A-17 Drywell Equip Sump Lvl HI-HI
7. DAN 902(3)-4 H-18 Drywell Floor Drn Sump Lvl HI-HI
8. DOA 0040-01 Slow Leak
9. DOP 2000-24 Drywell Sump Operation
10. DGP 02-02 Reactor Vessel Slow Fill
11. DEOP 0010-00 Guidelines for Use or Dresden Emergency Operating Procedures and Severe Accident Management Guidelines
12. DEOP 100 RPV Control, Table A
13. DIP 0260-01 Refuel Outage Reactor Vessel and Cavity Level Instrumentation
14. Technical Specifications Table 3.3.5.1 1

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1

Initiating Condition:

HOSTILE ACTION resulting in loss of physical control of the facility.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Value:

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1).

   OR

2. A HOSTILE ACTION has:

   - Caused failure of Spent Fuel Pool Cooling Systems

     AND

   - IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).

Table H1 - Safety Functions
• Reactivity Control (ability to shut down the reactor and keep it shutdown)
• RCS Inventory (ability to cool the core)
• Decay Heat Removal (ability to maintain heat sink)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1 (cont)

Basis (cont):

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

Threshold #1 Basis

This threshold encompasses conditions under which a HOSTILE ACTION has taken physical control of VITAL AREAS (containing vital equipment or controls of vital equipment) required to maintain any safety function. As a result, there is a loss of one or more of the Table H1 functions and equipment control cannot be transferred to and operated from another location.

If control of the plant equipment necessary to maintain all safety functions can be operated from the Control Room or transferred to another location, then the above EAL threshold is not met.

Threshold #2 Basis

This threshold addresses loss of physical control of spent fuel pool cooling systems if imminent fuel damage is likely because there is freshly off-loaded fuel in the pool. The condition “freshly off-loaded reactor fuel in pool” equates to fuel off-loaded within the last 120 days in NF-AA-309 Special Nuclear Material And Core Component Move Sheet Development.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HG1
2. SY-AA-101-132, Security Assessment and Response to Unusual Activities.
3. Station Security Plan – Appendix C
4. DOA 0010-18, Escalated Security Event / Hostile Force Intrusion
5. NF-AA-309, Special Nuclear Material And Core Component Move Sheet Development

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS1

Initiating Condition:

HOSTILE ACTION within the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

This condition represents an escalated threat to plant safety above that contained in the Alert in that a HOSTILE FORCE has progressed from the OWNER CONTROLLED AREA to the PROTECTED AREA.

This EAL addresses the contingency for a very rapid progression of events. It is not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack with minimal time available for further preparation or additional assistance to arrive requires Offsite Response Organizations (ORO) readiness and preparation for the implementation of protective measures.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS1 (cont)

Basis (cont):

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the PROTECTED AREA. Those events are adequately addressed by other EALs.

Escalation of this emergency classification level, if appropriate, would be based on actual plant status after impact or progression of attack.

Basis Reference(s):

1. NEI 99-01 Rev 5, HS4
2. SY-AA-101-132, Security Assessment and Response to Unusual Activities
3. Station Security Plan – Appendix C
4. DOA 0010-18, Escalated Security Event / Hostile Force Intrusion

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1

Initiating Condition:

HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site.

   OR

2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

OWNER CONTROLLED AREA (OCA): is the property associated with the station owned by the company. Access is normally limited to persons entering for official business.

Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

The fact that the site is under serious attack or is an identified attack target with minimal time available for further preparation or additional assistance to arrive requires a heightened state of readiness and implementation of protective measures that can be effective (such as on-site evacuation, dispersal or sheltering).

Basis: (cont)

Threshold #1 Basis

This EAL addresses the immediacy of an expected threat arrival or impact on the site within a relatively short time.

The intent of this EAL is to ensure that notifications for the airliner attack threat are made in a timely manner and that Offsite Response Organizations (ORO) and plant personnel are at a state of heightened awareness regarding the credible threat. Airliner is meant to be a large aircraft with the potential for causing significant damage to the plant.

This EAL is met when a plant receives information regarding an airliner attack threat from NRC and the airliner is within 30 minutes of the plant. Only the plant to which the specific threat is made need declare the Alert.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Threshold #2 Basis

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the OCA. Those events are adequately addressed by other EALs.

Note that this EAL is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA.

Basis Reference(s):

1. NEI 99-01 Rev 5, HA4
2. SY-AA-101-132, Security Assessment and Response to Unusual Activities
3. Station Security Plan – Appendix C
4. DOA 0010-18, Escalated Security Event / Hostile Force Intrusion

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1

Initiating Condition:

Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities.

   OR

2. A validated notification from NRC providing information of an aircraft threat.

   OR

3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

Basis:

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

Security events assessed as HOSTILE ACTIONS are classifiable under HA1, HS1 and HG1.

Basis: (cont)

A higher initial classification could be made based upon the nature and timing of the security threat and potential consequences. The licensee shall consider upgrading the emergency response status and emergency classification level in accordance with the site's Safeguards Contingency Plan and Emergency Plan.

Threshold #1 Basis

This threshold is included to ensure that appropriate notifications for the security threat are made in a timely manner. This includes information of a credible threat. Only the plant to which the specific threat is made need declare the Notification of an Unusual Event.

The determination of "credible" is made through use of information found in the Station Security Plan or SY-AA-101-132, "Security Assessment and Response to Unusual Activities" procedure.

Threshold #2 Basis

The intent of this EAL is to ensure that notifications for the aircraft threat are made in a timely manner and that Offsite Response Organizations (ORO) and plant personnel are at a state of heightened awareness regarding the credible threat. It is not the intent of this EAL to replace existing non-hostile related EALs involving aircraft.

This EAL is met when a plant receives information regarding an aircraft threat from NRC. Validation is performed by calling the NRC. Only the plant to which the specific threat is made need declare the Unusual Event.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Escalation to Alert emergency classification level would be via HA1 would be appropriate if the threat involves an airliner within 30 minutes of the plant.

Basis: (cont)

Threshold #3 Basis

Reference is made to security force because these individuals are the designated personnel on-site qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the plant Safeguards Contingency Plan.

This threshold is based on Station Security Plan – Appendix C. 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 in some cases under 10 CFR 50.72.

Basis Reference(s):

1. NEI 99-01 Rev 5, HU4
2. SY-AA-101-132, Security Assessment and Response to Unusual Activities
3. Station Security Plan – Appendix C
4. NRC Safeguards Advisory 10/6/01
5. Letter from Mr. B. A. Boger (NRC) to Ms. Lynette Hendricks (NEI) dated 2/4/02
6. DOA 0010-18, Escalated Security Event / Hostile Force Intrusion

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS2

Initiating Condition:

Control Room evacuation has been initiated and plant control cannot be established.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Control room evacuation has been initiated.

   AND

2. Control of the plant **cannot** be established per DSSP 0100-CR in **< 30 minutes**.

Basis:

The time period to establish control of the plant starts when either:

a. Control of the plant is no longer maintained in the Main Control Room

   OR

b. The last Operator has left the Main Control Room.

The intent of this EAL is to capture those events where control of the plant cannot be reestablished in a timely manner. In this case, expeditious transfer of control of safety systems has not occurred (although fission product barrier damage may not yet be indicated).

The intent of the EAL is to establish control of important plant equipment and knowledge of important plant parameters in a timely manner. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions. Typically, these safety functions are reactivity control (ability to shutdown the reactor and maintain it shutdown), reactor water level (ability to cool the core), and decay heat removal (ability to maintain a heat sink).

The determination of whether or not control is established at the remote shutdown panel is based on Emergency Director (ED) judgment. The Emergency Director is expected to make a reasonable, informed judgment within the specified time for transfer that the licensee has control of the plant from the remote shutdown locations.

Escalation of this emergency classification level, if appropriate, would be by Fission Product Barrier or Abnormal Rad Levels/Radiological Effluent EALs.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HS2
2. DSSP 0100-CR Hot Shutdown Procedure - Control Room Evacuation

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA2

Initiating Condition:

Control Room evacuation has been initiated.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Entry into DSSP 0100-CR for Control Room evacuation.

Basis:

With the control room evacuated, additional support, monitoring and direction through the Technical Support Center and/or other emergency response facilities may be necessary.

Inability to establish plant control from outside the control room will escalate this event to a Site Area Emergency.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HA5
2. DSSP 0100-CR Hot Shutdown Procedure - Control Room Evacuation

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3

Initiating Condition:

FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

FIRE or EXPLOSION resulting in any of the following:

- VISIBLE DAMAGE to a Table H2 permanent structure.

  OR

- VISIBLE DAMAGE to safety system equipment contained within a Table H2 area.

  OR

- Control Room indication of degraded safety system equipment performance contained within a Table H2 area.

Table H2 – Vital Areas
• Reactor Building • Aux Electric Room • Control Room • Diesel Generator Rooms • 4-KV ECCS Switchgear Area • Battery Rooms • CRD & CCSW Pump Rooms • Turbine Building Cable Tunnel • Turbine Building Safe Shutdown Areas • Crib House

Basis:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3 (cont)

Basis (cont):

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

The areas listed in Table H2 specify specific structures or areas that contain safety system, or component and functions required for safe shutdown of the plant.

VISIBLE DAMAGE is used to identify the magnitude of the FIRE or EXPLOSION and to discriminate against minor FIRES and EXPLOSIONS.

The reference to structures containing safety systems or components is included to discriminate against FIRES or EXPLOSIONS in areas having a low probability of affecting safe operation. The significance here is not that a safety system was degraded but the fact that the FIRE or EXPLOSION was large enough to cause damage to these systems.

An EXPLOSION due to failure of pressurized equipment that does not cause damage to other permanent structures or equipment associated with plant operations does not meet the criteria for declaration under this EAL, but may result in other declaration criteria being met (e.g., when the line is an element of a Fission Product Barrier, or the results in inventory loss).

The use of VISIBLE DAMAGE should not be interpreted as mandating a lengthy damage assessment prior to classification. The declaration of an Alert and the activation of the Technical Support Center will provide the Emergency Director with the resources needed to perform detailed damage assessments.

The Emergency Director also needs to consider any security aspects of the EXPLOSION.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions, Fission Product Barrier or Abnormal Rad Levels / Radiological Effluent EALs.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HA2
2. UFSAR 3.2
3. UFSAR 3.5.3
4. General Arrangement Drawings M-3, M-4, M-4A, M-5 and M-10

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3

Initiating Condition:

FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm.

Table H2 – Vital Areas
• Reactor Building • Aux Electric Room • Control Room • Diesel Generator Rooms • 4-KV ECCS Switchgear Area • Battery Rooms • CRD & CCSW Pump Rooms • Turbine Building Cable Tunnel • Turbine Building Safe Shutdown Areas • Crib House

OR

2. EXPLOSION within PROTECTED AREA affecting a Table H2 area.

Basis:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

Basis (cont):

PROTECTED AREA: An area which normally encompasses all controlled areas within the security protected area fence.

This EAL addresses the magnitude and extent of FIRES or EXPLOSIONS that may be potentially significant precursors of damage to safety systems. It addresses the FIRE / EXPLOSION, and not the degradation in performance of affected systems that may result.

As used here, notification is visual observation and report by plant personnel or sensor alarm indication.

For the purposes of declaring an emergency event, the term “extinguished” means no visible flames.

Thresholds #1:

The 15 minute time period begins with a credible notification that a FIRE is occurring, or indication of a fire detection system alarm/actuation. Verification of a fire detection system alarm/actuation includes actions that can be taken within the control room or other nearby site specific location to ensure that it is not spurious. An alarm is assumed to be an indication of a FIRE unless it is disproved within the 15 minute period by personnel dispatched to the scene. In other words, a personnel report from the scene may be used to disprove a sensor alarm if received within 15 minutes of the alarm, but shall not be required to verify the alarm.

The intent of this 15 minute duration is to size the FIRE and to discriminate against small FIRES that are readily extinguished (e.g., smoldering waste paper basket). Such fires are excluded from consideration in this threshold since they have no safety consequence.

Basis (cont):

Threshold #2 Basis:

This EAL addresses only those EXPLOSIONS of sufficient force to damage permanent structures or equipment associated with plant operations within the PROTECTED AREA.

An EXPLOSION due to failure of pressurized equipment that does not cause damage to other permanent structures or equipment associated with plant operations does not meet the criteria for declaration under this EAL, but may result in other declaration criteria being met (e.g., when the line is an element of a Fission Product Barrier, or the results in inventory loss).

No attempt is made to assess the actual magnitude of the damage. The occurrence of the EXPLOSION is sufficient for declaration.

The Emergency director also needs to consider any security aspects of the EXPLOSION, if applicable.

Escalation of this emergency classification level, if appropriate, would be based on HA3.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HU2
2. UFSAR 3.2
3. Drawing M-1D Plant Development Plan

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4

Initiating Condition:

Natural and destructive phenomena affecting VITAL AREAS.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by seismic instrumentation:
   - **> 0.10 g** (Channel 1 or 3)

     OR
   - **> 0.067 g** (Channel 2)

   AND

   b. Confirmed by **ANY** of the following:
   - Earthquake felt in plant.

     OR
   - National Earthquake Center.

     OR
   - Control Room indication of degraded performance of systems required for the safe shutdown of the plant.

   OR

2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area:
   - Tornado strike

     OR
   - High winds **> 100 mph**

     OR
   - Vehicle crash

     OR
   - Turbine failure-generated PROJECTILES

EAL Threshold Value(s) (cont):

Table H2 – Vital Areas
• Reactor Building • Aux Electric Room • Control Room • Diesel Generator Rooms • 4-KV ECCS Switchgear Area • Battery Rooms • CRD & CCSW Pump Rooms • Turbine Building Cable Tunnel • Turbine Building Safe Shutdown Areas • Crib House

OR

3. Flooding in any Table H3 area that results in **ANY** of the following:
   a. Degraded safety system performance as indicated in the Control Room.

      OR

   b. Industrial safety hazards (e.g., electric shock) that precludes access necessary to operate or monitor safety equipment.

      OR

   c. Water level **> DEOP 300-1, Maximum Safe** operating levels.

Table H3 – Internal Flooding Areas
• Condenser Pits • Condensate pump Rooms • Containment Cooling Service Water Vaults • Crib House • East Corner Room • West Corner Room

OR

4. Abnormal River level, as indicated by **EITHER**:
   - High river water level **> 513 ft**.

     OR

   - Low river water level **< 501 ft. 6 in.**

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

Basis:

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

These EALs escalate from HU4 in that the occurrence of the event has resulted in VISIBLE DAMAGE to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control room indications of degraded system response or performance. The occurrence of VISIBLE DAMAGE and/or degraded system response is intended to discriminate against lesser events. 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. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction ICs.

Threshold #1 Basis:

This threshold addresses events that may have resulted in a Table H2 area being subjected to forces beyond design limits and thus damage may be assumed to have occurred to plant safety systems.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

Basis (cont):

Threshold #2 Basis:

This threshold addresses events within the PROTECTED AREA that results in VISIBLE DAMAGE to any Table H2 structure or Control Room indication of degraded performance of a safety system in any Table H2 area:

This threshold addresses the following events:

- Tornado strike.
- High winds.
- Vehicle crashes such as plane, helicopter, train, barge, car or truck crashes. The Emergency director also needs to consider any security aspects of the vehicle crash.
- Threat to safety-related equipment imposed by PROJECTILES generated by main turbine rotating component failures.

Threshold #3 Basis:

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. The actual component failure or equipment misalignment is addressed by Technical Specifications or plant procedures unless the resulting flooding causes degraded performance of safety systems, or has created industrial safety hazards (e.g., electrical shock) that preclude necessary access to operate or monitor safety equipment. The inability to access, operate or monitor safety equipment represents an actual or substantial potential degradation of the level of safety of the plant.

Flooding as used in this EAL describes a condition where water is entering the room faster than installed equipment is capable of removal, resulting in a rise of water level within the room. Classification of this EAL should not be delayed while corrective actions are being taken to isolate the water source.

Threshold #4 Basis:

The probable maximum flood (PMF) produces a peak flood to 528 ft el. This is significantly above the grade elevation (517 ft) and the lowest opening leading to safety-related equipment (509 ft el.). When the water level reaches 509 ft el. the reactors are shutdown, the drywells are deinerted, and the vessels are flooded and cooled to cold shutdown conditions as quickly as possible. If the water level reaches the EAL threshold value (513 ft), reactor cooldown is transferred to the Isolation Condensers, which thereafter maintain a safe shutdown condition until the flood waters recede and plant startup can be initiated.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

Basis (cont):

Minimum river water levels to assure pump suction are:

- Circulating Water Pumps: 490 ft el.
- Service Water Pumps: 494 ft el.
- CCSW Pumps: 501 ft 6 in.
- Unit 2/3 Fire Pump: 498 ft 6 in.

The low river water level threshold (501 ft. 6 in.) is based on the most limiting pump suction requirement (CCSW).

Basis Reference(s):

1. NEI 99-01, Rev. 5 HA1
2. DOA 0010-03 Earthquakes
3. UFSAR 3.7.4
4. DIS 0020-01 Seismic Recorder Functional Testing, Data Retrieval, and Initialization
5. UFSAR 3.3.1.1
6. DOA 0010-02 Tornado Warning/Severe Winds
7. UFSAR 3.2
8. General Arrangement Drawings 3, 4, 4A, 5 and 10
9. Drawing M-1D Plant Development Plan
10. UFSAR 4.4.1.1
11. DOA 0010-01 Dresden Lock and Dam Failure
12. UFSAR 9.2.5.3.1
13. DOA 0010-04 Floods
14. DOA 0040-02 Localized Flooding In Plant
15. UFSAR 3.5.3

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4

Initiating Condition:

Natural and destructive phenomena affecting the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. Seismic event identified by any **TWO** of the following:
   - Earthquake felt in plant.

     OR
   - Seismic event confirmed by station seismic monitor procedure.

     OR
   - National Earthquake Center.

   OR
2. **EITHER** of the following occurring within the PROTECTED AREA boundary:
   - Tornado strike

     OR
   - Sustained **(>15 minutes)** high winds **> 100 mph**.

   OR
3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

   OR
4. Flooding in any Table H3 area that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

Table H3 – Internal Flooding Areas
• Condenser Pits • Condensate pump Rooms • Containment Cooling Service Water Vaults • Crib House • East Corner Room • West Corner Room

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont)

EAL Threshold Values (cont):

OR

5. Abnormal River level, as indicated by **EITHER**:

   a. High river level **> 509 ft.**

   OR

   b. Report of substantial reduction in river level by site personnel and confirmation by the Corp. of Engineers that Dresden Lock and Dam has failed.

Basis:

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

These EALs are categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

Threshold #1 Basis:

Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

Threshold #2 Basis:

This EAL is based on a tornado striking (touching down) or high winds within the PROTECTED AREA.

Escalation of this emergency classification level, if appropriate, would be based on VISIBLE DAMAGE, or by other in plant conditions, via HA4.

Basis (cont):

Threshold #3 Basis:

This EAL addresses main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Generator seal damage observed after generator purge does not meet the intent of this EAL because it did not impact normal operation of the plant.

Of major concern is the potential for leakage of combustible fluids (lubricating oils) and gases (hydrogen cooling) to the plant environs. Actual FIRES and flammable gas build up are appropriately classified via HU3 and HU5.

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 this emergency classification level, if appropriate, would be to HA4 based on damage done by PROJECTILES generated by the failure or by the radiological releases. The latter events would be classified by the radiological EALs or Fission Product Barrier.

Threshold #4 Basis:

The assessment of the potential for flooding to affect safety related equipment is based on the rate of level rise in the area and the ability to terminate the input prior to submerging or spraying the electrical portion of safety related equipment.

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. Minor leaks, such as valve packing or instrument line breaks would not constitute “Flooding.” The Internal Flooding Areas of concern for the Unusual Event declaration are those Table H3 areas that have the potential to affect safety related equipment needed for the current operating mode.

Escalation of this emergency classification level, if appropriate, would be based VISIBLE DAMAGE via HA4, or by other plant conditions.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont)

Basis (cont):

Threshold #5 Basis:

The possible maximum flood (PMF) produces a peak flood to 528 ft el. This is significantly above the grade elevation (517 ft) and the high river water level threshold, which is the lowest opening leading to safety-related equipment (509 ft el.). When this level is reached, the reactors are shutdown, the drywells are deinerted, and the vessels are flooded and cooled to cold shutdown conditions as quickly as possible. If the water level reaches 513 ft el., reactor cooldown is transferred to the Isolation Condensers, which thereafter maintain a safe shutdown condition until the flood waters recede and plant startup can be initiated.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HU1
2. DOA 0010-03 Earthquakes
3. UFSAR 3.7.4
4. DIS 0020-01 Seismic Recorder Functional Testing, Data Retrieval, and Initialization
5. UFSAR 3.3.1.1
6. DOA 0010-02 Tornado Warning/Severe Winds
7. UFSAR 3.2
8. General Arrangement Drawings 3, 4, 4A, 5 and 10
9. Drawing M-1D Plant Development Plan
10. UFSAR 4.4.1.1

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5

Initiating Condition:

Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.

Table H2 – Vital Areas
• Reactor Building • Aux Electric Room • Control Room • Diesel Generator Rooms • 4-KV ECCS Switchgear Area • Battery Rooms • CRD & CCSW Pump Rooms • Turbine Building Cable Tunnel • Turbine Building Safe Shutdown Areas • Crib House

Basis:

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

Basis (cont)

Gases in a VITAL AREA can affect the ability to safely operate or safely shutdown the reactor.

The fact that SCBA may be worn does not eliminate the need to declare the event.

A precautionary area evacuation for the purpose of atmospheric testing does not warrant declaration until test results are obtained unless access is required for operation of operable equipment to maintain safe operations or safely shutdown the reactor. Declaration should not be delayed for confirmation from atmospheric testing if the atmosphere poses an immediate threat to life and health or an immediate threat of severe exposure to gases. This could be based upon documented analysis, indication of personal ill effects from exposure, or operating experience with the hazards such as an inadvertent actuation of installed Cardox fire suppression system.

Station evaluations have shown that installed Halon systems by design do not create an IDLH atmosphere when discharged. Therefore, when an installed Halon Fire Suppression system discharge occurs, an IDLH atmosphere should not be assumed, and declaration of a toxic or asphyxiant IDLH atmosphere must be based on representative sampling of the affected area, unless there are indications of personal ill effects resulting from exposure.

Areas directly associated with a fire that may be considered to have a hazardous environment (due to smoke, design fire suppression system actuation or administrative controls awaiting ventilation and/or testing) do not warrant declaration of an Alert under this EAL but should be evaluated against the fire EALs.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of 19.5%, which can lead to breathing difficulties, unconsciousness or even death.

An uncontrolled release of flammable gasses 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. Flammable gasses, such as hydrogen and acetylene, are routinely used to maintain plant systems (hydrogen) or to repair equipment/components (acetylene - used in welding). This EAL assumes concentrations of flammable gasses which can ignite/support combustion.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions, Fission Product Barrier or Abnormal Rad Levels / Radioactive Effluent EALs.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 HA3
2. UFSAR 3.5.3
3. UFSAR 3.2
4. General Arrangement Drawings M-3, M-4, M-4A, M-5 and M-10

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU5

Initiating Condition:

Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS.

   OR

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

Basis:

NORMAL PLANT OPERATIONS: Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

This EAL is based on the release of toxic, corrosive, asphyxiant or flammable gases of sufficient quantity to affect NORMAL PLANT OPERATIONS.

The fact that SCBA may be worn does not eliminate the need to declare the event.

This EAL is not intended to require significant assessment or quantification. It assumes an uncontrolled process that has the potential to affect plant operations. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation.

The release may have originated within the Protected Area boundary, or it may have originated offsite and subsequently drifted inside the Protected Area boundary. Offsite events (e.g., tanker truck accident releasing toxic gases, etc.) resulting in the plant being within the evacuation area should also be considered in this EAL because of the adverse affect on NORMAL PLANT OPERATIONS.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU5 (cont)

Basis: (cont)

Areas directly associated with a fire that may be considered to have a hazardous environment (due to smoke, design fire suppression system actuation or administrative controls awaiting ventilation and/or testing) do not warrant declaration of an Unusual Event under this EAL but should be evaluated against the fire EALs.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of 19.5%, which can lead to breathing difficulties, unconsciousness or even death.

Escalation of this emergency classification level, if appropriate, would be based on HA5.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HU3
2. UFSAR 3.5.3
3. UFSAR 3.2
4. General Arrangement Drawings 3, 4, 4A, 5 and 10
5. DOA-0010-12, Toxic Gas/Chemical Release from Nearby Chemical Facilities

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG6

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the General Emergency class.

Basis Reference(s):

1. NEI 99-01, Rev 5 HG2

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS6

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a Site Area Emergency.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency class description for Site Area Emergency.

Basis Reference(s):

1. NEI 99-01, Rev 5 HS3

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA6

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the Alert emergency class.

Basis Reference(s):

1. NEI 99-01, Rev 5 HA6

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU6

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Unusual Event.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Basis:

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

Basis Reference(s):

1. NEI 99-01, Rev 5 HU5

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

E-HU1

Initiating Condition:

Damage to a loaded cask CONFINEMENT BOUNDARY.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**

Basis:

CONFINEMENT BOUNDARY – is the barrier(s) between areas containing radioactive substances and the environment.

An Unusual Event in this EAL is categorized on the basis of the occurrence of an event of sufficient magnitude that a loaded cask CONFINEMENT BOUNDARY is damaged or violated. This includes classification based on a loaded fuel storage cask CONFINEMENT BOUNDARY loss leading to the degradation of the fuel during storage or posing an operational safety problem with respect to its removal from storage.

Basis Reference(s):

1. NEI 99-01, Rev. 5 E-HU1
2. HI-STORM 100 FSAR Rev 3

Section 4: Emergency Measures

Exelon Nuclear emergency response actions are the same for all nuclear stations and are thus covered by Section E of the Emergency Plan.

4.1 Notification of the Emergency Organization

Standard NARS notifications for the Dresden Station are made to the State of Illinois Emergency Management Agency (IEMA). At the Dresden Station, if a General Emergency is the initiating event, the Emergency Director is responsible for notifying the following additional Illinois and local agencies:

- Grundy County EOC
- Kendall County EOC
- Will County EOC
- Grundy County Sheriff's Office
- Kendall County Sheriff's Office
- Will County Sheriff's Office

4.2 Assessment Actions

Throughout each emergency situation, continuing assessment will occur. Assessment actions at Dresden Station may include an evaluation of plant conditions; in-plant, onsite, and initial offsite radiological measurements; and initial estimates of offsite doses. Core damage information is used to refine dose assessments and confirm or extend initial protective action recommendations. Dresden Station utilizes NEDC-33045P-A, Revision 0, (2001) as the basis for the methodology for post-accident core damage assessment. This methodology utilizes real-time plant indications. In addition, Dresden Station may use samples of plant fluids and atmospheres as inputs to the CDAM (Core Damage Assessment Methodology) program for core damage estimation.

4.3 Protective Actions for the Offsite Public

To aid Control Room personnel during a rapidly developing emergency situation, Figure 4-1, "Protective Action Recommendation (PAR) Determination Flowchart for Dresden Station" has been developed based on Section J.10.m of the Emergency Plan.

4.3.1 Alert and Notification System (ANS) Sirens

This ANS consists of a permanently installed outdoor notification system within a ten mile radius around the station. The ten-mile radius around the station is a mix of agriculture and industry with a relatively low population distribution. The ANS, as installed, consists of mechanical and electronic sirens that will cover this entire area with a minimum sound level of 60 db. Additionally, the ANS will cover the heavily populated areas within the ten-mile radius around the station with a minimum sound level of 70 db to ensure complete coverage.

The ANS sirens are controlled and monitored on a daily basis, by a computerized telemetry system. The daily monitoring assures early failure detection and therefore maximizes system operability and reliability.

4.3.2 Evacuation Time Estimates

The ETE study used population data from the 2010 census which includes parts of three counties in Illinois (Will, Kendall and Grundy). The evacuation times are based on a detailed consideration of the EPZ roadway network and population distribution. The ETE Study, contained in EP-AA-1004 Addendum 2, Evacuation Time Estimates for the Dresden Generating Station Plume Exposure Pathway Emergency Planning Zone, presents evacuation times for daytime and nighttime scenarios under various weather conditions for the evacuation of various areas around the Dresden Station, once a decision has been made to evacuate.

4.4 Protective Actions for Onsite Personnel

Dresden Station has a siren system to assemble personnel during emergency conditions. Upon hearing a continuous two (2) minute siren, all personnel not having emergency assignments have been instructed to assemble in predesignated assembly areas. Refer to Figure 4-2.

Assembly of site personnel, for purposes of accountability and possible evacuation, is initiated per the requirements of Section J of the Emergency Plan. Accountability of site personnel is handled by the Dresden Station security force.

If a site evacuation of non-essential personnel is required by Section J of the Emergency Plan, personnel will be either relocated and monitored at the Relocation Centers or sent home if there is no release or radiological or safety concerns. The designated relocation centers for Dresden Station are:

- Mazon Relocation Center, Mazon, Illinois
- LaSalle County Nuclear Power Station, LaSalle Co. Illinois
- Braidwood Station, Braceville, Illinois

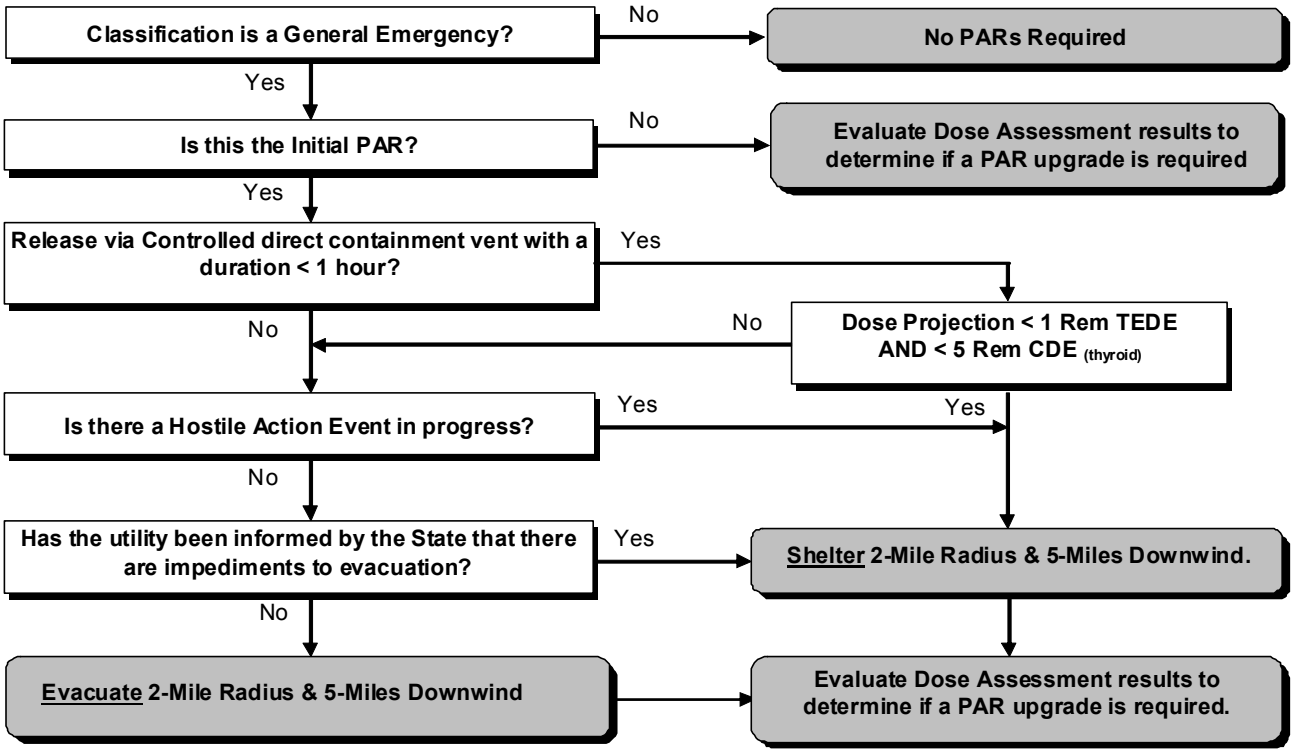
For evacuation routes, refer to EP-AA-113-F-19.

Traffic control for onsite areas will be handled by the Dresden Nuclear Power Station security force, if necessary.

Equipment and personnel would be available at LaSalle County Station, Braidwood Station, and the Mazon Relocation Center for monitoring and decontamination of evacuated personnel. If major decontamination, follow-up, or bioassay samples are necessary, those persons would be sent to LaSalle County Station or Braidwood Station.

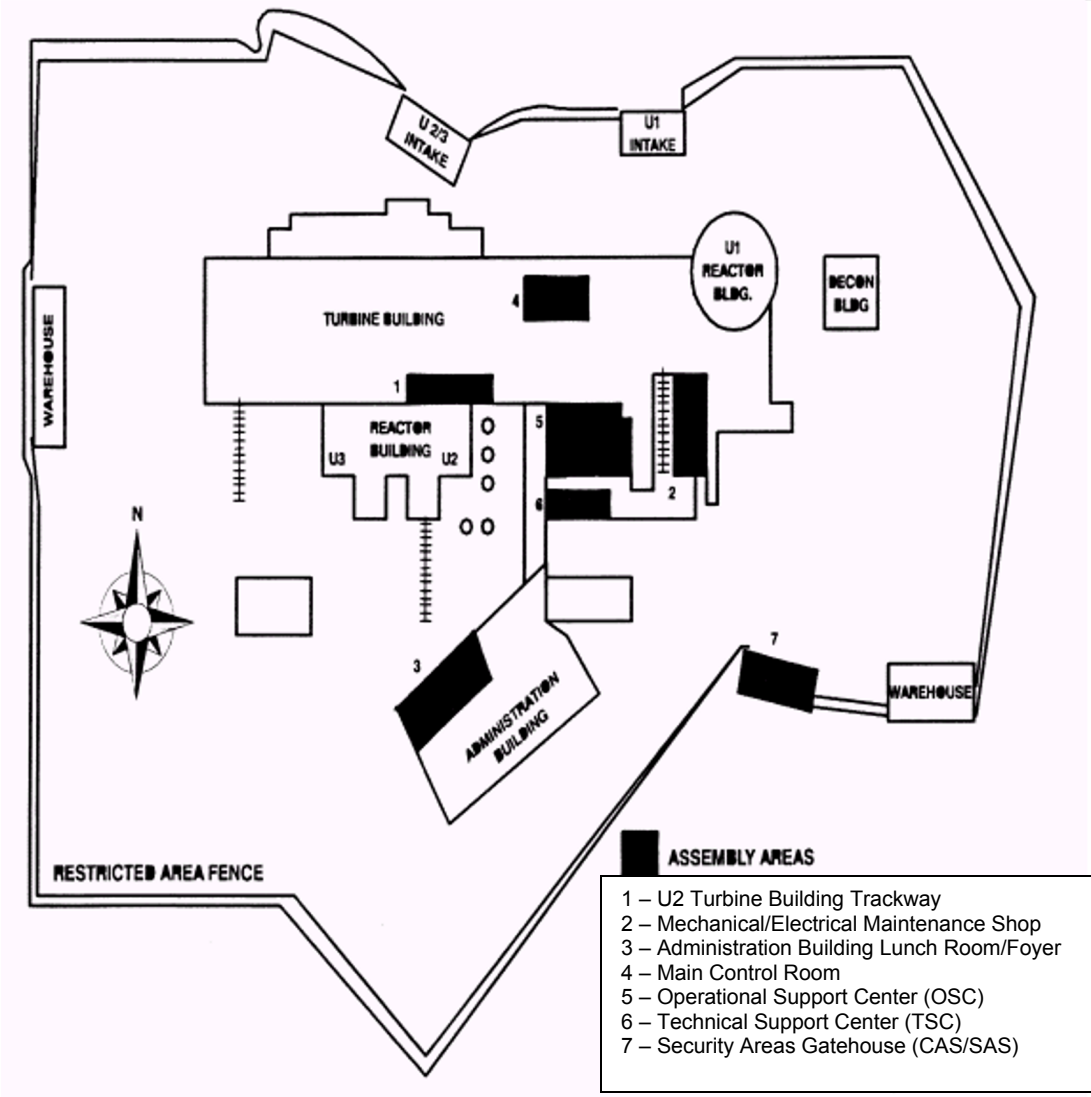
Other emergency measures common to all nuclear stations are discussed in the Emergency Plan.

Figure 4-1: Dresden Station PAR Determination Flowchart



2 Mile Radius, 5 Miles Downwind			
WD (from)			Subareas
002º	to	046º	1, 3. 4, 7
047º	to	182º	1, 3. 4
183º	to	292º	1, 3, 4, 12
293º	to	299º	1, 3, 4
300º	to	338º	1, 3, 4, 9
339º	to	001º	1, 3, 4, 7, 9

Figure 4-2: Dresden Onsite Assembly Areas and Emergency Response Facilities



Section 5: Emergency Facilities and Equipment

5.1 Emergency Response Facilities

Refer to Figure 4-2 for the location of the Dresden Station Control Room, Technical Support Center (TSC), and Operations Support Center (OSC) within the Station's Protected Area boundary.

5.1.1 Station Control Room

The Dresden Station Control Room is the initial onsite center of emergency control. The Dresden Station Units 2 and 3 Control Rooms are located at the 534' level at the east end of the Unit 2/3 Turbine Building.

5.1.2 Technical Support Center (TSC)

A Technical Support Center is located on the southwest corner of the Service Building at Elevation 518'. The TSC fully meets the requirements of Section H.1.b of the E-Plan.

5.1.3 Operational Support Center (OSC)

The Operational Support Center is located in the Radiation Protection Area and the Work Control Area. The OSC conforms to the requirements of Section H.1.c of the 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.

5.1.4 Alternative Facility

The Alternative Facility maintains the capability for staging the TSC/OSC emergency response organization personnel in the event of a hostile action. This alternative facility has the capability for communications with the emergency operations facility, control room, and plant security. The Alternative Facility is located at 960 North Rt. 47 Morris, Illinois.

5.2 Assessment Resources

5.2.1 Onsite Meteorological Monitoring Instrumentation

The meteorological tower, located approximately 3000 ft. west of the reactor building, is 400 ft. high and is instrumented at three levels. The 35 ft., 150 ft. and 300 ft. levels correspond to the elevations of the possible points of airborne effluent release. Wind speed and wind direction are measured at all three elevations. Ambient temperature is measured at the 35 ft. level and differential temperatures referenced to 35 ft. are measured at 150 ft. and 300 ft. Precipitation is also measured at the site.

The onsite meteorological monitoring program is covered in the contract 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.

5.2.1.1 Instrumentation

The meteorological tower is instrumented with equipment that conforms to the recommendations of Regulatory Guide 1.23 and ANSI/ANS 2.5 (1984). The equipment is placed on booms oriented into the generally prevailing wind at the site. Equipment signals are brought to an instrument building with controlled environmental conditions. The building at the base of the tower houses the analog and digital recording equipment, signal conditioners, and other equipment used to process and re-transmit the data to the end point users.

5.2.1.2 Meteorological Measurement Program During a Disaster

Cooperation between the corporate office and the meteorological contractor assures that a timely restoration of any outage can be made. Emergency field visits to the site are made as quickly as possible after detection of a failure.

Should a disaster of sufficient magnitude occur to destroy the tower structure, a contract is maintained to have a temporary tower erected within 72 hours, weather conditions permitting. Further, the meteorological contractor maintains two levels of sensors (wind speed, wind direction and temperature) in a state of readiness for use on the temporary tower.

Additionally, Exelon Nuclear's existing instrumentated towers at other nuclear sites provide a measurement network with multiple backup opportunities.

Meteorological data is available to the station Control Room, Technical Support Center, and Emergency Operations Facility for use in the Dose Assessment Computer Model for estimating the environmental impact of unplanned releases of radioactivity from the station.

5.2.2 Onsite Radiation Monitoring Equipment

5.2.2.1 Radiation Monitoring System

Onsite radiation monitoring systems at Dresden can be categorized into four systems:

- A process radiological monitoring and sample system;
- An effluent radiological monitoring and sampling system;

- An airborne radioactive monitoring system;
- An area radiation monitoring system; and
- A supply of portable survey and counting equipment.

5.2.2.2 Radiological Noble Gas Effluent Monitoring

A wide range monitor is installed in the effluent stream that enters the main chimneys and the reactor building vents. These wide range monitors have a range of $1x10^{-7}$ uCi/cc to $1x10^{5}$ uCi/cc.

The method of converting instrument readings to release rates will be determined after the energy responses of the detector are obtained. Due to system design, the monitors give an estimate of a release. Actual releases will be determined by periodically collecting grab samples, counting the samples collected and calculating the releases.

5.2.2.3 Radioiodine and Particulate Effluent Monitoring

Effluent sampling media are analyzed in the Station counting room. Silver based cartridges are available to reduce the interference of noble gases.

5.2.2.4 High-Range Containment Radiation Monitors

Two high range containment radiation monitors are installed on each of Dresden's units. The range of these monitors is from 1 R/hr to 10^{8} R/hr.

5.2.2.5 In-plant Iodine Instrumentation

Dresden Station has the capability to sample and determine iodine concentrations in the plant using charcoal cartridges and gamma ray spectroscopy. Portable monitors may be used to measure increasing levels of iodine during emergency conditions.

5.2.3 Onsite Process Monitors

Adequate monitoring capability exists to properly assess the plant status for the modes of operation. The operability of the post-accident instrumentation ensures information is available on selected plant parameters to monitor and assess important variables following an accident. Instrumentation is available to monitor the parameters and ranges given in the Dresden Station Technical Specifications.

Station procedures have been developed which would aid personnel in recognizing inadequate core cooling using applicable instrumentation.

5.2.4 Onsite Fire Detection Instrumentation

Dresden Station has a fire protection system that is designed to quickly detect any fires; annunciating locally and in the Control Room. The fire detection system is designed to applicable National Fire Protection Association (NFPA) standards. The majority of the detectors consist of electrically supervised ionization smoke detectors.

5.2.5 Facilities and Equipment for Offsite Monitoring

Consult the Offsite Dose Calculation Manual (ODCM) for the most current location for fixed continuous air samplers and DLR.

5.2.6 Site Hydrological Characteristics

The hydrological characteristics of Dresden Station are described in Section 2.4 of the Dresden UFSAR. The Dresden site at the confluence of the DesPlaines and Kankakee rivers is at the location considered to divide the upper and lower parts of the Illinois River system. The normal river pool elevation controlled at the adjacent Dresden Island Lock and Dam is nominally 505 feet. In December 1982, the Dresden site was subjected to flood waters that exceeded 509 feet establishing a maximum historical flood elevation. Nominal ground elevation is about 516 feet at the location of the principal structures of Units 2 and 3, and design plant grade is 517 feet. Consequently the probability of flooding critical areas of the site is remote.

Spillway capacity at the Dresden Island Lock and Dam is well in excess of the estimated maximum instantaneous flow of the Illinois River. The site elevation is well above the vast valley storage area upstream from the dam.

River system flow data applicable to the site are more than adequate to meet the cooling water requirements of the two operating units, to assure the availability of sufficient quantities of water for dilution of all radioactive liquid wastes discharged into the Illinois River within the limits in 10 CFR 20, and to reduce concentrations to approximately one one-thousandth of the maximum permissible concentration in the river below the point of discharge from the station.

The closest point downstream of the station where the Illinois River is used as a source of domestic water is Peoria which is 100 miles downstream. At this point the combined effects of dilution, mixing, radioactive decay, and deposition of radioactivity on the river bottom will have rendered the contribution of radioactivity by the station negligible in relation to that present in the Illinois River from other sources.

5.2.6.1 Probable Maximum Flood on Streams and Rivers

Since the site probable maximum flood (PMF) elevation of 528'-0" is above the plant grade (elevation 517'0") and above the lowest opening leading to safety-related equipment (elevation 509'-0"), the safe operation of the plant during the PMF is accomplished via implementation of the flood emergency procedures.

5.2.6.2 Potential Dike and Dam Failures, Seismically Induced

An earth dam of the type specified usually does not collapse in its entirety. A break occurs and widens as the water washes through the break. This tends to prolong the time it would take to empty the lake; nevertheless, instantaneous dike losses have been considered since the dikes are not constructed to Class I criteria.

The Dresden lock and dam are concrete structures that are operated and maintained by the U.S. Army Corps of Engineers. Operations response procedures are in place to deal with loss of the cooling lake and/or the lock and dam.

5.2.6.3 Ice Effects

An 8-foot diameter deicing line connects the discharge canal headworks and the crib house forebay. Its high point is in the headworks at elevation 495'-0" and its low point is in the forebay at elevation 489'-0". A slide gate valve is used to isolate the deicing line when not in use.

5.2.6.4 Cooling Lake

The purpose of the cooling lake is to provide adequate cooling of the circulating and service water before discharge to the Illinois River. The water discharged to the river must meet state requirements. The lake is connected to the intake and discharge canals for Units 2 and 3 by two canals (the "hot" and "cold" canals). The level of the lake is maintained by a concrete spillway located adjacent to the lift station and between the cold canal and the north end of the lake. The spillway is equipped with weir gates that can be lowered to block some of the spillover to maintain the level of the lake. The weir gates can be manually operated if necessary. Operations response procedures are in place regarding loss of lake level control and/or loss of the lift station.

A discussion of the groundwater resources and aquifers in the vicinity of Dresden Station is discussed in the Final Environmental Statement.

5.3 Protective Facilities and Equipment

The onsite assembly areas for Dresden Station are described in Section 4 of this annex. The offsite evacuation assembly areas for Dresden Station are discussed in Section 4 of this annex. These areas are outside the plume exposure Emergency Planning Zone and equipped with monitoring, decontamination and bioassay capabilities.

5.4 First Aid and Medical Facilities

Dresden Station has an inplant decon room located in a room adjacent to the Radiation Protection Office. This room is provided with a sink, decontamination shower, and a supply cabinet.

First aid kits, stretchers, sinks, eyewashes, and emergency showers have been placed in strategic locations throughout the station.

Medical treatment given to injured persons at the station is of a "first aid" nature. When more professional care is needed, injured persons are transported to a local hospital or clinic. Morris Hospital in Morris, Illinois is the Dresden Station primary supporting medical facility for radioactively contaminated injured persons. Provena St. Joseph Medical Center in Joliet, Illinois is the backup medical facility for evaluation and treatment of persons suffering from traumatic injury, medical illness, or radiation exposure and uptake.

Appendix 1: NUREG-0654 Cross-Reference

Annex Section	NUREG-0654
1.0	Part I, Section A
1.1	Part I, Section C
1.2	Part I, Section D
Figure 1-1	Part I, Section D
2.0	Part II, Section A.4
2.1	Part II, Section A.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.m
4.3.1	Part II, Section E.6
4.3.2	Part II, Section J.8
4.4	Part II, Section J.1-5
Figure 4-1	Part II, Section J.10.m
Figure 4-2	Part II, Section J.5
4.4	Part II, Section J.2 & 3
Table 4-1	Part II, Section J.8
Table 4-2	Part II, Section J.10.b
5.1	Part II, Section H.1 & G.3
5.2.1	Part II, Section H.5.a & 8
5.2.2	Part II, Section H.5.b & 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
5.2.6	Part II, Section H.5.a & 6.a
5.3	Part II, Section J.1-5
5.4	Part II, Section L.1 & 2

Appendix 2: Station Letters of Agreement

1. US Army Corps of Engineers - provide information regarding failure of or problems with the Dresden Lock and Dam.
2. Will County Sheriff's Office - provides services of law enforcement.
3. Grundy County Sheriff - services of law enforcement.
4. Morris Hospital of Morris, Illinois, acts as the primary supporting medical facility for Dresden Station.
5. General Electric Midwest Fuel Reprocessing Plant - Health Physics support - instrumentation and limited technical assistance.
6. Coal City Fire Protection and Ambulance District - Fire protection and advanced life support for transportation of accident victims.

ATTACHMENT 7

EP-AA-1005, Revision 36

Exelon Nuclear Radiological Emergency Plan Annex for LaSalle Station

EXELON NUCLEAR

RADIOLOGICAL EMERGENCY PLAN ANNEX FOR LASALLE STATION

Page Intentionally Left Blank

Table of Contents

REVISION HISTORY

Revision 0: July 1980	Revision 22, September, 2006	
Revision 1: April 1981	Revision 23, not implemented	
Revision 2: December 1981	Revision 24, May 2007	
Revision 3: October 1984	Revision 25, October 2007	
Revision 4: March 1986	Revision 26, March 2008	
Revision 5: February 1987	Revision 27, October 2008	
Revision 6: March 1991	Revision 28, February 2009	
Revision 6a: November 1992	Revision 29, June 2009	
Revision 6b: March 1993	Revision 30, March 2010	
Revision 6c: December 1993	Revision 31, October 2010	
Revision 6d: January 1994	Revision 32, April 2011	
Revision 6e: October 1994	Revision 33, February 2012	
Revision 6f: December 1995	Revision 34, November 2012	
Revision 6g: January 1996	Revision 35, December 2012	
Revision 6h: February 1996	Revision 36, June 2013	
Revision 6i: June 1996		
Revision 6j: February 1997		
Revision 6k: January 5, 1998		
Revision 6l: August 14, 1998		
Revision 7; May 13, 1999		
Revision 8; January 8, 2001		
Revision 9; May 7, 2001		
Revision 10; October 8, 2001		
Revision 11; October 31, 2001		
Revision 12; January 3, 2002		
Revision 13; July 22, 2002		
Revision 14; September 09, 2002		
Revision 15; June 30, 2003		
Revision 16; August 27, 2003		
Revision 17, December 2004		
Revision 18, May 2005		
Revision 19, September 2005		
Revision 20, January, 2006		
Revision 21, March, 2006		

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 Emergency Plan (Emergency Plan), Station Annexes, emergency plan implementing procedures, and associated program administrative documents. The 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 LaSalle 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 Emergency Plan.

1.1 Facility Description

The LaSalle Station, Units 1 and 2, is located in Brookfield Township of LaSalle County in northeastern Illinois.

It is approximately 55 direct-line miles southwest of Chicago and 20 miles west of Dresden Station. The plant is on flat terrain about 220 feet above the Illinois River channel which traverses north central Illinois some 3 1/2 miles to the north of the site. Figure LA 1-1 shows the site location.

The LaSalle Station utilizes two single cycle forced circulation Boiling Water Reactors (BWR), each rated at 3546 MWt. The design electrical rating of each unit is 1190 MWe; the net output is 1154 MWe from each General Electric (GE) turbine generator. The Nuclear Steam System Supplier (NSSS) was GE (Nuclear Energy Division). The entire plant, except for the NSSS, was designed by Sargent & Lundy (S & L) Engineers.

The containment design employs the BWR Mark II concept of over/under pressure suppression with multiple downcomers connecting the reactor drywell to the water filled pressure suppression chamber. The primary containment is a steel lined, post-tensioned, concrete enclosure, housing the reactor and the suppression pool. This primary containment is entirely enclosed in the reinforced concrete reactor building that is the secondary containment structure.

The power generation complex includes several contiguous buildings, including two Reactor Buildings, an Auxiliary Building (housing the Control Room), the Turbine Building, Diesel Generator Buildings, the Radwaste Building, the Service Building, and the Offgas Building. Other buildings such as the gatehouse, warehouses, etc., are also located in the general plant area.

A Lake Screen House on the intake flume is located about 800 feet east of the main building complex. A small river screen house, located on the Illinois River, provides makeup water to the cooling lake for the LaSalle Station.

Condenser cooling for the station is provided from a perched cooling lake of 2058 acres. The ultimate heat sink for emergency core cooling is a submerged pond and intake flume of 458 acre-feet capacity that underlies the cooling lake and the natural grade of the site.

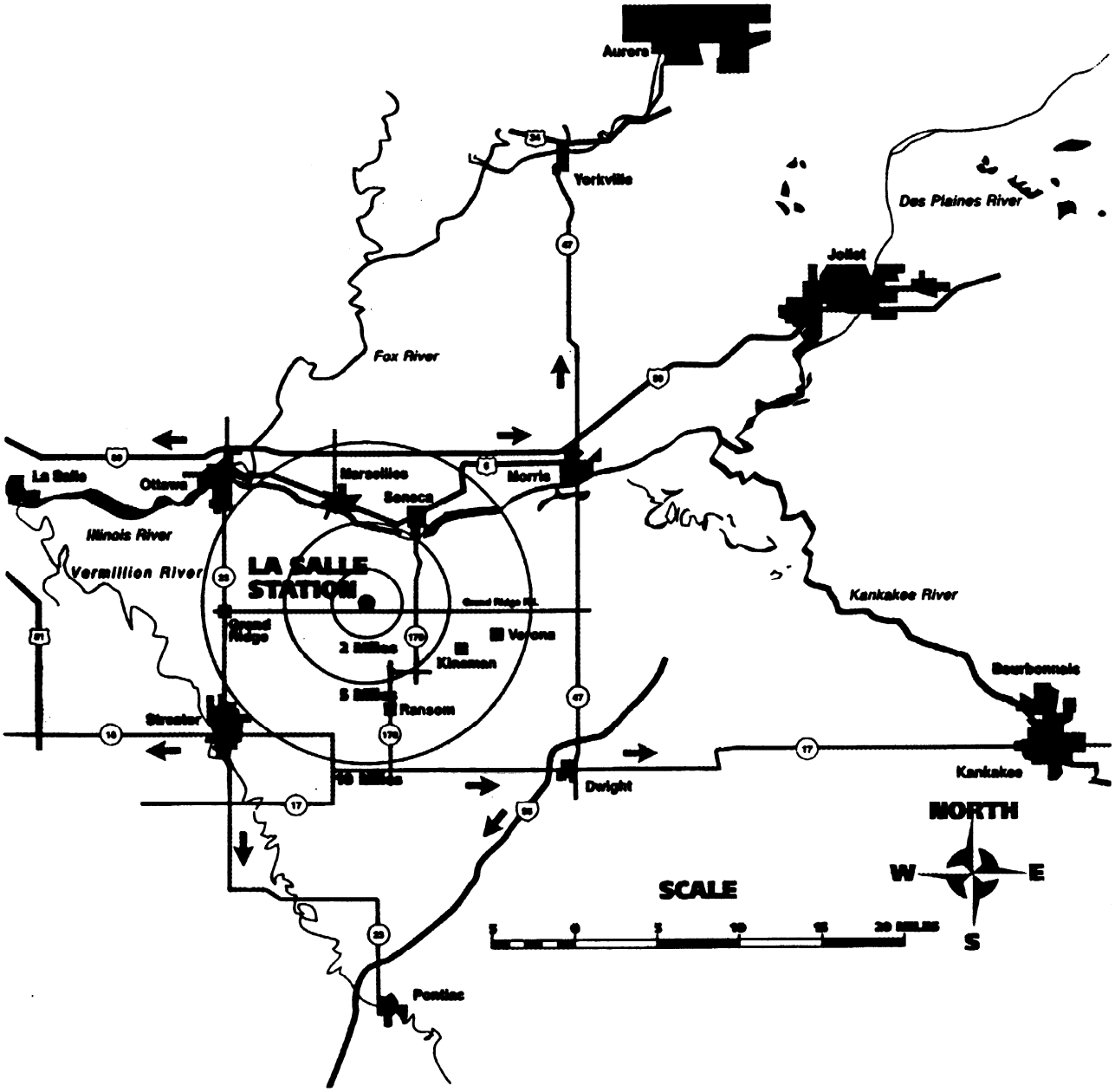
The LaSalle Station utilizes a single vent stack for elevated release of all gaseous waste. Liquid radwaste is stored for decay prior to release to the Illinois River or concentrated to solid waste for controlled disposal at regulated storage sites. For more specific site location information, refer to the Station UFSAR.

1.2 Emergency Planning Zone

The plume exposure Emergency Planning Zone (EPZ) for LaSalle Station is an area surrounding the Station with a radius of about ten miles. (Exact boundaries are determined by the State of Illinois). Refer to Figure 1-1.

The ingestion pathway EPZ for LaSalle Station is an area surrounding the Station with a radius of about 50 miles.

Figure 1-1: LaSalle Station Location and 10 Mile EPZ



Section 2: Organizational Control of Emergencies

This section describes the Emergency Response Organization (ERO) and its key positions. It outlines the staffing requirements which provide initial emergency response actions and provisions for timely augmentation of on-shift personnel when required. It also describes interfaces among Exelon Nuclear emergency response personnel and specifies the offsite support available to respond to the nuclear generating stations.

2.1 Shift Organization Staffing

Initial response to any emergency is by the normal plant organization present at the site. This organization includes positions that are onsite 24 hours per day and is described in Section B.1 of the Exelon Nuclear Standardized Radiological Emergency Plan. The Normal Shift Organization will be augmented, in an emergency, with designated/additional Emergency Response Organization (ERO) personnel within 60 minutes of notification as specified under Table 2-1. ERO activation is described in Section H.4 of the Exelon Nuclear Standardized Radiological Emergency Plan.

Table 2-1 outlines ERO positions required to meet minimum staffing and full augmentation of the on-shift complement at an Alert or higher classification, and the major tasks assigned to each position. Responsibilities for each position are described in Section B.5 of the Exelon Nuclear Standardized Radiological Emergency Plan.

2.2 Emergency Response Organization Block Diagram

Figures B-1a through B-1d of the Exelon Nuclear Standardized Radiological Emergency Plan illustrates the overall emergency response organization.

2.3 Non-Exelon Nuclear Support Groups

Exelon Nuclear has contractual agreements with several companies whose services would be available in the event of a radiological emergency. These agencies and their available services are listed in Appendix 3 of the Emergency Plan.

Emergency response coordination with governmental agencies and other support organizations is discussed in Section A of the Emergency Plan.

Agreements exist on file at LaSalle Station with several support agencies. These agencies and their support roles are listed in Appendix 2, Station Letters of Agreement.

Table 2-1: Minimum Staffing Requirements

Functional Area	Major Tasks	Emergency Positions	Minimum Shift Size	Minimum Staffing *60 Minute Augmentation	Minimum Staffing Other On-Call	Minimum Staffing Full Augmentation
1. Plant Operations/Safe Shutdown and Assessment of Operational Aspects	Control Room Staff	Shift Manager	1			
		Shift Supervisor	1			
		Nuclear Station Operator	3			
		Non-Licensed Operator	3			
2. Emergency Direction and Control	Command and Control	Shift Emergency Director (CR)	1[(a)]			
		Station Emergency Director (TSC)		1		
		Corporate Emergency Director (EOF)		1		
3. Notification & Communication	Emergency Communications	Plant Shift Personnel	1			
		TSC Director (TSC)		1		
		EOF Director (EOF)		1		
		State/Local Communicator		1 (EOF)		1 (TSC)
		ENS Communicator		1 (TSC)		1 (EOF)
		HPN Communicator		1 (EOF)		1 (TSC)
	Plant Status	OPs Communicator (CR/TSC)				2
		Operations Advisor (EOF)				1
	In-Plant Team Control	Damage Control Comm. (CR/TSC/OSC)				3
	Technical Activities	Technical Communicator (TSC)				1
		Technical Advisor (EOF)				1
	Governmental	State Environs Communicator (EOF)				(b)
		EOC Communicator (EOF)				1
		State EOC Liaison (State EOC)				(b)
		County EOC Liaison (County EOC)				(b)
		Regulatory Liaison (EOF)				1
4. Radiological Assessment	Offsite Dose Assessment	RP Personnel	1			
		Dose Assessment Coordinator (EOF)		1		
		Dose Assessor (EOF)				1
		Radiation Controls Coordinator (TSC)				1
	Offsite Surveys	Environmental Coordinator (EOF)		1		
		Field Team Communicator (EOF)				1
		Offsite Field Team Personnel		4		(b)
	Onsite Surveys	Onsite Field Team Personnel		2		(b)
	In-plant Surveys	RP Personnel	1	2		(b)
	Chemistry	Chemistry Personnel	1	1		(b)
	RP Supervisory	Radiation Protection Manager(TSC/EOF)		2		

Functional Area	Major Tasks	Emergency Positions	Minimum Shift Size	Minimum Staffing *60 Minute Augmentation	Minimum Staffing Other On-Call	Full Augmentation
5. Plant System Engineering, Repair, and Corrective Actions	Technical Support	STA / Incident Assessor (CR)	1			
		Technical Manager (TSC)		1		
		Core Thermal/Hydraulic Engineer (TSC)		1		
		Mechanical Engineer (TSC)		1		
		Electrical Engineer (TSC)		1		
		SAMG Decision-Maker (TSC)		1[(a)]		
		SAMG Evaluator (TSC)		2[(a)]		
		Operations Manager (TSC)		1		
		Radiation Controls Engineer (TSC)				1
		Technical Support Manager (EOF)				1
	Repair and Corrective Actions	Mechanical Maintenance (OSC)	1[(a)]	2		(b)
		Electrical/I&C Maintenance (OSC)	1[(a)]	3		(b)
		Maintenance Manager (TSC)		1		
		OSC Director (OSC)		1		
		Assistant OSC Director (OSC)				1
		OPs Lead & Support Personnel (OSC)				(b)
6. In-Plant Protective Actions	Radiation Protection	RP Personnel	2[(a)]	4		(b)
7. Fire Fighting	--	Fire Brigade[(c)]	5			
8. 1st Aid and Rescue Operations	--	Plant Personnel	2[(a)]			(b)
9. Site Access Control and Personnel Accountability	Security & Accountability	Security Team Personnel	(d)	(d)		
		Security Coordinator (TSC)				1
	EOF Security	Security Coordinator (EOF)				1
10. Resource Allocation and Administration	Logistics	Logistics Manager (EOF)		1		
		Logistics Coordinator (TSC)				1
	Administration	Administrative Coordinator (EOF)				1
		Clerical Staff (TSC/EOF/JIC)				(b)
	Inter Facility Logs	Events Recorder (EOF/JIC)				2
	Facility Support	Computer Specialist (EOF)				1

Functional Area	Major Tasks	Emergency Positions		Minimum Shift Size	Minimum Staffing *60 Minute Augmentation	Minimum Staffing Other On-Call	Full Augmentation
11. Public Information	Media Interface	Corporate Spokesperson	(JIC)			1	
		Rad Protection Spokesperson	(JIC)				1
		Technical Spokesperson	(JIC)				1
	Information Development	Public Information Director				1	
		News Writer					1
	Media Monitoring and Rumor Control	Media Monitoring Staff					(b)
		Rumor Control Staff					(b)
	Facility Operation and Control	JIC Director	(JIC)			1	
		JIC Coordinator	(JIC)				1
		Administrative Coordinator	(JIC)				1
		Access Controls	(JIC)				1
		Facility Support Staff	(JIC)				(b)
		TOTAL:		**18**	**37**	**3**	**32[(b)]**

* Response time is based on optimum travel conditions.

(a) May be provided by personnel assigned other functions.

(b) Personnel numbers depend on the type and extent of the emergency.

(c) Fire Brigade per FSAR/Technical Specifications, as applicable.

(d) Function performed by on-shift security personnel.

Section 3: Classification of Emergencies

3.1 General

Section D of the Exelon Nuclear Standardized Emergency Plan divides the types of emergencies into four Emergency Classification Levels (ECLs). The first four are the UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY, and GENERAL EMERGENCY. These ECLs are entered by meeting the Emergency Action Level (EAL) Threshold Values provided in this section of the Annex. The ECLs are escalated from least severe to most severe according to relative threat to the health and safety of the public and emergency workers. Depending on the severity of an event, prior to returning to a standard day-to-day organization, a state or phase called RECOVERY may be entered to provide dedicated resources and organization in support of restoration and communication activities following the termination of the emergency.

UNUSUAL EVENT: Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

ALERT: Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

SITE AREA EMERGENCY: Events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

GENERAL EMERGENCY: Events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

RECOVERY: Recovery can be considered as a phase of the emergency and is entered by meeting emergency termination criteria provided in EP-AA-111 Emergency Classification and Protective Action Recommendations.

An emergency is classified by assessing plant conditions and comparing abnormal conditions to Initiating Conditions and Threshold Values for each Emergency Action Level.

Individuals responsible for the classification of events will refer to the Initiating Condition and Threshold Values on the matrix of the appropriate station Standardized Emergency Plan Annex (this document). This matrix will contain Initiating Conditions, EAL Threshold Values, Mode Applicability Designators, appropriate EAL numbering system, and additional guidance necessary to classify events. It may be provided as a user aid.

The matrix is set up in six Recognition Categories. The first is designated as "R" and relates to Abnormal Radiological Conditions / Abnormal Radiological Effluent Releases. The second is designated as "F" and relates to Fission Product Barrier Degradation. The third is designated as "M" and relates to hot condition System Malfunctions. The fourth is designated as "C" and relates to Cold Shutdown / Refueling System. The fifth is designated as "H" and relates to Hazards and Other Conditions. The sixth is designated "E-H" and relates to ISFSI Malfunctions.

The 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.

The Initiating Conditions are coded with a two letter and one number code. The first letter is the Recognition Category designator, the second letter is the Classification Level, “U” for (NOTIFICATION OF) UNUSUAL EVENT, “A” for ALERT, “S” for SITE AREA EMERGENCY and “G” for GENERAL EMERGENCY. The EAL number is a sequential number for that Recognition Category series. All Initiating Conditions that are describing the severity of a common condition (series) will have the same number.

The EAL number may then be used to reference a corresponding page(s), which provides the basis information pertaining to the Initiating Condition:

- Threshold Value
- Mode Applicability
- Basis

Emergency Action Levels are the measurable, observable detailed conditions that must be met in order to classify the event. Classification is not to be made without referencing, comparing and satisfying the Threshold Values specified in the Emergency Action Levels.

A list of definitions is provided as part of this document for terms having specific meaning to the Emergency Action Levels. Site specific definitions are provided for terms with the intent to be used for a particular Initiating Condition/Threshold Value and may not be applicable to other uses of that term at other sites, the Emergency Plan or procedures.

References are also included to documents that were used to develop the EAL Threshold Values.

References to the Emergency Director means the person in Command and Control as defined in the Emergency Plan. Classification of emergencies is a non-delegable responsibility of Command and Control for the onsite facilities with responsibility assigned to the Shift Emergency Director (Control Room Shift Manager) or the Station Emergency Director (TSC). Classification of emergencies remains the responsibility of the applicable onsite facility even after Command and Control is transferred to the Corporate Emergency Director (EOF).

3.2 Classification, Instrumentation and Transient Events

Although the majority of the EALs provide very specific thresholds, the Emergency Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL is IMMINENT. If, in the judgment of the Emergency Director, an IMMINENT situation is at hand, the classification should be made as if the threshold has been exceeded. While this is particularly prudent at the higher emergency classification levels (as the early classification may provide for more effective implementation of protective measures), it is nonetheless applicable to all emergency classification levels.

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 indications, or (3) by direct observation by plant personnel, such that doubt related to the indication's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

Indications used for monitoring and evaluation of plant conditions include the normally used instrumentation, backup or redundant instrumentation, and the use of other parameters that provide information that supports determination if an EAL threshold value has been reached. When an EAL refers to a specific instrument or indication that is determined to be inaccurate or unavailable, then alternate indications shall be used to monitor the specified condition.

During an event that results in changing parameters trending towards an EAL classification, and instrumentation that was available to monitor this parameter becomes unavailable or the parameter goes off scale, the parameter should be assumed to have been exceeded consistent with the trend and the classification made if there are no other direct or indirect means available to determine if the threshold has not been exceeded.

Planned evolutions involve preplanning to address the limitations imposed by the condition, the performance of required surveillance testing, and the implementation of specific controls prior to knowingly entering the condition in accordance with the specific requirements of the site's Technical Specifications. Activities which cause the site to operate beyond that allowed by the site's Technical Specifications, planned or unplanned, may result in an EAL threshold being met or exceeded. Planned evolutions to test, manipulate, repair, perform maintenance or modifications to systems and equipment that result in an EAL

value being met or exceeded are not subject to classification and activation requirements as long as the evolution proceeds as planned and is within the operational limitations imposed by the specific operating license. However, these conditions may be subject to the reporting requirements of 10 CFR 50.72.

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.

Concerning Classification Downgrading Exelon Nuclear policy is that emergency classifications shall not be downgraded to a lower classification. Once declared, the event shall remain in effect until no Classification is warranted or until such time as conditions warrant classification to Recovery.

There may be cases in which a plant condition that exceeded an EAL was not recognized at the time of occurrence but is identified well after the condition has occurred (e.g., as a result of routine log or record review), and the condition no longer exists. In these cases, an emergency should not be declared. Reporting requirements of 10 CFR 50.72 are applicable, the guidance of NUREG-1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73 and the Reportability Reference Manual, should be applied.

3.3 Mode Applicability

The plant-operating mode that existed at the time that the event occurred, prior to any protective system or operator action initiated in response to the condition, is compared to the mode applicability of the EALs. If an event occurs, and a lower or higher plant-operating mode is reached before the emergency classification can be made, the declaration shall be based on the mode that existed at the time the event occurred.

For events that occur in Cold Shutdown or Refueling, escalation is via EALs that have Cold Shutdown or Refueling for mode applicability, even if Hot Shutdown (or a higher mode) is entered during any subsequent heat-up. In particular, the Fission Product Barrier Matrix EALs are applicable only to events that initiate in Hot Shutdown or higher.

If there is a change in Mode following an event declaration, any subsequent events involving EALs outside of the current declaration escalation path will be evaluated on the Mode of the plant at the time the subsequent events occur.

3.4 Emergency Director Judgment

Emergency Director Judgment EALs are provided in the Hazards and Other Condition Affecting Plant Safety section and on the Fission Product Barrier Matrix. Both of the Emergency Director Judgment EALs have specific criteria for when they should be applied.

The Hazards Section Emergency Director Judgment EALs are intended to address unanticipated conditions which are not addressed explicitly by other EALs but warrant declaration of an emergency because conditions exist which

are believed by the Emergency Director to fall under specific emergency classifications (UE, Alert, SAE or GE).

The FPB Matrix ED Judgment EALs are intended to include unanticipated conditions, which are not addressed explicitly by any of the other FPB threshold values, but warrant determination because conditions exist that fall under the broader definition for a significant Loss or Potential Loss of the barrier (equal to or greater than the defined FPB threshold values).

3.5 Fission Product Barrier Restoration

Fission Product Barriers (FPBs) are not treated the same as EAL threshold values. Conditions warranting declaration of the loss or potential loss of a Fission Product Barrier may occur resulting in a specific classification. The condition that caused the loss or potential loss declaration could be rectified as the result of Operator action, automatic actions, or designed plant response. Barriers will be considered re-established when there are direct verifiable indications (containment penetration or open valve has been isolated, coolant sample results, etc) that the barrier has been restored and is capable of mitigating future events.

The reestablishment of a fission product barrier does not alter or lower the existing classification. Entry into Termination/Recovery phase is still required for exiting the present classification. However the reestablishment of the barrier should be considered in determining future classifications should plant conditions or events change.

3.6 Definitions

AFFECTING SAFE SHUTDOWN: Event in progress has adversely affected functions that are necessary to bring the plant to and maintain it in the applicable HOT or COLD SHUTDOWN condition. Plant condition applicability is determined by Technical Specification LCOs in effect.

> Example 1: Event causes damage that results in entry into an LCO that requires the plant to be placed in HOT SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is not “AFFECTING SAFE SHUTDOWN.”
>
> Example 2: Event causes damage that results in entry into an LCO that requires the plant to be placed in COLD SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is “AFFECTING SAFE SHUTDOWN.”

BOMB: An explosive device suspected of having sufficient force to damage plant systems or structures.

CIVIL DISTURBANCE: A group of persons violently protesting station operations or activities at the site.

COMPENSATORY NON-ALARMING INDICATIONS: Process Computer, SPDS, and PPDS.

CONFINEMENT BOUNDARY: The barrier(s) between areas containing radioactive substances and the environment.

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized / energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

EXTORTION: An attempt to cause an action at the station by threat of force.

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fire. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTILE FORCE: One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

INTRUSION: A person(s) present in a specified area without authorization. Discovery of a BOMB in a specified area is indication of INTRUSION into that area by a HOSTILE FORCE.

INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI): A complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage.

NORMAL LEVELS: Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

NORMAL PLANT OPERATIONS: Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

OPERATING MODES	REACTOR MODE SWITCH POSITION	TEMP
(1) Power Operation:	Run	N/A
(2) Startup:	Refuel [(a)] or Startup/Hot Standby	N/A
(3) Hot Shutdown [(a)]:	Shutdown	> 200° F
(4) Cold Shutdown [(a)]:	Shutdown	≤ 200° F
(5) Refueling [(b)]:	Shutdown or Refuel	N/A
(D) Defueled:	All reactor fuel removed from reactor pressure vessel (full core off load during refueling or extended outage).	

[(a)] All reactor vessel head closure bolts fully tensioned.

[(b)] One or more reactor vessel head closure bolts less than fully tensioned.

Hot Matrix – applies in modes (1), (2), and (3)

Cold Matrix – applies in modes (4), (5), and (D)

OWNER CONTROLLED AREA (OCA): The property associated with the station and owned by the company. Access is normally limited to persons entering for official business.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

SABOTAGE: A deliberate damage, mis-alignment, or mis-operation of plant equipment with the intent to render the equipment inoperable. Equipment found tampered with or damaged due to malicious mischief may NOT meet the definition of SABOTAGE until this determination is made by security supervision.

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) Turbine Trip (2) Reactor Scram (3) ECCS Activation, (4) Recirc.

Runback > 25% Reactor Power change, or (5) thermal power oscillations >10% Reactor Power change.

STRIKE ACTION: A work stoppage within the PROTECTED AREA by a body of workers to enforce compliance with demands made on management. The STRIKE ACTION must threaten to interrupt NORMAL PLANT OPERATIONS.

UNISOLABLE: A breach or leak that cannot be promptly isolated.

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

Emergency Action Level Technical Basis Page Index

Abnormal Rad Levels / Radiological Effluent

Radiological Effluents

GENERAL EMERGENCY

RG1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. [1][2][3][4][5][D]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Vent Stack and SBGT WRGMs **> 8.02 E+09 uCi/sec** for **≥ 15 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 1000 mRem TEDE**
      OR
   b. **> 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**.
      OR
   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

SITE AREA EMERGENCY

RS1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. [1][2][3][4][5][D]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Vent Stack and SBGT WRGMs **> 8.02 E+08 uCi/sec** for **≥ 15 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 100 mRem TEDE**
      OR
   b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.
      OR
   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

ALERT

RA1 Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer. [1][2][3][4][5][D]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **200 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 15 minutes**.
   - Radwaste Effluent Monitor LCRM 0D18-K606
     OR
   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Vent Stack and SBGT WRGMs is **> 9.15 E+07 uCi/sec** for **≥ 15 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.

UNUSUAL EVENT

RU1 Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer. [1][2][3][4][5][D]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **2 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 60 minutes**.
   - Radwaste Effluent Monitor LCRM 0D18-K606
     OR
   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Vent Stack and SBGT WRGMs is **> 9.15 E+05 uCi/sec** for **≥ 60 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Abnormal Rad Levels / Radiological Effluent

Abnormal Rad Levels

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
		RA2 Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel. 1 2 3 4 5 D **EAL Threshold Values:** 1. VALID reading **> 1000 mR/hr** on the radiation monitor ARM 0D21-K604A due to **EITHER**: • Damaged irradiated fuel. **OR** • Water level drop. **OR** 2. Water level drop in the Reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal that will result in Irradiated Fuel becoming uncovered.	**RU2** UNPLANNED rise in plant radiation levels. 1 2 3 4 5 D **EAL Threshold Values:** 1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by: • Refueling Cavity water level **< 340 in.** on shutdown range. **OR** • Spent Fuel Pool water level **< 21 ft. 4 in**. **OR** • Report of visual observation of a drop in water level in the Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal. **AND** b. VALID Area Radiation Monitor reading rise on refuel radiation monitor ARM 0D21-K604A. **OR** 2. UNPLANNED VALID Area Radiation Monitor reading or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.
	Table R1 **Areas Requiring Continuous Occupancy** • Main Control Room (1(2)D18-K751A-D) • Central Alarm Station - (by survey)	**RA3** Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. 1 2 3 4 5 D **EAL Threshold Values:** Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R1) to maintain plant safety functions.	**RU3** Fuel Clad Degradation. 1 2 3 **EAL Threshold Values:** Fuel clad degradation resulting in **EITHER**: • Offgas system radiation monitor **HI-HI** alarm. **OR** • Specific coolant activity **> 4.0 uCi/gm** Dose Equivalent I-131.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
FG1 Loss of ANY two barriers AND Loss or Potential Loss of third barrier. 1 2 3	**FS1** Loss or Potential Loss of ANY two barriers. 1 2 3	**FA1** ANY Loss or ANY Potential Loss of either Fuel Clad or RCS. 1 2 3	**FU1** ANY Loss or ANY Potential Loss of Containment. 1 2 3

Sub-Category	FC - Fuel Clad		RC – Reactor Coolant System		CT - Containment	
	Loss	**Potential Loss**	**Loss**	**Potential Loss**	**Loss**	**Potential Loss**
1. Pri Coolant Activity	Coolant activity **> 300 uCi/gm** Dose Equivalent I-131	None	None	None	None	None
2. RPV Water Level	1. RPV level **cannot** be restored and maintained **> – 183 inches.**	2. RPV level **cannot** be restored and maintained **> – 161 inches** (TAF). **OR** 3. RPV level **cannot** be determined.	1. RPV level **cannot** be restored and maintained **> –161 inches** (TAF). **OR** 2. RPV level **cannot** be determined.	None	None	Plant conditions indicate that Primary Containment Flooding is required.
3. Primary Cont Conditions	None	None	1. Drywell pressure **> 1.77 psig**. **AND** 2. Drywell pressure rise due to RCS leakage.	None	1. Rapid unexplained drop in Drywell Pressure following initial pressure rise. **OR** 2. Drywell pressure response **not** consistent with LOCA conditions.	3. Drywell pressure **≥ 45 psig** and rising. **OR** 4. a. Drywell or Suppression chamber hydrogen concentration **≥ 6%.** **AND** b. Drywell or Suppression chamber oxygen concentration **≥ 5%.** **OR** 5. Heat Capacity Temperature Limit (LGA-003 Fig. H) exceeded.
4. RCS Leak Rate	None	None	1. UNISOLABLE Main Steam Line (MSL), Feedwater, RWCU or RCIC line break. **OR** 2 Emergency RPV Depressurization is required.	3. RCS leakage **> 50 gpm** inside the drywell. **OR** 4. UNISOLABLE primary system leakage outside drywell resulting in **EITHER:** • Secondary Containment area temperature **> LGA-002 Maximum Normal** operating levels. **OR** • Secondary Containment radiation level **> LGA-002 Maximum Normal** operating levels.	None	None
5. Pri Cont Rad Monitoring	Drywell radiation monitor reading **> 1.90 E+02 R/hr (190 R/hr)**.	None	Drywell radiation monitor reading **> 1.0 E+02 R/hr (100 R/hr).**	None	None	Drywell radiation monitor reading **> 4.35 E+02 R/hr (435 R/hr)**.
6. Primary Cont Isolation Failure or Bypass	None	None	None	None	1. a. Failure of isolation valves in any one line to close. **AND** b. Direct downstream pathway to the environment exists after a primary containment isolation signal. **OR** 2. Intentional venting/purging of Primary Containment per EOPs or SAMGs due to accident conditions. **OR** 3. UNISOLABLE primary system leakage outside drywell resulting in **EITHER:** • Secondary Containment area temperature **> LGA-002, Maximum Safe** operating levels. **OR** • Secondary Containment radiation level **> LGA-002, Maximum Safe** operating levels.	None
7. ED Judgment	1. Any condition in the opinion of the Emergency Director that indicates Loss of the Fuel Clad Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Fuel Clad Barrier.	1. Any condition in the opinion of the Emergency Director that indicates Loss of the RCS Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the RCS Barrier.	1. Any condition in the opinion of the Emergency Director that indicates Loss of the Containment Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment Barrier.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

System Malfunction

Loss of AC Power

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
MG1 Prolonged loss of all Off-Site power and all On-Site AC power to emergency busses. 1 2 3	**MS1** Loss of all Off-Site and all On-Site AC power to emergency busses for 15 minutes or longer. 1 2 3	**MA1** AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout. 1 2 3	**MU1** Loss of all Off-Site AC power to busses for 15 minutes or longer. 1 2 3
EAL Threshold Values: **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to unit ECCS busses. **AND** 2. Failure of DG 0 and DG 1A(2A) emergency diesel generators to supply power to unit ECCS busses. **AND** 3. a. Restoration of either unit ECCS bus (excluding Division 3) in **< 4 hours** is **not** likely. **OR** b. RPV level **cannot** be determined to be **> - 150 inches**.	**EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to unit ECCS busses. **AND** 2. Failure of DG 0 and DG 1A(2A) emergency diesel generators to supply power to unit ECCS busses. **AND** 3. Failure to restore power to at least one Unit ECCS bus (excluding Division 3) in **< 15 minutes** from the time of loss of both offsite and onsite AC power.	**EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. AC power capability to unit ECCS busses (excluding Division 3) reduced to only one of the following power sources for **≥ 15 minutes**: • System Auxiliary Transformer 142(242) • Unit Auxiliary Transformer 141(241) • Unit Emergency Diesel Generator 1A(2A) • Shared Emergency Diesel Generator DG 0 • Other unit SAT via crosstie breakers **AND** 2. Any additional single power source failure will result in unit blackout.	**EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of all off-site AC power to unit ECCS busses for **≥ 15 minutes**.

RPS Failure / Inadvertent Criticality

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
MG2 Automatic Scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists. 1 2	**MS2** Automatic Scram fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor. 1 2	**MA2** Automatic Scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor. 1 2	**MU2** Inadvertent criticality. 3
EAL Threshold Values: 1. Automatic scram was **not** successful as indicated by Reactor Power **> 3%.** **AND** 2. Manual scram/ARI actions were **not** successful as indicated by Reactor Power **> 3%.** **AND** 3. **EITHER** of the following exists: • RPV level **cannot** be restored and maintained **> -150 inches** on WR (- 183 inches on FZ if WR not available). **OR** • Heat Capacity Temperature Limit (LGA-003 Fig. H) exceeded.	**EAL Threshold Values:** 1. Automatic scram was **not** successful as indicated by Reactor Power **> 3%.** **AND** 2. Manual scram/ARI actions were **not** successful from the Reactor Console as indicated by Reactor Power **> 3%.**	**EAL Threshold Values:** 1. Automatic scram was **not** successful as indicated by Reactor Power **> 3%.** **AND** 2. Manual scram/ARI actions were successful from Reactor Console as indicated by Reactor Power **≤ 3%.**	**EAL Threshold Values:** UNPLANNED sustained positive period observed on nuclear instrumentation.

Modes: 1 – Power Operation, 2 – Startup, 3 –Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
DC Power		**MS3** Loss of all vital DC power for 15 minutes or longer. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of all vital DC power based on **< 108 VDC** on unit 125 VDC battery busses 111Y(211Y) and 112Y(212Y) for **≥ 15 minutes**.		
Annunciators		**MS4** Inability to monitor a SIGNIFICANT TRANSIENT in progress. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1) **AND** 2. SIGNIFICANT TRANSIENT in progress (Table M2). **AND** 3. Compensatory indications (computer points) are unavailable.	**MA4** UNPLANNED Loss of safety system annunciation or indication in the control room with EITHER (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1) **AND** 2. a. SIGNIFICANT TRANSIENT in progress (Table M2). **OR** b. Compensatory indications (computer points) are unavailable.	**MU4** UNPLANNED loss of safety system annunciation or indication in the control room for 15 minutes or longer. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1)
		Table M1 - Safety Systems • ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring	**Table M2 - Significant Transients** • Turbine trip • Reactor scram • ECCS actuation • Recirc Runback **>25%** Reactor Power change • Thermal power oscillations **> 10 %** Reactor Power change	

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
RCS Leak				**MU5** RCS leakage. 1 2 3 **EAL Threshold Values:** 1. Unidentified or pressure boundary leakage into the Drywell **> 10 gpm**. **OR** 2. Identified leakage into the Drywell **> 25 gpm**.
Communications		**Table M3 - Communications Capability** System / Onsite / Offsite Plant radio system: X Plant paging system: X Sound power phones: X In-plant telephones: X All telephone lines (commercial and microwave): Offsite X ENS: Offsite X HPN: Offsite X Satellite Phones: Offsite X Cellular Phones: Offsite X		**MU6** Loss of all On-site or Off-site communications capabilities. 1 2 3 **EAL Threshold Values:** 1. Loss of all Table M3 **Onsite** communications capability affecting the ability to perform routine operations. **OR** 2. Loss of all Table M3 **Offsite** communications capability affecting the ability to perform offsite notifications.
T. S. Time				**MU7** Inability to reach required shutdown within Technical Specification limits. 1 2 3 **EAL Threshold Values:** Plant is **not** brought to required operating mode within Technical Specifications LCO Action Statement Time.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Hazards and Other Conditions Affecting Plant Safety

Security

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
HG1 HOSTILE ACTION resulting in loss of physical control of the facility. 1 2 3 4 5 D **EAL Threshold Values:** 1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1). **OR** 2. A HOSTILE ACTION has: • Caused failure of Spent Fuel Pool Cooling Systems **AND** • IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).	**HS1** HOSTILE ACTION within the PROTECTED AREA. 1 2 3 4 5 D **EAL Threshold Values:** A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.	**HA1** HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. 1 2 3 4 5 D **EAL Threshold Values:** 1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site. **OR** 2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.	**HU1** Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant. 1 2 3 4 5 D **EAL Threshold Values:** 1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities. **OR** 2. A validated notification from NRC providing information of an aircraft threat. **OR** 3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

C. R. Evacuation

Table H1 - Safety Functions

- Reactivity Control (ability to shut down the reactor and keep it shutdown)
- RCS Inventory (ability to cool the core)
- Decay Heat Removal (ability to maintain heat sink)

HS2 Control Room evacuation has been initiated and plant control cannot be established. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Control Room evacuation has been initiated. **AND** 2. Control of the plant **cannot** be established per LOA-RX-101(201) or LOA-FX-101(201) in **< 15 minutes**.	**HA2** Control Room evacuation has been initiated. 1 2 3 4 5 D **EAL Threshold Values:** Entry into LOA-RX-101(201) or LOA-FX-101(201) for Control Room evacuation.	

Fire / Explosion

Table H2 – Vital Areas

- Reactor Building
- Control Room
- Auxiliary Building
- Diesel Generator Rooms
- Switchgear and Battery Rooms
- Remote Shutdown Rooms
- CSCS Pump Rooms
- LSH (for 0E12-F300 access only)

HA3 FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown. 1 2 3 4 5 D **EAL Threshold Values:** FIRE or EXPLOSION resulting in any of the following: • VISIBLE DAMAGE to a Table H2 permanent structure. **OR** • VISIBLE DAMAGE to safety system equipment contained within a Table H2 area. **OR** • Control Room indication of degraded safety system equipment performance contained within a Table H2 area.	**HU3** FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm. **OR** 2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Hazards and Other Conditions Affecting Plant Safety

Natural / Destructive Phenomena

Table H2 - Vital Areas

- Reactor Building
- Control Room
- Auxiliary Building
- Diesel Generator Rooms
- Switchgear and Battery Rooms
- Remote Shutdown Rooms
- CSCS Pump Rooms
- LSH (for 0E12-F300 access only)

Table H3 – Internal Flooding Areas

- RCIC Room
- B/C RHR Room
- HPCS Room
- A RHR Room
- CSCS Pump Rooms
- RB Raceway

ALERT

HA4 Natural and destructive phenomena affecting VITAL AREAS 1 2 3 4 5 D

EAL Threshold Values:

1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by seismic instrumentation **> 0.10 g**.

   AND

   b. Confirmed by **ANY** of the following:
   - Earthquake felt in plant.

     OR
   - National Earthquake Center.

     OR
   - Control Room indication of degraded performance of systems required for the safe shutdown of the plant.

   OR

2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area:
   - Tornado strike

     OR
   - High winds **> 90 mph**

     OR
   - Vehicle crash

     OR
   - Turbine failure-generated PROJECTILES

   OR

3. Flooding in any Table H3 area that results in **ANY** of the following:

   a. Degraded safety system performance as indicated in the Control Room.

   OR

   b. Industrial safety hazards (e.g., electric shock) that precludes access necessary to operate or monitor safety equipment.

   OR

   c. Water level **> LGA-002, Maximum Safe** operating levels.

UNUSUAL EVENT

HU4 Natural and destructive phenomena affecting the PROTECTED AREA. 1 2 3 4 5 D

EAL Threshold Values:

1. a. Seismic event as indicated by station seismic monitoring procedures **> 0.01g**.

   AND

   b. Confirmed by **EITHER**:
   - Earthquake felt in plant.

     OR
   - National Earthquake Center.

   OR

2. **EITHER** of the following occurring within the PROTECTED AREA boundary:
   - Tornado strike

     OR
   - Sustained **(> 15 minutes)** high winds **> 90 mph**

   OR

3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

   OR

4. Flooding in any Table H3 area that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Hazards and Other Conditions Affecting Plant Safety

Toxic / Flammable Gas

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Table H2 - Vital Areas • Reactor Building • Control Room • Auxiliary Building • Diesel Generator Rooms • Switchgear and Battery Rooms • Remote Shutdown Rooms • CSCS Pump Rooms • LSH (for 0E12-F300 access only)		**HA5** Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event. Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.	**HU5** Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS. 1 2 3 4 5 D **EAL Threshold Values:** 1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS. **OR** 2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.

Judgment

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
HG6 Other conditions existing which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**HS6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	**HA6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an ALERT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**HU6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
ISFSI MALFUNCTION				
ISFSI				**E-HU1** Damage to a loaded cask CONFINEMENT BOUNDARY 1 2 3 4 5 D **EAL Threshold Values:** Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Page Intentionally Left Blank

Abnormal Rad Levels / Radiological Effluent

Radiological Effluents

GENERAL EMERGENCY

RG1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. [1][2][3][4][5][D]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Vent Stack and SBGT WRGMs **> 8.02 E+09 uCi/sec** for **≥ 15 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 1000 mRem TEDE**
      OR
   b. **> 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**.
      OR
   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

SITE AREA EMERGENCY

RS1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. [1][2][3][4][5][D]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Vent Stack and SBGT WRGMs **> 8.02 E+08 uCi/sec** for **≥ 15 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 100 mRem TEDE**
      OR
   b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.
      OR
   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

ALERT

RA1 Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer. [1][2][3][4][5][D]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **200 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 15 minutes**.
   - Radwaste Effluent Monitor LCRM 0D18-K606
     OR
   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Vent Stack and SBGT WRGMs is **> 9.15 E+07 uCi/sec** for **≥ 15 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.

UNUSUAL EVENT

RU1 Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer. [1][2][3][4][5][D]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **2 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 60 minutes**.
   - Radwaste Effluent Monitor LCRM 0D18-K606
     OR
   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Vent Stack and SBGT WRGMs is **> 9.15 E+05 uCi/sec** for **≥ 60 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Abnormal Rad Levels / Radiological Effluent			
Abnormal Rad Levels		**RA2** Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel. 1 2 3 4 5 D **EAL Threshold Values:** 1. VALID reading **> 1000 mR/hr** on the radiation monitor ARM 0D21-K604A due to **EITHER**: • Damaged irradiated fuel. **OR** • Water level drop. **OR** 2. Water level drop in the Reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal that will result in Irradiated Fuel becoming uncovered.	**RU2** UNPLANNED rise in plant radiation levels. 1 2 3 4 5 D **EAL Threshold Values:** 1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by: • Refueling Cavity water level **< 340 in.** on shutdown range. **OR** • Spent Fuel Pool water level **< 21 ft. 4 in**. **OR** • Report of visual observation of a drop in water level in the Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal. **AND** b. VALID Area Radiation Monitor reading rise on refuel radiation monitor ARM 0D21-K604A. **OR** 2. UNPLANNED VALID Area Radiation Monitor reading or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.
	Table R1 **Areas Requiring Continuous Occupancy** • Main Control Room (1(2)D18-K751A-D) • Central Alarm Station - (by survey)	**RA3** Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. 1 2 3 4 5 D **EAL Threshold Values:** Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R1) to maintain plant safety functions.	

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS				
Loss of AC Power			**CA1** Loss of all Off-Site and all On-Site AC power to emergency busses for 15 minutes or longer. 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to unit ECCS busses. **AND** 2. Failure of DG 0 and DG 1A(2A) emergency diesel generators to supply power to unit ECCS busses. **AND** 3. Failure to restore power to at least one unit ECCS bus (excluding Division 3) in **< 15 minutes** from the time of loss of both offsite and onsite AC power.	**CU1** AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout. 4 5 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. AC power capability to unit ECCS busses (excluding Division 3) reduced to only one of the following power sources for **≥ 15 minutes**: • System Auxiliary Transformer 142(242) • Unit Auxiliary Transformer 141(241) • Unit Emergency Diesel Generator 1A(2A) • Shared Emergency Diesel Generator DG 0 • Other unit SAT via crosstie breakers **AND** 2. Any additional single power source failure will result in unit blackout.
Inadvertent Criticality				**CU2** Inadvertent criticality. 4 5 **EAL Threshold Values:** UNPLANNED sustained positive period observed on nuclear instrumentation.
DC Power				**CU3** Loss of required DC power for 15 minutes or longer. 4 5 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of required DC power based on **< 108 VDC** on unit 125 VDC battery busses 111Y(211Y) and 112Y(212Y) for **≥ 15 minutes**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

Communications

Table C1 - Communications Capability

System	Onsite	Offsite
Plant radio system	X	
Plant paging system	X	
Sound power phones	X	
In-plant telephones	X	
All telephone lines (commercial and microwave)		X
ENS		X
HPN		X
Satellite Phones		X
Cellular Phones		X

CU4 Loss of all On-site or Off-site communications capabilities. 4 5 D

EAL Threshold Values:

1. Loss of all Table C1 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table C1 **Offsite** communications capability affecting the ability to perform offsite notifications.

Heat Sink

Table C2 – RCS Reheat Duration Thresholds

RCS	Containment Closure	Duration
Intact	N/A	60 minutes*
Not Intact	Established	20 minutes*
	Not Established	0 minutes

*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then EAL Threshold #1 is **not** applicable.

CA5 Inability to maintain plant in cold shutdown. 4 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200°F** for **> Table C2 duration**.

   OR

2. UNPLANNED RPV pressure rise **> 10 psig** as a result of temperature rise due to loss of decay heat removal.

CU5 UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV. 4 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200°F**.

   OR

2. Loss of the following for **≥ 15 minutes:**
   - All RCS temperature indications

     AND
   - All RPV level indications

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

RCS Leakage / Inventory

GENERAL EMERGENCY

CG6 Loss of RPV inventory affecting fuel clad integrity with containment challenged. [4] [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. RPV level **< - 161 inches (TAF)** for **≥ 30 minutes**.
   AND
   b. Any Containment Challenge Indication (Table C4).
   OR
2. a. RPV level unknown for **≥ 30 minutes.**
   AND
   b. Loss of RPV inventory as indicated by any of the following:
   - Table C3 indication.
     OR
   - Erratic Source Range Monitor indication.
     OR
   - Refuel floor Rad monitor 0D21-K604A **> 3000 mR/hr**.

   AND
   c. Any Containment Challenge Indication (Table C4)

Table C4 – Containment Challenge Indications

- Primary Containment Hydrogen concentration **≥ 6%** and Oxygen **≥ 5%**.
- UNPLANNED rise in containment pressure
- CONTAINMENT CLOSURE **not** established.
- Any Secondary Containment radiation monitor **> LGA-002 Maximum Safe** operating level.

SITE AREA EMERGENCY

CS6 Loss of RPV inventory affecting core decay heat removal capability. [4] [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. With CONTAINMENT CLOSURE **not** established, RPV level **< - 56 inches**.
   OR
2. With CONTAINMENT CLOSURE established, RPV level **< - 161 inches (TAF).**
   OR
3. a. RPV level unknown for **≥ 30 minutes.**
   AND
   b. Loss of RPV inventory as indicated by any of the following:
   - Table C3 indications.
     OR
   - Erratic Source Range Neutron Monitor indication.
     OR
   - Refuel floor Rad monitor 0D21-K604A **> 3000 mR/hr**.

ALERT

CA6 Loss of RPV inventory. [4] [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. RPV level **< - 50 inches**.
   OR
2. a. RPV level unknown for **≥ 15 minutes**.
   AND
   b. Loss of RPV inventory per Table C3 indications.

Table C3 – Indications of RCS Leakage

- UNPLANNED floor or equipment sump level rise
- UNPLANNED Suppression Pool level rise
- UNPLANNED vessel make-up rise
- Observation of leakage or Inventory loss

UNUSUAL EVENT

CU6 RCS leakage. [4]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

RCS leakage results in the inability to restore and maintain RPV level **> 11 inches** for **≥ 15 minutes**.

CU7 UNPLANNED loss of RPV inventory. [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED Reactor Cavity or Vessel level drop that meets **EITHER**:
   - When controlling level above the RPV flange, Reactor Cavity level drop below the RPV flange for **≥ 15 minutes**.
     OR
   - When controlling level below the RPV flange, vessel level drop below the procedurally established limit **≥ 15 minutes**.

   OR
2. a. RPV level unknown.
   AND
   b. Loss of RPV inventory per Table C3 indications.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Hazards and Other Conditions Affecting Plant Safety

Security

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
HG1 HOSTILE ACTION resulting in loss of physical control of the facility. 1 2 3 4 5 D **EAL Threshold Values:** 1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1). **OR** 2. A HOSTILE ACTION has: • Caused failure of Spent Fuel Pool Cooling Systems **AND** • IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).	**HS1** HOSTILE ACTION within the PROTECTED AREA. 1 2 3 4 5 D **EAL Threshold Values:** A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.	**HA1** HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. 1 2 3 4 5 D **EAL Threshold Values:** 1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site. **OR** 2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.	**HU1** Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant. 1 2 3 4 5 D **EAL Threshold Values:** 1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities. **OR** 2. A validated notification from NRC providing information of an aircraft threat. **OR** 3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

C. R. Evacuation

Table H1 - Safety Functions

- Reactivity Control (ability to shut down the reactor and keep it shutdown)
- RCS Inventory (ability to cool the core)
- Decay Heat Removal (ability to maintain heat sink)

HS2 Control Room evacuation has been initiated and plant control cannot be established. 1 2 3 4 5 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Control Room evacuation has been initiated.
AND
2. Control of the plant **cannot** be established per LOA-RX-101(201) or LOA-FX-101(201) in **< 15 minutes**.

HA2 Control Room evacuation has been initiated. 1 2 3 4 5 D

EAL Threshold Values:

Entry into LOA-RX-101(201) or LOA-FX-101(201) for Control Room evacuation.

Fire / Explosion

Table H2 – Vital Areas

- Reactor Building
- Control Room
- Auxiliary Building
- Diesel Generator Rooms
- Switchgear and Battery Rooms
- Remote Shutdown Rooms
- CSCS Pump Rooms
- LSH (for 0E12-F300 access only)

HA3 FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown. 1 2 3 4 5 D

EAL Threshold Values:

FIRE or EXPLOSION resulting in any of the following:

- VISIBLE DAMAGE to a Table H2 permanent structure.
OR
- VISIBLE DAMAGE to safety system equipment contained within a Table H2 area.
OR
- Control Room indication of degraded safety system equipment performance contained within a Table H2 area.

HU3 FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA. 1 2 3 4 5 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm.
OR
2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety			

Natural / Destructive Phenomena

Table H2 - Vital Areas

- Reactor Building
- Control Room
- Auxiliary Building
- Diesel Generator Rooms
- Switchgear and Battery Rooms
- Remote Shutdown Rooms
- CSCS Pump Rooms
- LSH (for 0E12-F300 access only)

Table H3 – Internal Flooding Areas

- RCIC Room
- B/C RHR Room
- HPCS Room
- A RHR Room
- CSCS Pump Rooms
- RB Raceway

HA4 Natural and destructive phenomena affecting VITAL AREAS [1][2][3][4][5][D]

EAL Threshold Values:

1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by seismic instrumentation **> 0.10 g**.

   AND

   b. Confirmed by **ANY** of the following:
   - Earthquake felt in plant.

     OR
   - National Earthquake Center.

     OR
   - Control Room indication of degraded performance of systems required for the safe shutdown of the plant.

   OR

2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area:
   - Tornado strike

     OR
   - High winds **> 90 mph**

     OR
   - Vehicle crash

     OR
   - Turbine failure-generated PROJECTILES

   OR

3. Flooding in any Table H3 area that results in **ANY** of the following:

   a. Degraded safety system performance as indicated in the Control Room.

   OR

   b. Industrial safety hazards (e.g., electric shock) that precludes access necessary to operate or monitor safety equipment.

   OR

   c. Water level **> LGA-002, Maximum Safe** operating levels.

HU4 Natural and destructive phenomena affecting the PROTECTED AREA. [1][2][3][4][5][D]

EAL Threshold Values:

1. a. Seismic event as indicated by station seismic monitoring procedures **> 0.01g**.

   AND

   b. Confirmed by **EITHER**:
   - Earthquake felt in plant.

     OR
   - National Earthquake Center.

   OR

2. **EITHER** of the following occurring within the PROTECTED AREA boundary:
   - Tornado strike

     OR
   - Sustained **(> 15 minutes)** high winds **> 90 mph**

   OR

3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

   OR

4. Flooding in any Table H3 area that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Toxic / Flammable Gas	**Table H2 - Vital Areas** • Reactor Building • Control Room • Auxiliary Building • Diesel Generator Rooms • Switchgear and Battery Rooms • Remote Shutdown Rooms • CSCS Pump Rooms • LSH (for 0E12-F300 access only)		**HA5** Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event. Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.	**HU5** Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS. 1 2 3 4 5 D **EAL Threshold Values:** 1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS. **OR** 2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.
Judgment	**HG6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**HS6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	**HA6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an ALERT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**HU6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

COLD SHUTDOWN / REFUELING MATRIX

COLD SHUTDOWN / REFUELING MATRIX

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
ISFSI MALFUNCTION				
ISFSI				**E-HU1** Damage to a loaded cask CONFINEMENT BOUNDARY 1 2 3 4 5 D **EAL Threshold Values:** Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

COLD SHUTDOWN / REFUELING MATRIX

COLD SHUTDOWN / REFUELING MATRIX

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RG1

Initiating Condition:

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

NOTE: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Vent Stack and SBGT WRGMs **> 8.02 E+09 uCi/sec** for **≥ 15 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of **EITHER**:

   a. **> 1000 mRem TEDE**

      OR

   b. **> 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond site boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for ≥ **60 minutes**.

      OR

   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RG1 (cont)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed the EPA Protective Action Guides (PAGs). Public protective actions will be necessary. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public and likely involve fuel damage.

While these failures are addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

Threshold #1 Basis:

The site-specific monitors listed include effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading threshold is not, the results from dose assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency-implementing procedures call for the timely performance of dose assessments using actual meteorology and release information. If the results of dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading threshold.

Threshold #2 Basis:

The "site boundary" is the nearest distance from potential release points at which protective actions would be required for members of the public.

Threshold #3 Basis:

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. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption on sample media followed by field analysis are used for determining the iodine (CDE) thyroid value.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RG1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev 5 AG1
2. EP-AA-112-500, Emergency Environmental Monitoring
3. ODCM Section 12.4 Gaseous Effluents and Total Dose
4. UFSAR Section 11.5, Process and Effluent Radiological Monitoring and Sampling Systems
5. EP-EAL-0605 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values LaSalle Station

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RS1

Initiating Condition:

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

NOTE: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Vent Stack and SBGT WRGMs **> 8.02 E+08 uCi/sec** for **≥ 15 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of **EITHER**:

   a. **> 100 mRem TEDE**

      OR

   b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond site boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.

      OR

   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RS1 (cont)

Basis (cont):

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed 10% of the EPA Protective Action Guides (PAGs). Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

While these failures are addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

Threshold #1 Basis:

The site specific monitors listed include effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading threshold is not, the results from dose assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency-implementing procedures call for the timely performance of dose assessments using actual meteorology and release information. If the results of dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading threshold.

Threshold #2 Basis:

The "site boundary" is the nearest distance from potential release points at which Protective Actions would be required for members of the public.

Threshold #3 Basis:

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. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption on sample media followed by field analysis are used for determining the iodine (CDE) thyroid value.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RS1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev 5 AS1
2. EP-AA-112-500, Emergency Environmental Monitoring
3. ODCM Section 12.4, Gaseous Effluents and Total Dose
4. UFSAR Section 11.5,
5. EP-EAL-0605 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values LaSalle Station

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA1

Initiating Condition:

Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors **> 200 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 15 minutes**.

   - Radwaste Effluent Monitor LCRM 0D18-K606

     OR

   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Vent Stack and SBGT WRGMs is **> 9.15 E+07 uCi/sec** for **≥ 15 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA1 (cont)

Basis (cont):

This EAL addresses an actual or substantial potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in RU1 and RA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases are not to be prorated or averaged. For example, a release exceeding 600 times ODCM for 5 minutes does not meet the threshold.

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

Threshold #1 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

The effluent monitors listed are those normally used for planned discharges. If a discharge is performed using a different flowpath or effluent monitor other than those listed (e.g., a portable or temporary effluent monitor), then the declaration criteria will be based on the monitor specified in the Discharge Permit.

Threshold #2 Basis:

This threshold is intended for effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA1 (cont)

Basis (cont):

Threshold #3 Basis:

This threshold addresses uncontrolled releases that are detected by sample analyses, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

Basis Reference(s):

1. NEI 99-01, Rev 5 AA1
2. ODCM Section 12.3, Liquid Effluents
3. ODCM Section 12.4, Gaseous Effluents and Total Dose
4. UFSAR Section 11.5
5. LCP-140-7, Analysis Of Radwaste Discharge Tanks 1(2)WF05T and Determination Of Discharge Flowrate And Liquid Radwaste Effluent Monitor Response
6. Structural Drawing S-01A Composite Site Plan LaSalle Station Units 1 & 2
7. LAP-1800-4, Chemistry Department Improved Technical Specifications, Technical Requirements Manual, TRM Appendixes, Offsite Dose Calculation Manual (ODCM) LaSalle Annex Check Lists
8. LYP-1200-2, Instantaneous Airborne Releases – 10 CFR 20 Design Objectives
9. EP-EAL-0605 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values LaSalle Station

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU1

Initiating Condition:

Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors **> 2 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 60 minutes**.

   - Radwaste Effluent Monitor LCRM 0D18-K606

     OR

   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Vent Stack and SBGT WRGMs is **> 9.15 E+05 uCi/sec** for **≥ 60 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU1 (cont)

Basis (cont):

This EAL addresses a potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in RU1 and RA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases are not to be prorated or averaged. For example, a release exceeding 4 times ODCM for 30 minutes does not meet the threshold.

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

Threshold #1 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

The effluent monitors listed are those normally used for planned discharges. If a discharge is performed using a different flowpath or effluent monitor other than those listed (e.g., a portable or temporary effluent monitor), then the declaration criteria will be based on the monitor specified in the Discharge Permit.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU1 (cont)

Basis (cont):

Threshold #2 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL.

This threshold is intended for effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

Threshold #3 Basis:

This threshold addresses uncontrolled releases that are detected by sample analyses, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

Basis Reference(s):

1. NEI 99-01, Rev 5 AU1
2. ODCM Section 12.3, Liquid Effluents
3. ODCM Section 12.4, Gaseous Effluents and Total Dose
4. UFSAR Section 11.5
5. LCP-140-7, Analysis of Radwaste Discharge Tanks 1(2)WF05T and Determination of Discharge Flowrate and Liquid Radwaste Effluent Monitor Response
6. EP-EAL-0605 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values LaSalle Station
7. LAP-1800-4, Chemistry Department Improved Technical Specifications, Technical Requirements Manual, TRM Appendixes, Offsite Dose Calculation Manual (ODCM) LaSalle Annex Check Lists
8. LYP-1200-2, Instantaneous Airborne Releases – 10 CFR 20 Design Objectives

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA2

Initiating Condition:

Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. VALID reading **> 1000 mR/hr** on the radiation monitor ARM 0D21-K604A due to **EITHER**:

   - Damage to irradiated fuel

     OR

   - Water level drop

   OR

2. Water level drop in the Reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal that will result in Irradiated Fuel becoming uncovered.

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses increases in radiation dose rates within plant buildings, and may be a precursor to a radioactivity release to the environment. These events represent a loss of control over radioactive material and represent an actual or substantial potential degradation in the level of safety of the plant.

These events escalate from RU2 in that fuel activity has been released, or is anticipated due to fuel heatup. This EAL applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA2 (cont)

Basis (cont):

Threshold #1 Basis:

This EAL addresses radiation monitor indications of fuel uncovery and/or fuel damage.

Uncovering spent fuel represents a substantial degradation of the level of safety of the plant and warrants an Alert classification. Visual observation of spent fuel uncovery represents a major ALARA concern in that radiation levels could exceed 10,000 R/hr on the refuel bridge when fuel uncovery begins. The value of 1000 mR/hr was conservatively chosen for classification purposes.

Radiation monitor readings are used to provide indication of fuel uncovery and/or fuel damage. High monitor readings associated with the transfer or relocation of a source, stored in or near the pool or readings responding to a planned evolution such as removal of the reactor head or equipment relocation are not classified under this threshold since the reading would not be indicative of fuel uncovery and/or fuel damage.

Dropping heavy loads onto the spent fuel can cause significant damage to the spent fuel and an Alert is also warranted under these conditions provided that the above radiation monitor threshold readings are reached.

Escalation of this emergency classification level, if appropriate, would be based on RS1 or RG1.

Threshold #2 Basis:

Once Spent Fuel Pool water level drops below the low level alarm setpoint, further drops can be monitored only by visual observation unless the Spent Fuel Pool is in communication with the Refueling Cavity.

If available, video cameras may allow remote observation. Depending on available level instrumentation, the declaration threshold may need to be based on indications of water makeup rate.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA2 (cont)

Basis Reference(s):

1. NEI 99-01, Rev 5 AA2
2. LOA-FH-001 Irradiated Fuel Assembly Damage
3. LOR-1(2)H13-P601-B108, Refuel Floor Area High Range/Low Range Radiation - High
4. LOR-1(2)H13-P601-E205/F205, Fuel Pool Radiation High High
5. Technical Specification 3.9.6
6. LOP-SF-06 Filling the Reactor, Reactor Well and Dryer/Separator Pit Through Feedwater with Suppression Pool Cleanup
7. LOA-FC-101(201), Unit 1(2) Fuel Pool Cooling System Abnormal
9. LOA-AR-101(201), Area Radiation Monitoring System Abnormal
10. Technical Specification 3.7.8 Spent Fuel Storage Pool Water Level

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU2

Initiating Condition:

UNPLANNED rise in plant radiation levels.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by:

   - Refueling Cavity water level **< 340 in.** on shutdown range.

     OR

   - Spent Fuel Pool water level **< 21 ft. 4 in**.

     OR

   - Report of visual observation of a drop in water level in the Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal.

   AND

   b. VALID Area Radiation Monitor reading rise on refuel radiation monitor ARM 0D21-K604A.

   OR

2. UNPLANNED VALID Area Radiation Monitor reading or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

NORMAL LEVELS: Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU2 (cont)

Basis (cont):

This EAL addresses increased radiation levels as a result of water level decreases above irradiated fuel or events that have resulted, or may result, in UNPLANNED increases in radiation dose rates within plant buildings. These radiation increases represent a loss of control over radioactive material and represent a potential degradation in the level of safety of the plant.

Threshold #1 Basis:

Level indications may include installed or temporary water level instrumentation. If available, video cameras may allow remote observation for determining water level changes.

This EAL addresses unplanned lowering of level in the refueling pathway and a corresponding rise in refuel floor radiation readings. For events in Refuel mode where the water level drops with no corresponding rise in refuel floor radiation readings classification would be via CU7. This event escalates to an Alert per RA2 if irradiated fuel outside the reactor vessel is uncovered.

Threshold #2 Basis:

This EAL addresses increases in plant radiation levels that represent a loss of control of radioactive material resulting in a potential degradation in the level of safety of the plant.

This EAL excludes radiation level increases that result from planned activities such as use of radiographic sources and movement of radioactive waste materials. A specific list of ARMs is not required, as it would restrict the applicability of the threshold. The intent is to identify loss of control of radioactive material in any monitored area. Survey results are not required for confirmation of area radiation monitor readings but are applicable to areas where area radiation monitors do not have sufficient range to indicate a rise by a factor of 1000 over NORMAL LEVELS.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU2 (cont)

Basis Reference(s):

1. NEI 99-01, Rev 5 AU2
2. LRP-5800-3 Radiation Monitoring Alarm/Trip Setpoint Determination
3. RP-AA-203, Exposure Control and Authorization
4. Technical Specification 3.7.8, Spent Fuel Storage Pool Water Level
5. Technical Specification 3.9.6, Reactor Pressure Vessel (RPV) Water Level — Irradiated Fuel
6. Technical Specification 3.9.7, Reactor Pressure Vessel (RPV) Water Level — New Fuel or Control Rods
7. LOP-SF-06 Filling the Reactor, Reactor Well and Dryer/Separator Pit Through Feedwater with Suppression Pool Cleanup
8. LOA-FC-101(201), Unit 1(2) Fuel Pool Cooling System Abnormal

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA3

Initiating Condition:

Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R1) to maintain plant safety functions.

Table R1 – Areas Requiring Continuous Occupancy
• Main Control Room (1(2)D18-K751A-D) • Central Alarm Station (by survey)

Basis:

This EAL addresses increased radiation levels that impact continued operation in areas requiring continuous occupancy to maintain safe operation or to perform a safe shutdown.

The cause and/or magnitude of the increase in radiation levels is not a concern of this EAL. The Emergency Director must consider the source or cause of the increased radiation levels and determine if any other EAL may be involved.

Areas requiring continuous occupancy include Main Control Room and the Central Alarm Station (CAS).

Basis Reference(s):

1. NEI 99-01, Rev 5 AA3
2. LRP-5800-3, Radiation Monitoring Alarm/Trip Setpoint Determination
3. LIS-AR-105 (205)A-D, Main Control Room Radiation Monitor Channel A Calibration
4. UFSAR Section 3.8
5. UFSAR Section 12.3.2.5

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU3

Initiating Condition:

Fuel clad degradation.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Fuel clad degradation resulting in **EITHER**:

- Offgas system radiation monitor **HI-HI** alarm.

  OR

- Specific coolant activity **> 4.0 uCi/gm** Dose Equivalent I-131.

Basis:

This EAL is included because it is a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant.

Escalation of this EAL to the Alert level is via the Fission Product Barriers.

Threshold #1 Basis:

Conditions that cause the monitor to alarm that are not related to fuel clad degradation should not result in the declaration of an Unusual Event.

This threshold addresses site-specific radiation monitor readings that provide indication of a degradation of fuel clad integrity.

Threshold #2 Basis:

An Unusual Event is only warranted when actual fuel clad damage is the cause of the elevated coolant sample (as determined by laboratory confirmation). Fuel clad damage should be assumed to be the cause of elevated Reactor Coolant activity unless another cause is known.

This threshold addresses coolant samples exceeding coolant technical specifications for transient iodine spiking limits.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU3 (cont)

Basis Reference(s):

1. NEI 99-01, Rev 5 SU4
2. Technical Specifications 3.4.8
3. LOR 1(2) N62-P600-B501, Off Gas Pre-Treatment Radiation Monitor High-High Radiation
4. LRP-5820-34, Off-Gas Pre and Post Treatment Monitor Alarm and Trip Setpoints
5. LIS-OG-102 (202), Steam Jet Air Ejector Off Gas (Pretreatment) Radiation Monitor Calibration
6. LOA-AR-101 (201), Area Radiation Monitoring System Abnormal
7. LAP-1800-4, Chemistry Department Improved Technical Specifications, Technical Requirements Manual, TRM Appendixes, Offsite Dose Calculation Manual (ODCM) LaSalle Annex Check Lists

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FG1

Initiating Condition:

Loss of ANY two barriers AND Loss or Potential Loss of the third barrier.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the General Emergency classification level each barrier is weighted equally.

Basis Reference(s):

1. NEI 99-01, Rev 5Table 5-F-2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FS1

Initiating Condition:

Loss or Potential Loss of ANY two barriers.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the Site Area Emergency classification level, each barrier is weighted equally.

Basis Reference(s):

1. NEI 99-01, Rev 5 Table 5-F-2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FA1

Initiating Condition:

ANY Loss or ANY Potential Loss of either Fuel Clad or RCS.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the Alert classification level, Fuel Cladding and RCS barriers are weighted more heavily than the Containment barrier. Unlike the Containment barrier, loss or potential loss of either the Fuel Cladding or RCS barrier may result in the relocation of radioactive materials or degradation of core cooling capability. Note that the loss or potential loss of Containment barrier in combination with loss or potential loss of either Fuel Cladding or RCS barrier results in declaration of a Site Area Emergency under EAL FS1.

Basis Reference(s):

1. NEI 99-01, Rev 5Table 5-F-2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FU1

Initiating Condition:

ANY Loss or ANY Potential Loss of Containment.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

The Primary Containment Barrier includes the drywell, respective interconnecting paths, and other connections up to and including the outermost containment isolation valves. Containment Barrier thresholds are used primarily as discriminators for escalation from an Alert to a Site Area Emergency or a General Emergency.

The Containment Barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (i.e., Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment Barrier status is addressed by Technical Specifications.

Basis Reference(s):

1. NEI 99-01, Rev 5Table 5-F-2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FC1

Initiating Condition:

Primary Coolant Activity Level.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

Coolant activity **> 300 uCi/gm** Dose Equivalent I-131.

Basis:

300 uCi/gm Dose Equivalent I-131 is well above that expected for iodine spikes and corresponds to less than 5% fuel clad damage. This amount of radioactivity indicates significant clad damage and thus the Fuel Clad Barrier is considered lost.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FC2

Initiating Condition:

Reactor Vessel Water Level.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. RPV level **cannot** be restored and maintained **> – 183 inches.**

POTENTIAL LOSS

2. RPV level **cannot** be restored and maintained **> – 161 inches.** (TAF).

   OR

3. RPV level **cannot** be determined.

Basis:

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the SAMG program.

Determination of “restore and maintained” is based on the actions driven by Emergency Operating Procedures to restore level. The inability to reverse the RPV level lowering trend after lining up injection sources and injecting, including the use of low pressure systems following an Emergency Depressurization would warrant classification.

Loss Threshold #1 Basis:

This corresponds to the level used in EOPs to indicate challenge of core cooling.

Potential Loss Thresholds #2 and #3 Basis:

This threshold is the same as the RCS barrier Loss threshold and corresponds to the water level at the top of the active fuel. Thus, this threshold indicates a Potential Loss of the Fuel Clad barrier and a Loss of RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

Since the loss of ability to determine if adequate core cooling is being provided presents a significant challenge to the fuel clad barrier, a potential loss of the fuel clad barrier is specified.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FC2 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. LGA-001, RPV Control
3. LGA-010, Failure to Scram
4. LGA-005, RPV Flooding
5. LPGP-CALC-02, EOP & SAMG Calculation Control -- Setpoints and Calculation Results

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FC5

Initiating Condition:

Primary Containment Radiation Monitoring.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

Drywell radiation monitors reading **> 1.90 E+02 R/hr (190 R/hr)**.

Basis:

The Drywell radiation monitor reading is a value, which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the drywell.

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 Loss threshold. Thus, this threshold indicates a loss of both Fuel Clad barrier and RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. Core Damage Assessment Methodology

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FC7

Initiating Condition:

Emergency Director Judgment.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. Any condition in the opinion of the Emergency Director that indicates Loss of the Fuel Clad Barrier.

POTENTIAL LOSS

2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Fuel Clad Barrier.

Basis:

These thresholds address 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 threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC2

Initiating Condition:

Reactor Vessel Water Level.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. RPV level **cannot** be restored and maintained **> - 161 inches.** (TAF).

   OR

2. RPV level **cannot** be determined.

Basis:

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the SAMG program.

Determination of “restore and maintained” is based on the actions driven by Emergency Operating Procedures to restore level. The inability to reverse the RPV level lowering trend after lining up injection sources and injecting, including the use of low pressure systems following an Emergency Depressurization would warrant classification.

This threshold is the same as Fuel Clad Barrier Potential Loss threshold and corresponds to a challenge to core cooling. Thus, this threshold indicates a Loss of RCS barrier and Potential Loss of Fuel Clad barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. LPGP-CALC-02, EOP & SAMG Calculation Control -- Setpoints and Calculation Results
3. LGA-001, RPV Control

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC3

Initiating Condition:

Primary Containment Conditions

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. Drywell pressure **> 1.77 psig**.

   AND

2. Drywell pressure rise due to RCS leakage.

Basis:

The primary containment pressure is based on the drywell high pressure set point which indicates a LOCA by automatically initiating ECCS.

The second threshold focuses the fission product barrier loss threshold on a failure of the RCS instead of the non-LOCA malfunctions that may adversely affect primary containment pressure. Pressures of this magnitude can be caused by non-LOCA events such as a loss of drywell cooling or inability to control primary containment vent/purge.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. UFSAR Table 3.3.5.1-1
3. Technical Specifications Table 3.3.5.1-1
4. LGA-001, RPV Control
5. LGA-003, Primary Containment Control

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC4

Initiating Condition:

RCS Leak Rate.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. UNISOLABLE Main Steam Line (MSL), Feedwater, RWCU or RCIC line break.

   OR

2 Emergency RPV Depressurization is required.

POTENTIAL LOSS

3. RCS leakage **> 50 gpm** inside the drywell.

   OR

4. UNISOLABLE primary system leakage outside drywell resulting in **EITHER:**

   - Secondary Containment area temperature **> LGA-002 Maximum Normal** operating levels.

     OR

   - Secondary Containment radiation level **> LGA-002 Maximum Normal** operating levels.

Basis:

UNISOLABLE – is a breach or leak that cannot be promptly isolated.

Promptly allows for actions to be taken to isolate the leak. Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

Loss Thresholds #1 Basis:

An UNISOLABLE MSL break is a breach of the RCS barrier. Thus, this threshold is included for consistency with the Alert emergency classification level.

Other large high-energy line breaks such as Feedwater, RWCU, or RCIC that are UNISOLABLE also represent a significant loss of the RCS barrier and should be considered for purposes of classification.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC4 (cont)

Basis (cont):

Classification of a system break over system leakage is based on information available to the Control Room from the event. Indications that should be considered are:

- Reports describing magnitude of steam or water release.
- Use of system high flow alarms / indications, if available,
- Significant changes in makeup requirements,
- Abnormal reactor water level changes in response to the event.

The use of the above indications provides the Control Room the bases to determine that the on going event is more significant than the indications that would be expected from system leakage and therefore should be considered a system break.

Loss Thresholds #2 Basis:

Plant symptoms requiring Emergency RPV Depressurization per the EOPs are indicative of a loss of the RCS barrier. If Emergency RPV depressurization is required, the plant operators are directed to open safety relief valves (SRVs) and keep them open. Even though the RCS is being vented into the suppression pool, a loss of the RCS should be considered to exist due to the diminished effectiveness of the RCS pressure barrier to a release of fission products beyond its boundary.

Potential Loss Threshold #3 Basis:

This threshold is based on leakage 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 uncovery is not a significant concern for a 50 gpm leak, however, break propagation leading to significantly larger loss of inventory is possible.

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.

If primary system leak rate information is unavailable, other indicators of RCS leakage should be used.

Potential Loss Threshold #4 Basis:

Potential loss of RCS based on primary system leakage outside the primary containment is determined from site specific temperature or area radiation Maximum Normal setpoints in the areas of the main steam line tunnel, main turbine generator, RCIC, etc., which indicate a direct path from the RCS to areas outside primary containment.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC4 (cont)

Basis (cont):

The indicators reaching the threshold values and confirmed to be caused by unisolable RCS leakage warrant an Alert classification. An unisolable leak which is indicated by a Maximum Safe setpoint escalates to a Site Area Emergency when combined with Containment Barrier Loss threshold (after a containment isolation) and a General Emergency when the Fuel Clad Barrier criteria is also exceeded.

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.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. UFSAR Section 5.4.9
3. Technical Specifications 3.4.5 RCS Operational LEAKAGE
4. UFSAR Section 5.2.5
5. LOP-NB-03, Troubleshooting Drywell Leakage
6. LGA-002, Secondary Containment Control

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC5

Initiating Condition:

Primary Containment Radiation Monitoring

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

Drywell radiation monitor reading **> 1.0 E+02 R/hr (100 R/hr)**.

Basis:

The Drywell Radiation monitor reading is a value, which indicates the release of reactor coolant to the primary containment.

This reading is less than that specified for Fuel Clad barrier Loss. Thus, this threshold would be indicative of a RCS leak only. If the radiation monitor reading increased to that value specified by Fuel Clad Barrier threshold, fuel damage would also be indicated.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. Calc. EP-EAL-0611

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC7

Initiating Condition:

Emergency Director Judgment.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. Any condition in the opinion of the Emergency Director that indicates Loss of the RCS Barrier.

POTENTIAL LOSS

2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the RCS Barrier.

Basis:

These thresholds address 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 threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT2

Initiating Condition:

Reactor Vessel Water Level.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

POTENTIAL LOSS

Plant conditions indicate that Primary Containment Flooding is required.

Basis:

There is no Loss threshold associated with this item.

The potential loss requirement for Primary Containment Flooding indicates adequate core cooling cannot be established and maintained and that core melt is possible. Entry into Severe Accident Management Guidelines is a logical escalation in response to the inability to maintain adequate core cooling.

The condition in this potential loss threshold represents a potential core melt sequence which, if not corrected, could lead to vessel failure and increased potential for containment failure. In conjunction with Reactor Vessel water level “Loss” thresholds in the Fuel Clad and RCS barrier columns, this threshold will result in the declaration of a General Emergency -- loss of two barriers and the potential loss of a third.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. LGA-001, RPV Control
3. LGA-010, Failure to Scram
4. LGA-005, RPV Flooding

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT3

Initiating Condition:

Primary Containment Conditions.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. Rapid unexplained drop in Drywell pressure following initial pressure rise.

   OR

2. Drywell pressure response **not** consistent with LOCA conditions.

POTENTIAL LOSS

3. Drywell pressure **≥ 45 psig** and rising.

   OR

4. a. Drywell or suppression chamber hydrogen concentration **≥ 6%.**

      AND

   b. Drywell or suppression chamber oxygen concentration **≥ 5%.**

   OR

5. Heat Capacity Temperature Limit (LGA-003 Fig. H) exceeded.

Basis:

Loss Threshold #1 and #2 Basis

Rapid unexplained drop in pressure (i.e., not attributable to drywell spray or condensation effects) following an initial pressure rise from a high energy line break indicates a loss of containment integrity. Primary containment pressure should rise as a result of mass and energy release into containment from a LOCA. Thus, primary containment pressure not rising under these conditions indicates a loss of containment integrity.

This indicator relies on operator recognition of an unexpected response for the condition and therefore does not have a specific value associated with it. The unexpected response is important because it is the indicator for a containment breach condition. A pressure suppression bypass path would not be an indication of a containment breach.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT3 (cont)

Basis (cont):

Potential Loss Threshold #3 Basis:

Drywell pressure is based on the primary containment design pressure.

Potential Loss Threshold #4 Basis:

Explosive mixtures in the primary containment are assumed to be elevated concentrations of hydrogen and oxygen.

Potential Loss Threshold #5 Basis:

The Heat Capacity Temperature Limit is a function of suppression pool temperature and water level. It is utilized to preclude failure of the containment and equipment in the containment necessary for the safe shutdown of the plant and therefore, the inability to maintain plant parameters below the limit constitutes a potential loss of containment.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. UFSAR 15.6.5
3. UFSAR Section 6.2
4. LGA-003, Primary Containment Control
5. LGA-011, Hydrogen Control
6. LaSalle PSTG Section 5B, Hydrogen Control

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT5

Initiating Condition:

Primary Containment Radiation Monitoring

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

POTENTIAL LOSS

Drywell radiation monitor reading **> 4.35 E+02 R/hr (435 R/hr)**.

Basis:

The Drywell radiation monitor reading is a value that indicates significant fuel damage well in excess of that required for loss of RCS and Fuel Clad.

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.

There is no Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. Core Damage Assessment Methodology

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT6

Initiating Condition:

Primary Containment Isolation Failure or Bypass

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. a. Failure of isolation valves in any one line to close.

   AND

   b. Direct downstream pathway to the environment exists after a primary containment isolation signal.

   OR

2. Intentional venting/purging of Primary Containment per EOPs or SAMGs due to accident conditions.

   OR

3. UNISOLABLE primary system leakage outside drywell resulting in **EITHER:**

   - Secondary Containment area temperature **> LGA-002, Maximum Safe** operating levels.

     OR

   - Secondary Containment radiation level **> LGA-002, Maximum Safe** operating levels.

Basis:

UNISOLABLE – is a breach or leak that cannot be promptly isolated.

Promptly allows for actions to be taken to isolate the leak. Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

These thresholds address incomplete containment isolation that allows direct release to the environment.

Loss Threshold #1 Basis

This threshold addresses failure of open isolation devices, which should close upon receipt of a manual or automatic containment isolation signal resulting in a significant radiological release pathway to the environment. The concern is the unisolable open pathway to the environment. A failure of the ability to isolate any one line indicates a breach of primary containment integrity.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT6 (cont)

Basis (cont):

Failure of containment isolation valves to isolate with a downstream pathway to the environment following an automatic or manual isolation signal is only a concern during an event requiring mitigation by the Primary Containment barrier. If this condition exists during normal Power Operation, a Technical Specification Action Statement will address it. However, during events requiring Primary Containment integrity, this will represent a breach of Primary Containment.

The use of the modifier “direct” in defining the release path discriminates against release paths through interfacing liquid systems. The existence of an in–line charcoal filter does not make a release path indirect since the filter is not effective at removing fission product noble gases. Typical filters have an efficiency of 95-99% removal of iodine. Given the magnitude of the core inventory of iodine, significant releases could still occur. In addition, since the fission product release would be driven by boiling in the reactor vessel, the high humidity in the release stream can be expected to render the filters ineffective in a short period.

Leakage into a closed system is to be considered only if the closed system is breached and thereby creates a significant pathway to the environment. Examples include unisolable Main Steamline or RCIC steamline breaks, unisolable RWCU system breaks, and unisloable containment atmosphere vent paths. Minor release paths such as instrument and sample lines are not considered under this threshold.

Examples of “downstream pathway to the Environment” could be through Turbine/Condenser, or direct release to the Turbine or Reactor Building.

Loss Threshold #2 Basis:

EOPs may direct containment isolation valve logic(s) to be intentionally bypassed, regardless of radioactivity release rates. Under these conditions with a valid containment isolation signal, the containment should also be considered lost if containment venting is actually performed.

Intentional venting of primary containment for primary containment pressure or combustible gas control per EOPs to the secondary containment and/or the environment is considered a loss of containment. Containment venting for pressure control when not in an accident situation should not be considered.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT6 (cont)

Basis (cont):

Loss Threshold #3 Basis:

The presence of area radiation or temperature above Maximum Safe Operating setpoints indicating unisolable primary system leakage outside the primary containment are addressed after a containment isolation. The indicators should be confirmed to be caused by RCS 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.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. LGA-002, Secondary Containment Control

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT7

Initiating Condition:

Emergency Director Judgment.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. Any condition in the opinion of the Emergency Director that indicates Loss of the Containment Barrier.

POTENTIAL LOSS

2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment Barrier.

Basis:

These thresholds address any other factors that are to be used by the Emergency Director in determining whether the Containment barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

The Containment barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment barrier status is addressed by Technical Specifications.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MG1

Initiating Condition:

Prolonged loss of all Off-Site and all On-Site AC power to emergency busses.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to unit ECCS busses.

   AND

2. Failure of DG 0 and DG 1A(2A) emergency diesel generators to supply power to unit ECCS busses.

   AND

3. a. Restoration of either unit ECCS bus (excluding Division 3) in **< 4 hours** is **not** likely.

      OR

   b. RPV level **cannot** be determined to be **> - 150 inches**.

Basis:

Loss of all AC power to emergency busses 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 to emergency busses will lead to loss of fuel clad, RCS, and containment, thus warranting declaration of a General Emergency.

This EAL is specified to assure that in the unlikely event of a prolonged station blackout, timely recognition of the seriousness of the event occurs and that declaration of a General Emergency occurs as early as is appropriate, based on a reasonable assessment of the event trajectory.

The likelihood of restoring at least one emergency bus should be based on a realistic appraisal of the situation since a delay in an event classification escalation decision based on only a chance of mitigating the event could result in a loss of valuable time in preparing and implementing public protective actions.

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MG1 (cont)

Basis (cont):

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the SAMG program.

In addition, under these conditions, fission product barrier monitoring capability may be degraded.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SG1
2. UFSAR 8.1
3. LOA-AP-101(201), Unit 1(2) AC Power System Abnormal
4. UFSAR 15.9
5. LPGP-CALC-02, EOP & SAMG Calculation Control -- Setpoints and Calculation Results
6. LGA-001, RPV Control
7. LGA-010, Failure to Scram

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MS1

Initiating Condition:

Loss of all Off-Site and all On-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to unit ECCS busses.

   AND

2. Failure of DG 0 and DG 1A(2A) emergency diesel generators to supply power to unit ECCS busses.

   AND

3. Failure to restore power to at least one Unit ECCS bus (excluding Division 3) in **< 15 minutes** from the time of loss of both offsite and onsite AC power.

Basis:

Loss of all AC power to emergency busses 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 to emergency busses will lead to loss of Fuel Clad, RCS, and Containment, thus this event can escalate to a General Emergency.

Fifteen minutes was selected as a threshold to exclude momentary losses of off-site power.

Escalation to General Emergency is via Fission Product Barrier Degradation or MG1, "Prolonged Loss of All Off-Site Power and Prolonged Loss of All On-site AC Power."

Basis Reference(s):

1. NEI 99-01, Rev. 5 SS1
2. UFSAR 8.1.
3. LOA-AP-101(201), Unit 1(2) AC Power System Abnormal

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MA1

Initiating Condition:

AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. AC power capability to unit ECCS busses (excluding Division 3) reduced to only one of the following power sources for **≥ 15 minutes**:
   - System Auxiliary Transformer 142(242)
   - Unit Auxiliary Transformer 141(241)
   - Unit Emergency Diesel Generator 1A(2A)
   - Shared Emergency Diesel Generator DG 0
   - Other unit SAT via crosstie breakers

   AND

2. Any additional single power source failure will result in unit blackout.

Basis:

Capability: (pertaining to electrical power supplies) is equipment that is available to provide and maintain AC power at the required voltage and frequency for the required load.

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. Another related condition could be the loss of all off-site power and loss of on-site emergency generators with only one train of emergency busses being backfed from the unit main generator, or the loss of on-site emergency generators with only one train of emergency busses being backfed from off-site power. The subsequent loss of this single power source would escalate the event to a Site Area Emergency in accordance with MS1.

Fifteen minutes was selected as a threshold to exclude momentary losses of power.

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MA1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 SA5
2. UFSAR 8.1
3. LOA-AP-101(201) Unit 1(2) AC Power System Abnormal
4. UFSAR 15.9

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MU1

Initiating Condition:

Loss of all Off-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of all off-site AC power to unit ECCS busses for **≥ 15 minutes**.

Basis:

Prolonged loss of off-site 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 to emergency busses.

Fifteen minutes was selected as a threshold to exclude momentary losses of off-site power.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU1
2. UFSAR 8.1
3. LOA-AP-101 (201), Unit 1(2) AC Power System Abnormal

.

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MG2

Initiating Condition:

Automatic Scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic scram was **not** successful as indicated by Reactor Power **> 3%.**

   AND

2. Manual scram/ARI actions were **not** successful as indicated by Reactor Power **> 3%.**

   AND

3. **EITHER** of the following exists:

   - RPV level **cannot** be restored and maintained **> -150 inches** on WR (- 183 inches on FZ if WR not available).

     OR

   - Heat Capacity Temperature Limit (LGA-003 Fig. H) exceeded.

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful.

The third condition of this EAL indicates an extreme challenge to the ability to cool the core as indicated when RPV level cannot be restored and maintained above the Minimum Steam Cooling RPV Water Level or a challenge to Containment for energy transfer from the RPV as indicated by exceeding the Heat Capacity Temperature Limit. RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the SAMG program.

In the event either of these challenges exists at a time that the reactor has not been brought below the power associated with the safety system design a core melt sequence exists. In this situation, core degradation can occur rapidly. For this reason, the General Emergency declaration is intended to be anticipatory of the fission product barrier table declaration to permit maximum off-site intervention time.

Determination of “restore and maintained” is based on the actions driven by Emergency Operating Procedures to restore level. The inability to reverse the RPV level lowering trend after lining up injection sources and injecting, including the use of low pressure systems following an Emergency Depressurization would warrant classification.

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MG2 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 SG2
2. LGA-001, RPV Control
3. LGA-010, Failure to Scram
4. LGA-003, Primary Containment Control

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MS2

Initiating Condition:

Automatic Scram fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic scram was **not** successful as indicated by Reactor Power **> 3%.**

   AND

2. Manual scram/ARI actions were **not** successful from the Reactor Console as indicated by Reactor Power **> 3%.**

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful. A Site Area Emergency is warranted because conditions exist that lead to IMMINENT loss or potential loss of both fuel clad and RCS.

Manual actions taken at the reactor control console are any set of actions by the reactor operator(s) at which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

Manual actions are not considered successful if action away from the reactor control console is required to scram the reactor. This EAL is still applicable even if actions taken away from the reactor control console are successful in shutting the reactor down because the design limits of the fuel may have been exceeded or because of the gross failure of the Reactor Protection System to shutdown the plant.

Escalation of this event to a General Emergency would be due to a prolonged condition leading to an extreme challenge to either core-cooling or heat removal.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SS2
2. LGA-001, RPV Control
3. LGA-010, Failure to Scram
4. LGA-003, Primary Containment Control

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MA2

Initiating Condition:

Automatic Scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic scram was **not** successful as indicated by Reactor Power **> 3%**.

   AND

2. Manual scram/ARI actions were successful from Reactor Console as indicated by Reactor Power **< 3%**.

Basis:

Manual actions taken at the reactor control console are any set of actions by the reactor operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

This condition indicates failure of the automatic protection system to scram the reactor in response to exceeding reactor protective system setpoints during a plant transient. Associated RPS instrument failures during non-transient plant conditions would be addressed by Technical Specifications. This condition is more than a potential degradation of a safety system in that a front line automatic protection system did not function in response to a plant transient. Thus the plant safety has been compromised because design limits of the fuel may have been exceeded. An Alert is indicated because conditions may exist that lead to potential loss of fuel clad or RCS and because of the failure of the Reactor Protection System to automatically shutdown the plant.

If manual actions taken at the reactor control console fail to shutdown the reactor, the event would escalate to a Site Area Emergency.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SA2
2. LGA-001, RPV Control
3. LGA-010, Failure to Scram
4. Technical Specifications Table 3.3.1.1-1

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MU2

Initiating Condition:

Inadvertent criticality.

Operating Mode Applicability:

3

EAL Threshold Values:

UNPLANNED sustained positive period observed on nuclear instrumentation.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL addresses inadvertent criticality events. This EAL excludes inadvertent criticalities that occur during planned reactivity changes associated with reactor startups (e.g., criticality earlier than estimated). This condition can be identified using period monitors. The term “sustained“ is used in order to allow exclusion of expected short term positive periods from planned control rod movements. Escalation would be by the Fission Product Barrier.

This EAL indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU8
2. LIS-NR-301 (401), Unit 1(2) Source Range Monitor Rod Block Functional Test
3. LGP-1 (2)-1, Normal Unit Startup
4. LGP-1 (2)-S1, Master Startup Checklist

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MS3

Initiating Condition:

Loss of all vital DC power for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of all vital DC power based on **< 108 VDC** on unit 125 VDC battery busses 111Y(211Y) and 112Y(212Y) for **≥ 15 minutes**.

Basis:

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power will cause core uncovering and loss of containment integrity when there is significant decay heat and sensible heat in the reactor system.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Escalation to a General Emergency would occur by Abnormal Rad Levels/Radiological Effluent, Fission Product Barrier Degradation.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SS3
2. UFSAR 8.3.2
3. LOA-DC-101(201) Unit 1(2) DC Power System Failure

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MS4

Initiating Condition:

Inability to monitor a SIGNIFICANT TRANSIENT in progress.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**
   - Safety System annunciators (Table M1)

     OR
   - Safety System indications (Table M1)

Table M1 – Safety Systems
• ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring

AND

2. SIGNIFICANT TRANSIENT in progress (Table M2).

Table M2 - Significant Transients
• Turbine trip • Reactor scram • ECCS activation • Recirc. Runback **> 25%** Reactor Power change • Thermal power oscillations **> 10 %** Reactor Power change

AND

3. Compensatory indications (computer points) are unavailable.

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MS4 (cont)

Basis:

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) Turbine Trip (2) Reactor Scram (3) ECCS Activation, (4) Recirc. Runback > 25% Reactor Power change, or (5) thermal power oscillations > 10% Reactor Power change.

This EAL is intended to recognize the threat to plant safety associated with the complete loss of capability of the control room staff to monitor plant response to a SIGNIFICANT TRANSIENT.

"Planned" and “UNPLANNED” actions are not differentiated since the loss of instrumentation of this magnitude is of such significance during a transient that the cause of the loss is not a factor.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

A Site Area Emergency is considered to exist if the control room staff cannot monitor safety systems needed for protection of the public while a significant transient is in progress.

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MS4 (cont)

Basis (cont):

Indications needed to monitor safety systems necessary for protection of the public must include control room indications; computer generated indications and dedicated annunciation capability. The specific parameters are those used to determine such functions as the ability to shut down the reactor, maintain the core cooled and in a coolable geometry, remove heat from the core, and maintain the reactor coolant system and primary containment.

"Compensatory indications" in this context includes computer based information. This includes all computer systems available for this use.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SS6
2. LGA-001, RPV Control
2. LGA-003, Primary Containment Control
4. LOA-AN-101(201), Loss of Annunciators
5. LEP-AN-01, Annunciator Troubleshooting and Testing
6. LOP-CX-01, On Demand Functions Of The Plant Process Computer
7. LOP-CX-02, Safety Parameter Display System (SPDS)

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MA4

Initiating Condition:

UNPLANNED Loss of safety system annunciation or indication in the control room with EITHER (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**
   - Safety System annunciators (Table M1)

     OR

   - Safety System indications (Table M1)

Table M1 – Safety Systems
• ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring

AND

2. a. SIGNIFICANT TRANSIENT in progress (Table M2).

Table M2 - Significant Transients
• Turbine trip • Reactor scram • ECCS activation • Recirc. Runback **> 25%** Reactor Power change • Thermal power oscillations **> 10 %** Reactor Power change

OR

b. Compensatory indications (computer points) are unavailable.

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MA4 (cont)

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) Turbine Trip (2) Reactor Scram (3) ECCS Activation, (4) Recirc. Runback > 25% Reactor Power change, or (5) thermal power oscillations > 10% Reactor Power change

This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a SIGNIFICANT TRANSIENT.

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

"Compensatory indications" in this context includes computer based information. If both a major portion of the annunciation system and all computer monitoring are unavailable, the Alert is required.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

This Alert will be escalated to a Site Area Emergency if the operating crew cannot monitor the transient in progress due to a concurrent loss of compensatory indications with a SIGNIFICANT TRANSIENT in progress during the loss of annunciation or indication.

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MA4 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 SA4
2. LOA-AN-101(201), Loss of Annunciators
3. LEP-AN-01, Annunciator Troubleshooting and Testing
4. LOP-CX-01, On Demand Functions Of The Plant Process Computer
5. LOP-CX-02, Safety Parameter Display System (SPDS)

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MU4

Initiating Condition:

UNPLANNED loss of safety system annunciation or indication in the control room for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**

- Safety System annunciators (Table M1)

  OR

- Safety System indications (Table M1)

Table M1 – Safety Systems
• ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment.

Recognition of the availability of computer based indication equipment is considered.

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MU4 (cont)

Basis (cont):

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

Fifteen minutes was selected as a threshold to exclude momentary power losses.

This Unusual Event will be escalated to an Alert based on a concurrent loss of compensatory indications or if a SIGNIFICANT TRANSIENT is in progress during the loss of annunciation or indication.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU3
2. LOA-AN-101(201), Loss of Annunciators
3. LEP-AN-01, Annunciator Troubleshooting and Testing
4. LOP-CX-01, On Demand Functions Of The Plant Process Computer
5. LOP-CX-02, Safety Parameter Display System (SPDS)

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MU5

Initiating Condition:

RCS leakage.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

1. Unidentified or pressure boundary leakage into the Drywell **> 10 gpm**.

   OR

2. Identified leakage into the Drywell **> 25 gpm**.

Basis:

This EAL is included as an Unusual Event because it may be a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified or pressure boundary leakage was selected as it is observable with normal control room indications. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances).

Relief valve operation should be excluded from this EAL.

The EAL for identified leakage is set at a higher value due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage. In either case, escalation of this EAL to the Alert level is via Fission Product Barrier.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU5
2. Technical Specifications 3.4. 5
3. UFSAR 5.2.5
4. LOP-NB-03, Troubleshooting Drywell Leakage
6. LGA-001, RPV Control

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MU6

Initiating Condition:

Loss of all On-site or Off-site communications capabilities.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. Loss of all Table M3 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table M3 **Offsite** communications capability affecting the ability to perform offsite notifications.

Table M3 - Communications Capability

System	Onsite	Offsite
Plant radio system	X	
Plant paging system	X	
Sound power phones	X	
In-plant telephones	X	
All telephone lines (commercial and microwave)		X
ENS		X
HPN		X
Satellite Phones		X
Cellular Phones		X

Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MU6 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU6
2. EP-MW-124-1001 Facilities Inventories and Equipment Tests
3. LAP-100-37, Station Communications
4. LOP-CQ-02, Intercom/Loud Speaker System
5. LOP-CQ-03, Sound Powered Telephone System
6. LOP-CQ-04, Intra-Plant Radio System
7. OP-AA-104-101, Communications

RECOGNITION CATEGORY
SYSTEM MALFUNTIONS

MU7

Initiating Condition:

Inability to reach required shutdown within Technical Specification limits.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Plant is **not** brought to required operating mode within Technical Specifications LCO Action Statement time.

Basis:

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 Unusual Event is required when the plant is not brought 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**.**

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU2
2. LaSalle Technical Specifications

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CA1

Initiating Condition:

Loss of all Off-Site and all On-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to unit ECCS busses.

   AND

2. Failure of DG 0 and DG 1A(2A) emergency diesel generators to supply power to unit ECCS busses.

   AND

3. Failure to restore power to at least one unit ECCS bus (excluding Division 3) in **< 15 minutes** from the time of loss of both offsite and onsite AC power.

Basis:

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.

The event can be classified as an Alert when in cold shutdown, refueling, or defueled mode because of the significantly reduced decay heat and lower temperature and pressure, increasing the time to restore one of the emergency busses, relative to that specified for the Site Area Emergency EAL.

Escalating to Site Area Emergency, if appropriate, is by Abnormal Rad Levels / Radiological Effluent EALs.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CA3
2. UFSAR 8.3
3. LOA-AP-101 (201), Unit 1(2) AC Power System Abnormal

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU1

Initiating Condition:

AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. AC power capability to unit ECCS busses (excluding Division 3) reduced to only one of the following power sources for **≥ 15 minutes**:
   - System Auxiliary Transformer 142(242)
   - Unit Auxiliary Transformer 141(241)
   - Unit Emergency Diesel Generator 1A(2A)
   - Shared Emergency Diesel Generator DG 0
   - Other unit SAT via crosstie breakers

   AND

2. Any additional single power source failure will result in unit blackout.

Basis:

Capability: (pertaining to electrical power supplies) is equipment that is available to provide and maintain AC power at the required voltage and frequency for the required load.

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. The subsequent loss of this single power source would escalate the event to an Alert in accordance with CA1.

Fifteen minutes was selected as a threshold to exclude momentary losses of power.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU3
2. UFSAR 8.1
3. LOA-AP-101 (201) Unit 1(2) AC Power System Abnormal
4. UFSAR 15.9

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU2

Initiating Condition:

Inadvertent criticality.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

UNPLANNED sustained positive period observed on nuclear instrumentation.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL also addresses criticality events that occur in Cold Shutdown or Refueling modes such as fuel mis-loading events. This condition can be identified using period monitors. The term “sustained” is used in order to allow exclusion of expected short term positive periods from planned fuel bundle or control rod movements during core alteration.

This EAL indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU8
2. LIS-NR-301 (401), Unit 1(2) Source Range Monitor Rod Block Functional Test
3. LGP-1 (2)-1, Normal Unit Startup
4. LGP-1 (2)-S1, Master Startup Checklist

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU3

Initiating Condition:

Loss of required DC power for 15 minutes or longer.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of required DC power based on **< 108 VDC** on unit 125 VDC battery busses 111Y(211Y) and 112Y(212Y) for **≥ 15 minutes**.

Basis:

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.

The required busses are the minimum allowed by Technical Specifications for the mode of operation. It is intended that the loss of the operating (operable) train is to be considered. If this loss results in the inability to maintain cold shutdown, the escalation to an Alert will be per MA5.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU7
2. UFSAR 8.3.2
3. LOA-DC-101(201), Unit 1(2) DC Power System Failure

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU4

Initiating Condition:

Loss of all On-site or Off-site communications capabilities.

Operating Mode Applicability:

4, 5, D

EAL Threshold Values:

1. Loss of all Table C1 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table C1 **Offsite** communications capability affecting the ability to perform offsite notifications.

Table C1 - Communications Capability

System	Onsite	Offsite
Plant radio system	X	
Plant paging system	X	
Sound power phones	X	
In-plant telephones	X	
All telephone lines (commercial and microwave)		X
ENS		X
HPN		X
Satellite Phones		X
Cellular Phones		X

Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU4 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU6
2. EP-MW-124-1001 Facilities Inventories and Equipment Tests
3. LAP-100-37, Station Communications
4. LOP-CQ-02, Intercom/Loud Speaker System
5. LOP-CQ-03, Sound Powered Telephone System
6. LOP-CQ-04, Intra-Plant Radio System
7. OP-AA-104-101, Communications

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CA5

Initiating Condition:

Inability to maintain plant in cold shutdown.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200° F** for **> Table C2 duration**.

Table C2 – RCS Reheat Duration Thresholds		
RCS	**Containment Closure**	**Duration**
Intact	N/A	60 minutes*
Not Intact	Established	20 minutes*
	Not Established	0 minutes
*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then this EAL is **not** applicable.		

OR

2. UNPLANNED RPV pressure rise **> 10 psig** as a result of temperature rise due to loss of decay heat removal.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

RCS is intact when the RCS pressure boundary is in its normal condition for the Cold Shutdown mode of operation (e.g., no freeze seals or main steam line nozzle plugs, etc.).

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CA5 (cont)

Basis (cont):

Threshold #1 Basis:

The RCS Reheat Duration Threshold table addresses complete loss of functions required for core cooling for greater than 60 minutes during refueling and cold shutdown modes when RCS integrity is established. The status of CONTAINMENT CLOSURE in this condition is immaterial given that the RCS is providing a high pressure barrier to fission product release to the environment. The 60 minute time frame should allow sufficient time to restore cooling without there being a substantial degradation in plant safety.

The RCS Reheat Duration Threshold table also addresses the complete loss of functions required for core cooling for greater than 20 minutes during refueling and cold shutdown modes when CONTAINMENT CLOSURE is established but RCS integrity is not established. The allowed 20 minute time frame was included to allow operator action to restore the heat removal function, if possible.

Finally, complete loss of functions required for core cooling during refueling and cold shutdown modes when neither CONTAINMENT CLOSURE nor RCS integrity are established. No delay time is allowed because the evaporated reactor coolant that may be released into the Containment during this heatup condition could also be directly released to the environment.]

The note (*) indicates that this EAL is not applicable if actions are successful in restoring an RCS heat removal system to operation and RCS temperature is being reduced within the specified time frame.

Threshold #2 Basis:

The 10 psig pressure rise due to loss of decay heat removal infers an intact RCS with uncontrolled RPV temperature rise in excess of the Technical Specification cold shutdown limit (200° F) for which CA5 Threshold #1 would permit up to sixty minutes to restore RCS cooling before declaration of an Alert. This EAL therefore covers situations of high decay heat loads, in which the event should be declared without delay.

Escalation to Site Area Emergency would be via CS6 should boiling result in significant RPV level loss leading to core uncovery.

A loss of Technical Specification components alone is not intended to constitute an Alert. The same is true of a momentary UNPLANNED excursion above the Technical Specification cold shutdown temperature limit when the heat removal function is available.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CA5 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 CA4
2. Technical Specifications 3.6.1.1
3. Technical Specifications 3.6.4.1
4. OU-AA-103, Shutdown Safety
5. OU-LA-104, Shutdown Safety Management Program
6. LGP-1-S1, Master Startup Checklist
7. LGP-1-1, Normal Unit Startup
8. LOR 1(2)H13-P601-C204, RHR Shutdown Cooling Line High Temperature

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU5

Initiating Condition:

UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200° F**.

   OR

2. Loss of the following for **> 15 minutes:**
   - All RCS temperature indications.

     AND

   - All RPV level indications.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL is be a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant.

In cold shutdown the ability to remove decay heat relies primarily on forced cooling flow. Operation of the systems that provide this forced cooling may be jeopardized due to the unlikely loss of electrical power or RCS inventory. Since the RCS usually remains intact in the cold shutdown mode a large inventory of water is available to keep the core covered.

During refueling the level in the RPV will normally be maintained above the RPV flange. Refueling evolutions that decrease water level below the RPV flange are carefully planned and procedurally controlled. Loss of forced decay heat removal at reduced inventory may result in more rapid increases in RCS/RPV temperatures depending on the time since shutdown.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU5 (cont)

Basis (cont):

Normal means of core temperature indication and RCS level indication may not be available in the refueling mode. Redundant means of RPV level indication are therefore procedurally installed to assure that the ability to monitor level will not be interrupted. However, if all level and temperature indication were to be lost in either the cold shutdown of refueling modes, Threshold #2 would result in declaration of an Unusual Event if both temperature and level indication cannot be restored within 15 minutes from the loss of both means of indication. Escalation to Alert would be via CA6 based on an inventory loss or CA5 based on exceeding its temperature criteria.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU4
2. Technical Specifications Table 1.1-1
3. LGP-1-S1, Master Startup Checklist
4. LGP-1-1, Normal Unit Startup
5. LGA-001, RPV Control
6. LPGP-PSTG-01S03 Plant Specific Technical Guidelines Section 3 – Cautions
7. LOP-SF-06, Filling the Reactor, Reactor Well and Dryer/Separator Pit Through Feedwater with Suppression Pool Cleanup
8. LOR 1(2)H13-P601-C204, RHR Shutdown Cooling Line High Temperature

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CG6

Initiating Condition:

Loss of RPV inventory affecting fuel clad integrity with containment challenged.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. RPV level **< -161 inches (TAF)** for **≥ 30 minutes**.

   AND

   b. Any Containment Challenge Indication (Table C4).

   OR

2. a. RPV level unknown for **≥ 30 minutes.**

   AND

   b. Loss of RPV inventory as indicated by any of the following:

   - Table C3 indication.

     OR

   - Erratic Source Range Monitor indication.

     OR

   - Refuel floor Rad monitor 0D21-K604A **> 3000 mR/hr**.

   AND

   c. Any Containment Challenge Indication (Table C4)

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise
• UNPLANNED Suppression Pool level rise
• UNPLANNED vessel make up rate rise
• Observation of leakage or inventory loss

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CG6 (cont)

EAL Threshold Values: (cont)

Table C4 – Containment Challenge Indications
• Primary Containment Hydrogen concentration **≥ 6%** and Oxygen **≥ 5%**. • UNPLANNED rise in containment pressure • CONTAINMENT CLOSURE **not** established. • Any Secondary Containment radiation monitor **> LGA-002 Maximum Safe** operating level.

Basis:

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the SAMG program.

This EAL represents the inability to restore and maintain RPV level to above the top of active fuel with containment challenged. Fuel damage is probable if RPV level cannot be restored, as available decay heat will cause boiling, further reducing the RPV level. With the CONTAINMENT breached or challenged then the potential for unmonitored fission product release to the environment is high. This represents a direct path for radioactive inventory to be released to the environment. This is consistent with the definition of a General Emergency. The General Emergency is declared on the occurrence of the loss or IMMINENT loss of function of all three barriers.

A number of variables can have a significant impact on heat removal capability challenging the fuel clad barrier. Examples include initial vessel level and shutdown heat removal system design.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CG6 (cont)

Basis (cont):

Analysis indicates that core damage may occur within an hour following continued core uncovery therefore, 30 minutes was conservatively chosen.

If CONTAINMENT CLOSURE is re-established prior to exceeding the 30 minute core uncovery time limit then escalation to a General Emergency would not occur.

When RPV level indication is unavailable, the inventory loss must be detected by erratic Source Range Monitor indication, elevated drywell radiation or unexplained rise in drywell floor or equipment drain sump pumpout rate. Post-TMI studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and that Source Range Monitors can be used as a tool for making such determinations.

As water level in the RPV lowers, the dose rate above the core will rise. Indication of > 3000 mR/hr is indicative of core uncovery (i.e. level at TAF).

Basis Reference(s):

1. NEI 99-01, Rev. 5 CG1
2. LGA-001, RPV Control
3. Technical Specifications 3.6.1.1
4. Technical Specifications 3.6.4.1
5. LGA-003, Primary Containment Control
6. LGA-011, Hydrogen Control
7. LaSalle PSTG Section 5B, Hydrogen Control
8. LGA-002, Secondary Containment Control
9. UFSAR 3.6.2
10. LIS-NR-301(401), Unit 1(2) Source Range Monitor Rod Block Functional Test

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CS6

Initiating Condition:

Loss of RPV inventory affecting core decay heat removal capability.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. With CONTAINMENT CLOSURE **not** established, RPV level **< - 56 inches**.

   OR

2. With CONTAINMENT CLOSURE established, RPV level **< - 161 inches (TAF).**

   OR

3. a. RPV level unknown for **≥ 30 minutes.**

      AND

   b. Loss of RPV inventory as indicated by any of the following:

      - Table C3 indications.

        OR

      - Erratic Source Range Monitor indication.

        OR

      - Refuel Floor Rad Monitor 0D21-K604A **> 3000 mR/hr**.

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise
• UNPLANNED Suppression Pool level rise
• UNPLANNED vessel make up rate rise
• Observation of leakage or inventory loss

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CS6 (cont)

Basis (cont):

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the SAMG program.

Under the conditions specified, a continued drop in RCS/RPV level is indicative of a loss of inventory control. Inventory loss may be due to an RCS breach, pressure boundary leakage, or continued boiling in the RPV. Thus, declaration of a Site Area Emergency is warranted.

Escalation to a General Emergency is via CG6 or RG1.

Threshold #1 and #2 Basis:

If a low-pressure boundary to fission product release does not exist (i.e., without containment closure established), the RPV level associated with this threshold is six inches below the low-low ECCS actuation setpoint. If containment closure is established, a low-pressure boundary to fission product release exists and RPV level can drop to the top of active fuel before a Site Area Emergency declaration is required. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further RPV level drop and potential core uncovery.

Threshold #3 Basis:

When RPV level indication is unavailable, the inventory loss must be detected by erratic Source Range Monitor indication, elevated drywell radiation or unexplained rise in drywell floor or equipment drain sump pumpout rate. Post-TMI studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and that Source Range Monitors can be used as a tool for making such determinations.

The 30-minute duration allows sufficient time for actions to be performed to recover inventory control equipment.

As water level in the RPV lowers, the dose rate above the core will rise. Indication of > 3000 mR/hr. is indicative of core uncovery (i.e. level at TAF).

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CS6 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 CS1
2. LGA-001, RPV Control
3. Technical Specifications Table 3.3.5.1-1
4. LOP-SF-06, Filling the Reactor, Reactor Well and Dryer/Separator Pit Through Feedwater with Suppression Pool Cleanup
5. LGA-001, RPV Control
6. UFSAR 5.2.5
7. LOP-NB-03, Troubleshooting Drywell Leakage
8. LIS-NR-301(401), Unit 1(2) Source Range Monitor Rod Block Functional Test
9. LGP-1-1, Normal Unit Startup
10. LGP-1-S1, Master Startup Checklist

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CA6

Initiating Condition:

Loss of RPV inventory.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. RPV level **< - 50 inches**.

   OR

2. a. RPV level unknown for **≥ 15 minutes**.

      AND

   b. Loss of RPV inventory per Table C3 indications.

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise • UNPLANNED Suppression Pool level rise • UNPLANNED vessel make up rate rise • Observation of leakage or inventory loss

Basis:

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL serves as precursors to a loss of ability to adequately cool the fuel. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further RPV level decrease and potential core uncovery. This condition will result in a minimum emergency classification level of an Alert.

If RPV level continues to lower then escalation to Site Area Emergency will be via CS6.

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the SAMG program.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CA6 (cont)

Basis (cont):

Threshold #1 Basis:

The inability to restore and maintain level after reaching this setpoint would be indicative of a failure of the RCS barrier.

Threshold #2 Basis:

When RPV level indication is unavailable, the inventory loss must be detected by other means including rise in sump pumpout rates, changes in makeup or observation of leakage.

The 15-minute interval for the loss of level indication was chosen because it is half of the Site Area Emergency duration.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CA1
2. LOP-SF-06, Filling the Reactor, Reactor Well and Dryer/Separator Pit Through Feedwater with Suppression Pool Cleanup
3. LGA-001, RPV Control
4. Technical Specifications Table 3.3.5.1-1
5. LGA-001, RPV Control
6. UFSAR 5.2.5
7. LOP-NB-03, Troubleshooting Drywell Leakage

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU6

Initiating Condition:

RCS leakage.

Operating Mode Applicability:

4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

RCS leakage results in the inability to restore and maintain RPV level **> 11 inches** for **≥ 15 minutes.**

Basis:

This EAL is considered to be a potential degradation of the level of safety of the plant. The inability to maintain or restore level is indicative of loss of RCS inventory.

Prolonged loss of RCS Inventory may result in escalation to the Alert emergency classification level via either CA6 or CA5.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU1
2. LOP-SF-06, Filling the Reactor, Reactor Well and Dryer/Separator Pit Through Feedwater with Suppression Pool Cleanup
3. LGA-001, RPV Control
4. Technical Specifications Table 3.3.1.1-1.
5. LPGP-CALC-2
6. UFSAR 5.2.5

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU7

Initiating Condition:

UNPLANNED loss of RPV inventory.

Operating Mode Applicability:

5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED Refueling Cavity or Vessel level drop that meets **EITHER**:

   - When controlling level above the RPV flange, Refueling Cavity level drop below the RPV flange for **≥ 15 minutes**.

     OR

   - When controlling level below the RPV flange, vessel level drop below the procedurally established limit for **≥ 15 minutes**.

   OR

2. a. RPV level unknown.

   AND

   b. Loss of RPV inventory per Table C3 indications.

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise • UNPLANNED Suppression Pool level rise • UNPLANNED vessel make up rate rise • Observation of leakage or inventory loss

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU7 (cont)

Basis (cont):

This EAL is a precursor of more serious conditions and considered to be a potential degradation of the level of safety of the plant.

Refueling evolutions that lowers RCS water level below the RPV flange are carefully planned and procedurally controlled. An UNPLANNED event that results in water level dropping below the RPV flange, or below the planned RCS water level for the given evolution (if the planned RCS water level is already below the RPV flange), warrants declaration of a UE due to the reduced RCS inventory that is available to keep the core covered.

The allowance of 15 minutes was chosen because it is reasonable to assume that level can be restored within this time frame using one or more of the redundant means of makeup that should be available. If level cannot be restored in this time frame then it may indicate a more serious condition exists.

Continued loss of RCS Inventory will result in escalation to the Alert emergency classification level via either CA6 or CA5.

Threshold #1 Basis:

This EAL involves a drop in RCS level below the top of the RPV flange that continues for 15 minutes due to an UNPLANNED event. This EAL is not applicable to level changes in flooded reactor cavity level, which is addressed by RU2, until such time as the level drop reaches the level of the vessel flange.

If RPV level continues to lower and reaches the Low-Low ECCS Actuation Setpoint then escalation to CA6 would be appropriate.

Threshold #2 Basis:

This EAL addresses conditions in the refueling mode when normal means of core temperature indication and RCS level indication may not be available. Redundant means of RPV level indication will normally be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that RPV inventory loss was occurring by observing other indications such as sump level changes, changes in makeup or observation of leakage. Sump level changes must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

Escalation to the Alert emergency classification level would be via either CA6 or CA5.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNTIONS

CU7 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU2
2. Technical Specifications 3.4.5
3. UFSAR 5.2.5
4. LOP-NB-03, Troubleshooting Drywell Leakage
5. LOP-SF-06, Filling the Reactor, Reactor Well and Dryer/Separator Pit Through Feedwater with Suppression Pool Cleanup
6. LGA-001, RPV Control
7. Technical Specifications Table 3.3.5.1-1

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1

Initiating Condition:

HOSTILE ACTION resulting in loss of physical control of the facility.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Value:

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1).

   OR

2. A HOSTILE ACTION has:

   - Caused failure of Spent Fuel Pool Cooling Systems

     AND

   - IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).

Table H1 - Safety Functions
• Reactivity Control (ability to shut down the reactor and keep it shutdown) • RCS Inventory (ability to cool the core) • Decay Heat Removal (ability to maintain heat sink)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1 (cont)

Basis:

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

Threshold #1 Basis

This threshold encompasses conditions under which a HOSTILE ACTION has taken physical control of VITAL AREAS (containing vital equipment or controls of vital equipment) required to maintain any safety function. As a result, there is a loss of one or more of the Table H1 functions and equipment control cannot be transferred to and operated from another location.

If control of the plant equipment necessary to maintain all safety function can be operated from the Control Room or transferred to another location, then the above EAL threshold is not met.

Threshold #2 Basis

This threshold addresses loss of physical control of spent fuel pool cooling systems if imminent fuel damage is likely because there is freshly off-loaded fuel in the pool. The condition “freshly off-loaded reactor fuel in pool” equates to fuel off-loaded within the last 120 days in NF-AA-309 Special Nuclear Material And Core Component Move Sheet Development.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HG1
2. LOA-RX-101(201) Unit 1(2) Control Room Evacuation Abnormal
3. SY-AA-101-132, Security Assessment and Response to Unusual Activities
4. Station Security Plan – Appendix C
5. LOA-SY-001, Security Abnormal Procedure
6. NF-AA-309, Special Nuclear Material And Core Component Move Sheet Development

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS1

Initiating Condition:

HOSTILE ACTION within the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

This condition represents an escalated threat to plant safety above that contained in the Alert in that a HOSTILE FORCE has progressed from the OWNER CONTROLLED AREA to the PROTECTED AREA.

This EAL addresses the contingency for a very rapid progression of events. It is not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack with minimal time available for further preparation or additional assistance to arrive requires Offsite Response Organizations (ORO) readiness and preparation for the implementation of protective measures.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS1 (cont)

Basis (cont):

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the PROTECTED AREA. Those events are adequately addressed by other EALs.

Escalation of this emergency classification level, if appropriate, would be based on actual plant status after impact or progression of attack.

Basis Reference(s):

1. NEI 99-01 Rev 5, HS4
2. SY-AA-101-132, Security Assessment and Response to Unusual Activities
3. Station Security Plan – Appendix C
4. LOA-SY-001, Security Abnormal Procedure

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1

Initiating Condition:

HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site.

   OR

2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

OWNER CONTROLLED AREA (OCA): is the property associated with the station owned by the company. Access is normally limited to persons entering for official business.

Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

The fact that the site is under serious attack or is an identified attack target with minimal time available for further preparation or additional assistance to arrive requires a heightened state of readiness and implementation of protective measures that can be effective (such as on-site evacuation, dispersal or sheltering).

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1 (cont)

Basis: (cont)

Threshold #1 Basis

This EAL addresses the immediacy of an expected threat arrival or impact on the site within a relatively short time.

The intent of this EAL is to ensure that notifications for the airliner attack threat are made in a timely manner and that Offsite Response Organizations (ORO) and plant personnel are at a state of heightened awareness regarding the credible threat. Airliner is meant to be a large aircraft with the potential for causing significant damage to the plant.

This EAL is met when a plant receives information regarding an airliner attack threat from NRC and the airliner is within 30 minutes of the plant. Only the plant to which the specific threat is made need declare the Alert.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Threshold #2 Basis

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the OCA. Those events are adequately addressed by other EALs.

Note that this EAL is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA.

Basis Reference(s):

1. NEI 99-01 Rev 5, HA4
2. SY-AA-101-132, Security Assessment and Response to Unusual Activities
3. Station Security Plan – Appendix C
4. LOA-SY-001, Security Abnormal Procedure

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1

Initiating Condition:

Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities.

   OR

2. A validated notification from NRC providing information of an aircraft threat.

   OR

3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

Basis:

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

Security events assessed as HOSTILE ACTIONS are classifiable under HA1, HS1 and HG1.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1 (cont)

Basis: (cont)

A higher initial classification could be made based upon the nature and timing of the security threat and potential consequences. The licensee shall consider upgrading the emergency response status and emergency classification level in accordance with the site's Safeguards Contingency Plan and Emergency Plan.

Threshold #1 Basis

This threshold is included to ensure that appropriate notifications for the security threat are made in a timely manner. This includes information of a credible threat. Only the plant to which the specific threat is made need declare the Notification of an Unusual Event.

The determination of "credible" is made through use of information found in the Station Security Plan or SY-AA-101-132, "Security Assessment and Response to Unusual Activities" procedure.

Threshold #2 Basis

The intent of this EAL is to ensure that notifications for the aircraft threat are made in a timely manner and that Offsite Response Organizations (ORO) and plant personnel are at a state of heightened awareness regarding the credible threat. It is not the intent of this EAL to replace existing non-hostile related EALs involving aircraft.

This EAL is met when a plant receives information regarding an aircraft threat from NRC. Validation is performed by calling the NRC. Only the plant to which the specific threat is made need declare the Unusual Event.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Escalation to Alert emergency classification level would be via HA1 would be appropriate if the threat involves an airliner within 30 minutes of the plant.

Threshold #3 Basis

Reference is made to security force because these individuals are the designated personnel on-site qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the plant Safeguards Contingency Plan.

This threshold is based on Station Security Plan – Appendix C. 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 in some cases under 10 CFR 50.72.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 5, HU4
2. SY-AA-101-132, Security Assessment and Response to Unusual Activities
3. Station Security Plan – Appendix C
4. NRC Safeguards Advisory 10/6/01
5. Letter from Mr. B. A. Boger (NRC) to Ms. Lynette Hendricks (NEI) dated 2/4/02
6. LOA-SY-001, Security Abnormal Procedure

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS2

Initiating Condition:

Control Room evacuation has been initiated and plant control cannot be established.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Control Room evacuation has been initiated.

   AND

2. Control of the plant **cannot** be established per LOA-RX-101(201) or LOA-FX-101(201) in **< 15 minutes**.

Basis:

The time period to establish control of the plant starts when either:

a. Control of the plant is no longer maintained in the Main Control Room

   OR

b. The last Operator has left the Main Control Room.

The intent of this EAL is to capture those events where control of the plant cannot be reestablished in a timely manner. In this case, expeditious transfer of control of safety systems has not occurred (although fission product barrier damage may not yet be indicated).

The intent of the EAL is to establish control of important plant equipment and knowledge of important plant parameters in a timely manner. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions. Typically, these safety functions are reactivity control (ability to shutdown the reactor and maintain it shutdown), reactor water level (ability to cool the core), and decay heat removal (ability to maintain a heat sink).

The determination of whether or not control is established at the remote shutdown panel is based on Emergency Director (ED) judgment. The Emergency Director is expected to make a reasonable, informed judgment within the specified time for transfer that the licensee has control of the plant from the remote shutdown panel.

Escalation of this emergency classification level, if appropriate, would be by Fission Product Barrier or Abnormal Rad Levels/Radiological Effluent EALs.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS2 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 HS2
2. LOA-RX-101(201), Unit 1(2) Control Room Evacuation Abnormal
3. LOA-FX-101(201), Unit 1(2) Safe Shutdown with a Fire in the Control Room OR AEER

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA2

Initiating Condition:

Control Room evacuation has been initiated.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Entry into LOA-RX-101(201) or LOA-FX-101(201) for Control Room evacuation.

Basis:

With the control room evacuated, additional support, monitoring and direction through the Technical Support Center and/or other emergency response facilities may be necessary.

Inability to establish plant control from outside the control room will escalate this event to a Site Area Emergency.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HA5
2. LOA-RX-101(201), Unit 1(2) Control Room Evacuation Abnormal
3. LOA-FX-101(201), Unit 1(2) Safe Shutdown with a Fire in the Control Room OR AEER

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3

Initiating Condition:

FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

FIRE or EXPLOSION resulting in any of the following:

- VISIBLE DAMAGE to a Table H2 permanent structure.

  OR

- VISIBLE DAMAGE to safety system equipment contained within a Table H2 area.

  OR

- Control Room indication of degraded safety system equipment performance contained within a Table H2 area.

Table H2 – Vital Areas
• Reactor Building • Control Room • Auxiliary Building • Diesel Generator Rooms • Switchgear and Battery Rooms • Remote Shutdown Rooms • CSCS Pump Rooms • LSH (for 0E12-F300 access only)

Basis:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized / energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3 (cont)

Basis (cont):

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

The areas listed in Table H2 specify specific structures or areas that contain safety system, or component and functions required for safe shutdown of the plant.

VISIBLE DAMAGE is used to identify the magnitude of the FIRE or EXPLOSION and to discriminate against minor FIRES and EXPLOSIONS.

The reference to structures containing safety systems or components is included to discriminate against FIRES or EXPLOSIONS in areas having a low probability of affecting safe operation. The significance here is not that a safety system was degraded but the fact that the FIRE or EXPLOSION was large enough to cause damage to these systems.

An EXPLOSION due to failure of pressurized equipment that does not cause damage to other permanent structures or equipment associated with plant operations does not meet the criteria for declaration under this EAL, but may result in other declaration criteria being met (e.g., when the line is an element of a Fission Product Barrier, or the results in inventory loss).

The use of VISIBLE DAMAGE should not be interpreted as mandating a lengthy damage assessment prior to classification. The declaration of an Alert and the activation of the Technical Support Center will provide the Emergency Director with the resources needed to perform detailed damage assessments.

The Emergency Director also needs to consider any security aspects of the EXPLOSION.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions, Fission Product Barrier or Abnormal Rad Levels / Radiological Effluent EALs.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HA2
2. UFSAR 3.8
3. LOA-FP-101(201), Fire Protection System Abnormal

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3

Initiating Condition:

FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm.

Table H2 – Vital Areas
• Reactor Building • Control Room • Auxiliary Building • Diesel Generator Rooms • Switchgear and Battery Rooms • Remote Shutdown Rooms • CSCS Pump Rooms • LSH (for 0E12-F300 access only)

OR

2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

Basis:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized / energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

PROTECTED AREA: An area which normally encompasses all controlled areas within the security protected area fence.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3 (cont)

Basis (cont):

This EAL addresses the magnitude and extent of FIRES or EXPLOSIONS that may be potentially significant precursors of damage to safety systems. It addresses the FIRE / EXPLOSION, and not the degradation in performance of affected systems that may result.

As used here, notification is visual observation and report by plant personnel or sensor alarm indication.

For the purposes of declaring an emergency event, the term “extinguished” means no visible flames.

Thresholds #1:

The 15 minute time period begins with a credible notification that a FIRE is occurring, or indication of a fire detection system alarm/actuation. Verification of a fire detection system alarm/actuation includes actions that can be taken within the control room or other nearby site specific location to ensure that it is not spurious. An alarm is assumed to be an indication of a FIRE unless it is disproved within the 15 minute period by personnel dispatched to the scene. In other words, a personnel report from the scene may be used to disprove a sensor alarm if received within 15 minutes of the alarm, but shall not be required to verify the alarm.

The intent of this 15 minute duration is to size the FIRE and to discriminate against small FIRES that are readily extinguished (e.g., smoldering waste paper basket). Such fires are excluded from consideration in this threshold since they have no safety consequence.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3 (cont)

Basis (cont):

Threshold #2 Basis:

This EAL addresses only those EXPLOSIONS of sufficient force to damage permanent structures or equipment associated with plant operations within the PROTECTED AREA.

An EXPLOSION due to failure of pressurized equipment that does not cause damage to other permanent structures or equipment associated with plant operations does not meet the criteria for declaration under this EAL, but may result in other declaration criteria being met (e.g., when the line is an element of a Fission Product Barrier, or the results in inventory loss).

No attempt is made to assess the actual magnitude of the damage. The occurrence of the EXPLOSION is sufficient for declaration.

The Emergency director also needs to consider any security aspects of the EXPLOSION, if applicable.

Escalation of this emergency classification level, if appropriate, would be based on HA3.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HU2
2. UFSAR 3.8
3. LOA-FP-101(201), Fire Protection System Abnormal

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4

Initiating Condition:

Natural or destructive phenomena affecting VITAL AREAS.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by seismic instrumentation **> 0.10 g**.

   AND

   b. Confirmed by **ANY** of the following:

   - Earthquake felt in plant.

     OR

   - National Earthquake Center.

     OR

   - Control Room indication of degraded performance of systems required for the safe shutdown of the plant.

   OR

2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area:

   - Tornado strike

     OR

   - High winds **> 90 mph**

     OR

   - Vehicle crash

     OR

   - Turbine failure-generated PROJECTILES

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

EAL Threshold Value(s) (cont):

Table H2 – Vital Areas
• Reactor Building • Control Room • Auxiliary Building • Diesel Generator Rooms • Switchgear and Battery Rooms • Remote Shutdown Rooms • CSCS Pump Rooms • LSH (for 0E12-F300 access only)

OR

3. Flooding in any Table H3 area that results in **ANY** of the following:
   a. Degraded safety system performance as indicated in the Control Room.

      OR

   b. Industrial safety hazards (e.g., electric shock) that precludes access necessary to operate or monitor safety equipment.

      OR

   c. Water level **> LGA-002, Maximum Safe** operating levels.

Table H3 – Internal Flooding Areas
• RCIC Room • B/C RHR Room • HPCS Room • A RHR Room • CSCS Pump Rooms • RB Raceway

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

Basis:

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

These EALs escalate from HU4 in that the occurrence of the event has resulted in VISIBLE DAMAGE to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control room indications of degraded system response or performance. The occurrence of VISIBLE DAMAGE and/or degraded system response is intended to discriminate against lesser events. 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. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction EALs.

Threshold #1 Basis:

This threshold addresses events that may have resulted in a Table H2 area being subjected to forces beyond design limits and thus damage may be assumed to have occurred to plant safety systems.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

Basis (cont):

Threshold #2 Basis:

This threshold addresses events within the PROTECTED AREA that results in VISIBLE DAMAGE to any Table H2 structure or Control Room indication of degraded performance of a safety system in any Table H2 area:

This threshold addresses the following events:

- Tornado strike.
- High winds.
- Vehicle crashes such as plane, helicopter, train, barge, car or truck crashes. The Emergency director also needs to consider any security aspects of the vehicle crash.
- Threat to safety-related equipment imposed by PROJECTILES generated by main turbine rotating component failures.

Threshold #3 Basis:

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. The actual component failure or equipment misalignment is addressed by Technical Specifications or plant procedures unless the resulting flooding causes degraded performance of safety systems, or has created industrial safety hazards (e.g., electrical shock) that preclude necessary access to operate or monitor safety equipment. The inability to access, operate or monitor safety equipment represents an actual or substantial potential degradation of the level of safety of the plant.

Flooding as used in this EAL describes a condition where water is entering the room faster than installed equipment is capable of removal, resulting in a rise of water level within the room. Classification of this EAL should not be delayed while corrective actions are being taken to isolate the water source.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 HA1
2. UFSAR 3.3
3. UFSAR 3.4
4. UFSAR 3.7
5. UFSAR 3.8
6. UFSAR 3.11
7. LOR-1PM10J-B503 Seismic Operating Basis Earthquake (OBE)/Safe Shutdown Earthquake (SSE) Level Exceeded
8. LOA-TORN-001, High Winds/Tornado
9. Drawing S-01A, Composite Site Plan
10. LOA-FLD-001, Flooding
11. Drawing M-24, Flood Plan
12. LGA 002, Secondary Containment Control

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4

Initiating Condition:

Natural or destructive phenomena affecting the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. a. Seismic event as indicated by station seismic monitoring procedures **> 0.01g**.

   AND

   b. Confirmed by **EITHER**:

   - Earthquake felt in plant.

     OR

   - National Earthquake Center.

   OR

2. **EITHER** of the following occurring within the PROTECTED AREA boundary:

   - Tornado strike

     OR

   - Sustained **(> 15 minutes)** high winds **> 90 mph**

   OR

3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

   OR

4. Flooding in any Table H3 area that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

Table H3 – Internal Flooding Areas
• RCIC Room • B/C RHR Room • HPCS Room • A RHR Room • CSCS Pump Rooms • RB Raceway

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont)

Basis:

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

These EALs are categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

Threshold #1 Basis:

Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate.

The phrase "in plant" is meant to include buildings and structures associated with plant operations and to rule out buildings or structures such as warehouses, administrative buildings or Bullet Resistant Enclosures (BRE), which would not be a precursor of potential degradation of level of safety.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

Threshold #2 Basis:

This EAL is based on a tornado striking (touching down) or high winds within the PROTECTED AREA.

Escalation of this emergency classification level, if appropriate, would be based on VISIBLE DAMAGE, or by other in plant conditions, via HA4.

Threshold #3 Basis:

This EAL addresses main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Generator seal damage observed after generator purge does not meet the intent of this EAL because it did not impact normal operation of the plant.

Of major concern is the potential for leakage of combustible fluids (lubricating oils) and gases (hydrogen cooling) to the plant environs. Actual FIRES and flammable gas build up are appropriately classified via HU3 and HU5.

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 this emergency classification level, if appropriate, would be to HA4 based on damage done by PROJECTILES generated by the failure or by the radiological releases. The latter events would be classified by the radiological EALs or Fission Product Barrier.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont)

Basis (cont):

Threshold #4 Basis:

The assessment of the potential for flooding to affect safety related equipment is based on the rate of level rise in the area and the ability to terminate the input prior to submerging or spraying the electrical portion of safety related equipment.

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. Minor leaks, such as valve packing or instrument line breaks would not constitute “Flooding.” The Internal Flooding Areas of concern for the Unusual Event declaration are those Table H3 areas that have the potential to affect safety related equipment needed for the current operating mode.

Escalation of this emergency classification level, if appropriate, would be based VISIBLE DAMAGE via HA4, or by other plant conditions.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HU1
2. UFSAR 3.3
3. UFSAR 3.4
4. UFSAR 3.7
5. UFSAR 3.8
6. UFSAR 3.11
7. LOR-1PM10J-B504, Seismic Operating Basis Earthquake (OBE)/Safe Shutdown Earthquake (SSE) Level Exceeded
8. LOA-TORN-001, High Winds/Tornado
9. Drawing S-01A, Composite Site Plan
10. LOA-FLD-001, Flooding
11. Drawing M-24, Flood Plan
12. LOA-HY-01(02), Unit 1(2) Generator Hydrogen System Abnormal
13. LOP-HY-06, Hydrogen System Leak Detection
14. LOR-1PM03J-B511, Condenser Vacuum Low

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont)

Basis Reference(s) (cont):

15. LOR-1H13-P603-B201, Division 1 Main Condenser Vacuum Low
16. LOR-1H13-P603-B212, Division II Main Condenser Vacuum Low
17. LOR-2PM03J-B511, Condenser Vacuum Low
19. LOR-2H13-P603-B201, Division 1 Main Condenser Vacuum Low
10. LOR-2H13-P603-B212, Division II Main Condenser Vacuum Low
20. LGA 002, Secondary Containment Control

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5

Initiating Condition:

Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.

Table H2 – Vital Areas
• Reactor Building • Control Room • Auxiliary Building • Diesel Generator Rooms • Switchgear and Battery Rooms • Remote Shutdown Rooms • CSCS Pump Rooms • LSH (for 0E12-F300 access only)

Basis:

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5 (cont)

Basis (cont):

Gases in a VITAL AREA can affect the ability to safely operate or safely shutdown the reactor.

The fact that SCBA may be worn does not eliminate the need to declare the event.

A precautionary area evacuation for the purpose of atmospheric testing does not warrant declaration until test results are obtained unless access is required for operation of operable equipment to maintain safe operations or safely shutdown the reactor. Declaration should not be delayed for confirmation from atmospheric testing if the atmosphere poses an immediate threat to life and health or an immediate threat of severe exposure to gases. This could be based upon documented analysis, indication of personal ill effects from exposure, or operating experience with the hazards such as an inadvertent actuation of installed Cardox fire suppression system.

Station evaluations have shown that installed Halon systems by design do not create an IDLH atmosphere when discharged. Therefore, when an installed Halon Fire Suppression system discharge occurs, an IDLH atmosphere should not be assumed, and declaration of a toxic or asphyxiant IDLH atmosphere must be based on representative sampling of the affected area, unless there are indications of personal ill effects resulting from exposure.

Areas directly associated with a fire that may be considered to have a hazardous environment (due to smoke, design fire suppression system actuation or administrative controls awaiting ventilation and/or testing) do not warrant declaration of an Alert under this EAL but should be evaluated against the fire EALs.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of 19.5%, which can lead to breathing difficulties, unconsciousness or even death.

An uncontrolled release of flammable gasses 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. Flammable gasses, such as hydrogen and acetylene, are routinely used to maintain plant systems (hydrogen) or to repair equipment/components (acetylene - used in welding). This EAL assumes concentrations of flammable gasses which can ignite/support combustion.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions, Fission Product Barrier or Abnormal Rad Levels / Radioactive Effluent EALs.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 HA3
2. UFSAR 9.5
3. OP-AA-106-103 Chemical Release Or Spill Assessment And Response Determination
4. OP-LA-106-103 Hazardous Materials (Hazmat) Release Supplemental Information
5. EN-AA-702 Chemical Non-Emergency Response
6. ACIT 660892-16, Station Halon Discharge IDLH Evaluation

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU5

Initiating Condition:

Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS.

   OR

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

Basis:

NORMAL PLANT OPERATIONS: Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

This EAL is based on the release of toxic, corrosive, asphyxiant or flammable gases of sufficient quantity to affect NORMAL PLANT OPERATIONS.

The fact that SCBA may be worn does not eliminate the need to declare the event.

This EAL is not intended to require significant assessment or quantification. It assumes an uncontrolled process that has the potential to affect plant operations. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation.

The release may have originated within the Protected Area boundary, or it may have originated offsite and subsequently drifted inside the Protected Area boundary. Offsite events (e.g., tanker truck accident releasing toxic gases, etc.) resulting in the plant being within the evacuation area should also be considered in this EAL because of the adverse affect on NORMAL PLANT OPERATIONS.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU5 (cont)

Basis: (cont)

Areas directly associated with a fire that may be considered to have a hazardous environment (due to smoke, design fire suppression system actuation or administrative controls awaiting ventilation and/or testing) do not warrant declaration of an Unusual Event under this EAL but should be evaluated against the fire EALs.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of 19.5%, which can lead to breathing difficulties, unconsciousness or even death.

Escalation of this emergency classification level, if appropriate, would be based on HA5.

Basis Reference(s) (cont):

1. NEI 99-01, Rev. 5 HU3
2. UFSAR 9.53. UFSAR 2.2
3. OP-AA-106-103 Chemical Release Or Spill Assessment And Response Determination
4. OP-LA-106-103 Hazardous Materials (Hazmat) Release Supplemental Information
5. EN-AA-702 Chemical Non-Emergency Response

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG6

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the General Emergency class.

Basis Reference(s):

1. NEI 99-01, Rev 5 HG2

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS6

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a Site Area Emergency.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency class description for Site Area Emergency.

Basis Reference(s):

1. NEI 99-01, Rev 5 HS3

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA6

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the Alert emergency class.

Basis Reference(s):

1. NEI 99-01, Rev 5 HA6

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU6

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Unusual Event.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Basis:

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

Basis Reference(s):

1. NEI 99-01, Rev 5 HU5

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

E-HU1

Initiating Condition

Damage to a loaded cask CONFINEMENT BOUNDARY.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**

Basis:

CONFINEMENT BOUNDARY – is the barrier(s) between areas containing radioactive substances and the environment.

An Unusual Event in this EAL is categorized on the basis of the occurrence of an event of sufficient magnitude that a loaded cask CONFINEMENT BOUNDARY (MPC) is damaged or violated. This includes classification based on a loaded fuel storage cask CONFINEMENT BOUNDARY (MPC) loss leading to the degradation of the fuel during storage or posing an operational safety problem with respect to its removal from storage.

Basis Reference(s):

1. NEI 99-01, Rev 5 E-HU1

Section 4: Emergency Measures

Exelon Nuclear emergency response actions are the same for all nuclear stations and are thus covered by Section E of the Emergency Plan.

4.1 Activation and Notification of the Emergency Organization

Standard NARS notifications for the LaSalle Station are made to the State of Illinois Emergency Management Agency (IEMA). At the LaSalle Station, if a General Emergency is the initiating event, the Emergency Director is responsible for notifying the following offsite agencies:

- LaSalle County
- Grundy County

4.2 Assessment Actions

Throughout each emergency situation, continuing assessment will occur. Assessment actions at LaSalle Station may include an evaluation of plant conditions; in-plant, onsite, and initial offsite radiological measurements; and initial estimates of offsite doses. Core damage information is used to refine dose assessments and confirm or extend initial protective action recommendations. LaSalle Station utilizes NEDC-33045P-A, Revision 0, (2001) as the basis for the methodology for post-accident core damage assessment. This methodology utilizes real-time plant indications. In addition, LaSalle Station may use samples of plant fluids and atmospheres as inputs to the CDAM (Core Damage Assessment Methodology) program for core damage estimation.

4.3 Protective Actions for the Offsite Public

To aid Control Room personnel during a rapidly developing emergency situation, Figure 4-1, "Protective Action Recommendation (PAR) Determination Flowchart for LaSalle Station" has been developed based on Section J.10.m of the Emergency Plan.

4.3.1 Alert and Notification System (ANS) Sirens

The ANS consists of a permanently installed outdoor notification system within the ten mile radius around the station. The ten mile radius around the station is primarily an agricultural area with a population density below 2000 persons per square mile. The ANS as installed consists of mechanical and electronic sirens which will cover this entire area with a minimum sound level of 60 db. Additionally, the ANS will cover the heavily populated areas within the ten mile radius around the station with a minimum sound level of 70 db to ensure complete coverage.

Once the public has tuned to designated radio stations in an emergency, detailed instructional messages will be given to the public. State and local procedures provide for these messages.

4.3.2 Evacuation Time Estimates

The ETE study used population data from the 2010 census which includes parts of two counties in Illinois (LaSalle and Grundy). The evacuation times are based on a detailed consideration of the EPZ roadway network and population distribution. The ETE Study, contained in EP-AA-1005 Addendum 2, Evacuation Time Estimates for the LaSalle County Generating Station Plume Exposure Pathway Emergency Planning Zone, presents evacuation times for daytime and nighttime scenarios under various weather conditions for the evacuation of various areas around the LaSalle Station, once a decision has been made to evacuate.

4.4 Protective Actions for Onsite Personnel

LaSalle Station has a siren system to warn personnel of emergency conditions. Upon hearing a continuous two (2) minute siren, or receiving notification by other means of communication, all personnel not having emergency assignments have been instructed to assemble in a predesignated assembly area. The onsite assembly area for LaSalle Station is the Service Building Trackway on 710' elevation of the South Service Building. Refer to Figure 4-2. Accountability of site personnel is accomplished by the Station Security force.

If a site evacuation of non-essential personnel is required, personnel will be released to their homes or relocated and monitored at a relocation center.

The designated relocation centers for LaSalle Station are:

- Mazon Relocation Center, Mazon, Illinois
- Dresden Station, Morris, Illinois

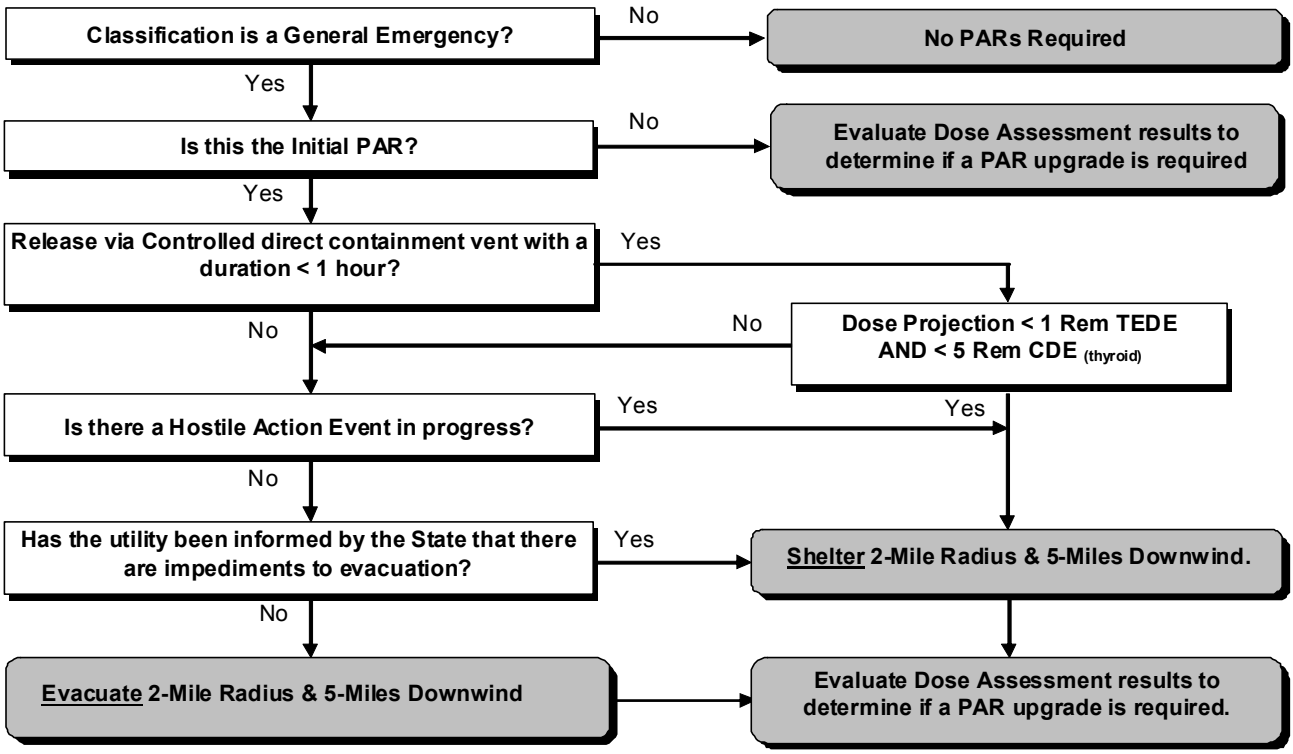
For evacuation routes, refer to EP-AA-113-F-20.

Traffic control for onsite areas will be the responsibility of the Station Security force. When a site evacuation is imminent, the Station Security force will post guards as necessary to assist in the evacuation.

Equipment and personnel would be available at the Mazon Relocation Center and Dresden Station for monitoring and decontamination of evacuated personnel. If major decontamination, follow-up or bioassay samples are necessary, those persons would be sent to Dresden and Braidwood Stations.

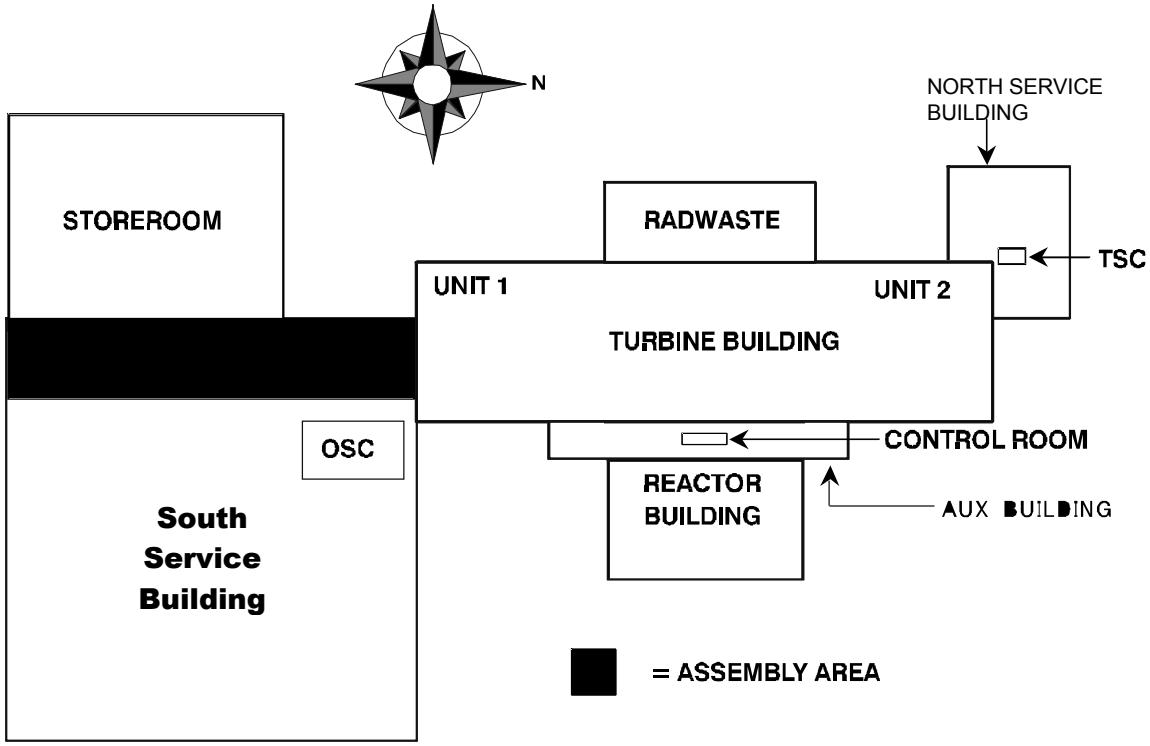
Other emergency measures are common to all nuclear stations and are thus discussed in the Emergency Plan.

Figure 4-1: LaSalle Station PAR Determination Flowchart



2 Mile Radius, 5 Miles Downwind			
WD (from)			Subareas
019º	to	035º	1, 2, 3
036º	to	168º	1, 3
169º	to	301º	1
302º	to	018º	1, 2

Figure 4-2: LaSalle Onsite Assembly Areas and Emergency Response Facilities



Section 5: Emergency Facilities and Equipment

5.1 Emergency Response Facilities

Refer to Figure 4-2 for the location of the LaSalle Station Control Room, Technical Support Center (TSC), and Operations Support Center (OSC) within the Station's Protected Area boundary.

5.1.1 Station Control Room

The LaSalle Station Control Room is the initial onsite center of emergency control and is located on the 768' elevation of the Auxiliary Building.

5.1.2 Technical Support Center (TSC)

LaSalle Station has a designated TSC in the upper basement level (Elevation 694) of the North Service Building. Standard air sampling equipment is used to monitor air-borne radioactivity levels in the TSC. The TSC fully meets the requirements of Section H.1.b of the Emergency Plan.

5.1.3 Operational Support Center (OSC)

LaSalle Station has a designated Operational Support Center (OSC). The OSC is located on the ground floor of the South Service Building. The OSC conforms to the requirements of Section H.1.c of the 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.

5.1.4 Alternative Facility

The Alternative Facility maintains the capability for staging the TSC/OSC emergency response organization personnel in the event of a hostile action. This alternative facility has the capability for communications with the emergency operations facility, control room, and plant security. The Alternative Facility is located at 960 North Rt. 47 Morris, Illinois.

5.2 Assessment Resources

5.2.1 Onsite Meteorological Monitoring Instrumentation

A 400 foot meteorological tower has been erected on the site on ground approximately final plant grade, 710 MSL. The tower is 180 feet from the nearest building which is approximately 30 feet tall. It is approximately 75 feet outside of and to the southeast of the protected area. The turbine building is approximately 134 feet tall, and the reactor building is approximately 185 feet tall.

The tower is instrumented at three levels. Wind speed and wind direction are measured at 33 feet, 200 feet and 375 feet. Ambient temperature is measured at the 33 feet level and differential temperatures referenced to 33 feet are measured at 200 feet and 375 feet. Precipitation is also

measured nearby. The 375 feet level corresponds to the elevation of the possible point of airborne release.

The onsite meteorological monitoring program is covered in the contract 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.

5.2.1.1 Instrumentation

The meteorological tower is instrumented with equipment that conforms with the system accuracy recommendations of Regulatory Guide 1.23 and ANSI/ANS 2.5 (1984). The equipment is placed on booms oriented normal to the general prevailing wind at the site. Equipment signals are brought to an instrument building with controlled environmental conditions. The building at the base of the tower houses the recording equipment, signal conditioners, etc., used to process and re-transmit the data to the end point users.

5.2.1.2 Meteorological Measurement Program During a Disaster

Cooperation between the corporate office and the meteorological contractor assures that a timely restoration of any outage can be made. Emergency field visits to the site are made as quickly as possible after detection of a failure.

Should a disaster of sufficient magnitude occur to destroy the tower structure, a contract is maintained to have a temporary tower erected within 72 hours, weather conditions permitting. Further, the meteorological contractor maintains two levels of sensors (wind speed, wind direction and temperature) in a state of readiness for use on the temporary tower.

Additionally, Exelon Nuclear's existing instrumentated towers at other nuclear sites provide a measurement network with multiple backup opportunities.

Meteorological data is available to the station Control Room, Technical Support Center, and Emergency Operations Facility for use in the Dose Assessment Computer Model for estimating the environmental impact of unplanned releases of radioactivity from the station.

5.2.2 Onsite Radiation Monitoring Equipment

Chapters 11 and 12 of the LaSalle Station UFSAR describe in detail the LaSalle Station radiation monitoring systems and equipment. The systems and equipment can be categorized into five (5) groups:

- A process radiological monitoring and sampling system;
- An effluent radiological monitoring and sampling system;
- An airborne radioactive monitoring system;
- An area radiation monitoring system; and
- Portable survey and counting equipment.

Some on-site equipment is particularly valuable for accident situations and is described in the following sections.

5.2.2.1 Radiological Noble Gas Effluent Monitoring

A General Atomic wide-range monitor is installed in the effluent stream which enters the LaSalle Station vent stack. A separate monitor is installed for the Standby Gas vent stack (contained inside the station vent stack). These wide-range monitors have a range of $1x10^{-7}$ uCi/cc to $1x10^{5}$ uCi/cc.

Instrument readings are available in the Control Room. The range of indication is 10^{1} to 10^{13} uCi/sec. Calibration factors for converting instrument responses to release rates are determined from energy response testing performed during calibration. The factors are then entered into the system microprocessor data base.

5.2.2.2 Radioiodine and Particulate Effluent Monitoring

Effluent sampling media are analyzed in the Station counting room by a Germanium isotopic analysis. The iodine cartridges are reverse-blown for at least ten minutes to reduce the level of entrapped noble gases or as otherwise directed by the Chemistry Supervisor. In addition, silver zeolite cartridges are to be used to further reduce the interference of noble gases.

5.2.2.3 High-Range Containment Radiation Monitors

The purpose of the containment atmosphere and gross gamma monitoring system is to provide the signals necessary to indicate and alarm high hydrogen concentration, high oxygen concentration, or high gross gamma radiation in the drywell following a loss-of-coolant-accident (LOCA).

The containment atmosphere monitoring subsystem monitors hydrogen and oxygen in the drywell resulting from radiolytic and chemical phenomena associated with an accident condition. The gross gamma monitoring subsystem,

consisting of two high range (1 R/hr. to 10^8 R/hr.) containment radiation detectors, monitors gamma radiation resulting from the gross release of fission products from the reactor fuel. Each subsystem has two redundant channels of instrumentation that are physically separated and electrically independent.

Each channel provides a local measurement and transmits the signals to the control room where a permanent record is made on seismically qualified recorders.

5.2.2.4 In-plant Iodine Instrumentation

LaSalle Station has the capability to sample and determine iodine concentrations in the plant using charcoal or silver zeolite cartridges and gamma ray spectroscopy. Portable monitors may be used to measure increasing levels of iodine during emergency conditions.

5.2.3 Onsite Process Monitors

Adequate monitoring capability exists to properly assess the plant status for all modes of operation. The operability of the postaccident instrumentation ensures information is available on selected plant parameters to monitor and assess important variables following an accident.

- Post-accident instrumentation is available to monitor:
- Reactor Vessel Pressure
- Reactor Vessel Water Level
- Suppression Chamber Water Level
- Suppression Chamber Water Temperature
- Suppression Chamber Air Temperature
- Drywell Pressure
- Drywell Temperature
- Containment Hydrogen Concentration
- Containment Gross Gamma Radiation

Station procedures have been developed which would aid personnel in recognizing inadequate core cooling using the above existing instrumentation.

5.2.4 Onsite Fire Detection Instrumentation

LaSalle Station has a fire protection system that is designed to quickly detect any fires; annunciating locally and in the Control Room. The fire detection system is designed to applicable National Fire Protection Association (NFPA) standards. The majority of the detectors consist of electrically supervised ionization smoke detectors. The system is normally powered from 120 VAC with automatic transfer to 125VDC on loss of power. In the event that a portion of the fire detection instrumentation is inoperable, increasing the frequency of fire watches in affected areas is required.

A further description of the LaSalle Station fire protection system can be found in Chapter 9 of the LaSalle Station UFSAR.

5.2.5 Facilities and Equipment for Offsite Monitoring

Consult the station specific Offsite Dose Calculation Manual (ODCM) for the most current location for fixed continuous air samplers and Dosimeter of Legal Record (DLR) locations.

5.2.6 Site Hydrological Characteristics

The hydrological characteristics of the LaSalle Station vicinity are described in Section 2.4 of the LaSalle Station UFSAR. The LaSalle Station and the cooling lake cover an area of approximately 3,060 acres. The station is located approximately 5.0 miles south of the Illinois River. The cooling lake is approximately 2 miles south of the Illinois River at its closest point.

The terrain around the plant site is gently rolling, with ground surface elevations vary from 700 feet to 724 feet MSL, which is 217 feet above the normal pool elevation in the Illinois River. The plant grade and floor elevations are 710 feet and 710.5 feet MSL respectively. The plant floor is 188 feet above a postulated probable maximum flood (PMF) with coincident wind waves in the Illinois River. The station site may therefore be characterized as "flood proof" or "dry" regarding floods in the Illinois River. Safety-related structures at the plant site are similarly unaffected by wave run-up due to winds coincident with a postulated probable maximum water level in the cooling lake. The elevation of the perimeter road around the plant buildings (including all the safety-related structures) is 709 feet MSL or above.

The river screen house and the outfall structure, both non-safety-related structures, are the only plant facilities that are potentially affected by floods in the Illinois River. The river screen house is capable of withstanding a 100-year flood in the Illinois River.

5.2.6.1 Flood Design Considerations

In the event of a seismically induced dam failure, it is unlikely that the resulting flood stage would exceed the Illinois River PMF stage at the site. Breaching of the peripheral dikes of the cooling lake at the time of a postulated seismic event would cause the impounded water to discharge directly into local creeks that meet the Illinois River. Since the plant grade is set at elevation 710 feet MSL, and the plant floor is at elevation 710.5 feet MSL, there is no likelihood of flooding of the plant facilities due to this phenomenon.

Since cooling of the power plant condensers is accomplished by pumping from the cooling lake and not from the Illinois River directly, plant safety is not affected by postulated blockage of the Illinois River or by any other concurrent flooding condition.

Although ice formation takes place on all rivers in the Illinois River basin, flooding caused by ice jams is a rare event. Ice jam formation does not exist in the Illinois River near the site, since the river is approximately 800 feet wide and is kept navigable by dredging when required. The lake screen house is protected against icing in the lake by provision of warming lines near the screen house.

Makeup water is pumped from the Illinois River using three pumps with a total capacity of 90,000 gpm. The rate of pumping varies depending upon the plant operating load level and the weather conditions. It is designed to maintain a constant lake level and a total dissolved solids (TDS) level of less than 750 ppm in the blowdown. The minimum operating lake level is 697.75 feet MSL. Lake level is continuously monitored in the main control room of the power plant. Safety-related facilities at the plant site are unaffected by the probable maximum water level in the lake with coincident wind wave activity. In the event that the cooling lake level drops to an elevation of 690 feet MSL or lower, the nuclear reactors are shut down as described in Subsection 5.2.6.

Due to the considerable width of the Illinois River and the well-developed flood plain, there is little likelihood that rock falls, ice jams, or subsidence would completely divert the flow from the river screen house location.

5.2.6.2 Groundwater Use and Protection

The discussion of regional groundwater hydrology includes the hydrogeologic systems within a 25-mile radius circle centered at the LaSalle Station, Units 1 and 2. The discussion of site groundwater hydrology includes the hydrogeologic systems within the LSCS property lines.

Groundwater will be used to supply the water requirements for the following plant systems: makeup demineralizer; potable supply. Groundwater will be obtained from two deep wells in the Cambrian-Ordovician Aquifer. Each well is equipped with a deep well submersible pump with a rated capacity of 300 gpm. The water will be stored in a 350,000 - gallon, ground level tank prior to distribution to the demineralizer and domestic systems. Groundwater for public use within 10 miles of the site is obtained predominantly from wells in the Cambrian-Ordovician Aquifer.

An accidental spill of radioactive materials would have no effect on the public groundwater supplies. The principal aquifer in the area is overlain by approximately 350 feet of impervious till and underlying shales.

5.3 Protective Facilities and Equipment

The on-site assembly area for LaSalle Station is the Service Building Trackway on 710' elevation of the South Service Building as described in Section 6.4 of this annex. This area is suitable because:

1. It is an open area suitable for assembling large numbers of people in a short period of time;

2. It is relatively close to the Main Access Facility; and

3. It has a relatively low probability of being affected by a serious accident involving the NSSS.

The offsite relocation centers for LaSalle Station are discussed in Section 4 of this annex. All three centers are suitable because:

1. They are outside the LaSalle Station plume exposure pathway emergency planning zone; and

2. The relocation centers are owned by Exelon Nuclear, therefore, personnel, supplies and communication equipment are readily available.

5.4 First Aid and Medical Facilities

LaSalle Station has an inplant first aid/decontamination room on the ground floor of the Auxiliary Building near the station laboratory complex. This room is provided with a sink, a portable first aid table, a shower, and a supply cabinet.

First aid kits, stretchers, sinks, eyewashes, and emergency showers have been placed in strategic locations throughout the station.

Medical treatment given to injured persons at the station is of a "first aid" nature. When more professional care is needed, injured persons are transported to a local hospital or clinic. St. Mary's Hospital in Streator, Illinois is the LaSalle Station primary supporting medical facility for injured persons who are contaminated with radioactivity. Morris Hospital in Morris, Illinois is the LaSalle Station supporting Trauma Center for injured persons who are contaminated with radioactivity.

Provena St. Joseph Medical Center in Joliet, Illinois is the backup medical facility for evaluation and treatment of persons suffering from traumatic injury, medical illness, or radiation exposure and uptake.

Appendix 1: NUREG-0654 Cross-Reference

Annex Section	NUREG-0654
1.0	Part I, Section A
1.1	Part I, Section C
1.2	Part I, Section D
Figure 1-1	Part I, Section D
2.0	Part II, Section A.4
2.1	Part II, Section A.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.m
4.3.1	Part II, Section E.6
4.3.2	Part II, Section J.8
Figure 4-1	Part II, Section J.10.m
Figure 4-2	Part II, Section J.5
4.4	Part II, Section J.2 & 3
Table 4-1	Part II, Section J.8
Table 4-2	Part II, Section J.10.b
5.1	Part II, Section H.1 & G.3
5.2.1	Part II, Section H.5.a & 8
5.2.2	Part II, Section H.5.b & 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
5.2.6	Part II, Section H.5.a & 6.a
5.3	Part II, Section J.1-5
5.4	Part II, Section L.1 & 2

Appendix 2: Station Letters of Agreement

1. LaSalle County Sheriff's Office - law enforcement
2. St. Mary's Hospital of Streator, Illinois - medical services
3. Morris Hospital in Morris, Illinois - medical services
4. Marseilles Rural Fire Department - fire protection
5. Seneca Fire Department - fire protection services
6. Seneca Ambulance - ambulance services
7. Marseilles Area Ambulance Service

ATTACHMENT 8

EP-AA-1006, Revision 35

Exelon Nuclear Radiological Emergency Plan Annex for Quad Cities Station

EXELON NUCLEAR

RADIOLOGICAL EMERGENCY PLAN ANNEX FOR QUAD CITIES STATION

Table of Contents

REVISION HISTORY

Revision 0; 04/80	Revision 8N; 01/98	Revision 34, 12/12	
Revision 1; 07/80	Revision 8P; 07/98	Revision 35, 6/13	
Revision 2; 04/81	Revision 9; 05/99		
Revision 3; 04/82	Revision 10; 01/00		
Revision 4; 04/83	Revision 11; 01/01		
Revision 5; 12/84	Revision 12; 10/01		
Revision 5A; 03/85	Revision 13; 10/01		
Revision 6; 03/86	Revision 14; 01/02		
Revision 7; 02/87	Revision 15; 07/02		
Revision 7A; 12/87	Revision 16; 09/02		
Revision 7B; 08/88	Revision 17; 06/03		
Revision 7C; 05/89	Revision 18; 08/03		
Revision 7D; 12/89	Revision 20, Canceled		
Revision 8; 09/94	Revision 21, 10/05		
Revision 8A; 01/95	Revision 22, 12/05		
Revision 8B; 03/95	Revision 23, 04/06		
Revision 8C; 09/95	Revision 24, 04/07		
Revision 8D; 12/93	Revision 25, 10/07		
Revision 8E; 12/93	Revision 26, 03/08		
Revision 8F; 01/94	Revision 27, 12/08		
Revision 8G; 04/94	Revision 28, 03/10		
Revision 8H; 10/94	Revision 29, 06/10		
Revision 8I; 12/95	Revision 30, 01/11		
Revision 8J; 12/95	Revision 31, 03/11		
Revision 8K; 04/96	Revision 32, 06/12		
Revision 8L; 05/96	Revision 33, 11/12		

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 Emergency Plan (Emergency Plan), Station Annexes, emergency plan implementing procedures, and associated program administrative documents. The 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 Quad Cities Station Annex and contains information and guidance that is unique to the station. This includes Emergency Action Levels (EALs), and facility geography 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 Emergency Plan.

1.1 Facility Description

The Quad Cities Station, Units 1 and 2, is located in Cordova Township of Rock Island County in northwestern Illinois. The station is located on the east bank of the Mississippi River three miles north of Cordova, Illinois. Cooling water for the plant is provided by the Mississippi River, with the water being returned to the river by diffuser pipes. The plant consists of two boiling water reactors (BWR), nuclear steam supply systems (NSSS), and turbine generators furnished by General Electric Company. The steam supply system is designed for a power output of 2957 MWt for each of the two units.

The Quad Cities Station area consists of approximately 126 acres (with a radius of about 1/4-mile about the Units 1/2 chimney) and is owned and controlled by Mid American Energy Company and Exelon Nuclear as tenants in common.

For more specific site location information, refer to the Updated Final Safety Analysis Report (UFSAR) for Quad Cities Station, Units 1 and 2.

1.2 Emergency Planning Zones

The Plume Exposure Emergency Planning Zone (EPZ) for Quad Cities Station is an area surrounding the station with a radius of about ten miles, (exact boundaries are determined by the States of Illinois and Iowa). Refer to Figure 1-1.

The Ingestion Pathway Emergency Planning Zone (EPZ) for Quad Cities Station is an area surrounding the Station with a radius of about 50 miles.

1.3 State of Iowa

Much of the Plume Exposure EPZ for the Quad Cities Station lies within the State of Iowa. The State of Iowa has developed an "Iowa Emergency Plan." This section provides a summary of the essential elements of the Iowa Emergency Plan, outlining the specific responsibilities of certain "key" Iowa State Agency players in a response operational mode. Basic descriptions for the Iowa State agencies responsible for actions in the event of a nuclear power station are as follows:

1.3.1 Iowa Emergency Management Division (IEMD)

IEMD coordinates all activities of State agencies and departments, all local governments, and the utility in support of emergency response activities. These activities are coordinated from the Iowa State EOC in Des Moines.

1.3.2 The Iowa Commissioner of Public Health

The Iowa Department of Public Health alerts the State Hygienic Lab when emergency action conditions are reported by a commercial nuclear power reactor, which impacts upon the public health and safety in Iowa, and when emergency team response has been determined to be necessary or imminent. They perform necessary calculations and evaluate the impact of existing and projected radioactivity releases in terms of public health risk. They translate the evaluation of existing and projected environmental contamination and resulting dose into terms of alternative protective actions. They recommend appropriate protective actions to the Governor's Office, IEMD and other State agencies as appropriate.

1.3.3 University Hygienic Lab (UHL)

The UHL, located in Iowa City, Iowa conducts and coordinates all field surveillance and monitoring activities directed toward measuring radiation exposure and radioactivity contamination in the environment resulting from an accident at a commercial nuclear power reactor; provides and coordinates laboratory support of all environmental sampling and radiological monitoring activities during a nuclear emergency; communicates all relevant data and protective action recommendations to the State Department of Public Health; provides radiological laboratory support for environmental samples analysis; and provides recommendations for decontamination of contaminated area.

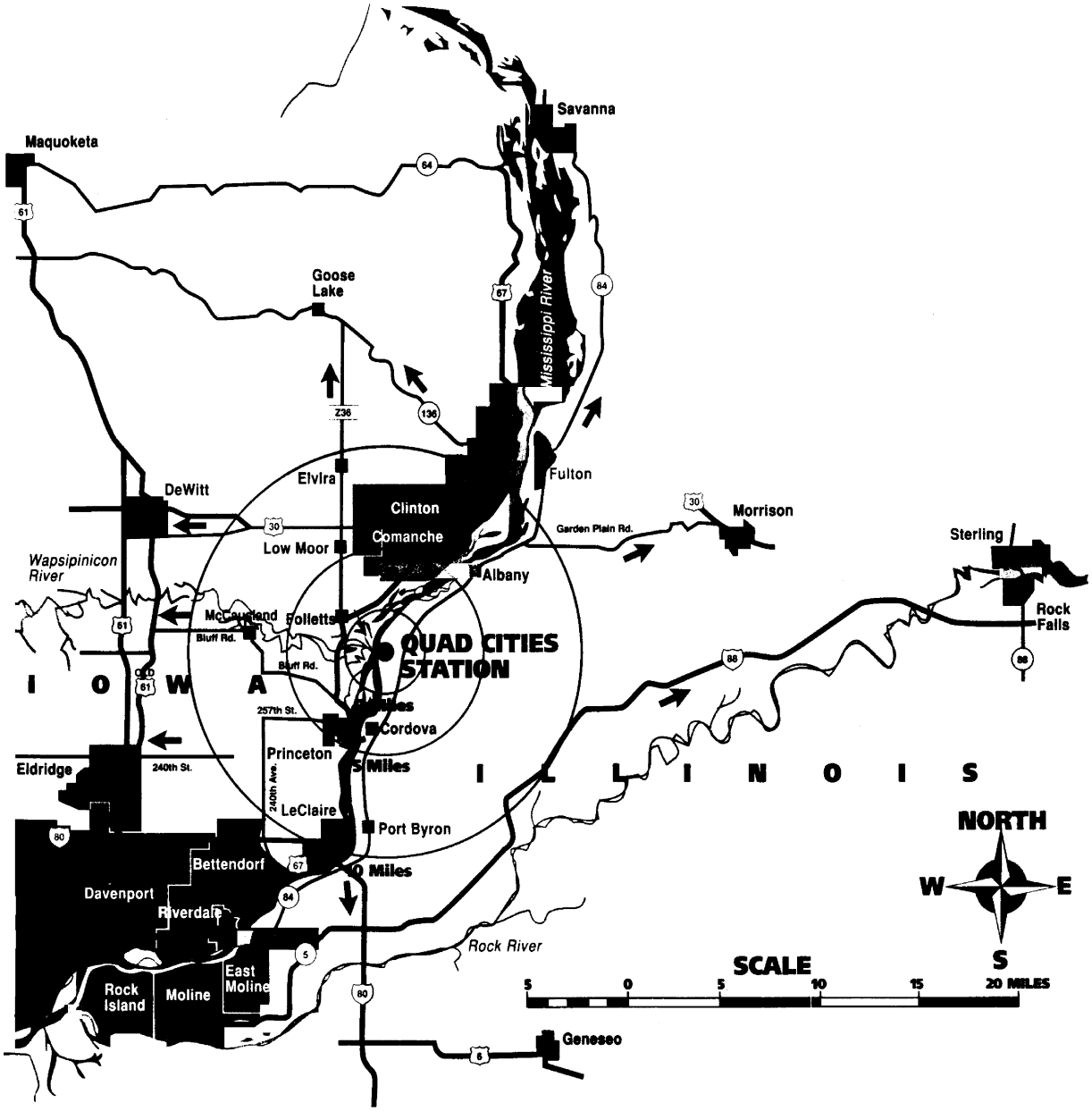
1.3.4 Clinton County

Clinton County will provide a coordinated local government response in conjunction with the State of Iowa, from the County Emergency Operations Center (EOC) in Clinton, IA.

1.3.5 Scott County

Scott County will provide a coordinated local government response in conjunction with the State of Iowa, from the County Emergency Operations Center (EOC) in Davenport, IA.

Figure 1-1: Quad Cities Station Location And 10 Mile EPZ



Section 2: Organizational Control of Emergencies

This section describes the Emergency Response Organization (ERO) and its key positions. It outlines the staffing requirements which provide initial emergency response actions and provisions for timely augmentation of on-shift personnel when required. It also describes interfaces among Exelon Nuclear emergency response personnel and specifies the offsite support available to respond to the nuclear generating stations.

2.1 Shift Organization Staffing

Initial response to any emergency is by the normal plant organization present at the site. This organization includes positions that are onsite 24 hours per day and is described in Section B.1 of the Exelon Nuclear Standardized Radiological Emergency Plan. The Normal Shift Organization will be augmented, in an emergency, with designated/additional Emergency Response Organization (ERO) personnel within 60 minutes of notification as specified under Table 2-1. ERO activation is described in Section H.4 of the Exelon Nuclear Standardized Radiological Emergency Plan.

Table 2-1 outlines ERO positions required to meet minimum staffing and full augmentation of the on-shift complement at an Alert or higher classification, and the major tasks assigned to each position. Responsibilities for each position are described in Section B.5 of the Exelon Nuclear Standardized Radiological Emergency Plan.

2.2 Emergency Response Organization Block Diagram

Figures B-1a through B-1d of the Exelon Nuclear Standardized Radiological Emergency Plan illustrates the overall emergency response organization.

2.3 Non-Exelon Nuclear Support Groups

Exelon Nuclear has contractual agreements with several companies whose services would be available in the event of a radiological emergency. These agencies and their available services are listed in Appendix 3 of the Emergency Plan.

Emergency response coordination with governmental agencies and other support organizations is discussed in Section A of the Emergency Plan.

Agreements exist on file at Quad Cities Station with several support agencies. These agencies and their support roles are listed in Appendix 2, Station Letters of Agreement.

Table 2-1: Minimum Staffing Requirements

Functional Area	Major Tasks	Emergency Positions	Minimum Shift Size	Minimum Staffing *60 Minute Augmentation	Minimum Staffing Other On-Call	Minimum Staffing Full Augmentation
1. Plant Operations/Safe Shutdown and Assessment of Operational Aspects	Control Room Staff	Shift Manager	1			
		Shift Supervisor	2			
		Nuclear Station Operator	4			
		Non-Licensed Operator	4			
2. Emergency Direction and Control	Command and Control	Shift Emergency Director (CR)	1[(a)]			
		Station Emergency Director (TSC)		1		
		Corporate Emergency Director (EOF)		1		
3. Notification & Communication	Emergency Communications	Plant Shift Personnel	1			
		TSC Director (TSC)		1		
		EOF Director (EOF)		1		
		State/Local Communicator		1 (EOF)		1 (TSC)
		ENS Communicator		1 (TSC)		1 (EOF)
		HPN Communicator		1 (EOF)		1 (TSC)
	Plant Status	OPs Communicator (CR/TSC)				2
		Operations Advisor (EOF)				1
	In-Plant Team Control	Damage Control Comm. (CR/TSC/OSC)				3
	Technical Activities	Technical Communicator (TSC)				1
		Technical Advisor (EOF)				1
	Governmental	State Environs Communicator (EOF)				(b)
		EOC Communicator (EOF)				1
		State EOC Liaison (State EOC)				(b)
		County EOC Liaison (County EOC)				(b)
		Regulatory Liaison (EOF)				1
4. Radiological Assessment	Offsite Dose Assessment	RP Personnel	1			
		Dose Assessment Coordinator (EOF)		1		
		Dose Assessor (EOF)				1
		Radiation Controls Coordinator (TSC)				1
	Offsite Surveys	Environmental Coordinator (EOF)		1		
		Field Team Communicator (EOF)				1
		Offsite Field Team Personnel		4		(b)
	Onsite Surveys	Onsite Field Team Personnel		2		(b)
	In-plant Surveys	RP Personnel	1	2		(b)
	Chemistry	Chemistry Personnel	1	1		(b)
	RP Supervisory	Radiation Protection Manager(TSC/EOF)		2		

Functional Area	Major Tasks	Emergency Positions	Minimum Shift Size	Minimum Staffing *60 Minute Augmentation	Minimum Staffing Other On-Call	Full Augmentation
5. Plant System Engineering, Repair, and Corrective Actions	Technical Support	STA / Incident Assessor (CR)	1			
		Technical Manager (TSC)		1		
		Core Thermal/Hydraulic Engineer (TSC)		1		
		Mechanical Engineer (TSC)		1		
		Electrical Engineer (TSC)		1		
		SAMG Decision-Maker (TSC)		1[(a)]		
		SAMG Evaluator (TSC)		2[(a)]		
		Operations Manager (TSC)		1		
		Radiation Controls Engineer (TSC)				1
		Technical Support Manager (EOF)				1
	Repair and Corrective Actions	Mechanical Maintenance (OSC)	1[(a)]	2		(b)
		Electrical/I&C Maintenance (OSC)	1[(a)]	3		(b)
		Maintenance Manager (TSC)		1		
		OSC Director (OSC)		1		
		Assistant OSC Director (OSC)				1
		OPs Lead & Support Personnel (OSC)				(b)
6. In-Plant Protective Actions	Radiation Protection	RP Personnel	2[(a)]	4		(b)
7. Fire Fighting	--	Fire Brigade[(c)]	5			
8. 1st Aid and Rescue Operations	--	Plant Personnel	2[(a)]			(b)
9. Site Access Control and Personnel Accountability	Security & Accountability	Security Team Personnel	(d)	(d)		
		Security Coordinator (TSC)				1
	EOF Security	Security Coordinator (EOF)				1
10. Resource Allocation and Administration	Logistics	Logistics Manager (EOF)		1		
		Logistics Coordinator (TSC)				1
	Administration	Administrative Coordinator (EOF)				1
		Clerical Staff (TSC/EOF/JIC)				(b)
	Inter Facility Logs	Events Recorder (EOF/JIC)				2
	Facility Support	Computer Specialist (EOF)				1

Functional Area	Major Tasks	Emergency Positions	Minimum Shift Size	Minimum Staffing *60 Minute Augmentation	Minimum Staffing Other On-Call	Full Augmentation
11. Public Information	Media Interface	Corporate Spokesperson (JIC)			1	
		Rad Protection Spokesperson (JIC)				1
		Technical Spokesperson (JIC)				1
	Information Development	Public Information Director			1	
		News Writer				1
	Media Monitoring and Rumor Control	Media Monitoring Staff				(b)
		Rumor Control Staff				(b)
	Facility Operation and Control	JIC Director (JIC)			1	
		JIC Coordinator (JIC)				1
		Administrative Coordinator (JIC)				1
		Access Controls (JIC)				1
		Facility Support Staff (JIC)				(b)
		TOTAL:	**21**	**37**	**3**	**32[(b)]**

* Response time is based on optimum travel conditions.

(a) May be provided by personnel assigned other functions.

(b) Personnel numbers depend on the type and extent of the emergency.

(c) Fire Brigade per FSAR/Technical Specifications, as applicable.

(d) Function performed by on-shift security personnel.

Section 3: Classification of Emergencies

3.1 General

Section D of the Exelon Nuclear Standardized Emergency Plan divides the types of emergencies into four Emergency Classification Levels (ECLs). The first four are the UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY, and GENERAL EMERGENCY. These ECLs are entered by meeting the Emergency Action Level (EAL) Threshold Values provided in this section of the Annex. The ECLs are escalated from least severe to most severe according to relative threat to the health and safety of the public and emergency workers. Depending on the severity of an event, prior to returning to a standard day-to-day organization, a state or phase called RECOVERY may be entered to provide dedicated resources and organization in support of restoration and communication activities following the termination of the emergency.

UNUSUAL EVENT: Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

ALERT: Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

SITE AREA EMERGENCY: Events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

GENERAL EMERGENCY: Events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

RECOVERY: Recovery can be considered as a phase of the emergency and is entered by meeting emergency termination criteria provided in EP-AA-111 Emergency Classification and Protective Action Recommendations.

An emergency is classified by assessing plant conditions and comparing abnormal conditions to Initiating Conditions and Threshold Values for each Emergency Action Level.

Individuals responsible for the classification of events will refer to the Initiating Condition and Threshold Values on the matrix of the appropriate station Standardized Emergency Plan Annex (this document). This matrix will contain Initiating Conditions, EAL Threshold Values, Mode Applicability Designators, appropriate EAL numbering system, and additional guidance necessary to classify events. It may be provided as a user aid.

The matrix is set up in six Recognition Categories. The first is designated as "R" and relates to Abnormal Radiological Conditions / Abnormal Radiological Effluent Releases. The second is designated as "F" and relates to Fission Product Barrier Degradation. The third is designated as "M" and relates to System Malfunctions. The fourth is designated as "C" and relates to Cold Shutdown / Refueling System Malfunctions. The fifth is designated as "H" and relates to Hazards and Other Conditions. The sixth is designated "E-H" and relates to ISFSI Malfunctions.

The 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.

The Initiating Conditions are coded with a two letter and one number code. The first letter is the Recognition Category designator, the second letter is the Classification Level, “U” for (NOTIFICATION OF) UNUSUAL EVENT, “A” for ALERT, “S” for SITE AREA EMERGENCY and “G” for GENERAL EMERGENCY. The EAL number is a sequential number for that Recognition Category series. All Initiating Conditions that are describing the severity of a common condition (series) will have the same number.

The EAL number may then be used to reference a corresponding page(s), which provides the basis information pertaining to the Initiating Condition:

- Threshold Value
- Mode Applicability
- Basis

Emergency Action Levels are the measurable, observable detailed conditions that must be met in order to classify the event. Classification is not to be made without referencing, comparing and satisfying the Threshold Values specified in the Emergency Action Levels.

A list of definitions is provided as part of this document for terms having specific meaning to the Emergency Action Levels. Site specific definitions are provided for terms with the intent to be used for a particular Initiating Condition/Threshold Value and may not be applicable to other uses of that term at other sites, the Emergency Plan or procedures.

References are also included to documents that were used to develop the EAL Threshold Values.

References to the Emergency Director means the person in Command and Control as defined in the Emergency Plan. Classification of emergencies is a non-delegable responsibility of Command and Control for the onsite facilities with responsibility assigned to the Shift Emergency Director (Control Room Shift Manager) or the Station Emergency Director (TSC). Classification of emergencies remains the responsibility of the applicable onsite facility even after Command and Control is transferred to the Corporate Emergency Director (EOF).

3.2 Classification, Instrumentation and Transient Events

Although the majority of the EALs provide very specific thresholds, the Emergency Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL is IMMINENT. If, in the judgment of the Emergency Director, an IMMINENT situation is at hand, the classification should be made as if the threshold has been exceeded. While this is particularly prudent at the higher emergency classification levels (as the early classification may provide for more effective implementation of protective measures), it is nonetheless applicable to all emergency classification levels.

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 indications, or (3) by direct observation by plant personnel, such that doubt related to the indication's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

Indications used for monitoring and evaluation of plant conditions include the normally used instrumentation, backup or redundant instrumentation, and the use of other parameters that provide information that supports determination if an EAL threshold value has been reached. When an EAL refers to a specific instrument or indication that is determined to be inaccurate or unavailable, then alternate indications shall be used to monitor the specified condition.

During an event that results in changing parameters trending towards an EAL classification, and instrumentation that was available to monitor this parameter becomes unavailable or the parameter goes off scale, the parameter should be assumed to have been exceeded consistent with the trend and the classification made if there are no other direct or indirect means available to determine if the threshold has not been exceeded.

Planned evolutions involve preplanning to address the limitations imposed by the condition, the performance of required surveillance testing, and the implementation of specific controls prior to knowingly entering the condition in accordance with the specific requirements of the site's Technical Specifications. Activities which cause the site to operate beyond that allowed by the site's Technical Specifications, planned or unplanned, may result in an EAL threshold being met or exceeded. Planned evolutions to test, manipulate, repair, perform maintenance or modifications to systems and equipment that result in an EAL value being met or exceeded are not subject to classification and activation requirements as long as the evolution proceeds as planned and is within the operational limitations imposed by the specific operating license. However, these conditions may be subject to the reporting requirements of 10 CFR 50.72.

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.

Concerning Classification Downgrading Exelon Nuclear policy is that emergency classifications shall not be downgraded to a lower classification. Once declared, the event shall remain in effect until no Classification is warranted or until such time as conditions warrant classification to Recovery.

There may be cases in which a plant condition that exceeded an EAL was not recognized at the time of occurrence but is identified well after the condition has occurred (e.g., as a result of routine log or record review), and the condition no longer exists. In these cases, an emergency should not be declared. Reporting requirements of 10 CFR 50.72 are applicable, the guidance of NUREG-1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73 and the Reportability Reference Manual, should be applied.

3.3 Mode Applicability

The plant-operating mode that existed at the time that the event occurred, prior to any protective system or operator action initiated in response to the condition, is compared to the mode applicability of the EALs. If an event occurs, and a lower or higher plant-operating mode is reached before the emergency classification can be made, the declaration shall be based on the mode that existed at the time the event occurred.

For events that occur in Cold Shutdown or Refueling, escalation is via EALs that have Cold Shutdown or Refueling for mode applicability, even if Hot Shutdown (or a higher mode) is entered during any subsequent heat-up. In particular, the Fission Product Barrier Matrix EALs are applicable only to events that initiate in Hot Shutdown or higher.

If there is a change in Mode following an event declaration, any subsequent events involving EALs outside of the current declaration escalation path will be evaluated on the Mode of the plant at the time the subsequent events occur.

3.4 Emergency Director Judgment

Emergency Director Judgment EALs are provided in the Hazards and Other Condition Affecting Plant Safety section and on the Fission Product Barrier Matrix. Both of the Emergency Director Judgment EALs have specific criteria for when they should be applied.

The Hazards Section Emergency Director Judgment EALs are intended to address unanticipated conditions which are not addressed explicitly by other EALs but warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under specific emergency classifications (UE, Alert, SAE or GE).

The FPB Matrix ED Judgment EALs are intended to include unanticipated conditions, which are not addressed explicitly by any of the other FPB threshold values, but warrant determination because conditions exist that fall under the broader definition for a significant Loss or Potential Loss of the barrier (equal to or greater than the defined FPB threshold values).

3.5 Fission Product Barrier Restoration

Fission Product Barriers (FPBs) are not treated the same as EAL threshold values. Conditions warranting declaration of the loss or potential loss of a Fission Product Barrier may occur resulting in a specific classification. The condition that caused the loss or potential loss declaration could be rectified as the result of Operator action, automatic actions, or designed plant response. Barriers will be considered re-established when there are direct verifiable indications (containment penetration or open valve has been isolated, coolant sample results, etc) that the barrier has been restored and is capable of mitigating future events.

The reestablishment of a fission product barrier does not alter or lower the existing classification. Entry into Termination/Recovery phase is still required for exiting the present classification. However the reestablishment of the barrier should be considered in determining future classifications should plant conditions or events change.

3.6 Definitions

AFFECTING SAFE SHUTDOWN: Event in progress has adversely affected functions that are necessary to bring the plant to and maintain it in the applicable HOT or COLD SHUTDOWN condition. Plant condition applicability is determined by Technical Specification LCOs in effect.

Example 1: Event causes damage that results in entry into an LCO that requires the plant to be placed in HOT SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is not “AFFECTING SAFE SHUTDOWN.”

Example 2: Event causes damage that results in entry into an LCO that requires the plant to be placed in COLD SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is “AFFECTING SAFE SHUTDOWN.”

BOMB: An explosive device suspected of having sufficient force to damage plant systems or structures.

CIVIL DISTURBANCE: A group of persons violently protesting station operations or activities at the site.

CONFINEMENT BOUNDARY: The barrier(s) between areas containing radioactive substances and the environment.

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

EXTORTION: An attempt to cause an action at the station by threat of force.

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fire. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTILE FORCE: One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

INTRUSION: A person(s) present in a specified area without authorization. Discovery of a BOMB in a specified area is indication of INTRUSION into that area by a HOSTILE FORCE.

INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI): A complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage.

NORMAL PLANT OPERATIONS: Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

OPERATING MODES	REACTOR MODE SWITCH POSITION	TEMP
(1) Power Operation:	Run	N/A
(2) Startup:	Refuel [(a)] or Startup/Hot Standby	N/A
(3) Hot Shutdown [(a)]:	Shutdown	> 212° F
(4) Cold Shutdown [(a)]:	Shutdown	≤ 212° F
(5) Refueling [(b)]:	Shutdown or Refuel	N/A
(D) Defueled:	All reactor fuel removed from reactor pressure vessel (full core off load during refueling or extended outage).	

[(a)] All reactor vessel head closure bolts fully tensioned.

[(b)] One or more reactor vessel head closure bolts less than fully tensioned.

Hot Matrix – applies in modes (1), (2), and (3)

Cold Matrix – applies in modes (4), (5), and (D)

OWNER CONTROLLED AREA (OCA): is the property associated with the station owned by the company. Access is normally limited to persons entering for official business.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

SABOTAGE: A deliberate damage, mis-alignment, or mis-operation of plant equipment with the intent to render the equipment inoperable. Equipment found tampered with or damaged due to malicious mischief may NOT meet the definition of SABOTAGE until this determination is made by security supervision.

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) Turbine Trip (2) Reactor Scram (3) ECCS Activation, (4) Recirc. Runback > 25% Reactor Power change, or (5) thermal power oscillations > 10% Reactor Power change.

STRIKE ACTION: A work stoppage within the PROTECTED AREA by a body of workers to enforce compliance with demands made on management. The STRIKE ACTION must threaten to interrupt NORMAL PLANT OPERATIONS.

UNISOLABLE: A breach or leak that cannot be promptly isolated.

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

Emergency Action Level Technical Basis Page Index

Abnormal Rad Levels / Radiological Effluent

Radiological Effluents

GENERAL EMERGENCY

RG1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. [1] [2] [3] [4] [5] [D]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Rx Bldg Vent and Chimney SPINGs **> 3.84 E+09 uCi/sec** for **≥ 15 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 1000 mRem TEDE**
      OR
   b. **> 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**.
      OR
   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

SITE AREA EMERGENCY

RS1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. [1] [2] [3] [4] [5] [D]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Rx Bldg Vent and Chimney SPINGs **> 3.84 E+08 uCi/sec** for **≥ 15 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 100 mRem TEDE**
      OR
   b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.
      OR
   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

ALERT

RA1 Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer. [1] [2] [3] [4] [5] [D]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors **> 200 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 15 minutes**.
   - Radwaste Discharge effluent monitor 1/2-1799-01
     OR
   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Rx Bldg Vent and Chimney SPINGs is **> 4.38 E+07 uCi/sec** for **≥ 15 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.

UNUSUAL EVENT

RU1 Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer. [1] [2] [3] [4] [5] [D]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **2 times alarm setpoint** established by a current radioactivity discharge permit for ≥ **60 minutes**.
   - Radwaste Discharge effluent monitor 1/2-1799-01
     OR
   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Rx Bldg Vent and Chimney SPINGs is **> 4.38 E+05 uCi/sec** for **≥ 60 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Abnormal Rad Levels / Radiological Effluent			
Abnormal Rad Levels	**Table R1** **Fuel Handling Incident Radiation Monitors** • 1(2) 1705-16A Fuel Pool Rad Mon • 1(2) 1705-16B Fuel Pool Rad Mon	**RA2** Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel. 1 2 3 4 5 D **EAL Threshold Values:** 1. VALID reading **> 1000 mR/hr** on any Table R1 Radiation Monitor due to **EITHER**: • Damaged irradiated fuel. **OR** • Water level drop. **OR** 2. Water level drop in the Reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal that will result in irradiated fuel becoming uncovered.	**RU2** UNPLANNED rise in plant radiation levels. 1 2 3 4 5 D **EAL Threshold Values:** 1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by: • Refueling Cavity water level **< 282 inches.** (Upper Wide Range simulated signal). **OR** • Spent Fuel Pool water level **< 19 ft** above the fuel (**– 4 ft** indicated level). **OR** • Report of visual observation of a drop in water level in the Reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal. **AND** b. VALID Area Radiation Monitor reading rise on one or more radiation monitor in Table R1. **OR** 2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.
	Table R2 **Areas Requiring Continuous Occupancy** • Main Control Room (Unit 1 ARM Channel #22) • Central Alarm Station - (by survey)	**RA3** Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. 1 2 3 4 5 D **EAL Threshold Values:** Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R2) to maintain plant safety functions.	**RU3** Fuel Clad Degradation. 1 2 3 **EAL Threshold Values:** Fuel clad degradation resulting in **EITHER**: • Offgas system radiation monitor **Hi-Hi** alarm. **OR** • Specific coolant activity **> 4.0 µCi/gm** Dose Equivalent I-131.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

HOT MATRIX Fission Product Barrier Matrix HOT MATRIX

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
FG1 Loss of ANY two barriers AND Loss or Potential Loss of third barrier. 1 2 3	**FS1** Loss or Potential Loss of ANY two barriers. 1 2 3	**FA1** ANY Loss or ANY Potential Loss of either Fuel Clad or RCS. 1 2 3	**FU1** ANY Loss or ANY Potential Loss of Containment. 1 2 3

Sub-Category	FC - Fuel Clad		RC – Reactor Coolant System		CT - Containment	
	Loss	**Potential Loss**	**Loss**	**Potential Loss**	**Loss**	**Potential Loss**
1. Pri Coolant Activity	Coolant activity **> 300 uCi/gm** Dose Equivalent I-131	None	None	None	None	None
2. RPV Water Level	1. RPV level **cannot** be restored and maintained **> – 166 inches.**	2. RPV level **cannot** be restored and maintained **> – 142 inches (TAF).** **OR** 3. RPV level **cannot** be determined.	1. RPV level **cannot** be restored and maintained **> –142 inches (TAF)**. **OR** 2. RPV level **cannot** be determined.	None	None	Plant conditions indicate that Primary Containment Flooding is required.
3. Primary Cont Conditions	None	None	1. Drywell pressure **> 2.5 psig**. **AND** 2. Drywell pressure rise due to RCS leakage.	None	1. Rapid unexplained drop in Drywell Pressure following initial pressure rise. **OR** 2. Drywell pressure response **not** consistent with LOCA conditions.	3. Drywell pressure **≥ 56 psig** and rising. **OR** 4. a. Drywell or Torus hydrogen concentration **≥ 6%.** **AND** b. Drywell or Torus oxygen concentration **≥ 5%.** **OR** 5. Heat Capacity Temperature Limit (QGA 200, Figure M) exceeded.
4. RCS Leak Rate	None	None	1. UNISOLABLE Main Steam Line (MSL), HPCI, Feedwater, RWCU or RCIC line break. **OR** 2 Emergency RPV Depressurization is required.	3. RCS leakage **> 50 gpm** inside the drywell. **OR** 4. UNISOLABLE primary system leakage outside drywell resulting in **EITHER:** • Secondary Containment area temperature **> QGA 300, Maximum Normal** operating levels. **OR** • Secondary Containment radiation level **> QGA 300, Maximum Normal** operating levels.	None	None
5. Pri Cont Rad Monitoring	Drywell radiation monitor reading **> 6.65E+02 R/hr**.	None	Drywell radiation monitor reading **> 100 R/hr.**	None	None	Drywell radiation monitor reading **> 1.55 E+03 R/hr**.
6. Primary Cont Isolation Failure or Bypass	None	None	None	None	1. a. Failure of isolation valves in any one line to close. **AND** b. Direct downstream pathway to the environment exists after a primary containment isolation signal. **OR** 2. Intentional venting/purging of Primary Containment per EOPs or SAMGs due to accident conditions. **OR** 3. UNISOLABLE primary system leakage outside drywell resulting in **EITHER:** • Secondary Containment area temperature **> QGA 300, Maximum Safe** operating levels. **OR** • Secondary Containment area radiation level **> QGA 300, Maximum Safe** operating levels.	None
7. ED Judgment	1. Any condition in the opinion of the Emergency Director that indicates Loss of the Fuel Clad Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Fuel Clad Barrier.	1. Any condition in the opinion of the Emergency Director that indicates Loss of the RCS Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the RCS Barrier.	1. Any condition in the opinion of the Emergency Director that indicates Loss of the Containment Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment Barrier.

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
Loss of AC Power	**MG1** Prolonged loss of all Off-Site power and all On-Site AC power to emergency busses. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to unit ECCS busses. **AND** 2. Failure of Unit EDG 1(2), shared EDG 1/2, and SBO DG1(2) emergency diesel generators to supply power to unit ECCS busses. **AND** 3. a. Restoration of at least one unit ECCS bus in **< 1 hours** is **not** likely. **OR** b. RPV level **cannot** be determined to be **> - 142 inches.** (TAF).	**MS1** Loss of all Off-Site and all On-Site AC power to emergency busses for 15 minutes or longer. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to unit ECCS busses. **AND** 2. Failure of Unit EDG 1(2), shared EDG 1/2, and SBO DG1(2) emergency diesel generators to supply power to unit ECCS busses. **AND** 3. Failure to restore power to at least one unit ECCS bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.	**MA1** AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. AC power capability to unit ECCS busses reduced to only one of the following sources for **≥ 15 minutes**. • Reserve Auxiliary Transformer TR-12(TR-22) • Unit Auxiliary Transformer TR-11(TR-21) • Unit Emergency Diesel Generator • Shared Emergency Diesel Generator • Unit crosstie breakers • SBO Diesel Generator **AND** 2. Any additional single power source failure will result in a unit blackout.	**MU1** Loss of all Off-Site AC power to busses for 15 minutes or longer. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of all off-site AC power to unit ECCS busses for **≥ 15 minutes**.
RPS Failure /Inadvertent Criticality	**MG2** Automatic Scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists. 1 2 **EAL Threshold Values:** 1. Automatic scram was **not** successful as indicated by Reactor Power **> 5%.** **AND** 2. Manual scram/ARI actions were **not** successful as indicated by Reactor Power **> 5%.** **AND** 3. **EITHER** of the following exists: • RPV level **cannot** be restored and maintained **> - 166 inches**. **OR** • Heat Capacity Temperature Limit (QGA 200, Figure M) exceeded.	**MS2** Automatic Scram fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor. 1 2 **EAL Threshold Values:** 1. Automatic scram was **not** successful as indicated by Reactor Power **> 5%.** **AND** 2. Manual scram/ARI actions were **not** successful from the Reactor Console as indicated by Reactor Power **> 5%.**	**MA2** Automatic Scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor. 1 2 **EAL Threshold Values:** 1. Automatic scram was **not** successful as indicated by Reactor Power **> 5%.** **AND** 2. Manual scram/ARI actions were successful from Reactor Console as indicated by Reactor Power **≤ 5%.**	**MU2** Inadvertent criticality. 3 **EAL Threshold Values:** UNPLANNED sustained positive period observed on nuclear instrumentation.

Modes: 1 – Power Operation, 2 – Startup, 3 –Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
DC Power		**MS3** Loss of all vital DC power for 15 minutes or longer. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of all vital DC power based on **< 105 VDC** on unit 125 VDC battery busses #1 and #2 for **≥ 15 minutes**.		
Annunciators		**MS4** Inability to monitor a SIGNIFICANT TRANSIENT in progress. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1) **AND** 2. SIGNIFICANT TRANSIENT in progress (Table M2). **AND** 3. Compensatory indications (computer points) are unavailable.	**MA4** UNPLANNED Loss of safety system annunciation or indication in the control room with EITHER (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1) **AND** 2. a. SIGNIFICANT TRANSIENT in progress (Table M2). **OR** b. Compensatory indications (computer points) are unavailable.	**MU4** UNPLANNED loss of safety system annunciation or indication in the control room for 15 minutes or longer. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1)
		Table M1 - Safety Systems • ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring	**Table M2 - Significant Transients** • Turbine trip • Reactor scram • ECCS actuation • Recirc Runback >25% power change • Thermal power oscillations > 10 % Reactor Power change	

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

System Malfunction

RCS Leak

MU5 RCS leakage. 1 2 3

EAL Threshold Values:

1. Unidentified or pressure boundary leakage into the Drywell **> 10 gpm**.

   OR

2. Identified leakage into the Drywell **> 25 gpm**.

Communications

Table M3 - Communications Capability

System	Onsite	Offsite
Plant Radio System	X	
Plant Paging System	X	
Sound Power Phones	X	
In-Plant Telephones	X	
All Telephone Lines (commercial and microwave)		X
ENS		X
HPN		X
Cellular Phones		X
Satellite Phones		X

MU6 Loss of all On-site or Off-site communications capabilities. 1 2 3

EAL Threshold Values:

1. Loss of all Table M3 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table M3 **Offsite** communications capability affecting the ability to perform offsite notifications.

T. S. Time

MU7 Inability to reach required shutdown within Technical Specification limits. 1 2 3

EAL Threshold Values:

Plant is **not** brought to required operating mode within Technical Specifications LCO Action Statement Time.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Hazards and Other Conditions Affecting Plant Safety

Security

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
HG1 HOSTILE ACTION resulting in loss of physical control of the facility. 1 2 3 4 5 D **EAL Threshold Values:** 1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1). **OR** 2. A HOSTILE ACTION has: • Caused failure of Spent Fuel Pool Cooling Systems **AND** • IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).	**HS1** HOSTILE ACTION within the PROTECTED AREA. 1 2 3 4 5 D **EAL Threshold Values:** A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.	**HA1** HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. 1 2 3 4 5 D **EAL Threshold Values:** 1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site. **OR** 2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.	**HU1** Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant. 1 2 3 4 5 D **EAL Threshold Values:** 1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities. **OR** 2. A validated notification from NRC providing information of an aircraft threat. **OR** 3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

C. R. Evacuation

Table H1 - Safety Functions

- Reactivity Control (ability to shut down the reactor and keep it shutdown)
- RCS Inventory (ability to cool the core)
- Decay Heat Removal (ability to maintain heat sink)

HS2 Control Room evacuation has been initiated and plant control cannot be established. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Control Room evacuation has been initiated. **AND** 2. Control of the plant **cannot** be established in **< 30 minutes** per: • QOA 0010-05 **OR** • QCARP 0050-01 **OR** • QCARP 0050-02	**HA2** Control Room evacuation has been initiated. 1 2 3 4 5 D **EAL Threshold Values:** Entry into **ANY** of the following for Control Room evacuation: • QOA 0010-05 **OR** • QCARP 0050-01 **OR** • QCARP 0050-02	

Fire / Explosion

Table H2 – Vital Areas

- Main Control Room
- Reactor Building
- Diesel Generator Rooms
- 4 kV Switchgear Area
- Battery Rooms
- B-Train Control Room HVAC
- RHR Service Water Vaults
- Cribhouse
- Turbine Building Cable Tunnel

HA3 FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown. 1 2 3 4 5 D **EAL Threshold Values:** FIRE or EXPLOSION resulting in any of the following: • VISIBLE DAMAGE to a Table H2 permanent structure. **OR** • VISIBLE DAMAGE to safety system equipment contained within a Table H2 area. **OR** • Control Room indication of degraded safety system equipment performance contained within a Table H2 area.	**HU3** FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm. **OR** 2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Hazards and Other Conditions Affecting Plant Safety

Natural / Destructive Phenomena

Table H2 – Vital Areas

- Main Control Room
- Reactor Building
- Diesel Generator Rooms
- 4 kV Switchgear Area
- Battery Rooms
- B-Train Control Room HVAC
- RHR Service Water Vaults
- Cribhouse
- Turbine Building Cable Tunnel

Table H3 – Internal Flooding Areas

- A RHR Room
- B RHR Room
- A Core Spray Room
- B Core Spray Room
- Torus Area
- HPCI Area

GENERAL EMERGENCY

SITE AREA EMERGENCY

ALERT

HA4 Natural and destructive phenomena affecting VITAL AREAS [1] [2] [3] [4] [5] [D]

EAL Threshold Values:

1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by Strong Motion Seismograph:
   - **> 0.125 volts (0.10 g)** (Channel 1 or 3)
   - **OR**
   - **> 0.100 volts (0.08 g)** (Channel 2)

   AND

   b. Confirmed by **EITHER:**
   - Earthquake felt in plant.
   - **OR**
   - National Earthquake Center.
   - **OR**
   - Control Room indication of degraded performance of systems required for the safe shutdown of the plant.

   OR

2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area:
   - Tornado strike
   - **OR**
   - High winds **> 100 mph**
   - **OR**
   - Vehicle crash
   - **OR**
   - Turbine failure-generated PROJECTILES

   OR

3. Flooding in any Table H3 area that results in **ANY** of the following:
   - Degraded safety system performance as indicated in the Control Room.
   - **OR**
   - Industrial safety hazards (e.g., electric shock) that preclude access necessary to operate or monitor safety equipment.
   - **OR**
   - Water level **> QGA 300, Maximum Safe** operating levels.

   OR

4. Abnormal River level, as indicated by **EITHER**:
   - High river water level **> 603 ft.**
   - **OR**
   - Low river water level **< 561 ft.**

UNUSUAL EVENT

HU4 Natural and destructive phenomena affecting the PROTECTED AREA. [1] [2] [3] [4] [5] [D]

EAL Threshold Values:

1. Seismic event as indicated by any **TWO** of the following:
   - Seismic event confirmed by station seismic monitor procedure.
   - **OR**
   - Earthquake felt in plant.
   - **OR**
   - National Earthquake Center.

   OR

2. **EITHER** of the following occurring within the PROTECTED AREA boundary:
   - Tornado strike
   - **OR**
   - Sustained **(> 15 minutes)** high winds **> 100 mph**

   OR

3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

   OR

4. Flooding in any Table H3 area that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

   OR

5. Abnormal River level, as indicated by **EITHER**:
   - High river water level **> 594 ft.**
   - **OR**
   - Report of substantial reduction in river level by site personnel and confirmation by the Corp. of Engineers that Dam # 14 has failed.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Hazards and Other Conditions Affecting Plant Safety

Toxic / Flammable Gas

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Table H2 – Vital Areas • Main Control Room • Reactor Building • Diesel Generator Rooms • 4 kV Switchgear Area • Battery Rooms • B-Train Control Room HVAC • RHR Service Water Vaults • Cribhouse • Turbine Building Cable Tunnel		**HA5** Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event. Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.	**HU5** Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS. 1 2 3 4 5 D **EAL Threshold Values:** 1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS. **OR** 2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.

Judgment

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
HG6 Other conditions existing which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**HS6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	**HA6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an ALERT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**HU6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
ISFSI Malfunction				
ISFSI				**E-HU1** Damage to a loaded cask CONFINEMENT BOUNDARY 1 2 3 4 5 D **EAL Threshold Values:** Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Abnormal Rad Levels / Radiological Effluent

Radiological Effluents

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
RG1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 5 D **EAL Threshold Values:** **Note**: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results. 1. The sum of VALID readings on the Rx Bldg Vent and Chimney SPINGs **> 3.84 E+09 uCi/sec** for **≥ 15 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate). **OR** 2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**: a. **> 1000 mRem TEDE** **OR** b. **> 5000 mRem CDE Thyroid** **OR** 3. Field survey results at or beyond Site Boundary indicate **EITHER**: a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**. **OR** b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.	**RS1** Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 5 D **EAL Threshold Values:** **Note**: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results. 1. The sum of VALID readings on the Rx Bldg Vent and Chimney SPINGs **> 3.84 E+08 uCi/sec** for **≥ 15 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate). **OR** 2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**: a. **> 100 mRem TEDE** **OR** b. **> 500 mRem CDE Thyroid** **OR** 3. Field survey results at or beyond Site Boundary indicate **EITHER**: a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**. **OR** b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation**.**	**RA1** Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown. 1. VALID reading on any of the following effluent monitors **> 200 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 15 minutes**. • Radwaste Discharge effluent monitor 1/2-1799-01 **OR** • Discharge Permit specified monitor **OR** 2. The sum of VALID readings on the Rx Bldg Vent and Chimney SPINGs is **> 4.38 E+07 uCi/sec** for **≥ 15 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate). **OR** 3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.	**RU1** Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown. 1. VALID reading on any of the following effluent monitors > **2 times alarm setpoint** established by a current radioactivity discharge permit for ≥ **60 minutes**. • Radwaste Discharge effluent monitor 1/2-1799-01 **OR** • Discharge Permit specified monitor **OR** 2. The sum of VALID readings on the Rx Bldg Vent and Chimney SPINGs is **> 4.38 E+05 uCi/sec** for **≥ 60 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate). **OR** 3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of ≥ **60 minutes**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Abnormal Rad Levels / Radiological Effluent			
Abnormal Rad Levels	**Table R1** **Fuel Handling Incident Radiation Monitors** • 1(2) 1705-16A Fuel Pool Rad Mon • 1(2) 1705-16B Fuel Pool Rad Mon	**RA2** Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel. 1 2 3 4 5 D **EAL Threshold Values:** 1. VALID reading **> 1000 mR/hr** on any Table R1 Radiation Monitor due to **EITHER**: • Damaged irradiated fuel. **OR** • Water level drop. **OR** 2. Water level drop in the Reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal that will result in irradiated fuel becoming uncovered.	**RU2** UNPLANNED rise in plant radiation levels. 1 2 3 4 5 D **EAL Threshold Values:** 1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by: • Refueling Cavity water level **< 282 inches.** (Upper Wide Range simulated signal). **OR** • Spent Fuel Pool water level **< 19 ft** above the fuel (**– 4 ft** indicated level). **OR** • Report of visual observation of a drop in water level in the Reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal. **AND** b. VALID Area Radiation Monitor reading rise on one or more radiation monitor in Table R1. **OR** 2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.
	Table R2 **Areas Requiring Continuous Occupancy** • Main Control Room (Unit 1 ARM Channel #22) • Central Alarm Station - (by survey)	**RA3** Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. 1 2 3 4 5 D **EAL Threshold Values:** Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R2) to maintain plant safety functions.	

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Cold Shutdown / Refueling System Malfunctions				
Loss of AC Power			**CA1** Loss of all Off-Site and all On-Site AC power to emergency busses for 15 minutes or longer. [4] [5] [D] **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to unit ECCS busses. **AND** 2. Failure of Unit EDG 1(2), Shared EDG 1/2, and SBO DG1(2) emergency diesel generators to supply power to unit ECCS busses. **AND** 3. Failure to restore power to at least one unit ECCS bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.	**CU1** AC power capibilty to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout. [4] [5] **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. AC power capability to unit ECCS busses reduced to only one of the following sources for **≥ 15 minutes**. • Reserve Auxiliary Transformer TR-12(TR-22) • Unit Auxiliary Transformer TR-11(TR-21) • Unit Emergency Diesel Generator • Shared Emergency Diesel Generator • Unit crosstie breakers • SBO Diesel Generator **AND** 2. Any additional single power source failure will result in a unit blackout.
Inadvertent Criticality				**CU2** Inadvertent criticality. [4] [5] **EAL Threshold Values:** UNPLANNED sustained positive period observed on nuclear instrumentation.
DC Power				**CU3** Loss of required DC power for 15 minutes or longer. [4] [5] **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of required DC power based on **< 105 VDC** on unit 125 VDC battery busses #1 and #2 for **≥ 15 minutes**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Cold Shutdown / Refueling System Malfunctions

Communications

Table C1 - Communications Capability

System	Onsite	Offsite
Plant Radio System	X	
Plant Paging System	X	
Sound Power Phones	X	
In-Plant Telephones	X	
All Telephone Lines (commercial and microwave)		X
ENS		X
HPN		X
Cellular Phones		X
Satellite Phones		X

CU4 Loss of all On-site or Off-site communications capabilities. [4] [5] [D]

EAL Threshold Values:

1. Loss of all Table C1 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table C1 **Offsite** communications capability affecting the ability to perform offsite notifications.

Heat Sink

Table C2 – RCS Reheat Duration Thresholds

RCS	Containment Closure	Duration
Intact	N/A	60 minutes*
Not Intact	Established	20 minutes*
	Not Established	0 minutes

*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then EAL Threshold #1 is **not** applicable.

CA5 Inability to maintain plant in cold shutdown. [4] [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 212°F** for **> Table C2 duration**.

   OR

2. UNPLANNED RPV pressure rise **> 10 psig** as a result of temperature rise due to loss of decay heat removal.

CU5 UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV. [4] [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 212°F**.

   OR

2. Loss of the following for **≥ 15 minutes:**
   - All RCS temperature indications

     AND
   - All RPV level indications

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Cold Shutdown / Refueling System Malfunctions

RCS Leakage / Inventory

GENERAL EMERGENCY

CG6 Loss of RPV inventory affecting fuel clad integrity with containment challenged. [4] [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. RPV level **< - 142 inches (TAF)** for **≥ 30 minutes**.
   AND
   b. Any Containment Challenge Indication (Table C4).
   OR
2. a. RPV level unknown for **≥ 30 minutes.**
   AND
   b. Loss of RPV inventory as indicated by any of the following:
   - Table C3 indication.
     OR
   - Erratic Source Range Monitor indication.
     OR
   - Fuel Handling ARM 1(2)-1705-16 A or B indicates **> 3000 mR/hr**.

   AND
   c. Any Containment Challenge Indication (Table C4)

Table C4 – Containment Challenge Indications

- Primary Containment Hydrogen concentration **≥ 6%** and Oxygen **≥ 5%**.
- UNPLANNED rise in containment pressure
- CONTAINMENT CLOSURE **not** established.
- Any Secondary Containment radiation monitors reading **> QGA 300, Maximum Safe** operating level.

SITE AREA EMERGENCY

CS6 Loss of RPV inventory affecting core decay heat removal capability. [4] [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. With CONTAINMENT CLOSURE **not** established, RPV level **< - 65 inches**.
   OR
2. With CONTAINMENT CLOSURE established, RPV level **< - 142 (TAF) inches.**
   OR
3. a. RPV level unknown for **≥ 30 minutes.**
   AND
   b. Loss of RPV inventory as indicated by any of the following:
   - Table C3 indications.
     OR
   - Erratic Source Range Neutron Monitor indication.
     OR
   - Fuel Handling ARM 1(2)-1705-16 A or B indicates **> 3000 mR/hr**.

ALERT

CA6 Loss of RPV inventory. [4] [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. RPV level **< - 59 inches**.
   OR
2. a. RPV level unknown for **≥ 15 minutes**.
   AND
   b. Loss of RPV inventory per Table C3 indications.

Table C3 – Indications of RCS Leakage

- UNPLANNED floor or equipment sump level rise
- UNPLANNED Torus level rise
- UNPLANNED vessel make-up rise
- Observation of leakage or Inventory loss

UNUSUAL EVENT

CU6 RCS leakage. [4]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

RCS leakage results in the inability to restore and maintain RPV level **> 0 inches** for **≥ 15 minutes**.

CU7 UNPLANNED loss of RPV inventory. [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED Reactor Cavity or Vessel level drop that meets **EITHER**:
   - When controlling level above the RPV flange, Refueling Cavity level drop below the RPV flange for **≥ 15 minutes**.
     OR
   - When controlling level below the RPV flange, vessel level drop below the procedurally established limit for **≥ 15 minutes**.

   OR
2. a. RPV level unknown.
   AND
   b. Loss of RPV inventory per Table C3 indications.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Hazards and Other Conditions Affecting Plant Safety

Security

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
HG1 HOSTILE ACTION resulting in loss of physical control of the facility. 1 2 3 4 5 D **EAL Threshold Values:** 1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1). **OR** 2. A HOSTILE ACTION has: • Caused failure of Spent Fuel Pool Cooling Systems **AND** • IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).	**HS1** HOSTILE ACTION within the PROTECTED AREA. 1 2 3 4 5 D **EAL Threshold Values:** A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.	**HA1** HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. 1 2 3 4 5 D **EAL Threshold Values:** 1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site. **OR** 2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.	**HU1** Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant. 1 2 3 4 5 D **EAL Threshold Values:** 1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities. **OR** 2. A validated notification from NRC providing information of an aircraft threat. **OR** 3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

C. R. Evacuation

Table H1 - Safety Functions

- Reactivity Control (ability to shut down the reactor and keep it shutdown)
- RCS Inventory (ability to cool the core)
- Decay Heat Removal (ability to maintain heat sink)

HS2 Control Room evacuation has been initiated and plant control cannot be established. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Control Room evacuation has been initiated. **AND** 2. Control of the plant **cannot** be established in **< 30 minutes** per: • QOA 0010-05 **OR** • QCARP 0050-01 **OR** • QCARP 0050-02	**HA2** Control Room evacuation has been initiated. 1 2 3 4 5 D **EAL Threshold Values:** Entry into **ANY** of the following for Control Room evacuation: • QOA 0010-05 **OR** • QCARP 0050-01 **OR** • QCARP 0050-02	

Fire / Explosion

Table H2 – Vital Areas

- Main Control Room
- Reactor Building
- Diesel Generator Rooms
- 4 kV Switchgear Area
- Battery Rooms
- B-Train Control Room HVAC
- RHR Service Water Vaults
- Cribhouse
- Turbine Building Cable Tunnel

HA3 FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown. 1 2 3 4 5 D **EAL Threshold Values:** FIRE or EXPLOSION resulting in any of the following: • VISIBLE DAMAGE to a Table H2 permanent structure. **OR** • VISIBLE DAMAGE to safety system equipment contained within a Table H2 area. **OR** • Control Room indication of degraded safety system equipment performance contained within a Table H2 area.	**HU3** FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm. **OR** 2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety			

Natural / Destructive Phenomena

Table H2 – Vital Areas

- Main Control Room
- Reactor Building
- Diesel Generator Rooms
- 4 kV Switchgear Area
- Battery Rooms
- B-Train Control Room HVAC
- RHR Service Water Vaults
- Cribhouse
- Turbine Building Cable Tunnel

Table H3 – Internal Flooding Areas

- A RHR Room
- B RHR Room
- A Core Spray Room
- B Core Spray Room
- Torus Area
- HPCI Area

HA4 Natural and destructive phenomena affecting VITAL AREAS [1][2][3][4][5][D]

EAL Threshold Values:

1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by Strong Motion Seismograph:
   - **> 0.125 volts (0.10 g)** (Channel 1 or 3)
   - **OR**
   - **> 0.100 volts (0.08 g)** (Channel 2)

   AND

   b. Confirmed by **EITHER:**
   - Earthquake felt in plant.
   - **OR**
   - National Earthquake Center.
   - **OR**
   - Control Room indication of degraded performance of systems required for the safe shutdown of the plant.

   OR

2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area:
   - Tornado strike
   - **OR**
   - High winds **> 100 mph**
   - **OR**
   - Vehicle crash
   - **OR**
   - Turbine failure-generated PROJECTILES

   OR

3. Flooding in any Table H3 area that results in **ANY** of the following:
   - Degraded safety system performance as indicated in the Control Room.
   - **OR**
   - Industrial safety hazards (e.g., electric shock) that preclude access necessary to operate or monitor safety equipment.
   - **OR**
   - Water level **> QGA 300, Maximum Safe** operating levels.

   OR

4. Abnormal River level, as indicated by **EITHER**:
   - High river water level **> 603 ft.**
   - **OR**
   - Low river water level **< 561 ft.**

HU4 Natural and destructive phenomena affecting the PROTECTED AREA. [1][2][3][4][5][D]

EAL Threshold Values:

1. Seismic event as indicated by any **TWO** of the following:
   - Seismic event confirmed by station seismic monitor procedure.
   - **OR**
   - Earthquake felt in plant.
   - **OR**
   - National Earthquake Center.

   OR

2. **EITHER** of the following occurring within the PROTECTED AREA boundary:
   - Tornado strike
   - **OR**
   - Sustained **(> 15 minutes)** high winds **> 100 mph**

   OR

3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

   OR

4. Flooding in any Table H3 area that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

   OR

5. Abnormal River level, as indicated by **EITHER**:
   - High river water level **> 594 ft.**
   - **OR**
   - Report of substantial reduction in river level by site personnel and confirmation by the Corp. of Engineers that Dam # 14 has failed.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Toxic / Flammable Gas	**Table H2 – Vital Areas** • Main Control Room • Reactor Building • Diesel Generator Rooms • 4 kV Switchgear Area • Battery Rooms • B-Train Control Room HVAC • RHR Service Water Vaults • Cribhouse • Turbine Building Cable Tunnel		**HA5** Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event. Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.	**HU5** Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS. 1 2 3 4 5 D **EAL Threshold Values:** 1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS. **OR** 2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.
Judgment	**HG6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**HS6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	**HA6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an ALERT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**HU6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
ISFSI Malfunction				
ISFSI				**E-HU1** Damage to a loaded cask CONFINEMENT BOUNDARY 1 2 3 4 5 D **EAL Threshold Values:** Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RG1

Initiating Condition:

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

NOTE: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Rx Bldg Vent and Chimney SPINGs **> 3.84 E+09 uCi/sec** for **≥ 15 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of **EITHER**:

   a. **> 1000 mRem TEDE**

      OR

   b. **> 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond the site boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**.

      OR

   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RG1 (cont)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed the EPA Protective Action Guides (PAGs). Public protective actions will be necessary. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public and likely involve fuel damage.

While these failures are addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

Threshold #1 Basis:

The site-specific monitors listed include effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading Threshold is not, the results from dose assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency-implementing procedures call for the timely performance of dose assessments using actual meteorology and release information. If the results of dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading Threshold.

Threshold #2 Basis:

The "site boundary" is the nearest distance from potential release points at which protective actions would be required for members of the public.

Threshold #3 Basis:

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. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption on sample media followed by field analysis are used for determining the iodine (CDE) thyroid value.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RG1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 AG1
2. EP-AA-112-500 Emergency Environmental Monitoring
3. EP-EAL-0606 Revision 2, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values Quad Cities Station
4. QGA 400 Radioactivity Release Control

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RS1

Initiating Condition:

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

NOTE: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The sum of VALID readings on the Rx Bldg Vent and Chimney SPINGs **> 3.84 E+08 uCi/sec** for **≥ 15 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of **EITHER**:

   a. **> 100 mRem TEDE**

      OR

   b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond the site boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.

      OR

   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RS1 (cont)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed 10% of the EPA Protective Action Guides (PAGs). Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

While these failures are addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

Threshold #1 Basis:

The site specific monitors listed include effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading threshold is not, the results from dose assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency-implementing procedures call for the timely performance of dose assessments using actual meteorology and release information. If the results of dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading threshold.

Threshold #2 Basis:

The "site boundary" is the nearest distance from potential release points at which Protective Actions would be required for members of the public.

Threshold #3 Basis:

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. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption on sample media followed by field analysis are used for determining the iodine (CDE) thyroid value.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RS1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 AS1
2. EP-AA-112-500 Emergency Environmental Monitoring
3. EP-EAL-0606 Revision 2, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values Quad Cities Station

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RA1

Initiating Condition:

Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors **> 200 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 15 minutes**.

   - Radwaste Effluent Monitor 1/2-1799-01

     OR

   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Rx Bldg Vent and Chimney SPINGs is **> 4.38 E+07 uCi/sec** for **≥ 15 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates **> 200 times ODCM** Limit with a release duration of **≥ 15 minutes**.

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RA1 (cont)

Basis: (cont)

This EAL addresses an actual or substantial potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in RU1 and RA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases are not to be prorated or averaged. For example, a release exceeding 600 times ODCM for 5 minutes does not meet the threshold.

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

Threshold #1 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

The effluent monitors listed are those normally used for planned discharges. If a discharge is performed using a different flowpath or effluent monitor other than those listed (e.g., a portable or temporary effluent monitor), then the declaration criteria will be based on the monitor specified in the Discharge Permit.

Threshold #2 Basis:

This threshold is intended for effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RA1 (cont)

Basis: (cont)

Threshold #3 Basis:

This threshold addresses uncontrolled releases that are detected by sample analyses, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

Basis Reference(s):

1. NEI 99-01, Rev. 5 AA1
2. CY-QC-120-729 Liquid Effluent Monitor Alarm Setpoints
3. CY-QC-120-737 Radioactive Liquid Discharge Batch Analysis
4. CY-QC-110-602 Radwaste System Sampling
5. QOP 2000-24, Discharging to the River from the River Discharge Tank using the Waste Surge Pump
6. QOP 2000-25, Discharging to the River from the River Discharge Tank using the River Discharge Pump
7. CY-QC-120-729, Liquid Effluent Alarm Setpoints
8. QCOA 1700-02, High Radiation detected on Eberline Radiation Monitoring System
9. QCAN 912-5 C-6, Radwaste High Rad.
10. QCAN 901(2)-3-G-1, Liquid Process Rad. Monitor High Radiation
11. CY-QC-120-735, Main Chimney & Reactor Vent Noble Gas Release Rate Action Levels
12. QCOA 1700-01, Abnormal Chimney Radiation
13. EP-EAL-0606 Revision 2, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values Quad Cities Station
14. QGA 400 Radioactivity Release Control

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RU1

Initiating Condition:

Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors **> 2 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 60 minutes**.

   - Radwaste Effluent Monitor 1/2-1799-01

     OR

   - Discharge Permit specified monitor

   OR

2. The sum of VALID readings on the Rx Bldg Vent and Chimney SPINGs is **> 4.38 E+05 uCi/sec** for **≥ 60 minutes** (as determined from Control Room Panels or PPDS – Total Noble Gas Release Rate).

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RU1 (cont)

Basis: (cont)

This EAL addresses a potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in RU1 and RA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases are not to be prorated or averaged. For example, a release exceeding 4 times ODCM for 30 minutes does not meet the threshold.

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

Threshold #1 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

The effluent monitors listed are those normally used for planned discharges. If a discharge is performed using a different flowpath or effluent monitor other than those listed (e.g., a portable or temporary effluent monitor), then the declaration criteria will be based on the monitor specified in the Discharge Permit.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RU1 (cont)

Basis: (cont)

Threshold #2 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL.

This threshold is intended for effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

Threshold #3 Basis:

This threshold addresses uncontrolled releases that are detected by sample analyses, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

Basis Reference(s):

1. NEI 99-01, Rev. 5 AU1
2. CY-QC-120-729 Liquid Effluent Monitor Alarm Setpoints
3. CY-QC-120-737 Radioactive Liquid Discharge Batch Analysis
4. CY-QC-110-602 Radwaste System Sampling
5. EP-EAL-0606 Revision 2, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values Quad Cities Station

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RA2

Initiating Condition:

Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. VALID reading **> 1000 mR/hr** on any Table R1 Radiation Monitor due to **EITHER**:

   - Damage to irradiated fuel

     OR

   - Water level drop

Table R1 - Fuel Handling Incident Radiation Monitors
• 1(2) 1705-16A Fuel Pool Rad Mon • 1(2) 1705-16B Fuel Pool Rad Mon

   OR

2. Water level drop in the Reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal that will result in irradiated fuel becoming uncovered.

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses increases in radiation dose rates within plant buildings, and may be a precursor to a radioactivity release to the environment. These events represent a loss of control over radioactive material and represent an actual or substantial potential degradation in the level of safety of the plant.

These events escalate from RU2 in that fuel activity has been released, or is anticipated due to fuel heatup. This EAL applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RA2 (cont)

Basis (cont):

Threshold #1 Basis:

This EAL addresses radiation monitor indications of fuel uncovery and/or fuel damage.

Uncovering spent fuel represents a substantial degradation of the level of safety of the plant and warrants an Alert classification. Visual observation of spent fuel uncovery represents a major ALARA concern in that radiation levels could exceed 10,000 R/hr on the refuel bridge when fuel uncovery begins. The value of 1000 mR/hr was conservatively chosen for classification purposes.

Radiation monitor readings are used to provide indication of fuel uncovery and/or fuel damage. High monitor readings associated with the transfer or relocation of a source, stored in or near the pool or readings responding to a planned evolution such as removal of the reactor head or equipment relocation are not classified under this threshold since the reading would not be indicative of fuel uncovery and/or fuel damage.

Dropping heavy loads onto the spent fuel can cause significant damage to the spent fuel and an Alert is also warranted under these conditions provided that the above radiation monitor threshold readings are reached.

Escalation of this emergency classification level, if appropriate, would be based on RS1 or RG1.

Threshold #2 Basis:

Once Spent Fuel Pool water level drops below the low level alarm setpoint, further drops can be monitored only by visual observation unless the Spent Fuel Pool is in communication with the Refueling Cavity.

If available, video cameras may allow remote observation. Depending on available level instrumentation, the declaration threshold may need to be based on indications of water makeup rate.

Basis Reference(s):

1. NEI 99-01, Rev. 5 AA2
2. QCOA 1900-01 Loss of Water Level in the Fuel Storage Pool or Reactor Cavity
3. QCAN 901(2)-3 B-1 Refuel Floor Hi Radiation
4. QCAN 901(2)-3 G-16/H-16 Fuel Pool Channel A/B Hi Radiation
5. QCIS 1700-07 Reactor Building Ventilation and Fuel Pool Radiation Monitoring Calibration and Functional Test

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RU2

Initiating Condition:

UNPLANNED rise in plant radiation levels.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by:

   - Refueling Cavity water level **< 282 inches.** (Upper Wide Range simulated signal).

     OR

   - Spent Fuel Pool water level **< 19 ft** above the fuel (**– 4 ft** indicated level).

     OR

   - Report of visual observation of a drop in water level in the Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal.

   AND

   b. VALID area radiation monitor reading rise on one or more radiation monitors in Table R1.

Table R1 - Fuel Handling Incident Radiation Monitors
• 1(2) 1705-16A Fuel Pool Rad Mon • 1(2) 1705-16B Fuel Pool Rad Mon

OR

2. UNPLANNED VALID Area Radiation Monitor reading or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RU2 (cont)

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

NORMAL LEVELS: Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

This EAL addresses increased radiation levels as a result of water level decreases above irradiated fuel or events that have resulted, or may result, in UNPLANNED increases in radiation dose rates within plant buildings. These radiation increases represent a loss of control over radioactive material and represent a potential degradation in the level of safety of the plant.

Threshold #1 Basis:

Level indications may include installed or temporary water level instrumentation. If available, video cameras may allow remote observation for determining water level changes.

This EAL addresses unplanned lowering of level in the refueling pathway and a corresponding rise in refuel floor radiation readings. For events in Refuel mode where the water level drops with no corresponding rise in refuel floor radiation readings classification would be via CU7. This event escalates to an Alert per RA2 if irradiated fuel outside the reactor vessel is uncovered.

Threshold #2 Basis:

This EAL addresses increases in plant radiation levels that represent a loss of control of radioactive material resulting in a potential degradation in the level of safety of the plant.

This EAL excludes radiation level increases that result from planned activities such as use of radiographic sources and movement of radioactive waste materials. A specific list of ARMs is not required, as it would restrict the applicability of the threshold. The intent is to identify loss of control of radioactive material in any monitored area. Survey results are not required for confirmation of area radiation monitor readings but are applicable to areas where area radiation monitors do not have sufficient range to indicate a rise by a factor of 1000 over NORMAL LEVELS.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RU2 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 AU2
2. QCOP 0201-13 Reactor Level Upper Wide Range Reference Leg Extension Use and Control
3. Technical Specifications 3.7.8 Spent Fuel Storage Pool Water Level
4. Technical Specifications 3.9.6 Reactor Pressure Vessel (RPV) Water Level—Irradiated Fuel
5. QCAN 901(2)-4 B-24 FUEL POOL STORAGE HI/LO LEVEL
6. QCOA 1900-01 Loss of Water Level in the Fuel Storage Pool or Reactor Cavity

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RA3

Initiating Condition:

Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R2) to maintain plant safety functions.

Table R2 – Areas Requiring Continuous Occupancy
• Main Control Room (Unit 1 ARM Channel #22) • Central Alarm Station (by survey)

Basis:

This EAL addresses increased radiation levels that impact continued operation in areas requiring continuous occupancy to maintain safe operation or to perform a safe shutdown.

The cause and/or magnitude of the increase in radiation levels is not a concern of this EAL. The Emergency Director must consider the source or cause of the increased radiation levels and determine if any other EAL may be involved.

Areas requiring continuous occupancy include Main Control Room and the Central Alarm Station.

Basis Reference(s):

1. NEI 99-01, Rev. 5 AA3
2. QCOP 1800-1 Operation of ARM Indicator/Trip Units
3. UFSAR Section 3.2
4. General Arrangement Drawings M-5, 6, 8 and 10

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENTS

RU3

Initiating Condition:

Fuel Clad degradation.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Fuel clad degradation resulting in **EITHER**:

- Offgas system radiation monitor **Hi-Hi** alarm.

  OR

- Specific coolant activity **> 4.0 uCi/gm** Dose Equivalent I-131.

Basis:

This EAL is included because it is a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant.

Escalation of this EAL to the Alert level is via the Fission Product Barriers.

Threshold #1 Basis:

Conditions that cause the monitor to alarm that are not related to fuel clad degradation should not result in the declaration of an Unusual Event.

This threshold addresses site-specific radiation monitor readings that provide indication of a degradation of fuel clad integrity.

Threshold #2 Basis:

An Unusual Event is only warranted when actual fuel clad damage is the cause of the elevated coolant sample (as determined by laboratory confirmation). Fuel clad damage should be assumed to be the cause of elevated Reactor Coolant activity unless another cause is known.

This threshold addresses coolant samples exceeding coolant technical specifications for transient iodine spiking limits.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU4
2. Technical Specifications 3.4.6
3. Technical Specifications 3.7.6
4. QCAN 901(2)-3 C-2 OFF GAS HIGH-HIGH RADIATION

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FG1

Initiating Condition:

Loss of ANY two barriers AND Loss or Potential Loss of the third barrier.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the General Emergency classification level each barrier is weighted equally.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FS1

Initiating Condition:

Loss or Potential Loss of ANY two barriers.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the Site Area Emergency classification level, each barrier is weighted equally.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FA1

Initiating Condition:

ANY Loss or ANY Potential Loss of either Fuel Clad or RCS.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the Alert classification level, Fuel Cladding and RCS barriers are weighted more heavily than the Containment barrier. Unlike the Containment barrier, loss or potential loss of either the Fuel Cladding or RCS barrier may result in the relocation of radioactive materials or degradation of core cooling capability. Note that the loss or potential loss of Containment barrier in combination with loss or potential loss of either Fuel Cladding or RCS barrier results in declaration of a Site Area Emergency under EAL FS1.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FU1

Initiating Condition:

ANY Loss or ANY Potential Loss of Containment.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

The Primary Containment Barrier includes the drywell, respective interconnecting paths, and other connections up to and including the outermost containment isolation valves. Containment Barrier thresholds are used primarily as discriminators for escalation from an Alert to a Site Area Emergency or a General Emergency.

The Containment Barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (i.e., Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment Barrier status is addressed by Technical Specifications.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FC1

Initiating Condition:

Primary Coolant Activity Level.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

Coolant activity **> 300 uCi/gm** Dose Equivalent I-131.

Basis:

300 uCi/gm Dose Equivalent I-131 is well above that expected for iodine spikes and corresponds to less than 5% fuel clad damage. This amount of radioactivity indicates significant clad damage and thus the Fuel Clad Barrier is considered lost.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. NF-AA-430, Failed Fuel Action Plan

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FC2

Initiating Condition:

Reactor Vessel Water Level.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. RPV level **cannot** be restored and maintained **> – 166 inches.**

POTENTIAL LOSS

2. RPV level **cannot** be restored and maintained **> – 142 inches** (TAF).

   OR

3. RPV level **cannot** be determined.

Basis:

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions.

Determination of "restore and maintained" is based on the actions driven by Emergency Operating Procedures to restore level. The inability to reverse the RPV level lowering trend after lining up injection sources and injecting, including the use of low pressure systems following an Emergency Depressurization would warrant classification.

Loss Threshold #1 Basis:

This corresponds to the level used in EOPs to indicate challenge of core cooling.

Potential Loss Thresholds #2 and #3 Basis:

This threshold is the same as the RCS barrier Loss threshold and corresponds to the water level at the top of the active fuel. Thus, this threshold indicates a Potential Loss of the Fuel Clad barrier and a Loss of RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

Since the loss of ability to determine if adequate core cooling is being provided presents a significant challenge to the fuel clad barrier, a potential loss of the fuel clad barrier is specified.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. QGA 100 RPV Control
3. QGA 101 RPV Control (ATWS)
4. QGA 500-4 RPV Flooding

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FC5

Initiating Condition:

Primary Containment Radiation Monitoring.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

Drywell radiation monitor reading **> 6.65 E+02 R/hr**.

Basis:

The Drywell radiation monitor reading is a value, which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the drywell.

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 Loss threshold. Thus, this threshold indicates a loss of both Fuel Clad barrier and RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. Core Damage Assessment Methodology

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

FC7

Initiating Condition:

Emergency Director Judgment.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. Any condition in the opinion of the Emergency Director that indicates Loss of the Fuel Clad Barrier.

POTENTIAL LOSS

2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Fuel Clad Barrier.

Basis:

These thresholds address 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 threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC2

Initiating Condition:

Reactor Vessel Water Level.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. RPV level **cannot** be restored and maintained **> –142 inches**. (TAF).

   OR

2. RPV level **cannot** be determined.

Basis:

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions.

Determination of "restore and maintained" is based on the actions driven by Emergency Operating Procedures to restore level. The inability to reverse the RPV level lowering trend after lining up injection sources and injecting, including the use of low pressure systems following an Emergency Depressurization would warrant classification.

This threshold is the same as Fuel Clad Barrier Potential Loss threshold and corresponds to a challenge to core cooling. Thus, this threshold indicates a Loss of RCS barrier and Potential Loss of Fuel Clad barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. QGA 100 RPV Control
3. QGA 500-4 RPV Flooding

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC3

Initiating Condition:

Primary Containment Conditions

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. Drywell pressure **> 2.5 psig**.

   AND

2. Drywell pressure rise due to RCS leakage.

Basis:

The primary containment pressure is based on the drywell high pressure set point which indicates a LOCA by automatically initiating ECCS.

The second threshold focuses the fission product barrier loss threshold on a failure of the RCS instead of the non-LOCA malfunctions that may adversely affect primary containment pressure. Pressures of this magnitude can be caused by non-LOCA events such as a loss of drywell cooling or inability to control primary containment vent/purge.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. QGA 100 RPV Control
3. QGA 200 Primary Containment Control

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC4

Initiating Condition:

RCS Leak Rate.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. UNISOLABLE Main Steam Line (MSL), HPCI, Feedwater, RWCU or RCIC line break.

   OR

2 Emergency RPV Depressurization is required.

POTENTIAL LOSS

3. RCS leakage **> 50 gpm** inside the drywell.

   OR

4. UNISOLABLE primary system leakage outside drywell resulting in **EITHER:**

   - Secondary Containment area temperature **> QGA 300, Maximum Normal** operating levels.

     OR

   - Secondary Containment radiation level **> QGA 300, Maximum Normal** operating levels.

Basis:

UNISOLABLE – is a breach or leak that cannot be promptly isolated.

Promptly allows for actions to be taken to isolate the leak. Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

Loss Thresholds #1 Basis :

An UNISOLABLE MSL break is a breach of the RCS barrier. Thus, this threshold is included for consistency with the Alert emergency classification level.

Other large high-energy line breaks such as HPCI, Feedwater, RWCU, or RCIC that are UNISOLABLE also represent a significant loss of the RCS barrier and should be considered for purposes of classification.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC4 (cont)

Basis: (cont)

Classification of a system break over system leakage is based on information available to the Control Room from the event. Indications that should be considered are:

- Reports describing magnitude of steam or water release.
- Use of system high flow alarms / indications, if available,
- Significant changes in makeup requirements,
- Abnormal reactor water level changes in response to the event.

The use of the above indications provides the Control Room the bases to determine that the on going event is more significant than the indications that would be expected from system leakage and therefore should be considered a system break.

Loss Thresholds #2 Basis:

Plant symptoms requiring Emergency RPV Depressurization per the EOPs are indicative of a loss of the RCS barrier. If Emergency RPV depressurization is required, the plant operators are directed to open safety relief valves (SRVs) and keep them open. Even though the RCS is being vented into the torus, a loss of the RCS should be considered to exist due to the diminished effectiveness of the RCS pressure barrier to a release of fission products beyond its boundary.

Potential Loss Threshold #3 Basis:

This threshold is based on leakage 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 uncovery is not a significant concern for a 50 gpm leak, however, break propagation leading to significantly larger loss of inventory is possible.

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.

If primary system leak rate information is unavailable, other indicators of RCS leakage should be used.

Potential Loss Threshold #4 Basis:

Potential loss of RCS based on primary system leakage outside the primary containment is determined from site specific temperature or area radiation Maximum Normal setpoints in the areas of the main steam line tunnel, main turbine generator, RCIC, HPCI, etc., which indicate a direct path from the RCS to areas outside primary containment.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC4 (cont)

Basis: (cont)

The indicators reaching the threshold values and confirmed to be caused by unisolable RCS leakage warrant an Alert classification. An unisolable leak which is indicated by a Maximum Safe setpoint escalates to a Site Area Emergency when combined with Containment Barrier Loss threshold (after a containment isolation) and a General Emergency when the Fuel Clad Barrier criteria is also exceeded.

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.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. M-13 Main steam piping
3. UFSAR 5.2.5
4. QCOA 0201-01 Rev 016, Increasing Drywell Pressure
5. QOA 900-4 A-17 900-4 A-17 Annunciator
6. QCOS 1600-07 Reactor Coolant Leakage In The Drywell
7. QGA 300 Secondary Containment Control

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC5

Initiating Condition:

Primary Containment Radiation Monitoring

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

Drywell radiation monitor reading **> 100 R/hr**.

Basis:

The Drywell Radiation monitor reading is a value, which indicates the release of reactor coolant to the primary containment.

This reading is less than that specified for Fuel Clad barrier Loss. Thus, this threshold would be indicative of a RCS leak only. If the radiation monitor reading increased to that value specified by Fuel Clad Barrier threshold, fuel damage would also be indicated.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. Calc. EP-EAL-0611

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

RC7

Initiating Condition:

Emergency Director Judgment.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. Any condition in the opinion of the Emergency Director that indicates Loss of the RCS Barrier.

POTENTIAL LOSS

2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the RCS Barrier.

Basis:

These thresholds address 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 threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT2

Initiating Condition:

Reactor Vessel Water Level.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

POTENTIAL LOSS

Plant conditions indicate that Primary Containment Flooding is required.

Basis:

There is no Loss threshold associated with this item.

The potential loss requirement for Primary Containment Flooding indicates adequate core cooling cannot be established and maintained and that core melt is possible. Entry into Severe Accident Management Guidelines is a logical escalation in response to the inability to maintain adequate core cooling.

The condition in this potential loss threshold represents a potential core melt sequence which, if not corrected, could lead to vessel failure and increased potential for containment failure. In conjunction with Reactor Vessel water level “Loss” thresholds in the Fuel Clad and RCS barrier columns, this threshold will result in the declaration of a General Emergency - loss of two barriers and the potential loss of a third.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. QGA 100 RPV Control
3. QGA 101 RPV Control (ATWS)
4. QGA 500-4 RPV Flooding

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT3

Initiating Condition:

Primary Containment Conditions.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. Rapid unexplained drop in Drywell pressure following initial pressure rise.

   OR

2. Drywell pressure response **not** consistent with LOCA conditions.

POTENTIAL LOSS

3. Drywell pressure **> 56 psig** and rising.

   OR

4. a. Drywell or torus hydrogen concentration **≥ 6%.**

      AND

   b. Drywell or torus oxygen concentration **≥ 5%.**

   OR

5. Heat Capacity Temperature Limit (QGA 200, Figure M) exceeded.

Basis:

Loss Threshold #1 and #2 Basis

Rapid unexplained drop in pressure (i.e., not attributable to drywell spray or condensation effects) following an initial pressure rise from a high energy line break indicates a loss of containment integrity. Primary containment pressure should rise as a result of mass and energy release into containment from a LOCA. Thus, primary containment pressure not rising under these conditions indicates a loss of containment integrity.

This indicator relies on operator recognition of an unexpected response for the condition and therefore does not have a specific value associated with it. The unexpected response is important because it is the indicator for a containment breach condition.

Potential Loss Threshold #3 Basis:

Drywell pressure is based on the primary containment design pressure.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT3

Basis: (cont)

Potential Loss Threshold #4 Basis:

Explosive mixtures in the primary containment are assumed to be elevated concentrations of hydrogen and oxygen.

Potential Loss Threshold #5 Basis:

The Heat Capacity Temperature Limit is a function of torus temperature and water level. It is utilized to preclude failure of the containment and equipment in the containment necessary for the safe shutdown of the plant and therefore, the inability to maintain plant parameters below the limit constitutes a potential loss of containment.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. UFSAR Fig. 6.2-16a
3. UFSAR Section 15.6
4. UFSAR 6.2.1.1
5. QGA 200 Primary Containment Control
6. Quad Cities PSTG Section 5, Primary Containment Control

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT5

Initiating Condition:

Primary Containment Radiation Monitoring.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

POTENTIAL LOSS

Drywell radiation monitor reading **> 1.55 E+03 R/hr**.

Basis:

The Drywell radiation monitor reading is a value that indicates significant fuel damage well in excess of that required for loss of RCS and Fuel Clad.

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.

There is no Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. Core Damage Assessment Methodology

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT6

Initiating Condition:

Primary Containment Isolation Failure or Bypass.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. a. Failure of isolation valves in any one line to close.

   AND

   b. Direct downstream pathway to the environment exists after a primary containment isolation signal.

   OR

2. Intentional venting/purging of Primary Containment per EOPs or SAMGs due to accident conditions.

   OR

3. UNISOLABLE primary system leakage outside drywell resulting in **EITHER:**

   - Secondary Containment area temperature **> QGA 300, Maximum Safe** operating levels.

     OR

   - Secondary Containment radiation level **> QGA 300, Maximum Safe** operating levels.

Basis:

UNISOLABLE – is a breach or leak that cannot be promptly isolated.

Promptly allows for actions to be taken to isolate the leak. Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

These thresholds address incomplete containment isolation that allows direct release to the environment.

Loss Threshold #1 Basis

This threshold addresses failure of open isolation devices, which should close upon receipt of a manual or automatic containment isolation signal resulting in a significant radiological release pathway to the environment. The concern is the unisolable open pathway to the environment. A failure of the ability to isolate any one line indicates a breach of primary containment integrity.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT6 (cont)

Basis: (cont)

Failure of containment isolation valves to isolate with a downstream pathway to the environment following an automatic or manual isolation signal is only a concern during an event requiring mitigation by the Primary Containment barrier. If this condition exists during normal Power Operation, a Technical Specification Action Statement will address it. However, during events requiring Primary Containment integrity, this will represent a breach of Primary Containment.

The use of the modifier “direct” in defining the release path discriminates against release paths through interfacing liquid systems. The existence of an in–line charcoal filter does not make a release path indirect since the filter is not effective at removing fission product noble gases. Typical filters have an efficiency of 95-99% removal of iodine. Given the magnitude of the core inventory of iodine, significant releases could still occur. In addition, since the fission product release would be driven by boiling in the reactor vessel, the high humidity in the release stream can be expected to render the filters ineffective in a short period.

Leakage into a closed system is to be considered only if the closed system is breached and thereby creates a significant pathway to the environment. Examples include unisolable Main Steamline, HPCI or RCIC steamline breaks, unisolable RWCU system breaks, and unisloable containment atmosphere vent paths. Minor release paths such as instrument and sample lines are not considered under this threshold.

Examples of “downstream pathway to the Environment” could be through Turbine/Condenser, or direct release to the Turbine or Reactor Building.

Loss Threshold #2 Basis:

EOPs may direct containment isolation valve logic(s) to be intentionally bypassed, regardless of radioactivity release rates. Under these conditions with a valid containment isolation signal, the containment should also be considered lost if containment venting is actually performed.

Intentional venting of primary containment for primary containment pressure or combustible gas control per EOPs to the secondary containment and/or the environment is considered a loss of containment. Containment venting for pressure control when not in an accident situation should not be considered.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT6 (cont)

Basis: (cont)

Loss Threshold #3 Basis:

The presence of area radiation or temperature above Maximum Safe Operating setpoints indicating unisolable primary system leakage outside the primary containment are addressed after a containment isolation. The indicators should be confirmed to be caused by RCS 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.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2
2. QGA 200 Primary Containment Control
3. QGA 200-5 Hydrogen Control
4. QCOP 1600-13 Post-Accident Venting of the Primary Containment
5. QGA 300 Secondary Containment Control

RECOGNITION CATEGORY
FISSION PRODUCT BARRIERS

CT7

Initiating Condition:

Emergency Director Judgment.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

LOSS

1. Any condition in the opinion of the Emergency Director that indicates Loss of the Containment Barrier.

POTENTIAL LOSS

2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment Barrier.

Basis:

These thresholds address any other factors that are to be used by the Emergency Director in determining whether the Containment barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

The Containment barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment barrier status is addressed by Technical Specifications.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG1

Initiating Condition:

Prolonged loss of all Off-Site and all On-Site AC power to emergency busses.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to unit ECCS busses.

   AND

2. Failure of Unit EDG 1(2), shared EDG 1/2, and SBO DG1(2) emergency diesel generators to supply power to unit ECCS busses.

   AND

3. a. Restoration of at least one unit ECCS bus in **< 1 hour** is **not** likely.

      OR

   b. RPV level **cannot** be determined to be **> – 142 inches.** (TAF).

Basis:

Loss of all AC power to emergency busses 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 to emergency busses will lead to loss of fuel clad, RCS, and containment, thus warranting declaration of a General Emergency.

This EAL is specified to assure that in the unlikely event of a prolonged unit blackout, timely recognition of the seriousness of the event occurs and that declaration of a General Emergency occurs as early as is appropriate, based on a reasonable assessment of the event trajectory.

The likelihood of restoring at least one emergency bus should be based on a realistic appraisal of the situation since a delay in an event classification escalation decision based on only a chance of mitigating the event could result in a loss of valuable time in preparing and implementing public protective actions.

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions.

In addition, under these conditions, fission product barrier monitoring capability may be degraded.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 SG1
2. UFSAR Figure 8.3-1
3. UFSAR Section 8.3
4. QCOA 6100-03 Loss of Offsite Power
5. QOP 6100-02 Restoring Reserve Auxiliary Transformer 12 To Service
6. QOP 6100-04 Restoring Reserve Auxiliary Transformer 22 To Service
7. QCOA 6100-04 Station Blackout
8. GE letter No. 92-38 from L.G. Knutson to Pat Donahue, dated April 7, 1992, “AC TURBINE LOADS SMALL TASK NO. QC107” (Station Blackout analysis)
9. QGA 100 RPV Control

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS1

Initiating Condition:

Loss of all Off-Site and all On-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to unit ECCS busses.

   AND

2. Failure of Unit EDG 1(2), shared EDG 1/2, and SBO DG1(2) emergency diesel generators to supply power to unit ECCS busses.

   AND

3. Failure to restore power to at least one unit ECCS bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.

Basis:

Loss of all AC power to emergency busses 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 to emergency busses will lead to loss of Fuel Clad, RCS, and Containment, thus this event can escalate to a General Emergency.

Fifteen minutes was selected as a threshold to exclude momentary losses of off-site power.

Escalation to General Emergency is via Fission Product Barrier Degradation or MG1, "Prolonged Loss of All Off-site Power and Prolonged Loss of All On-site AC Power."

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS1 (cont.)

Basis Reference(s):

1. NEI 99-01, Rev. 5 SS1
2. UFSAR Figure 8.3-1
3. UFSAR Section 8.3
4. QCOA 6100-03 Loss of Offsite Power
5. QOP 6100-02 Restoring Reserve Auxiliary Transformer 12 To Service
6. QOP 6100-04 Restoring Reserve Auxiliary Transformer 22 To Service
7. QCOA 6100-04 Station Blackout
8. GE letter No. 92-38 from L.G. Knutson to Pat Donahue, dated April 7, 1992, “AC TURBINE LOADS SMALL TASK NO. QC107” (Station Blackout analysis)

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA1

Initiating Condition:

AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. AC power capability to unit ECCS busses reduced to only one of the following power sources for **≥ 15 minutes**:
    - Reserve Auxiliary Transformer TR-12(TR-22)
    - Unit Auxiliary Transformer TR-11(TR-21)
    - Unit Emergency Diesel Generator
    - Shared Emergency Diesel Generator
    - Unit crosstie breakers
    - SBO Diesel Generator

    AND

2. Any additional single power source failure will result in unit blackout.

Basis:

Capability: (pertaining to electrical power supplies) is equipment that is available to provide and maintain AC power at the required voltage and frequency for the required load.

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a unit blackout. This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. Another related condition could be the loss of all off-site power and loss of on-site emergency generators with only one train of emergency busses being backfed from the unit main generator, or the loss of on-site emergency generators with only one train of emergency busses being backfed from off-site power. The subsequent loss of this single power source would escalate the event to a Site Area Emergency in accordance with MS1.

Fifteen minutes was selected as a threshold to exclude momentary losses of power.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 SA5
2. UFSAR Figure 8.3-1
3. UFSAR Section 8.3
4. QCOA 6100-03 Loss of Offsite Power
5. QOP 6100-02 Restoring Reserve Auxiliary Transformer 12 To Service
6. QOP 6100-04 Restoring Reserve Auxiliary Transformer 22 To Service
7. QCOA 6100-04 Station Blackout
8. GE letter No. 92-38 from L.G. Knutson to Pat Donahue, dated April 7, 1992, “AC TURBINE LOADS SMALL TASK NO. QC107” (Station Blackout analysis)

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU1

Initiating Condition:

Loss of all Off-site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of all off-site AC power to unit ECCS busses for **≥ 15 minutes**.

Basis:

Prolonged loss of off-site 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 to emergency busses.

Fifteen minutes was selected as a threshold to exclude momentary losses of off-site power.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU1
2. UFSAR Figure 8.3-1
3. UFSAR Section 8.3
4. QCOA 6100-03 Loss of Offsite Power
5. QOP 6100-02 Restoring Reserve Auxiliary Transformer 12 To Service
6. QOP 6100-04 Restoring Reserve Auxiliary Transformer 22 To Service
7. QCOA 6100-04 Station Blackout

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG2

Initiating Condition:

Automatic Scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic scram was **not** successful as indicated by Reactor Power **> 5%.**

   AND

2. Manual scram/ARI actions were **not** successful as indicated by Reactor Power **> 5%.**

   AND

3. **EITHER** of the following exists:

   - RPV level **cannot** be restored and maintained **> – 166 inches**.

     OR

   - Heat Capacity Temperature Limit (QGA 200, Figure M) exceeded.

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful.

The third condition of this EAL indicates an extreme challenge to the ability to cool the core as indicated when RPV level cannot be restored and maintained above the Minimum Steam Cooling RPV Water Level or a challenge to Containment for energy transfer from the RPV as indicated by exceeding the Heat Capacity Limit. RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions.

In the event either of these challenges exists at a time that the reactor has not been brought below the power associated with the safety system design a core melt sequence exists. In this situation, core degradation can occur rapidly. For this reason, the General Emergency declaration is intended to be anticipatory of the fission product barrier table declaration to permit maximum off-site intervention time.

Determination of “restore and maintained” is based on the actions driven by Emergency Operating Procedures to restore level. The inability to reverse the RPV level lowering trend after lining up injection sources and injecting, including the use of low pressure systems following an Emergency Depressurization would warrant classification.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG2 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 SG2
2. QGA 100 RPV Control
3. QGA 101 RPV Control (ATWS)
4. QGA 200 Primary Containment Control

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS2

Initiating Condition:

Automatic Scram fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic scram was **not** successful as indicated by Reactor Power **> 5%.**

   AND

2. Manual scram/ARI actions were **not** successful from the Reactor Console as indicated by Reactor Power **> 5%.**

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful. A Site Area Emergency is warranted because conditions exist that lead to IMMINENT loss or potential loss of both fuel clad and RCS.

Manual actions taken at the reactor control console are any set of actions by the reactor operator(s) at which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

Manual actions are not considered successful if action away from the reactor control console is required to scram the reactor. This EAL is still applicable even if actions taken away from the reactor control console are successful in shutting the reactor down because the design limits of the fuel may have been exceeded or because of the gross failure of the Reactor Protection System to shutdown the plant.

Escalation of this event to a General Emergency would be due to a prolonged condition leading to an extreme challenge to either core-cooling or heat removal.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SS2
2. QGA 100 RPV Control
3. QGA 101 RPV Control (ATWS)

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA2

Initiating Condition:

Automatic Scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic scram was **not** successful as indicated by Reactor Power **> 5%**.

   AND

2 Manual scram/ARI actions were successful from Reactor Console as indicated by Reactor Power **≤ 5%**.

Basis:

Manual actions taken at the reactor control console are any set of actions by the reactor operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

This condition indicates failure of the automatic protection system to scram the reactor in response to exceeding reactor protective system setpoints during a plant transient. Associated RPS instrument failures during non-transient plant conditions would be addressed by Technical Specifications. This condition is more than a potential degradation of a safety system in that a front line automatic protection system did not function in response to a plant transient. Thus the plant safety has been compromised because design limits of the fuel may have been exceeded. An Alert is indicated because conditions may exist that lead to potential loss of fuel clad or RCS and because of the failure of the Reactor Protection System to automatically shutdown the plant.

If manual actions taken at the reactor control console fail to shutdown the reactor, the event would escalate to a Site Area Emergency.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SA2
2. QGA 100 RPV Control
3. QGA 101 RPV Control (ATWS)
4. Technical Specifications Table 3.3.1.1-1
5. Technical Specification 3.3.1.3
6. Technical Specification Bases 3.3.1.1 and 3.3.1.3

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU2

Initiating Condition:

Inadvertent criticality.

Operating Mode Applicability:

3

EAL Threshold Values:

UNPLANNED sustained positive period observed on nuclear instrumentation.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL addresses inadvertent criticality events. This EAL excludes inadvertent criticalities that occur during planned reactivity changes associated with reactor startups (e.g., criticality earlier than estimated). This condition can be identified using period monitors. The term “sustained“ is used in order to allow exclusion of expected short term positive periods from planned control rod movements. Escalation would be by the Fission Product Barrier.

This EAL indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU8
2. Technical Specifications B3.3.1
3. QCAN 901(2)-5 E-5 SRM Period Short

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS3

Initiating Condition:

Loss of all vital DC power for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of all vital DC power based on **< 105 VDC** on unit 125 VDC battery busses #1 and #2 for **≥ 15 minutes**.

Basis:

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power will cause core uncovering and loss of containment integrity when there is significant decay heat and sensible heat in the reactor system.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Escalation to a General Emergency would occur by Abnormal Rad Levels/Radiological Effluent, Fission Product Barrier Degradation.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SS3
2. Technical Specifications 3.8.4 and B3.8.4
3. UFSAR Section 8.3.2
4. QOP 6900-02 125 VDC Electrical System
5. QCTS 0230-01 Unit One (Two) 125 VDC Service Test Normal or Alternate Battery

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS4

Initiating Condition:

Inability to monitor a SIGNIFICANT TRANSIENT in progress.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**
   - Safety System annunciators (Table M1)
     OR
   - Safety System indications (Table M1)

Table M1 – Safety Systems
• ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring

AND

2. SIGNIFICANT TRANSIENT in progress (Table M2).

Table M2 - Significant Transients
• Turbine trip • Reactor scram • ECCS activation • Recirc. Runback **> 25%** Reactor Power change • Thermal power oscillations **> 10 %** Reactor Power change

AND

3. Compensatory indications (computer points) are unavailable.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS4 (cont)

Basis:

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) Turbine Trip (2) Reactor Scram (3) ECCS Activation, (4) Recirc. Runback > 25% Reactor Power change, or (5) thermal power oscillations > 10% Reactor Power change.

This EAL is intended to recognize the threat to plant safety associated with the complete loss of capability of the control room staff to monitor plant response to a SIGNIFICANT TRANSIENT.

"Planned" and “UNPLANNED” actions are not differentiated since the loss of instrumentation of this magnitude is of such significance during a transient that the cause of the loss is not a factor.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

A Site Area Emergency is considered to exist if the control room staff cannot monitor safety systems needed for protection of the public while a significant transient is in progress.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS4 (cont)

Basis (cont):

Indications needed to monitor safety systems necessary for protection of the public must include control room indications; computer generated indications and dedicated annunciation capability. The specific parameters are those used to determine such functions as the ability to shut down the reactor, maintain the core cooled and in a coolable geometry, remove heat from the core, and maintain the reactor coolant system and primary containment.

"Compensatory indications" in this context includes computer based information. This includes all computer systems available for this use.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SS6
2. QGA 100 RPV Control
3. QGA 200 Primary Containment Control
4. QCOA 0900-01 Loss of Annunciators
5. QOP 9900-101 Process Computer
6. QOP 9900-102 Operation of Safety Parameter Display System

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA4

Initiating Condition:

UNPLANNED Loss of safety system annunciation or indication in the control room with EITHER (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**
   - Safety System annunciators (Table M1)

     OR
   - Safety System indications (Table M1)

Table M1 – Safety Systems
• ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring

AND

2. a. SIGNIFICANT TRANSIENT in progress (Table M2).

Table M2 - Significant Transients
• Turbine trip • Reactor scram • ECCS activation • Recirc. Runback **> 25%** Reactor Power change • Thermal power oscillations **> 10 %** Reactor Power change

OR

b. Compensatory indications (computer points) are unavailable.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA4 (cont)

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) Turbine Trip (2) Reactor Scram (3) ECCS Activation, (4) Recirc. Runback > 25% Reactor Power change, or (5) thermal power oscillations > 10% Reactor Power change

This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a SIGNIFICANT TRANSIENT.

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

"Compensatory indications" in this context includes computer based information. If both a major portion of the annunciation system and all computer monitoring are unavailable, the Alert is required.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

This Alert will be escalated to a Site Area Emergency if the operating crew cannot monitor the transient in progress due to a concurrent loss of compensatory indications with a SIGNIFICANT TRANSIENT in progress during the loss of annunciation or indication.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA4 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 SA4
2. QCOA 0900-01 Loss of Annunciators
3. QOP 9900-101 Process Computer
4. QOP 9900-102 Operation of Safety Parameter Display System

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU4

Initiating Condition:

UNPLANNED loss of safety system annunciation or indication in the control room for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**

- Safety System annunciators (Table M1)

  OR

- Safety System indications (Table M1)

Table M1 – Safety Systems
• ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment.

Recognition of the availability of computer based indication equipment is considered.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU4 (cont)

Basis (cont):

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

Fifteen minutes was selected as a threshold to exclude momentary power losses.

This Unusual Event will be escalated to an Alert based on a concurrent loss of compensatory indications or if a SIGNIFICANT TRANSIENT is in progress during the loss of annunciation or indication.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU3
2. QCOA 0900-01 Loss of Annunciators
3. QOP 9900-101 Process Computer
4. QOP 9900-102 Operation of Safety Parameter Display System

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU5

Initiating Condition:

RCS leakage.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

1. Unidentified or pressure boundary leakage into the Drywell **> 10 gpm**.

   OR

2. Identified leakage into the Drywell **> 25 gpm**.

Basis:

This EAL is included as an Unusual Event because it may be a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified or pressure boundary leakage was selected as it is observable with normal control room indications. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances).

Relief valve operation should be excluded from this EAL.

The EAL for identified leakage is set at a higher value due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage. In either case, escalation of this EAL to the Alert level is via Fission Product Barrier.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU5
2. QCOS 1600-07 Reactor Coolant Leakage in the Drywell
3. Technical Specifications 3.4.4
4. UFSAR 5.2.5
5. QCOA 0201-01 Increasing Drywell Pressure

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU6

Initiating Condition:

Loss of all On-site or Off-site communications capabilities.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

1. Loss of all Table M3 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table M3 **Offsite** communications capability affecting the ability to perform offsite notifications.

Table M3 - Communications Capability

System	Onsite	Offsite
Plant Radio System	X	
Plant Paging System	X	
Sound Power Phones	X	
In-Plant Telephones	X	
All Telephone Lines (commercial and microwave)		X
ENS		X
HPN		X
Cellular Phones		X
Satellite Phones		X

Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU6 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU6
2. EP-MW-124-1001 Facilities Inventories and Equipment Tests
3. UFSAR Section 9.5.2

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU7

Initiating Condition:

Inability to reach required shutdown within Technical Specification limits.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Plant is **not** brought to required operating mode within Technical Specifications LCO Action Statement time.

Basis:

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 Unusual Event is required when the plant is not brought 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.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU2
2. QCNP Technical Specifications

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA1

Initiating Condition:

Loss of all Off-site and all On-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to unit ECCS busses.

   AND

2. Failure of Unit EDG 1(2), Shared EDG 1/2, and SBO DG1(2) emergency diesel generators to supply power to unit ECCS busses.

   AND

3. Failure to restore power to at least one unit ECCS bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.

Basis:

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.

The event can be classified as an Alert when in cold shutdown, refueling, or defueled mode because of the significantly reduced decay heat and lower temperature and pressure, increasing the time to restore one of the emergency busses, relative to that specified for the Site Area Emergency EAL.

Escalating to Site Area Emergency, if appropriate, is by Abnormal Rad Levels / Radiological Effluent EALs.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 CA3
2. UFSAR Figure 8.3-1
3. UFSAR Section 8.3
4. QCOA 6100-03 Loss of Offsite Power
5. QOP 6100-02 Restoring Reserve Auxiliary Transformer 12 To Service
6. QOP 6100-04 Restoring Reserve Auxiliary Transformer 22 To Service
7. QCOA 6100-04 Station Blackout
8. GE letter No. 92-38 from L.G. Knutson to Pat Donahue, dated April 7, 1992, "ACTURBINE LOADS SMALL TASK NO. QC107" (Station Blackout analysis)

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU1

Initiating Condition:

AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. AC power capability to unit ECCS busses reduced to only one of the following power sources for **≥ 15 minutes**:
    - Reserve Auxiliary Transformer TR-12(TR-22)
    - Unit Auxiliary Transformer TR-11(TR-21)
    - Unit Emergency Diesel Generator
    - Shared Emergency Diesel Generator
    - Unit crosstie breakers
    - SBO Diesel Generator

    AND

2. Any additional single power source failure will result in unit blackout.

Basis:

Capability: (pertaining to electrical power supplies) is equipment that is available to provide and maintain AC power at the required voltage and frequency for the required load.

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a unit blackout. This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. The subsequent loss of this single power source would escalate the event to an Alert in accordance with CA1.

Fifteen minutes was selected as a threshold to exclude momentary losses of power.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU1 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU3
2. UFSAR Figure 8.3-1
3. UFSAR Section 8.3
4. QCOA 6100-03 Loss of Offsite Power
5. QOP 6100-02 Restoring Reserve Auxiliary Transformer 12 To Service
6. QOP 6100-04 Restoring Reserve Auxiliary Transformer 22 To Service
7. QCOA 6100-04 Station Blackout
8. GE letter No. 92-38 from L.G. Knutson to Pat Donahue, dated April 7, 1992, “AC TURBINE LOADS SMALL TASK NO. QC107” (Station Blackout analysis)

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU2

Initiating Condition:

Inadvertent criticality.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

UNPLANNED sustained positive period observed on nuclear instrumentation.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL also addresses criticality events that occur in Cold Shutdown or Refueling modes such as fuel mis-loading events. This condition can be identified using period monitors. The term “sustained” is used in order to allow exclusion of expected short term positive periods from planned fuel bundle or control rod movements during core alteration.

This EAL indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU8
2. Technical Specifications B3.3.1
3. QCAN 901(2)-5 E-5 SRM Period Short

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU3

Initiating Condition:

Loss of required DC power for 15 minutes or longer.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of required DC power based on **< 105 VDC** on unit 125 VDC battery busses #1 and #2 for **> 15 minutes**.

Basis:

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.

The required busses are the minimum allowed by Technical Specifications for the mode of operation. It is intended that the loss of the operating (operable) train is to be considered. If this loss results in the inability to maintain cold shutdown, the escalation to an Alert will be per CA5.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU7
2. Technical Specifications 3.8.4 and B3.8.4
3. UFSAR Section 8.3.2
4. QOP 6900-02 125 VDC Electrical System
5. QCTS 0230-01 Unit One (Two) 125 VDC Service Test Normal or Alternate Battery

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU4

Initiating Condition:

Loss of all On-site or Off-site communications capabilities.

Operating Mode Applicability:

4, 5, D

EAL Threshold Values:

1. Loss of all Table C1 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table C1 **Offsite** communications capability affecting the ability to perform offsite notifications.

Table C1 - Communications Capability

System	Onsite	Offsite
Plant Radio System	X	
Plant Paging System	X	
Sound Power Phones	X	
In-Plant Telephones	X	
All Telephone Lines (commercial and microwave)		X
ENS		X
HPN		X
Cellular Phones		X
Satellite Phones		X

Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU4 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU6
2. EP-MW-124-1001 Facilities Inventories and Equipment Tests
3. UFSAR Section 9.5.2

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5

Initiating Condition:

Inability to maintain plant in cold shutdown.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 212° F** for **> Table C2 duration**.

Table C2 – RCS Reheat Duration Thresholds		
RCS	**Containment Closure**	**Duration**
Intact	N/A	60 minutes*
Not Intact	Established	20 minutes*
	Not Established	0 minutes
*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then this EAL is **not** applicable.		

OR

2. UNPLANNED RPV pressure rise **> 10 psig** as a result of temperature rise due to loss of decay heat removal.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

RCS is intact when the RCS pressure boundary is in its normal condition for the Cold Shutdown mode of operation (e.g., no freeze seals or main steam line nozzle plugs, etc.).

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5 (cont)

Basis (cont):

Threshold #1 Basis:

The RCS Reheat Duration Threshold table addresses complete loss of functions required for core cooling for greater than 60 minutes during refueling and cold shutdown modes when RCS integrity is established. The status of CONTAINMENT CLOSURE in this condition is immaterial given that the RCS is providing a high pressure barrier to fission product release to the environment. The 60 minute time frame should allow sufficient time to restore cooling without there being a substantial degradation in plant safety.

The RCS Reheat Duration Threshold table also addresses the complete loss of functions required for core cooling for greater than 20 minutes during refueling and cold shutdown modes when CONTAINMENT CLOSURE is established but RCS integrity is not established. The allowed 20 minute time frame was included to allow operator action to restore the heat removal function, if possible.

Finally, complete loss of functions required for core cooling during refueling and cold shutdown modes when neither CONTAINMENT CLOSURE nor RCS integrity are established. No delay time is allowed because the evaporated reactor coolant that may be released into the Containment during this heatup condition could also be directly released to the environment.]

The note (*) indicates that this EAL is not applicable if actions are successful in restoring an RCS heat removal system to operation and RCS temperature is being reduced within the specified time frame.

Threshold #2 Basis:

The 10 psig pressure rise due to loss of decay heat removal infers an intact RCS with uncontrolled RPV temperature rise in excess of the Technical Specification cold shutdown limit (212° F) for which CA5 Threshold #1 would permit up to sixty minutes to restore RCS cooling before declaration of an Alert. This EAL therefore covers situations of high decay heat loads, in which the event should be declared without delay.

Escalation to Site Area Emergency would be via CS6 should boiling result in significant RPV level loss leading to core uncovery.

A loss of Technical Specification components alone is not intended to constitute an Alert. The same is true of a momentary UNPLANNED excursion above the Technical Specification cold shutdown temperature limit when the heat removal function is available.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 CA4
2. Technical Specifications Table 1.1-1
3. Technical Specifications 3.6.1.1
4. Technical Specifications 3.6.4.1
5. OU-AA-103 Shutdown Safety
6. QCOA 1000-02 Loss of Shutdown Cooling
7. QGA 100 RPV Control
8. QGA 100 RPV Control Detail A
9. QCGP 1-1 Normal Unit Startup
10. QCIS 0600-01 Unit One Division 1 Reactor Pressure 0 to 1200 psig Indication Calibration

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU5

Initiating Condition:

UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 212° F**.

   OR

2. Loss of the following for **> 15 minutes:**
   - All RCS temperature indications

     AND
   - All RPV level indications

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL is be a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant.

In cold shutdown the ability to remove decay heat relies primarily on forced cooling flow. Operation of the systems that provide this forced cooling may be jeopardized due to the unlikely loss of electrical power or RCS inventory. Since the RCS usually remains intact in the cold shutdown mode a large inventory of water is available to keep the core covered.

During refueling the level in the RPV will normally be maintained above the RPV flange. Refueling evolutions that decrease water level below the RPV flange are carefully planned and procedurally controlled. Loss of forced decay heat removal at reduced inventory may result in more rapid increases in RCS/RPV temperatures depending on the time since shutdown.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU5 (cont)

Basis (cont):

Normal means of core temperature indication and RCS level indication may not be available in the refueling mode. Redundant means of RPV level indication are therefore procedurally installed to assure that the ability to monitor level will not be interrupted. However, if all level and temperature indication were to be lost in either the cold shutdown of refueling modes, Threshold #2 would result in declaration of an Unusual Event if both temperature and level indication cannot be restored within 15 minutes from the loss of both means of indication. Escalation to Alert would be via CA6 based on an inventory loss or CA5 based on exceeding its temperature criteria.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU4
2. Technical Specifications Table 1.1-1
3. QGA 100, RPV Control
4. QCOP 0201-02, Filling the Reactor Vessel and/or Reactor Cavity Using a Condensate Booster Pump via the Feedwater System
5. QCOP 0201-13, Reactor Vessel Upper Wide Range Reference Leg Extension Use and Control
6. QCOP 0201-14, Reactor Vessel Level Control Using a Local Pressure Gauge
7. QCOA 1000-02 Loss of Shutdown Cooling

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6

Initiating Condition:

Loss of RPV inventory affecting fuel clad integrity with containment challenged.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. RPV level **< -142 inches (TAF)** for **≥ 30 minutes**.

   AND

   b. Any Containment Challenge Indication (Table C4).

   OR

2. a. RPV level unknown for **≥ 30 minutes.**

   AND

   b. Loss of RPV inventory as indicated by any of the following:

   - Table C3 indication.

     OR

   - Erratic Source Range Monitor indication.

     OR

   - Fuel Handling ARM 1(2)-1705-16 A or B indicates **> 3000 mR/hr**.

   AND

   c. Any Containment Challenge Indication (Table C4)

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise
• UNPLANNED Torus level rise
• UNPLANNED vessel make up rate rise
• Observation of leakage or inventory loss

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6 (cont)

EAL Threshold Values: (cont)

Table C4 – Containment Challenge Indications
• Primary Containment Hydrogen concentration **≥ 6%** and Oxygen **≥ 5%**. • UNPLANNED rise in containment pressure • CONTAINMENT CLOSURE **not** established. • Any Secondary Containment radiation monitors reading **> QGA 300, Maximum Safe** operating level.

Basis:

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions.

This EAL represents the inability to restore and maintain RPV level to above the top of active fuel with containment challenged. Fuel damage is probable if RPV level cannot be restored, as available decay heat will cause boiling, further reducing the RPV level. With the CONTAINMENT breached or challenged then the potential for unmonitored fission product release to the environment is high. This represents a direct path for radioactive inventory to be released to the environment. This is consistent with the definition of a General Emergency. The General Emergency is declared on the occurrence of the loss or IMMINENT loss of function of all three barriers.

A number of variables can have a significant impact on heat removal capability challenging the fuel clad barrier. Examples include initial vessel level and shutdown heat removal system design.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6 (cont)

Basis:

Analysis indicates that core damage may occur within an hour following continued core uncovery therefore, 30 minutes was conservatively chosen.

If CONTAINMENT CLOSURE is re-established prior to exceeding the 30 minute core uncovery time limit then escalation to a General Emergency would not occur.

When RPV level indication is unavailable, the inventory loss must be detected by erratic Source Range Monitor indication, elevated drywell radiation or unexplained rise in drywell floor or equipment drain sump pumpout rate. Post-TMI studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and that Source Range Monitors can be used as a tool for making such determinations.

As water level in the RPV lowers, the dose rate above the core will rise. Indication of > 3000 mR/hr is indicative of core uncovery (i.e. level at TAF).

Basis Reference(s):

1. NEI 99-01, Rev. 5 CG1
2. QGA 100, RPV Control
3. Technical Specifications 3.3.1
4. Technical Specifications 3.6.1.1
5. Technical Specifications 3.6.4.1
6. QGA-200-5, Hydrogen Control
7. UFSAR 6.2.1.1
8. QGA 300 Secondary Containment Control
9. EP-EAL-0501, Estimation Of Radiation Monitor Readings Indicating Core Uncovery During Refueling

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6

Initiating Condition:

Loss of RPV inventory affecting core decay heat removal capability.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. With CONTAINMENT CLOSURE **not** established, RPV level **< - 65 inches**.

   OR

2. With CONTAINMENT CLOSURE established, RPV level **< -142 (TAF) inches.**

   OR

3. a. RPV level unknown for **≥ 30 minutes.**

      AND

   b. Loss of RPV inventory as indicated by any of the following:

      - Table C3 indications.

        OR

      - Erratic Source Range Monitor indication.

        OR

      - Fuel Handling ARM 1(2)-1705-16 A or B indicates **> 3000 mR/hr**.

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise
• UNPLANNED Torus level rise
• UNPLANNED vessel make up rate rise
• Observation of leakage or inventory loss

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6 (cont)

Basis :

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions.

Under the conditions specified, a continued drop in RCS/RPV level is indicative of a loss of inventory control. Inventory loss may be due to an RCS breach, pressure boundary leakage, or continued boiling in the RPV. Thus, declaration of a Site Area Emergency is warranted.

Escalation to a General Emergency is via CG6 or RG1.

Threshold #1 and #2 Basis:

If a low-pressure boundary to fission product release does not exist (i.e., without containment closure established), the RPV level associated with this threshold is six inches below the low-low ECCS actuation setpoint. If containment closure is established, a low-pressure boundary to fission product release exists and RPV level can drop to the top of active fuel before a Site Area Emergency declaration is required. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further RPV level drop and potential core uncovery.

Threshold #3 Basis:

When RPV level indication is unavailable, the inventory loss must be detected by erratic Source Range Monitor indication, elevated drywell radiation or unexplained rise in drywell floor or equipment drain sump pumpout rate. Post-TMI studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and that Source Range Monitors can be used as a tool for making such determinations.

The 30-minute duration allows sufficient time for actions to be performed to recover inventory control equipment.

As water level in the RPV lowers, the dose rate above the core will rise. Indication of > 3000 mR/hr. is indicative of core uncovery (i.e. level at TAF).

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 CS1
2. Technical Specifications 3.3.5.1
3. Technical Specifications 3.6.1.1
4. Technical Specifications 3.6.4.1
5. QGA 100, RPV Control
6. Technical Specifications 3.3.1
7. Technical Specifications Table 3.3.3.1-1
8. Technical Specifications 3.3.5.1
9. QCOS 1600-07, Reactor Coolant Leakage in the Drywell
10. Technical Specifications 3.4.4
11. UFSAR 5.2.5
12. QCOA 0201-01, Increasing Drywell Pressure
13. QOA 900-4 A-17, Annuciator Response

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA6

Initiating Condition:

Loss of RPV inventory.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. RPV level **< - 59 inches**.

   OR

2. a. RPV level unknown for **≥ 15 minutes**.

      AND

   b. Loss of RPV inventory per Table C3 indications.

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise
• UNPLANNED Torus level rise
• UNPLANNED vessel make up rate rise
• Observation of leakage or inventory loss

Basis:

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL serves as precursors to a loss of ability to adequately cool the fuel. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further RPV level decrease and potential core uncovery. This condition will result in a minimum emergency classification level of an Alert.

If RPV level continues to lower then escalation to Site Area Emergency will be via CS6.

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA6 (cont)

Basis: (cont)

Threshold #1 Basis:

The inability to restore and maintain level after reaching this setpoint would be indicative of a failure of the RCS barrier.

Threshold #2 Basis:

When RPV level indication is unavailable, the inventory loss must be detected by other means including rise in sump pumpout rates, changes in makeup or observation of leakage.

The 15-minute interval for the loss of level indication was chosen because it is half of the Site Area Emergency duration.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CA1
2. Technical Specifications 3.3.5.1
3. QCOS 1600-07, Reactor Coolant Leakage in the Drywell
4. Technical Specifications 3.4.4
5. UFSAR 5.2.5
6. QCOA 0201-01, Increasing Drywell Pressure
7. QOA 900-4 A-17, Annuciator Response
8. QGA 100, RPV Control
9. QCOP 0201-02, Filling the Reactor Vessel and/or Reactor Cavity Using a Condensate Booster Pump via the Feedwater System
10. QCOP 0201-13, Reactor Vessel Upper Wide Range Reference Leg Extension Use and Control
11. QCOP 0201-14, Reactor Vessel Level Control Using a Local Pressure Gauge

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU6

Initiating Condition:

RCS leakage.

Operating Mode Applicability:

4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

RCS leakage results in the inability to restore and maintain RPV level **> 0 inches** for **≥ 15 minutes.**

Basis:

This EAL is considered to be a potential degradation of the level of safety of the plant. The inability to maintain or restore level is indicative of loss of RCS inventory.

Prolonged loss of RCS Inventory may result in escalation to the Alert emergency classification level via either CA6 or CA5.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU1
2. Technical Specifications 3.3.5.1
3. Technical Specifications 3.4.4
4. UFSAR 5.2.5
5. QGA 100, RPV Control
6. QCOP 0201-02, Filling the Reactor Vessel and/or Reactor Cavity Using a Condensate Booster Pump via the Feedwater System
7. QCOP 0201-13, Reactor Vessel Upper Wide Range Reference Leg Extension Use and Control
8. QCOP 0201-14, Reactor Vessel Level Control Using a Local Pressure Gauge

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU7

Initiating Condition:

UNPLANNED loss of RPV inventory.

Operating Mode Applicability:

5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED Refueling Cavity or Vessel level drop that meets **EITHER**:

   - When controlling level above the RPV flange, Refueling Cavity level drop below the RPV flange for **≥ 15 minutes**.

     OR

   - When controlling level below the RPV flange, vessel level drop below the procedurally established limit for **≥ 15 minutes**.

   OR

2. a. RPV level unknown.

   AND

   b. Loss of RPV inventory per Table C3 indications.

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise
• UNPLANNED Torus level rise
• UNPLANNED vessel make up rate rise
• Observation of leakage or inventory loss

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU7 (cont)

Basis (cont):

This EAL is a precursor of more serious conditions and considered to be a potential degradation of the level of safety of the plant.

Refueling evolutions that lowers RCS water level below the RPV flange are carefully planned and procedurally controlled. An UNPLANNED event that results in water level dropping below the RPV flange, or below the planned RCS water level for the given evolution (if the planned RCS water level is already below the RPV flange), warrants declaration of a UE due to the reduced RCS inventory that is available to keep the core covered.

The allowance of 15 minutes was chosen because it is reasonable to assume that level can be restored within this time frame using one or more of the redundant means of makeup that should be available. If level cannot be restored in this time frame then it may indicate a more serious condition exists.

Continued loss of RCS Inventory will result in escalation to the Alert emergency classification level via either CA6 or CA5.

Threshold #1 Basis:

This EAL involves a drop in RCS level below the top of the RPV flange that continues for 15 minutes due to an UNPLANNED event. This EAL is not applicable to level changes in flooded reactor cavity level, which is addressed by RU2, until such time as the level drop reaches the level of the vessel flange.

If RPV level continues to lower and reaches the Low-Low ECCS Actuation Setpoint then escalation to CA6 would be appropriate.

Threshold #2 Basis:

This EAL addresses conditions in the refueling mode when normal means of core temperature indication and RCS level indication may not be available. Redundant means of RPV level indication will normally be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that RPV inventory loss was occurring by observing other indications such as sump level changes, changes in makeup or observation of leakage. Sump level changes must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

Escalation to the Alert emergency classification level would be via either CA6 or CA5.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU7 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU2
2. UFSAR 5.2.5
3. QOA 900-4 A-17, Annunciator Response
4. QGA 100, RPV Control
5. QCOP 0201-02, Filling the Reactor Vessel and/or Reactor Cavity Using a Condensate Booster Pump via the Feedwater System
6. QCOP 0201-13, Reactor Vessel Upper Wide Range Reference Leg Extension Use and Control
7. QCOP 0201-14, Reactor Vessel Level Control Using a Local Pressure Gauge

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1

Initiating Condition:

HOSTILE ACTION resulting in loss of physical control of the facility.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Value:

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1).

   OR

2. A HOSTILE ACTION has:

   - Caused failure of Spent Fuel Pool Cooling Systems

     AND

   - IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).

Table H1 - Safety Functions
• Reactivity Control (ability to shut down the reactor and keep it shutdown) • RCS Inventory (ability to cool the core) • Decay Heat Removal (ability to maintain heat sink)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1 (cont)

Basis (cont):

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

Threshold #1 Basis

This threshold encompasses conditions under which a HOSTILE ACTION has taken physical control of VITAL AREAS (containing vital equipment or controls of vital equipment) required to maintain any safety function. As a result, there is a loss of one or more of the Table H1 functions and equipment control cannot be transferred to and operated from another location.

If control of the plant equipment necessary to maintain all safety functions can be operated from the Control Room or transferred to another location, then the above EAL threshold is not met.

Threshold #2 Basis

This threshold addresses loss of physical control of spent fuel pool cooling systems if imminent fuel damage is likely because there is freshly off-loaded fuel in the pool. The condition “freshly off-loaded reactor fuel in pool” equates to fuel off-loaded within the last 120 days in NF-AA-309 Special Nuclear Material And Core Component Move Sheet Development.

Basis Reference(s):

1. SY-AA-101-132, Security Assessment and Response to Unusual Activities
2. Station Security Plan – Appendix C
3. NF-AA-309 Special Nuclear Material And Core Component Move Sheet Development
4. NEI 99-01, Rev. 5 HG1

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS1

Initiating Condition:

HOSTILE ACTION within the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

This condition represents an escalated threat to plant safety above that contained in the Alert in that a HOSTILE FORCE has progressed from the OWNER CONTROLLED AREA to the PROTECTED AREA.

This EAL addresses the contingency for a very rapid progression of events. It is not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack with minimal time available for further preparation or additional assistance to arrive requires Offsite Response Organizations (ORO) readiness and preparation for the implementation of protective measures.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS1 (cont)

Basis (cont):

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the PROTECTED AREA. Those events are adequately addressed by other EALs.

Escalation of this emergency classification level, if appropriate, would be based on actual plant status after impact or progression of attack.

Basis Reference(s):

1. NEI 99-01 Rev 5, HS4
2. SY-AA-101-132, Security Assessment and Response to Unusual Activities
3. Station Security Plan – Appendix C

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1

Initiating Condition:

HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site.

   OR

2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

OWNER CONTROLLED AREA (OCA): is the property associated with the station owned by the company. Access is normally limited to persons entering for official business.

Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

The fact that the site is under serious attack or is an identified attack target with minimal time available for further preparation or additional assistance to arrive requires a heightened state of readiness and implementation of protective measures that can be effective (such as on-site evacuation, dispersal or sheltering).

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1 (cont)

Basis: (cont)

Threshold #1 Basis

This EAL addresses the immediacy of an expected threat arrival or impact on the site within a relatively short time.

The intent of this EAL is to ensure that notifications for the airliner attack threat are made in a timely manner and that Offsite Response Organizations (ORO) and plant personnel are at a state of heightened awareness regarding the credible threat. Airliner is meant to be a large aircraft with the potential for causing significant damage to the plant.

This EAL is met when a plant receives information regarding an airliner attack threat from NRC and the airliner is within 30 minutes of the plant. Only the plant to which the specific threat is made need declare the Alert.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Threshold #2 Basis

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the OCA. Those events are adequately addressed by other EALs.

Note that this EAL is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA. This includes ISFSI's that may be outside the PROTECTED AREA but still within the OWNER CONTROLLED AREA.

Basis Reference(s):

1. NEI 99-01 Rev 5, HA4
2. SY-AA-101-132, Security Assessment and Response to Unusual Activities
3. Station Security Plan – Appendix C

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1

Initiating Condition:

Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. A credible site specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities.

   OR

2. A validated notification from NRC providing information of an aircraft threat.

   OR

3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

Basis:

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

Security events assessed as HOSTILE ACTIONS are classifiable under HA1, HS1 and HG1.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1 (cont)

Basis: (cont)

A higher initial classification could be made based upon the nature and timing of the security threat and potential consequences. The licensee shall consider upgrading the emergency response status and emergency classification level in accordance with the site's Safeguards Contingency Plan and Emergency Plan.

Threshold #1 Basis

This threshold is included to ensure that appropriate notifications for the security threat are made in a timely manner. This includes information of a credible threat. Only the plant to which the specific threat is made need declare the Notification of an Unusual Event.

The determination of "credible" is made through use of information found in the Station Security Plan or SY-AA-101-132, "Security Assessment and Response to Unusual Activities" procedure.

Threshold #2 Basis

The intent of this EAL is to ensure that notifications for the aircraft threat are made in a timely manner and that Offsite Response Organizations (ORO) and plant personnel are at a state of heightened awareness regarding the credible threat. It is not the intent of this EAL to replace existing non-hostile related EALs involving aircraft.

This EAL is met when a plant receives information regarding an aircraft threat from NRC. Validation is performed by calling the NRC. Only the plant to which the specific threat is made need declare the Unusual Event.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Escalation to Alert emergency classification level would be via HA1 would be appropriate if the threat involves an airliner within 30 minutes of the plant.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1 (cont)

Basis: (cont)

Threshold #3 Basis

Reference is made to security force because these individuals are the designated personnel on-site qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the plant Safeguards Contingency Plan.

This threshold is based on Station Security Plan – Appendix C. 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 in some cases under 10 CFR 50.72.

Basis Reference(s):

1. NEI 99-01 Rev 5, HU4
2. SY-AA-101-132, Security Assessment and Response to Unusual Activities.
3. Station Security Plan – Appendix C
4. NRC Safeguards Advisory 10/6/01
5. Letter from Mr. B. A. Boger (NRC) to Ms. Lynette Hendricks (NEI) dated 2/4/02

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS2

Initiating Condition:

Control Room evacuation has been initiated and plant control cannot be established.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Control Room evacuation has been initiated.

   AND

2. Control of the plant **cannot** be established in **< 30 minutes** per:
   - QOA 0010-05
     OR
   - QCARP 0050-01
     OR
   - QCARP 0050-02

Basis:

The time period to establish control of the plant starts when either:

a. Control of the plant is no longer maintained in the Main Control Room

   OR

b. The last Operator has left the Main Control Room.

The intent of this EAL is to capture those events where control of the plant cannot be reestablished in a timely manner. In this case, expeditious transfer of control of safety systems has not occurred (although fission product barrier damage may not yet be indicated).

The intent of the EAL is to establish control of important plant equipment and knowledge of important plant parameters in a timely manner. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions. Typically, these safety functions are reactivity control (ability to shutdown the reactor and maintain it shutdown), reactor water level (ability to cool the core), and decay heat removal (ability to maintain a heat sink).

The determination of whether or not control is established is based on Emergency Director (ED) judgment. The Emergency Director is expected to make a reasonable, informed judgment within the specified time for transfer that the licensee has control of the plant.

Escalation of this emergency classification level, if appropriate, would be by Fission Product Barrier or Abnormal Rad Levels/Radiological Effluent EALs.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS2 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 HS2
2. QOA 0010-05 Plant Operation With The Control Room Inaccessible
3. QCARP 0050-01, SB-1-1 Injection with SSMP and Bringing the Unit to Cold Shutdown
4. QCARP 0050-02, SB-1-1 Injection with RCIC and Bringing the Unit to Cold Shutdown

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA2

Initiating Condition:

Control Room evacuation has been initiated.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Entry into **ANY** of the following for Control Room evacuation:

- QOA 0010-05

  OR

- QCARP 0050-01

  OR

- QCARP 0050-02

Basis:

With the control room evacuated, additional support, monitoring and direction through the Technical Support Center and/or other emergency response facilities may be necessary.

Inability to establish plant control from outside the control room will escalate this event to a Site Area Emergency.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HA5
2. QOA 0010-05, Plant Operation With The Control Room Inaccessible
3. QCARP 0050-01, SB-1-1 Injection with SSMP and Bringing the Unit to Cold Shutdown
4. QCARP 0050-02, SB-1-1 Injection with RCIC and Bringing the Unit to Cold Shutdown

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3

Initiating Condition:

FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

FIRE or EXPLOSION resulting in any of the following:

- VISIBLE DAMAGE to a Table H2 permanent structure.

  OR

- VISIBLE DAMAGE to safety system equipment contained within a Table H2 area.

  OR

- Control Room indication of degraded safety system equipment performance contained within a Table H2 area.

Table H2 – Vital Areas
• Main Control Room • Reactor Building • Diesel Generator Rooms • 4 kV Switchgear Area • Battery Rooms • B-Train Control Room HVAC • RHR Service Water Vaults • Cribhouse • Turbine Building Cable Tunnel

Basis:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3 (cont)

Basis (cont):

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

The areas listed in Table H2 specify specific structures or areas that contain safety system, or component and functions required for safe shutdown of the plant.

VISIBLE DAMAGE is used to identify the magnitude of the FIRE or EXPLOSION and to discriminate against minor FIRES and EXPLOSIONS.

The reference to structures containing safety systems or components is included to discriminate against FIRES or EXPLOSIONS in areas having a low probability of affecting safe operation. The significance here is not that a safety system was degraded but the fact that the FIRE or EXPLOSION was large enough to cause damage to these systems.

An EXPLOSION due to failure of pressurized equipment that does not cause damage to other permanent structures or equipment associated with plant operations does not meet the criteria for declaration under this EAL, but may result in other declaration criteria being met (e.g., when the line is an element of a Fission Product Barrier, or the results in inventory loss).

The use of VISIBLE DAMAGE should not be interpreted as mandating a lengthy damage assessment prior to classification. The declaration of an Alert and the activation of the Technical Support Center will provide the Emergency Director with the resources needed to perform detailed damage assessments.

The Emergency Director also needs to consider any security aspects of the EXPLOSION.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions, Fission Product Barrier or Abnormal Rad Levels / Radiological Effluent EALs.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HA2
2. UFSAR Section 3.2

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3

Initiating Condition:

FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm.

Table H2 – Vital Areas
• Main Control Room • Reactor Building • Diesel Generator Rooms • 4 kV Switchgear Area • Battery Rooms • B-Train Control Room HVAC • RHR Service Water Vaults • Cribhouse • Turbine Building Cable Tunnel

OR

2. EXPLOSION within PROTECTED AREA affecting a Table H2 area.

Basis:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

PROTECTED AREA: An area which normally encompasses all controlled areas within the security protected area fence.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3 (cont)

Basis (cont):

This EAL addresses the magnitude and extent of FIRES or EXPLOSIONS that may be potentially significant precursors of damage to safety systems. It addresses the FIRE / EXPLOSION, and not the degradation in performance of affected systems that may result.

As used here, notification is visual observation and report by plant personnel or sensor alarm indication.

For the purposes of declaring an emergency event, the term “extinguished” means no visible flames.

Thresholds #1:

The 15 minute time period begins with a credible notification that a FIRE is occurring, or indication of a fire detection system alarm/actuation. Verification of a fire detection system alarm/actuation includes actions that can be taken within the control room or other nearby site specific location to ensure that it is not spurious. An alarm is assumed to be an indication of a FIRE unless it is disproved within the 15 minute period by personnel dispatched to the scene. In other words, a personnel report from the scene may be used to disprove a sensor alarm if received within 15 minutes of the alarm, but shall not be required to verify the alarm.

The intent of this 15 minute duration is to size the FIRE and to discriminate against small FIRES that are readily extinguished (e.g., smoldering waste paper basket). Such fires are excluded from consideration in this threshold since they have no safety consequence.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3 (cont)

Basis (cont):

Threshold #2 Basis:

This EAL addresses only those EXPLOSIONS of sufficient force to damage permanent structures or equipment associated with plant operations within the PROTECTED AREA.

An EXPLOSION due to failure of pressurized equipment that does not cause damage to other permanent structures or equipment associated with plant operations does not meet the criteria for declaration under this EAL, but may result in other declaration criteria being met (e.g., when the line is an element of a Fission Product Barrier, or the results in inventory loss).

No attempt is made to assess the actual magnitude of the damage. The occurrence of the EXPLOSION is sufficient for declaration.

The Emergency director also needs to consider any security aspects of the EXPLOSION, if applicable.

Escalation of this emergency classification level, if appropriate, would be based on HA3.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HU2
2. UFSAR Section 3.2

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4

Initiating Condition:

Natural or destructive phenomena affecting VITAL AREAS.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by Strong Motion Seismograph:

   - **> 0.125 volts (0.10 g)** (Channel 1 or 3)

     OR

   - **> 0.100 volts (0.08 g)** (Channel 2)

   AND

   b. Confirmed by **ANY** of the following:

   - Earthquake felt in plant.

     OR

   - National Earthquake Center.

     OR

   - Control Room indication of degraded performance of systems required for the safe shutdown of the plant.

   OR

2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area:

   - Tornado strike

     OR

   - High winds **> 100 mph**

     OR

   - Vehicle crash

     OR

   - Turbine failure-generated PROJECTILES

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

EAL Threshold Value(s) (cont):

Table H2 – Vital Areas
• Main Control Room • Reactor Building • Diesel Generator Rooms • 4 kV Switchgear Area • Battery Rooms • B-Train Control Room HVAC • RHR Service Water Vaults • Cribhouse • Turbine Building Cable Tunnel

OR

3. Flooding in any Table H3 area that results in **ANY** of the following:
   a. Degraded safety system performance as indicated in the Control Room.
      OR
   b. Industrial safety hazards (e.g., electric shock) that precludes access necessary to operate or monitor safety equipment.
      OR
   c. Water level **> QGA 300, Maximum Safe** operating levels.

Table H3 – Internal Flooding Areas
• A RHR Room • B RHR Room • A Core Spray Room • B Core Spray Room • Torus Area • HPCI Area

OR

4. Abnormal River level, as indicated by **EITHER**:
   - High river water level **> 603 ft.**
     OR
   - Low river water level **< 561 ft.**

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

Basis (cont):

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

PROJECTILE: An object directed toward a NUCLEAR POWER PLANT (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

These EALs escalate from HU4 in that the occurrence of the event has resulted in VISIBLE DAMAGE to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control room indications of degraded system response or performance. The occurrence of VISIBLE DAMAGE and/or degraded system response is intended to discriminate against lesser events. 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. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction ICs.

Threshold #1 Basis:

This threshold addresses events that may have resulted in a Table H2 area being subjected to forces beyond design limits and thus damage may be assumed to have occurred to plant safety systems.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

Basis (cont):

Threshold #2 Basis:

This threshold addresses events within the PROTECTED AREA that results in VISIBLE DAMAGE to any Table H2 structure or Control Room indication of degraded performance of a safety system in any Table H2 area:

This threshold addresses the following events:

- Tornado strike.
- High winds.
- Vehicle crashes such as plane, helicopter, train, barge, car or truck crashes. The Emergency director also needs to consider any security aspects of the vehicle crash.
- Threat to safety-related equipment imposed by PROJECTILES generated by main turbine rotating component failures.

Threshold #3 Basis:

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. The actual component failure or equipment misalignment is addressed by Technical Specifications or plant procedures unless the resulting flooding causes degraded performance of safety systems, or has created industrial safety hazards (e.g., electrical shock) that preclude necessary access to operate or monitor safety equipment. The inability to access, operate or monitor safety equipment represents an actual or substantial potential degradation of the level of safety of the plant.

Flooding as used in this EAL describes a condition where water is entering the room faster than installed equipment is capable of removal, resulting in a rise of water level within the room. Classification of this EAL should not be delayed while corrective actions are being taken to isolate the water source.

Threshold #4 Basis:

River level elevation of 603 feet is the maximum flood elevation, which can assure the plant, can be shutdown and maintained in a safe condition.

Low river level < 561 feet threatens the source of makeup water to the Ultimate Heat Sink, which jeopardizes the ability to maintain both units in cold shutdown.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 HA1
2. UFSAR Section 3.7.4
3. UFSAR Section 3.7.1
4. QCIS 0010-01 Strong Motion Accelerometer Recorder Operability Test
5. QCOA 0010-09 Earthquake
6. QCOP 0010-07 Seismic Event Retrieval
7. QCOA 0010-10 Tornado Watch/Warning, Severe Thunder Storm Warning or Severe Winds
8. UFSAR Section 3.3
9. Drawing B-01A Composite Site Plan
10. UFSAR Section 3.2
11. QGA 300 Secondary Containment Control
12. UFSAR Section 3.4.1.1
13. QCTP 0130-11 Internal Flood Protection Program
14. Drawing FL-1 Flood Barriers
15. Quad Cities Nuclear Power Station Unit 1 and 2 Internal Flooding Analysis Note Book, July 1993 Final Draft, prepared by Individual Plant Evaluation Partnership (IPEP)

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4

Initiating Condition:

Natural and destructive phenomena affecting the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. Seismic event as indicated by any **TWO** of the following:
   - Seismic event confirmed by station seismic monitor procedure.

     OR
   - Earthquake felt in plant.

     OR
   - National Earthquake Center.

   OR
2. **EITHER** of the following occurring within the PROTECTED AREA boundary:
   - Tornado strike

     OR
   - Sustained **(> 15 minutes)** high winds **> 100 mph**

   OR
3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

   OR
4. Flooding in any Table H3 area that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

Table H3 – Internal Flooding Areas
• A RHR Room • B RHR Room • A Core Spray Room • B Core Spray Room • Torus Area • HPCI Area

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont)

EAL Threshold Values:

OR

5. Abnormal River level, as indicated by **EITHER**:

   - High river water level **> 594 ft.**

     OR

   - Report of substantial reduction in river level by site personnel and confirmation by the Corp. of Engineers that Dam # 14 has failed.

Basis:

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

These EALs are categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

Threshold #1 Basis:

Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

Threshold #2 Basis:

This EAL is based on a tornado striking (touching down) or high winds within the PROTECTED AREA.

Escalation of this emergency classification level, if appropriate, would be based on VISIBLE DAMAGE, or by other in plant conditions, via HA4.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont)

Basis (cont):

Threshold #3 Basis:

This EAL addresses main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Generator seal damage observed after generator purge does not meet the intent of this EAL because it did not impact normal operation of the plant.

Of major concern is the potential for leakage of combustible fluids (lubricating oils) and gases (hydrogen cooling) to the plant environs. Actual FIRES and flammable gas build up are appropriately classified via HU3 and HU5.

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 this emergency classification level, if appropriate, would be to HA4 based on damage done by PROJECTILES generated by the failure or by the radiological releases. The latter events would be classified by the radiological EALs or Fission Product Barrier.

Threshold #4 Basis:

The assessment of the potential for flooding to affect safety related equipment is based on the rate of level rise in the area and the ability to terminate the input prior to submerging or spraying the electrical portion of safety related equipment.

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. Minor leaks, such as valve packing or instrument line breaks would not constitute “Flooding.” The Internal Flooding Areas of concern for the Unusual Event declaration are those Table H3 areas that have the potential to affect safety related equipment needed for the current operating mode.

Escalation of this emergency classification level, if appropriate, would be based VISIBLE DAMAGE via HA4, or by other plant conditions.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont)

Basis (cont):

Threshold #5 Basis:

The Design Flood elevation is 594.5 ft. el. (rounded down to 594 ft. el. MSL). This initial design flood elevation is equal to the plant grade of 594.5 ft. el. and any mode of operation is, therefore, possible without additional protective measures.

The station design is such that if Lock and Dam No. 14 were to fail, the water level would recede in the intake bay to the point where it would be separated from the river. As the water level recedes in the intake bay, circulating water, service water and fire diesel pumps would become inoperable, leaving only RHRSW and DGCW available to shutdown the units. Use of the ultimate heat sink to shutdown the reactors requires the operation of portable diesel pumps with a total capacity of 5100 gpm to reverse the normal flow of makeup water. Makeup water would be provided from the river through the discharge piping and return to the river across the log boom in the intake bay.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HU1
2. UFSAR Section 3.7.4
3. UFSAR Section 3.7.1
4. QCIS 0010-01 Strong Motion Accelerometer Recorder Operability Test
5. QCOA 0010-09 Earthquake
6. QCOP 0010-07 Seismic Event Retrieval
7. QCOA 0010-10 Tornado Watch/Warning, Severe Thunder Storm Warning or Severe Winds
8. UFSAR Section 3.3
9. Drawing B-01A Composite Site Plan
10. UFSAR Section 3.2
11. QCTP 0130-11 Internal Flood Protection Program
12. Drawing FL-1 Flood Barriers
13. Quad Cities Nuclear Power Station Unit 1 and 2 Internal Flooding Analysis Note Book, July 1993 Final Draft, prepared by Individual Plant Evaluation Partnership (IPEP)

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5

Initiating Condition:

Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.

Table H2 – Vital Areas
• Main Control Room • Reactor Building • Diesel Generator Rooms • 4 kV Switchgear Area • Battery Rooms • B-Train Control Room HVAC • RHR Service Water Vaults • Cribhouse • Turbine Building Cable Tunnel

Basis:

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5 (cont)

Basis (cont)

Gases in a VITAL AREA can affect the ability to safely operate or safely shutdown the reactor.

The fact that SCBA may be worn does not eliminate the need to declare the event.

A precautionary area evacuation for the purpose of atmospheric testing does not warrant declaration until test results are obtained unless access is required for operation of operable equipment to maintain safe operations or safely shutdown the reactor. Declaration should not be delayed for confirmation from atmospheric testing if the atmosphere poses an immediate threat to life and health or an immediate threat of severe exposure to gases. This could be based upon documented analysis, indication of personal ill effects from exposure, or operating experience with the hazards such as an inadvertent actuation of installed Cardox fire suppression system.

Station evaluations have shown that installed Halon systems by design do not create an IDLH atmosphere when discharged. Therefore, when an installed Halon Fire Suppression system discharge occurs, an IDLH atmosphere should not be assumed, and declaration of a toxic or asphyxiant IDLH atmosphere must be based on representative sampling of the affected area, unless there are indications of personal ill effects resulting from exposure.

Areas directly associated with a fire that may be considered to have a hazardous environment (due to smoke, design fire suppression system actuation or administrative controls awaiting ventilation and/or testing) do not warrant declaration of an Alert under this EAL but should be evaluated against the fire EALs.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of 19.5%, which can lead to breathing difficulties, unconsciousness or even death.

An uncontrolled release of flammable gasses 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. Flammable gasses, such as hydrogen and acetylene, are routinely used to maintain plant systems (hydrogen) or to repair equipment/components (acetylene - used in welding). This EAL assumes concentrations of flammable gasses which can ignite/support combustion.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions, Fission Product Barrier or Abnormal Rad Levels / Radioactive Effluent EALs.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5 (cont)

Basis Reference(s):

1. NEI 99-01, Rev. 5 HA3
2. UFSAR Section 3.2
3. ACIT 660892-20, Station Halon Discharge IDLH Evaluation

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU5

Initiating Condition:

Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS.

   OR

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

Basis:

NORMAL PLANT OPERATIONS: Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

This EAL is based on the release of toxic, corrosive, asphyxiant or flammable gases of sufficient quantity to affect NORMAL PLANT OPERATIONS.

The fact that SCBA may be worn does not eliminate the need to declare the event.

This EAL is not intended to require significant assessment or quantification. It assumes an uncontrolled process that has the potential to affect plant operations. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation.

The release may have originated within the Protected Area boundary, or it may have originated offsite and subsequently drifted inside the Protected Area boundary. Offsite events (e.g., tanker truck accident releasing toxic gases, etc.) resulting in the plant being within the evacuation area should also be considered in this EAL because of the adverse affect on NORMAL PLANT OPERATIONS.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU5 (cont)

Basis: (cont)

Areas directly associated with a fire that may be considered to have a hazardous environment (due to smoke, design fire suppression system actuation or administrative controls awaiting ventilation and/or testing) do not warrant declaration of an Unusual Event under this EAL but should be evaluated against the fire EALs.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of 19.5%, which can lead to breathing difficulties, unconsciousness or even death.

Escalation of this emergency classification level, if appropriate, would be based on HA5.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HU3
2. UFSAR Section 3.2

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG6

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the General Emergency class.

Basis Reference(s):

1. NEI 99-01, Rev 5 HG2

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS6

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a Site Area Emergency.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency class description for Site Area Emergency.

Basis Reference(s):

1. NEI 99-01, Rev 5 HS3

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA6

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the Alert emergency class.

Basis Reference(s):

1. NEI 99-01, Rev 5 HA6

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU6

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Unusual Event.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Basis:

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

Basis Reference(s):

1. NEI 99-01, Rev 5 HU5

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

E-HU1

Initiating Condition:

Damage to a loaded cask CONFINEMENT BOUNDARY.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**

Basis:

CONFINEMENT BOUNDARY – is the barrier(s) between areas containing radioactive substances and the environment.

An Unusual Event in this EAL is categorized on the basis of the occurrence of an event of sufficient magnitude that a loaded cask CONFINEMENT BOUNDARY is damaged or violated. This includes classification based on a loaded fuel storage cask CONFINEMENT BOUNDARY loss leading to the degradation of the fuel during storage or posing an operational safety problem with respect to its removal from storage.

Basis Reference(s):

1. NEI 99-01, Rev. 5 E-HU1
2. HI-STORM 100 FSAR Rev. 3
3. HI-STAR 100 FSAR Rev. 1

Section 4: Emergency Measures

4.1 Notification of the Emergency Organization

Standard NARS notifications for the Quad Cities Station are made to the State of Illinois Emergency Management Agency (IEMA), the State of Iowa Emergency Management Division (IEMD), Scott County Sheriff's Office, and Clinton County Sheriff's Office. At the Quad Cities Generating Station, if a General Emergency is the initiating event, the Emergency Director is responsible for notifying the following additional Illinois, Iowa and local agencies:

- Rock Island Communications Center
- Whiteside County Sheriff

4.2 Assessment Actions

Throughout each emergency situation, continuing assessment will occur. Assessment actions at Quad Cities Station may include an evaluation of plant conditions; in-plant, onsite, and initial offsite radiological measurements; and initial estimates of offsite doses. Core damage information is used to refine dose assessments and confirm or extend initial protective action recommendations. Quad Cities Station utilizes NEDC-33045P-A, Revision 0, (2001) as the basis for the methodology for post-accident core damage assessment. This methodology utilizes real-time plant indications. In addition, Quad Cities Station may use samples of plant fluids and atmospheres as inputs to the CDAM (Core Damage Assessment Methodology) program for core damage estimation.

4.3 Protective Actions for the Offsite Public

To aid Control Room personnel during a rapidly developing emergency situation, Figure 4.1: "Protective Action Recommendation (PAR) Determination Flowchart for Quad Cities Station" has been developed based on Section J.10.m of the Emergency Plan.

4.3.1 Alert and Notification System (ANS) Sirens

This ANS consists of a permanently installed outdoor notification system within a ten-mile radius around the station. The ten-mile radius around the station is primarily an agricultural area with a population density below 2000 persons per square mile. The ANS, as installed, consists of mechanical and electronic sirens that will cover this entire area with a minimum sound level of 60 db. Additionally, the ANS will cover the heavily populated areas within ten-mile radius around the station with a minimum sound level of 70 db to ensure complete coverage.

4.3.2 Evacuation Time Estimates

The ETE study used population data from the 2010 census which includes parts of two counties in Iowa (Clinton, Scott) and two counties in Illinois (Rock Island and Whiteside). The evacuation times are based on a detailed consideration of the EPZ roadway network and population distribution. The ETE Study, contained in EP-AA-1006 Addendum 2, Evacuation Time Estimates for the Quad Cities Generating Station Plume Exposure Pathway

Emergency Planning Zone, presents evacuation times for daytime and nighttime scenarios under various weather conditions for the evacuation of various areas around the Quad Cities Station, once a decision has been made to evacuate.

4.4 Protective Actions for Onsite Personnel

Quad Cities Station has a siren system to warn personnel of emergency conditions. Upon hearing a continuous two (2) minute siren, all personnel not having emergency assignments have been instructed to assemble in predesignated assembly areas. Refer to Figure 4-2.

If a site evacuation of non-essential personnel is required, personnel will be released to their homes or relocated and monitored at one of the following designated relocation centers for Quad Cities:

- Morrison Relocation Center, Morrison, Illinois
- Byron Station, Byron Illinois

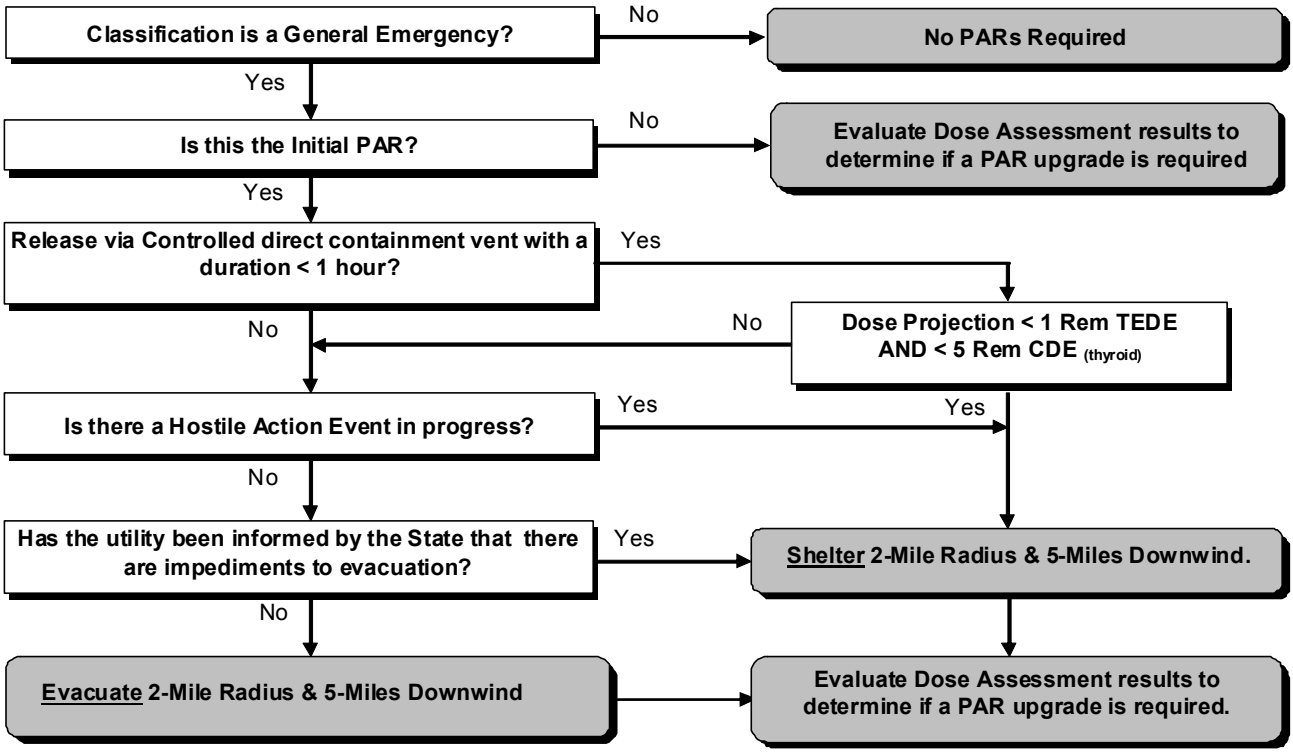
For evacuation routes, refer to EP-AA-113-F-21.

Traffic control for onsite areas will be handled by the Quad Cities Station security force, if necessary.

When a site evacuation is imminent, the TSC Security Coordinator notifies by phone or dispatches a security guard to notify those personnel in buildings outside the protected area (Training Building, Warehouse, Wastewater Treatment Plant, etc.). These personnel are evacuated using the prescribed route to the designated relocation center. Personnel in the warehouses, sewage treatment plant, wastewater treatment plant, and training building will assemble at their present location and await further instructions (e. g. evacuation).

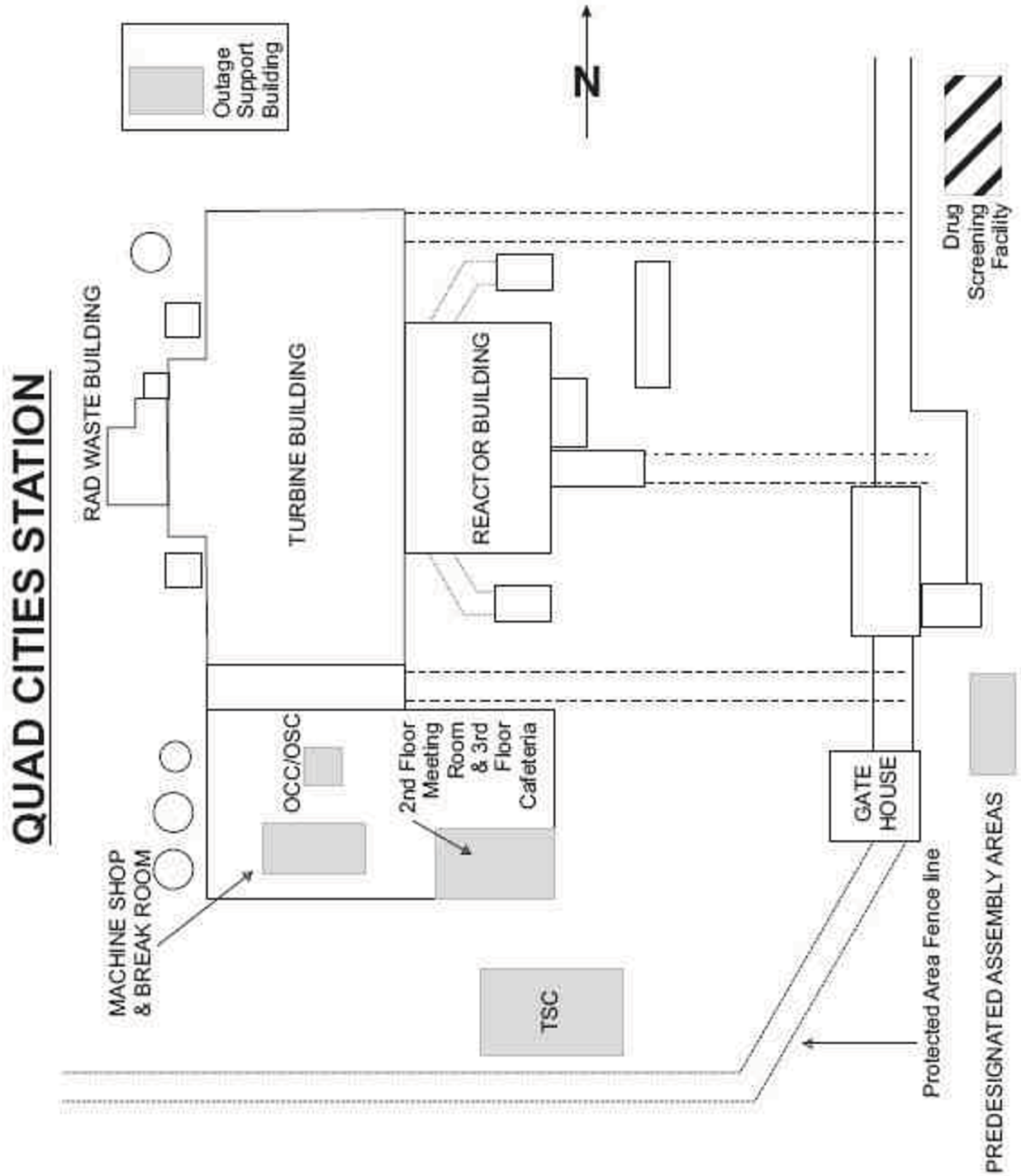
Equipment and personnel would be available at the Morrison Relocation Center and Byron Station for monitoring and decontamination of evacuated personnel. If major decontamination and follow-up or bioassay samples are necessary, those persons would be sent to Byron Station.

Figure 4-1: PAR Determination Flowchart



2 Mile Radius, 5 Miles Downwind				
WD (from)			Illinois	Iowa
009º	to	024º	1, 3	1, 2, 6
025º	to	029º	1, 3	1, 2, 4, 6
030º	to	081º	1	1, 2, 4, 6
082º	to	090º	1	1, 2, 3, 4, 6
091º	to	116º	1	1, 2, 3, 4
117º	to	165º	1	1, 2, 3
166º	to	186º	1	1, 2, 3, 5
187º	to	215º	1	1, 2, 5
216º	to	240º	1, 2	1, 2, 5
241º	to	289º	1, 2	1, 2
290º	to	318º	1, 2, 3	1, 2
319º	to	008º	1, 3	1, 2

Figure 4-2: Predesignated Assembly Areas



Section 5: Emergency Facilities and Equipment

5.1 Emergency Response Facilities

Refer to Figure 5-1 for the location of the Quad Cities Station Control Room, Technical Support Center (TSC), and Operations Support Center (OSC) within the Station's Protected Area boundary.

5.1.1 Station Control Room

The Quad Cities Station Control Room shall be the initial onsite center of emergency control. The Control Room is located on the 620-foot elevation of the Service Building.

5.1.2 Technical Support Center (TSC)

Quad Cities Station has established a Technical Support Center (TSC) in a building located south of the Service Building. The TSC fully meets the requirements of Section H.1.b of the Emergency Plan.

5.1.3 Operational Support Center (OSC)

Quad Cities Station has designated an Operational Support Center. The OSC is located on the ground floor in the Service Building in a space designated as the Outage Control Center. The OSC conforms to the requirements of Section H.1.c of the 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.

5.1.4 Alternative Facility

The Alternative Facility maintains the capability for staging the TSC/OSC emergency response organization personnel in the event of a hostile action. This alternative facility has the capability for communications with the emergency operations facility, control room, and plant security. The Alternative Facility is located at 14439 Crosby Road, Morrison Illinois.

5.2 Assessment Resources

5.2.1 Onsite Meteorological Monitoring Instrumentation

The meteorological tower, located 1623 meters SSE of the plant, is 300 ft. high and is instrumented at three levels. The 33 ft., 196 ft. and 296 ft. levels correspond to the elevations of the possible points of airborne effluent release. Wind speed and wind direction are measured at all three elevations. Ambient temperature is measured at 33 ft. and differential temperatures referenced to 33 ft. are measured at 196 ft. and 296 ft. Precipitation is measured nearby.

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.

5.2.1.1 Instrumentation

The meteorological tower is instrumented with equipment that conforms with the recommendations of Regulatory Guide 1.23 and ANSI/ANS 2.5 (1984). The equipment is placed on booms oriented into the general prevailing wind at the site. Equipment signals are brought to the process computers and to an instrument building with controlled environmental conditions. The building at the base of the tower houses the recording equipment, signal conditioners, etc., used to process and re-transmit the data to the end point users.

5.2.1.2 Meteorological Measurement Program During a Disaster

Cooperation between the corporate office and the meteorological contractor assures that a timely restoration of any outage can be made. Emergency field visits to the site are made as quickly as possible after detection of a failure.

Should a disaster of sufficient magnitude occur to destroy the tower structure, a contract is maintained to have a temporary tower erected within 72 hours, weather conditions permitting. Further, the meteorological contractor maintains two levels of sensors (wind speed, wind direction and temperature) in a state of readiness for use on the temporary tower.

Additionally, Exelon Nuclear's existing instrumented towers at other nuclear sites provide a high density measurement network with multiple backup opportunities.

Meteorological data are available to the station Control Room, Technical Support Center, and Emergency Operations Facility for use in the Dose Assessment Computer Model for estimating the environmental impact of unplanned releases of radioactivity from the station.

5.2.2 Onsite Radiation Monitoring Equipment

Sections 2.7, 7.6 and 9.5 of the UFSAR for Quad Cities Station, Unit 1 and 2, describe in detail the radiation monitoring systems and equipment. The modified off-gas treatment system is described in Section 9.2 of the UFSAR. In addition to the dedicated systems described here, chemistry and health physics personnel are trained and equipped to perform radiological monitoring and sampling.

The radiation monitoring systems and equipment can be categorized into four (4) groups:

5.2.2.1 Radiological Noble Gas Effluent Monitoring: A wide-range monitoring system is installed in the effluent stream in the main chimney and in the effluent stream of the reactor building vent stack. Methods for converting instrument readings to release rates have been developed and are incorporated into Station procedures.

5.2.2.2 Radioiodine and Particulate Effluent Monitoring: Effluent sampling media are analyzed in the Station counting room using a GeLi isotopic system.

5.2.2.3 High-Range Containment Radiation Monitors: Two high range containment radiation monitors are installed on each of Quad Cities Station's units. The range of these monitors is from 1 R/hr to 108 R/hr.

5.2.2.4 In-plant Iodine Instrumentation: Quad Cities Station has the capability to sample and determine iodine concentrations in the plant using Silver Zeolite or charcoal cartridges and gamma ray spectroscopy. Monitors may be used to measure increasing levels of iodine during emergency conditions (e.g. a portable gamma ray spectroscopy system).

5.2.3 Onsite Process Monitors

Adequate monitoring capability exists to properly assess the plant status for all modes of operation. The operability of the post-accident instrumentation ensures information is available on selected plant parameters to monitor and assess important variables following an accident. Instrumentation is available to monitor the parameters and ranges given in Technical Specifications.

Station procedures have been developed which would aid personnel in recognizing inadequate core cooling using applicable instrumentation.

5.2.4 Onsite Fire Detection Instrumentation

Quad Cities Station has a fire protection system that is designed to quickly detect any fires, annunciate locally and in the Control Room, and initiate the appropriate automatic action.

The station fire protection system is described in the Fire Hazards Analysis Report. The detection instrument minimum requirements and further system description are contained in QCAP 1500-1 (Administrative Requirements for Fire Protection). In the event that a portion of the fire detection instrumentation is inoperable, contingency actions are taken as defined in the above.

5.2.5 Facilities and Equipment for Offsite Monitoring

Consult Chapter 11 of the station specific Offsite Dose Calculation Manual (ODCM) for the most current location for fixed continuous air samplers and Dosimeter of Legal Record (DLR) locations.

5.2.6 Site Hydrological Characteristics

Assessments covering the hydrological aspects of the site (i.e., effects of the Mississippi River) are made as follows:

a. Onsite: River level gauge located in the intake bay.

b. Offsite: The U.S. Army Corps. of Engineers will provide information regarding river levels and other conditions of importance. (Flood information can be obtained from the U.S. National Weather Service.)

5.3 Protective Facilities and Equipment

The onsite assembly areas for Quad Cities Station are shown in Figure 4-2. These areas are suitable because:

1) They are large open areas suitable for assembling a large number of people in a short time;

2) They are relatively close to the Security Gatehouse; and

3) They have a low probability of being affected by a serious accident involving the Nuclear Steam Supply System (NSSS).

The offsite evacuation assembly areas for Quad Cities Station are discussed in Section 4.4 of this annex. These areas are suitable because they are easily accessible. The relocation routes to these facilities would be determined by the actual wind direction at the time of evacuation.

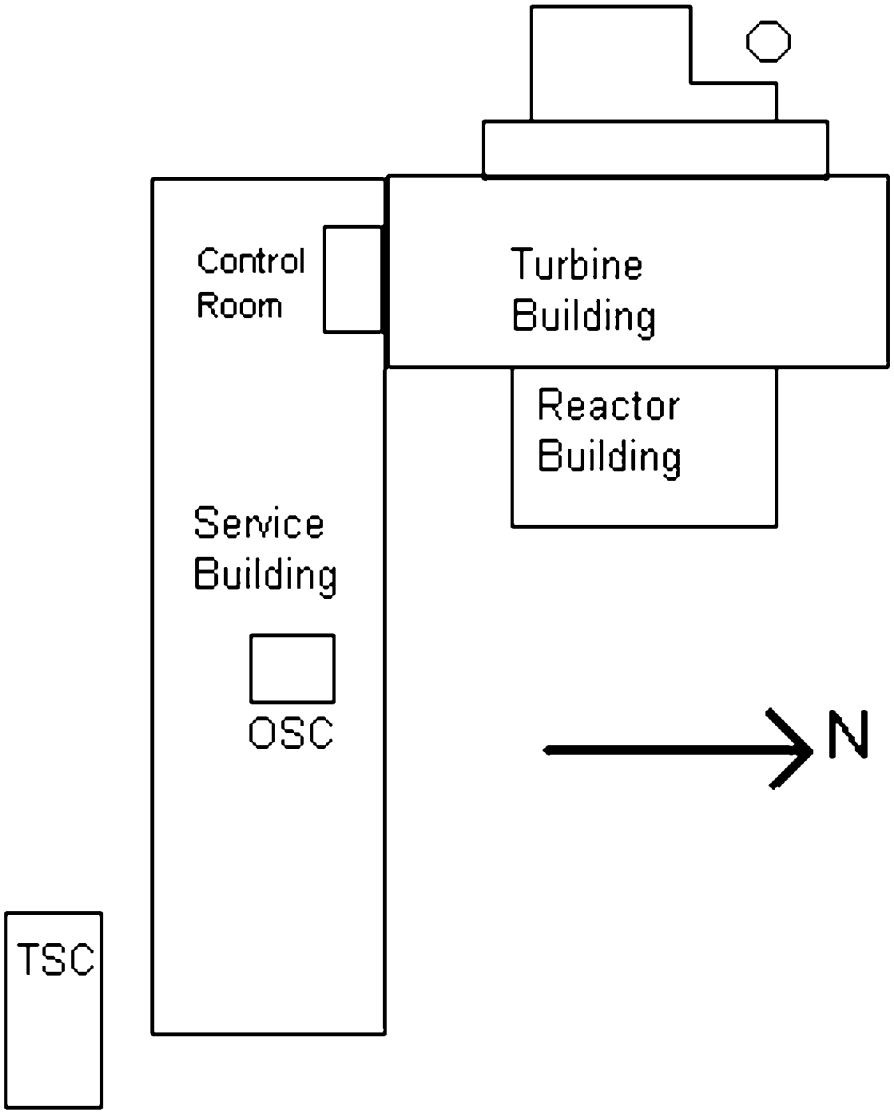
5.4 First Aid and Medical Facilities

Quad Cities Station has a decontamination/first aid room on the ground floor of the Service Building near the entrance to the plant. This room is provided with a sink, showers, and supply cabinet.

First aid kits, stretchers, sinks, eyewashes, and emergency showers have been placed in strategic locations throughout the station.

Medical treatment given to injured persons at the station is of a "first aid" nature. When more professional care is needed, injured persons are transported to a local hospital or clinic. Genesis Medical Center Illini Campus in Silvis, Illinois, is the Quad Cities Station primary supporting medical facility. Trinity Medical Center West Campus in Rock Island, Illinois is the backup medical facility for evaluation and treatment of persons suffering from traumatic injury, medical illness, or radiation exposure and uptake.

Figure QCA 5-1: Location Of Onsite Area Emergency Response Facilities



Appendix 1: NUREG-0654 Cross-Reference

Annex Section	NUREG-0654
1.0	Part I, Section A
1.1	Part I, Section C
1.2	Part I, Section D
1.3	Part II, Section A.1
Figure 1-1	Part I, Section D
2.0	Part II, Section A.4
2.1	Part II, Section A.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.m
4.3.1	Part II, Section E.6
4.3.2	Part II, Section J.8
4.4	Part II, Section J.1-5
Figure 4-1	Part II, Section J.10.m
Figure 4-2	Part II, Section J.5
4.4	Part II, Section J.2 & 3
Table 4-1	Part II, Section J.8
Table 4-2	Part II, Section J.10.b
5.1	Part II, Section H.1 & G.3
5.2.1	Part II, Section H.5.a & 8
5.2.2	Part II, Section H.5.b & 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
5.2.6	Part II, Section H.5.a & 6.a
5.3	Part II, Section J.1-5
5.4	Part II, Section L.1 & 2
Figure 5-1	Part II, Section H.1

Appendix 2: Station Letters of Agreement

1. The Illinois State Police - law enforcement
2. The Rock Island County Sheriff's Office -law enforcement
3. Genesis Medical Center Illini Campus in Silvis, Illinois - medical treatment and ambulance services
4. Trinity Medical Center West Campus – medical treatment.
5. Cordova Fire Department - fire protection

ATTACHMENT 9

EP-AA-1007, Revision 27

Exelon Nuclear Radiological Emergency Plan Annex for
Peach Bottom Atomic Power Station

Exelon Generation®

EXELON NUCLEAR

RADIOLOGICAL EMERGENCY PLAN ANNEX

FOR

PEACH BOTTOM ATOMIC POWER STATION

Table of Contents

Section **Page**

Table of Contents

Section **Page**

Section 5: Emergency Facilities and Equipment

APPENDICES

ADDENDUMS

Table of Contents

REVISION HISTORY

REVISION	REVISION DATE
0	August 2002
1	September 2002
2	November 2002
3	January 2003
4	February 2003
5	February 2003
6	April 2003
7	May 2003
8	September 2003
9	October 2003
10	December 2004
11	May 2005
12	September 2005
13	January 2006
14	May 2007
15	September 2007
16	November 2007
17	September 2008
18	May 2009
19	March 2010
20	December 2010
21	March 2011
22	September 2011
23	February 2012
24	November 2012
25	November 2012
26	December 2012
27	June 2013

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

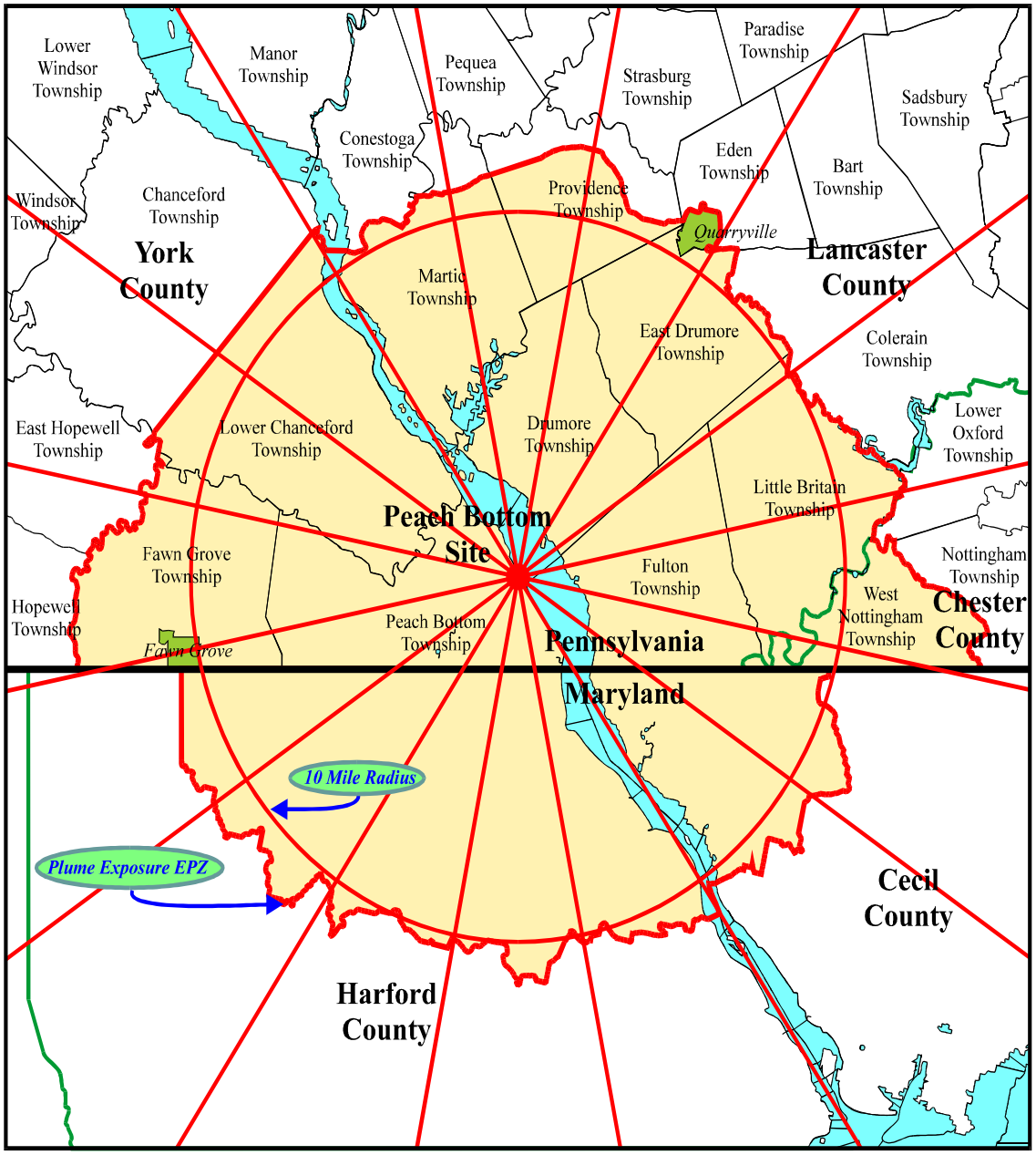
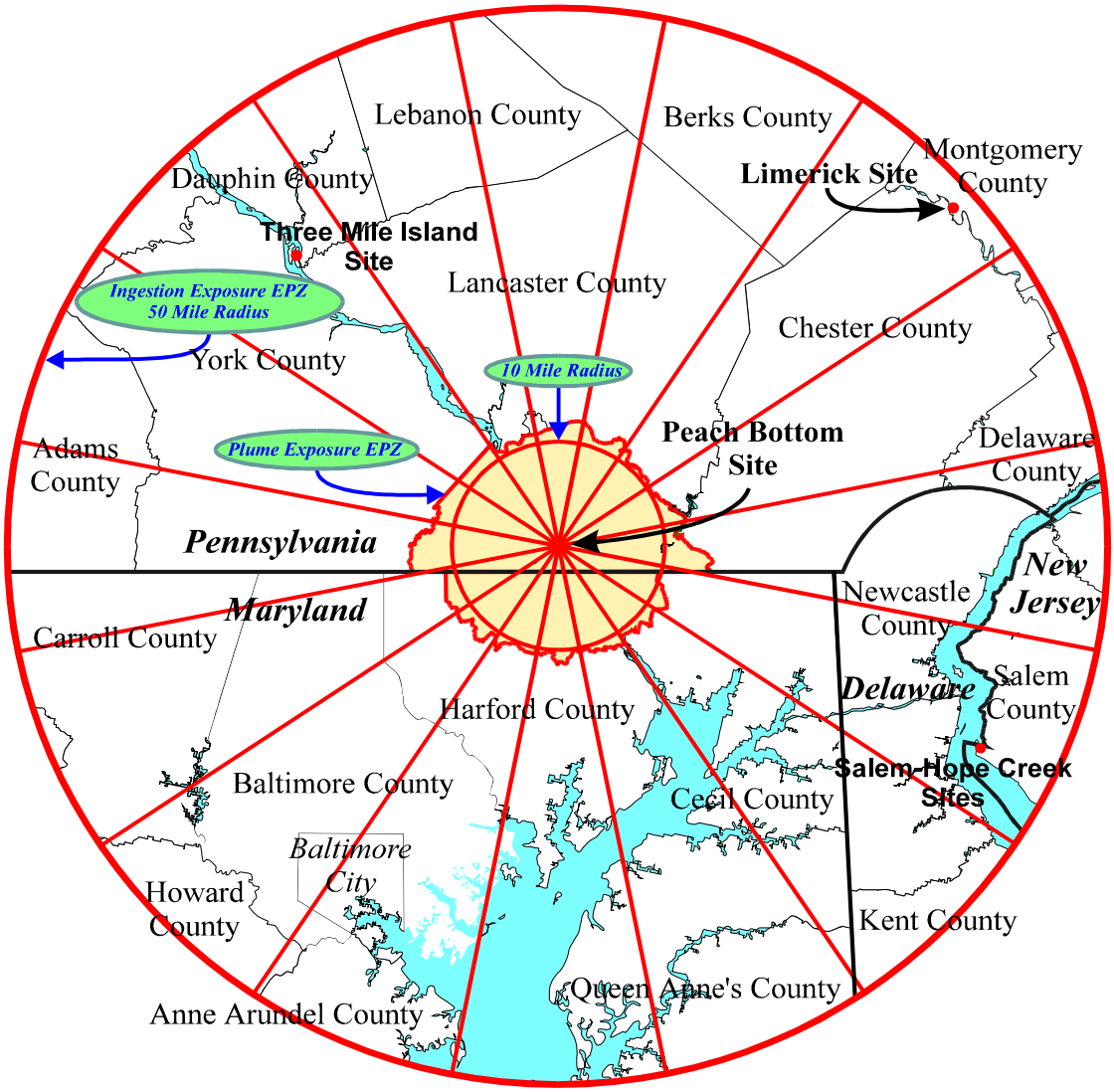


Figure PBAPS 1-2: 50-Mile Ingestion Pathway EPZ



Section 2: Organizational Control of Emergencies

This section describes the Emergency Response Organization (ERO) and its key positions. It outlines the staffing requirements which provide initial emergency response actions and provisions for timely augmentation of on-shift personnel when required. It also describes interfaces among Exelon Nuclear emergency response personnel and specifies the offsite support available to respond to the nuclear generating stations.

2.1 Shift Organization Staffing

Initial response to any emergency is by the normal plant organization present at the site. This organization includes positions that are onsite 24 hours per day and is described in Section B.1 of the Exelon Nuclear Standardized Radiological Emergency Plan. The Normal Shift Organization will be augmented, in an emergency, with designated/additional Emergency Response Organization (ERO) personnel within 60 minutes of notification as specified under Table PBAPS 2-1. ERO activation is described in Section H.4 of the Exelon Nuclear Standardized Radiological Emergency Plan.

Table PBAPS 2-1 outlines ERO positions required to meet minimum staffing and full augmentation of the on-shift complement at an Alert or higher classification, and the major tasks assigned to each position. Responsibilities for each position are described in Section B.5 of the Exelon Nuclear Standardized Radiological Emergency Plan.

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.

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 PBAP-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.

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

No changes in augmentation positions or staffing levels for the Joint Information Center (JIC)) and Emergency News Center (ENC) from that specified in the Exelon Nuclear Standardized Radiological Emergency Plan.

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 + 3 months (25% grace period).

2.4 Non-Exelon Nuclear Support Groups

Agreements exist on file with or are verified current annually by the MA Region Corporate Emergency Preparedness Group for the following support agencies listed in Appendix 2 of the Exelon Nuclear Radiological Emergency Plan Annex for PBAPS.

Additionally, Exelon Nuclear has contractual agreements common within Exelon Nuclear with several companies whose services would be available in the event of a radiological emergency. These agencies are listed in Appendix 3 of the Exelon Nuclear Standardized Radiological Emergency 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	Minimum Shift Size	[a]60 Minute Augmentation	Full Augmentation
1. Plant Operations/Safe Shutdown and Assessment of Operational Aspects	Control Room Staff	Shift Manager	1		
		Control Room Supervisor	1		
		Reactor Operator	3		
		Equipment Operator	3		
2. Emergency Direction and Control	Command and Control / Emergency Operations	Shift Emergency Director (CR)	1[d]		
		Station Emergency Director (TSC)		1	
		Corporate Emergency Director (EOF)		1	
3. Notification & Communication	Emergency Communications	Shift Personnel[b]	2		
		TSC Director (TSC)		1	
		EOF Director (EOF)		1	
		State/Local Communicator		1 (EOF)	1 (TSC)
		ENS Communicator		1 (TSC)	1 (EOF)
		HPN Communicator		1 (EOF)	1 (TSC)
	Plant Status	Operations Communicator (CR/TSC)			2
	In-Plant Team Control	Damage Control Comm. (CR/TSC/OSC)			3
	Technical Activities	Technical Communicator (TSC)			1
	Governmental	EOC Communicator (EOF)			1
		State EOC Liaison[f] (PEMA/MEMA)			2
		Regulatory Liaison (EOF)			1
4. Radiological Accident Assessment and Support of Operational Accident Assessment	Offsite Dose Assessment	Radiation Protection Personnel[c]	1		
		Dose Assessment Coordinator (EOF)		1	
		Dose Assessor (EOF)			1
		Radiation Controls Coordinator (TSC)			1
	Offsite Surveys	Environmental Coordinator (EOF)		1	
		Field Team Communicator (EOF)			1
		Off-Site Field Team Personnel [j]	2	2	(e)
	Onsite Surveys	RP Personnel		2	(e)
	In-plant Surveys	RP Technicians	1	2	(e)
	Chemistry	Chemistry Personnel	1	1	(e)
	RP Supervisory	Radiation Protection Manager(TSC/EOF)		2	

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

Functional Area	Major Tasks	Emergency Positions	Minimum Shift Size	[a]60 Minute Augmentation	Full Augmentation
5. Plant System Engineering, Repair and Corrective Actions	Technical Support	STA / Incident Assessor[k] (CR)	1		
		Technical Manager (TSC)		1	
		Core/Thermal Hydraulics Engineer (TSC)		1	
		Mechanical Engineer (TSC)		1	
		Electrical Engineer (TSC)		1	
		SAMG Decision Maker (TSC)		1[d]	
		SAMG Evaluator (TSC)		2[d]	
		Operations Manager (TSC)		1	
		Radiation Controls Engineer (TSC)			1
	Repair and Corrective Actions	Mechanical Maintenance (OSC)	1[d]	2	(e)
		Rad Waste Operator	1		(e)
		Electrical Maintenance (OSC)	1[d]	2	(e)
		Instrument & Control (I&C) (OSC)	1		
		Maintenance Manager (TSC)		1	
		OSC Director (OSC)		1	
		Assistant OSC Director (OSC)			1
		OPs Lead & Support Personnel (OSC)			(e)
	Accident Analysis	Technical Support Manager (EOF)			1
		Operations Advisor (EOF)			1
		Technical Advisor (EOF)			1
6. In-Plant Protective Actions	Radiation Protection	RP Personnel[c]	2[d]	4	(e)
7. Fire Fighting	--	Fire Brigade[g]	5		
8. First Aid and Rescue Operations	--	Plant Personnel	2[d]		(e)
9. Site Access Control and Personnel Accountability	Security & Accountability	Security Team Personnel	(h)	(h)	
	EOF Security	Security Coordinator[l] (TSC/ EOF)			2
10. Resource Allocation and Administration	Logistics / Administration	Logistics Manager (EOF)		1	
		Logistics Coordinator (TSC)			1
		Administrative Coordinator (EOF)			1
		Clerical Staff (TSC/OSC/EOF)			(e)
		Events Recorder (EOF)			1
		Computer Specialist (EOF)			1
		SUB-TOTAL:	**23**	**34**	**27+**

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

Functional Area	Major Tasks	Emergency Positions	Minimum Shift Size	[a]60 Minute Augmentation	Full Augmentation
11. Public Information	Media Interface	Corporate Spokesperson (JIC)		1	
		Rad Protection Spokesperson (JIC)			1
		Technical Spokesperson (JIC)			1
	Information Development	Public Information Director (JIC)		1	
		News Writer (JIC)			1
	Media Monitoring and Rumor Control	Communications Department (JIC)			(e)
	Facility Operation and Control	JIC Director (JIC)		1	
		JIC Coordinator (JIC)			1
		Administrative Coordinator (JIC)			1
		Events Recorder (EOF)			1
		Clerical Staff (JIC)			(e)
		Access Controls (JIC)			1
		SUB-TOTAL:	**0**	**3[i]**	**7+**

	Minimum Shift Size	Total Minimum Staff	Total Full Augmentation
TOTAL:	**23**	**37**	**34+**

[a] Response time is based on optimum travel conditions.
[b] Refer to Section 2.1.2 for a description of shift emergency communication staffing.
[c] Refer to Section 2.1.1 for description of on-shift dose assessment staffing.
[d] May be provided by personnel assigned other functions. Personnel can fulfill multiple functions.
[e] Personnel numbers depend on the type and extent of the emergency.
[f] 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.
[g] Fire Brigade per UFSAR / TRM, as applicable.
[h] Function performed by on-shift security personnel.
[i] 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 JIC Director.
[j] One member of each Field Survey Team is a Driver.
[k] Refer to Section 2.1.3 for description of on-shift STA/Incident Assessor staffing requirements.
[l] TSC Security Coordinator position will be staffed by PBAPS Security personnel. The EOF Security Coordinator position will be staffed by Corporate personnel.

Figure PBAPS 2-1: Exelon Overall ERO Command Structure

Bolded Boxes indicate minimum staffing positions.

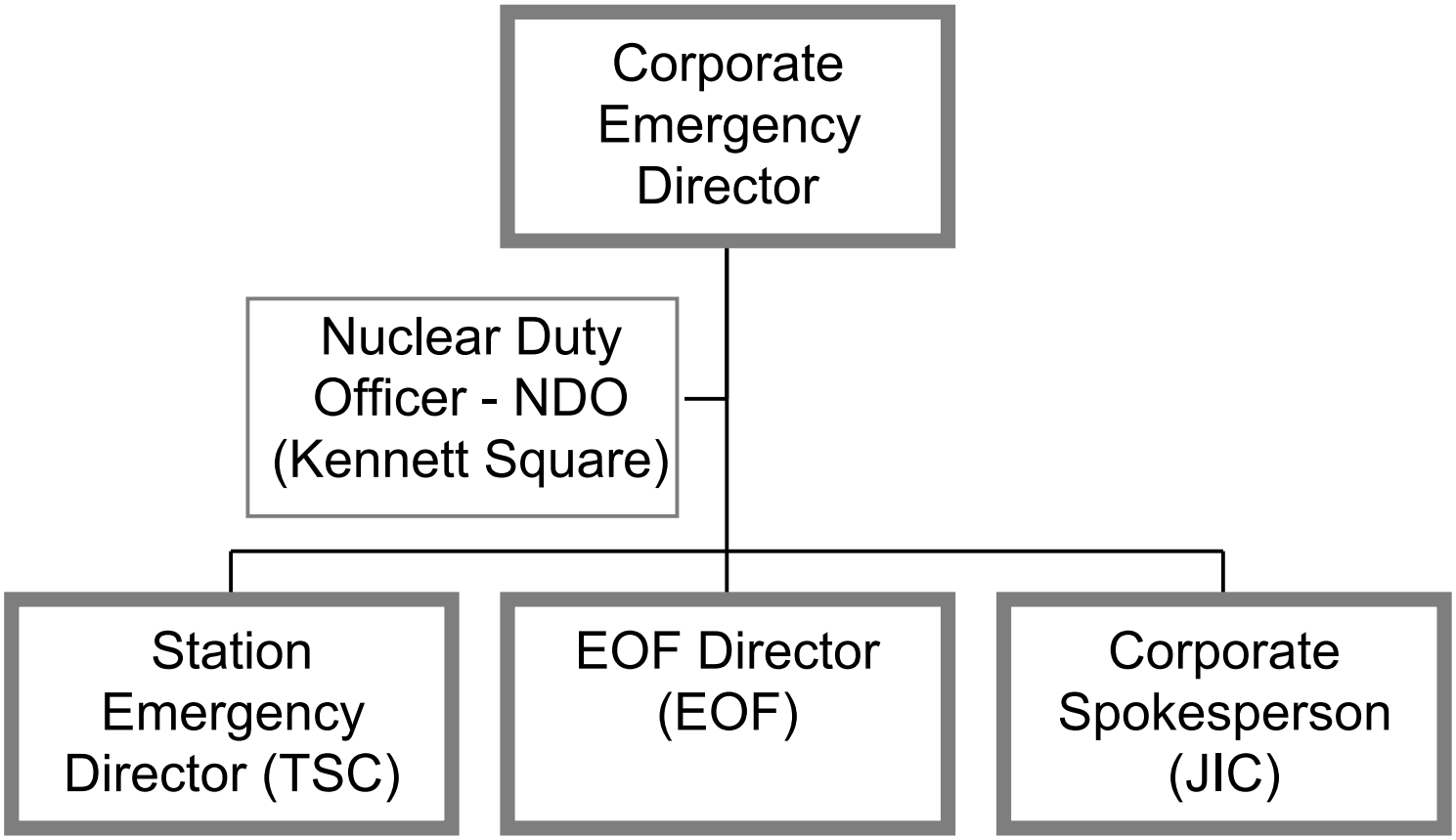
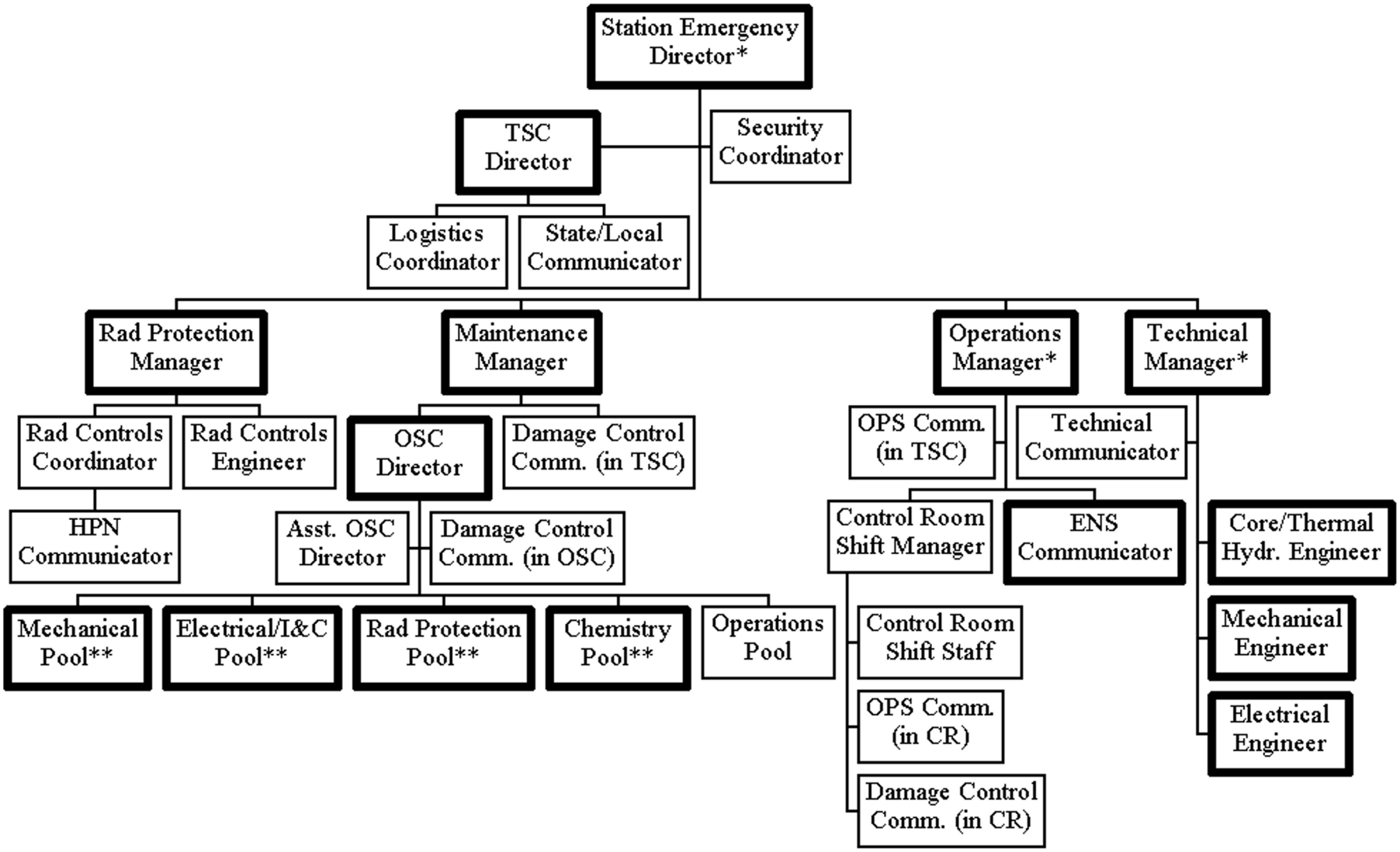


Figure PBAPS 2-2: Emergency Onsite Organization

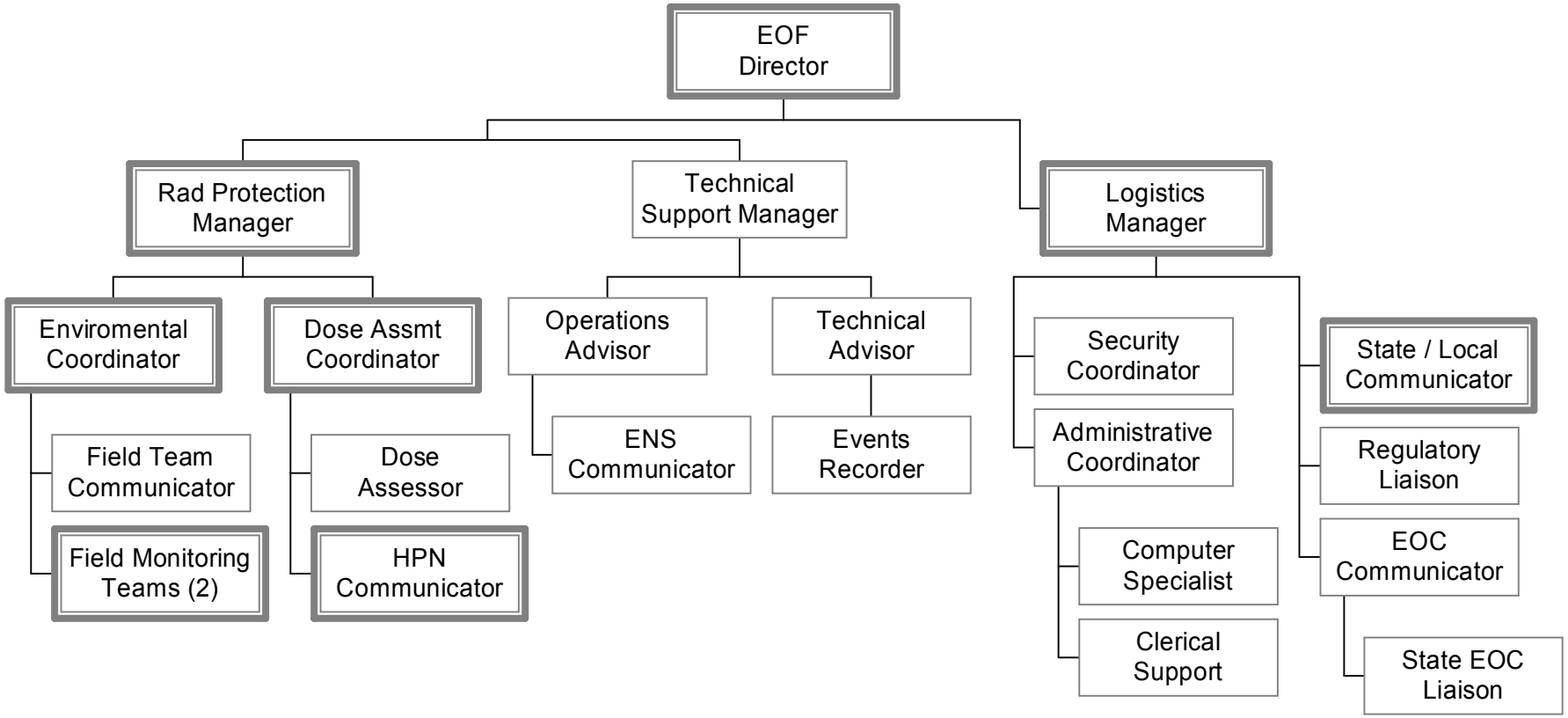


Bolded Boxes indicate minimum staffing positions.

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

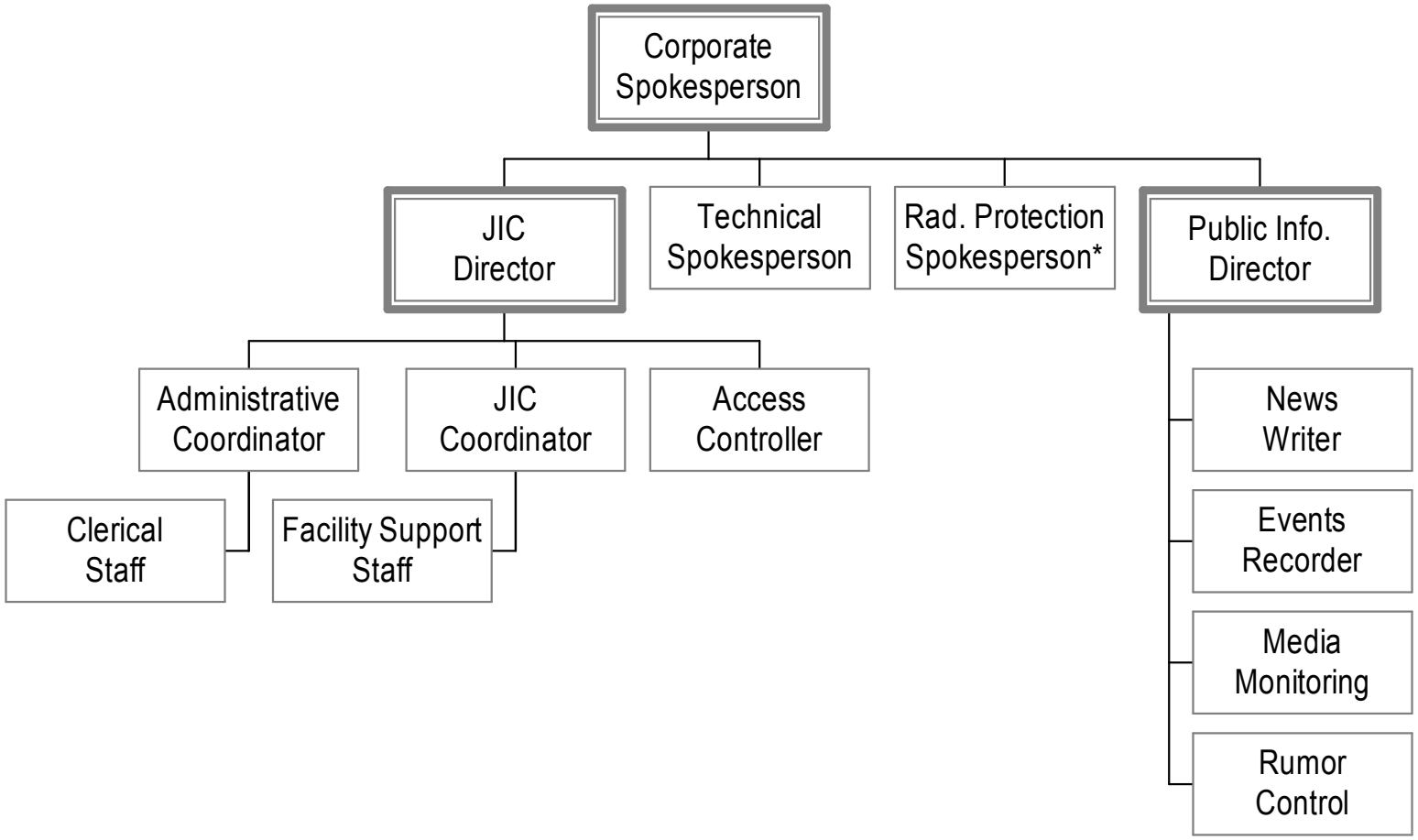
** Refer to Table PBAPS 2-1 for required staffing levels

Figure PBAPS 2-3: Emergency Offsite Organization



Bolded Boxes indicate minimum staffing positions.

Figure PBAPS 2-4: Emergency Public Information Organization



Bolded Boxes indicate minimum staffing positions.

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

Section 3: Classification of Emergencies

3.1 General

Section D of the Exelon Nuclear Standardized Emergency Plan divides the types of emergencies into four Emergency Classification Levels (ECLs). They are the UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY, and GENERAL EMERGENCY. These ECLs are entered by meeting the Emergency Action Level (EAL) Threshold Values provided in this section of the Annex. The ECLs are escalated from least severe to most severe according to relative threat to the health and safety of the public and emergency workers. Depending on the severity of an event, prior to returning to a standard day-to-day organization, a state or phase called RECOVERY may be entered to provide dedicated resources and organization in support of restoration and communication activities following the termination of the emergency.

UNUSUAL EVENT: Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

ALERT: Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

SITE AREA EMERGENCY: Events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

GENERAL EMERGENCY: Events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

RECOVERY: Recovery can be considered as a phase of the emergency and is entered by meeting emergency termination criteria provided in EP-AA-111 Emergency Classification and Protective Action Recommendations.

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 (T.S.), for Units 2 and 3, based on Reactor Mode Switch Position and specific plant conditions. "Defueled" Mode was established for classification purposes to reflect conditions where all fuel has been removed from the Reactor Pressure Vessel.

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

Hot Matrix - applies in modes (1), (2), and (3)

Cold Matrix - applies in modes (4), (5), and (D)

Individuals responsible for the classification of events will refer to the Initiating Condition and Threshold Values on the matrix of the appropriate station Standardized Emergency Plan Annex (this document). This matrix will contain Initiating Conditions, EAL Threshold Values, Mode Applicability Designators, appropriate EAL numbering system, and additional guidance necessary to classify events. It may be provided as a user aid.

The matrix is set up in six Recognition Categories. The first is designated as "R" and relates to Abnormal Radiological Conditions / Abnormal Radiological Effluent Releases. The second is designated as "F" and relates to Fission Product Barrier Degradation. The third is designated as "M" and relates to hot condition System Malfunctions. The fourth is designated as "C" and relates to Cold Shutdown / Refueling System Malfunctions. The fifth is designated as "H" and relates to Hazards and Other Conditions. The sixth is designated "E-H" and relates to ISFSI Malfunctions.

The 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.

The Initiating Conditions are coded with a two letter and one number code. The first letter is the Recognition Category designator; the second letter is the Classification Level, "U" for (NOTIFICATION OF) UNUSUAL EVENT, "A" for ALERT, "S" for SITE AREA EMERGENCY and "G" for GENERAL EMERGENCY. The EAL number is a sequential number for that Recognition Category series. All Initiating Conditions that are describing the severity of a common condition (series) will have the same number.

The EAL number may then be used to reference a corresponding page(s), which provides the basis information pertaining to the Initiating Condition:

- Threshold Value
- Mode Applicability
- Basis

Emergency Action Levels are the measurable, observable detailed conditions that must be met in order to classify the event. Classification is not to be made without referencing, comparing and satisfying the Threshold Values specified in the Emergency Action Levels.

A list of definitions is provided as part of this document for terms having specific meaning to the Emergency Action Levels. Site specific definitions are provided for terms with the intent to be used for a particular Initiating Condition/Threshold Value and may not be applicable to other uses of that term at other sites, the Emergency Plan or procedures.

References are also included to documents that were used to develop the EAL Threshold Values.

References to the Emergency Director means the person in Command and Control as defined in the Emergency Plan. Classification of emergencies is a non-delegable responsibility of Command and Control for the onsite facilities with responsibility assigned to the Shift Emergency Director (Control Room Shift Manager) or the Station Emergency Director (TSC). Classification of emergencies remains the responsibility of the applicable onsite facility even after Command and Control is transferred to the Corporate Emergency Director (EOF).

3.2 Classification, Instrumentation and Transient Events

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 indications, or (3) by direct observation by plant personnel, such that doubt related to the indication's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

Indications used for monitoring and evaluation of plant conditions include the normally used instrumentation, backup or redundant instrumentation, and the use of other parameters that provide information that supports determination if an EAL threshold value has been reached. When an EAL refers to a specific instrument or indication that is determined to be inaccurate or unavailable, then alternate indications shall be used to monitor the specified condition.

During an event that results in changing parameters trending towards an EAL classification, and instrumentation that was available to monitor this parameter becomes unavailable or the parameter goes off scale, the parameter should be assumed to have been exceeded and the classification made if there are no other direct or indirect means available to determine if the threshold has not been exceeded.

Although the majority of the EALs provide very specific thresholds, the Emergency Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL is IMMINENT. If, in the judgment of the Emergency Director, an IMMINENT situation is at hand, the classification should be made as if the threshold has been exceeded. While this is particularly prudent at the higher emergency classification levels (as the early classification may provide for more effective implementation of protective measures), it is nonetheless applicable to all emergency classification levels.

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.

Planned evolutions involve preplanning to address the limitations imposed by the condition, the performance of required surveillance testing, and the implementation of specific controls prior to knowingly entering the condition in accordance with the specific requirements of the site's Technical Specifications. Activities which cause the site to operate beyond that allowed by the site's Technical Specifications, planned or unplanned, may result in an EAL threshold being met or exceeded. Planned evolutions to test, manipulate, repair, perform maintenance or modifications to systems and equipment that result in an EAL value being met or exceeded are not subject to classification and activation requirements as long as the evolution proceeds as planned and is within the operational limitations imposed by the specific operating license. However, these conditions may be subject to the reporting requirements of 10 CFR 50.72.

Concerning Classification Downgrading Exelon Nuclear policy is that emergency classifications shall <u>not</u> be downgraded to a lower classification. Once declared, the event shall remain in effect until no Classification is warranted or until such time as conditions warrant classification to Recovery.

There may be cases in which a plant condition that exceeded an EAL was not recognized at the time of occurrence but is identified well after the condition has occurred (e.g., as a result of routine log or record review), and the condition no longer exists. In these cases, an emergency should not be declared. Reporting requirements of 10 CFR 50.72 are applicable, the guidance of NUREG-1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73 and the Reportability Reference Manual, should be applied.

3.3 Mode Applicability

The plant-operating mode that existed at the time that the event occurred, prior to any protective system or operator action initiated in response to the condition, is compared to the mode applicability of the EALs. If an event occurs, and a lower or higher plant-operating mode is reached before the emergency classification can be made, the declaration shall be based on the mode that existed at the time the event occurred.

For events that occur in Cold Shutdown or Refueling, escalation is via EALs that have Cold Shutdown or Refueling for mode applicability, even if Hot Shutdown (or a higher mode) is entered during any subsequent heat-up. In particular, the Fission Product Barrier Matrix EALs are applicable only to events that initiate in Hot Shutdown or higher.

If there is a change in Mode following the initial event declaration, any subsequent events will be evaluated on the existing Mode of the plant at the time the conditions occur.

3.4 Emergency Director Judgment

Emergency Director Judgment EALs are provided in the Hazards and Other Condition Affecting Plant Safety section and on the Fission Product Barrier Matrix. Both of the Emergency Director Judgment EALs have specific criteria for when they should be applied.

The Hazards Section Emergency Director Judgment EALs are intended to address unanticipated conditions which are not addressed explicitly by other EALs but warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under specific emergency classifications (UE, Alert, SAE or GE).

The FPB Matrix ED Judgment EALs are intended to include unanticipated conditions, which are not addressed explicitly by any of the other FPB threshold values, but warrant determination because conditions exist that fall under the broader definition for a significant Loss or Potential Loss of the barrier (equal to or greater than the defined FPB threshold values).

3.5 Fission Product Barrier Restoration

Fission Product Barrier (FPB) thresholds are treated the same as EAL threshold values. Conditions warranting declaration of the loss or potential loss of a Fission Product Barrier may occur resulting in a specific classification. The condition that caused the loss or potential loss declaration could be rectified as the result of Operator action, automatic actions, or designed plant response. Barriers will be considered re-established when there are direct verifiable indications (containment penetration or open valve has been isolated, coolant sample results, etc) that the barrier has been restored and is capable of mitigating future events.

The reestablishment of a fission product barrier does not alter or lower the existing classification. Entry into Termination/Recovery phase is still required for exiting the present classification. However the reestablishment of the barrier should be considered in determining future classifications should plant conditions or events change. This ensures site classifications are based on existing plant conditions and reduces the possibility of over classification.

3.6 Definitions

In the IC/EALs, selected words have been set in all capital letters. These words are defined terms having specific meanings as they relate to this procedure. Definitions of these terms are provided below.

AFFECTING SAFE SHUTDOWN: Event in progress has adversely affected functions that are necessary to bring the plant to and maintain it in the applicable HOT or COLD SHUTDOWN condition. Plant condition applicability is determined by Technical Specification LCOs in effect.

Example 1: Event causes damage that results in entry into an LCO that requires the plant to be placed in HOT SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is not "AFFECTING SAFE SHUTDOWN."

Example 2: Event causes damage that results in entry into an LCO that requires the plant to be placed in COLD SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is "AFFECTING SAFE SHUTDOWN."

BOMB: Refers to an explosive device suspected of having sufficient force to damage plant systems or structures.

CIVIL DISTURBANCE: A group of persons violently protesting station operations or activities at the site.

CONFINEMENT BOUNDARY: The barrier(s) between areas containing radioactive substances and the environment.

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

EXTORTION: An attempt to cause an action at the station by threat of force.

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute FIRES. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTILE FORCE: One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

INTRUSION: A person(s) present in a specified area without authorization. Discovery of a BOMB in a specified area is indication of INTRUSION into that area by a HOSTILE FORCE.

INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI): A complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage.

NORMAL PLANT OPERATIONS: Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

OWNER CONTROLLED AREA (OCA): is the property associated with the station owned by the company. Access is normally limited to persons entering for official business.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: Typically the site specific area which normally encompasses all controlled areas within the security PROTECTED AREA fence.

SABOTAGE: Deliberate damage, mis-alignment, or mis-operation of plant equipment with the intent to render the equipment inoperable. Equipment found tampered with or damaged due to malicious mischief may not meet the definition of SABOTAGE until this determination is made by security supervision.

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) Turbine Trip, (2) Reactor scram, (3) ECCS actuation, (4) Recirc Runback >25% power change, or (5) thermal power oscillations >10%.

STRIKE ACTION: A work stoppage within the PROTECTED AREA by a body of workers to enforce compliance with demands made on management. The STRIKE ACTION must threaten to interrupt NORMAL PLANT OPERATIONS.

UNISOLABLE: A breach or leak that cannot be promptly isolated.

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

VALID: An indication, report, or condition, is considered to be VALID when it is verified by (1) an instrument channel check, (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.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of the affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, and paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

VITAL AREAS: Typically any site specific areas, normally within the PROTECTED AREA, that contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

Table PBAPS 3-1: Emergency Action Levels (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Abnormal Rad Levels / Radiological Effluent				
Radiological Effluents	**RG1** Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 5 D **EAL Threshold Values:** **Note**: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results. 1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**: **OR** 2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**: a. **> 1000 mRem TEDE** **OR** b. **> 5000 mRem CDE Thyroid** **OR** 3. Field survey results at or beyond Site Boundary indicate **EITHER**: a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**. **OR** b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.	**RS1** Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 5 D **EAL Threshold Values:** **Note**: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results. 1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**: **OR** 2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**: a. **> 100 mRem TEDE** **OR** b. **> 500 mRem CDE Thyroid** **OR** 3. Field survey results at or beyond Site Boundary indicate **EITHER**: a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**. **OR** b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.	**RA1** Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown. 1. VALID reading on any of the following effluent monitors > **200 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 15 minutes**. • Radwaste Discharge effluent monitor (RIS-0-17-350) **OR** • Discharge Permit specified monitor **OR** 2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**. **OR** 3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.	**RU1** Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown. 1. VALID reading on any of the following effluent monitors > **2 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 60 minutes**. • Radwaste Discharge effluent monitor (RIS-0-17-350) **OR** • Discharge Permit specified monitor **OR** 2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 60 minutes**. **OR** 3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Table R1 -- Effluent Monitor Thresholds

Release Path	General Emergency	Site Area Emergency	Alert	Unusual Event
Main Stack (RI-0-17-050B Common)	5.57 E+09 μCi/sec	5.57 E+08 μCi/sec	6.36 E+07 μCi/sec	6.36 E+05 μCi/sec
Vent Stack (RI-2979B Unit 2 or RI-3979B Unit 3)	1.60 E+08 μCi/sec	1.60 E+07 μCi/sec	1.82 E+06 μCi/sec	1.82 E+04 μCi/sec

Table PBAPS 3-1: Emergency Action Levels (EAL) Matrix

Abnormal Rad Levels / Radiological Effluent

Abnormal Rad Levels

GENERAL EMERGENCY

SITE AREA EMERGENCY

Table R2 - Refuel Floor ARMs

- Steam Separator Pool, 234 ELEV, 3.7 (7.9)
- Refuel Slot, 234 ELEV, 3.8 (7.10)
- Fuel Pool, 234 ELEV, 3.9 (7.11)
- Refueling Bridge, 234 ELEV, 3.10 (7.12)

ALERT

RA2 Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel. 1 2 3 4 5 D

EAL Threshold Values:

1. VALID reading **> 1000 mR/hr** on any Table R2 Radiation Monitor due to **EITHER**:
   - Damaged irradiated fuel.

   OR
   - Water level drop.

   OR
2. Water level drop in the Reactor Refueling Cavity or Spent Fuel Pool that will result in irradiated fuel becoming uncovered.

UNUSUAL EVENT

RU2 UNPLANNED rise in plant radiation levels. 1 2 3 4 5 D

EAL Threshold Values:

1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by:
   - Refueling Cavity water level **< 458 inches** on Shutdown/Refuel Range indicator LI-2(3)-2-3-86 or PR/FR-2(3)-06-097.

   OR
   - Spent Fuel Pool level **< 232 ft 3 inches** plant elevation.

   OR
   - Report of visual observation of a drop in water level in the Reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal.

   AND

   b. VALID Area Radiation Monitor reading rise on one or more radiation monitor in Table R2.

   OR
2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.

Table R3
Areas Requiring Continuous Occupancy

- Main Control Room
- Central Alarm Station - (by survey)

RA3 Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. 1 2 3 4 5 D

EAL Threshold Values:

Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R3) to maintain plant safety functions.

RU3 Fuel Clad Degradation. 1 2 3

EAL Threshold Values:

Fuel clad degradation resulting in **EITHER**:

- Air Ejector discharge radiation monitor RIS-2(3)-17-150 A/B **Hi-Hi** alarm.

  OR
- Coolant activity **> 4.0 µCi/gm** Dose Equivalent I-131.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

TABLE PBAPS 3-1 Emergency Action Level (EAL) Matrix - Fission Product Barrier Matrix

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
FG1 Loss of ANY two barriers AND Loss or Potential Loss of third barrier. 1 2 3	**FS1** Loss or Potential Loss of. ANY two barriers. 1 2 3	**FA1** ANY Loss or ANY Potential Loss of either Fuel Clad or RCS. 1 2 3	**FU1** ANY Loss or ANY Potential Loss of Containment. 1 2 3

Sub-Category	FC - Fuel Clad		RC – Reactor Coolant System		CT - Containment	
	Loss	**Potential Loss**	**Loss**	**Potential Loss**	**Loss**	**Potential Loss**
1. Pri Coolant Activity	Coolant activity **> 300 uCi/gm** Dose Equivalent I-131	None	None	None	None	None
2. RPV Water Level	1. RPV level **cannot** be restored and maintained **> – 195 inches.**	2. RPV level **cannot** be restored and maintained **> – 172 inches.** **OR** 3. RPV level **cannot** be determined.	1. RPV level **cannot** be restored and maintained **> –172 inches**. **OR** 2. RPV level **cannot** be determined.	None	None	Plant conditions indicate that Primary Containment Flooding is required.
3. Primary Cont Conditions	None	None	1. Drywell pressure **> 2.0 psig**. **AND** 2. Drywell pressure rise due to RCS leakage.	None	1. Rapid unexplained drop in Drywell Pressure following initial pressure rise. **OR** 2. Drywell pressure response **not** consistent with LOCA conditions.	3. Drywell pressure **≥ 56 psig** and rising. **OR** 4. a. Drywell or Torus hydrogen concentration **> 6%.** **AND** b. Drywell or Torus oxygen concentration **> 5%.** **OR** 5. Heat Capacity Limit (T-102 Curve T/T-1) exceeded.
4. RCS Leak Rate	None	None	1. UNISOLABLE Main Steam Line (MSL), HPCI, Feedwater, RWCU or RCIC line break. **OR** 2 Emergency RPV Depressurization is required.	3. RCS leakage **> 50 gpm** inside the drywell. **OR** 4. UNISOLABLE primary system leakage outside drywell resulting in **EITHER:** • Secondary Containment area temperatures **> T-103 Alarm Setpoint** **OR** • Secondary Containment area radiation levels **> T-103 Alarm Setpoint.**	None	None
5. Pri Cont Rad Monitoring	Drywell radiation monitor reading **> 9.55E+02 R/hr**.	None	Drywell Radiation monitor reading **> 100 R/hr.**	None	None	Drywell radiation monitor reading **> 2.20 E+03 R/hr**.
6. Primary Cont Isolation Failure or Bypass	None	None	None	None	1. a. Failure of isolation valves in any one line to close. **AND** b. Direct downstream pathway to the environment exists after a primary containment isolation signal. **OR** 2. Intentional venting/purging of Primary Containment per TRIPs or SAMPs due to accident conditions. **OR** 3. UNISOLABLE primary system leakage outside drywell resulting in **EITHER:** • Secondary Containment area temperatures > **T-103 Action Level**. **OR** • Secondary Containment area radiation levels **> T-103 Action Level**.	None
7. ED Judgment	1. Any condition in the opinion of the Emergency Director that indicates Loss of the Fuel Clad Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Fuel Clad Barrier.	1. Any condition in the opinion of the Emergency Director that indicates Loss of the RCS Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the RCS Barrier.	1. Any condition in the opinion of the Emergency Director that indicates Loss of the Containment Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment Barrier.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Table PBAPS 3-1: Emergency Action Levels (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
Loss of AC Power	**MG1** Prolonged loss of all Off-Site power and all On-Site AC power to emergency busses. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to unit 4 KV Safeguards Buses. **AND** 2. Failure of E1, E2, E3 and E4 Emergency Diesel Generators to supply power to unit 4 KV Safeguards Buses. **AND** 3. a. Restoration of at least one unit 4KV Safeguard Bus in **< 2 hours** is **not** likely. **OR** b. RPV level **cannot** be determined to be > - **172 inches.**	**MS1** Loss of all Off-Site and all On-Site AC power to emergency busses for 15 minutes or longer. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to unit 4 KV Safeguards Buses. **AND** 2. Failure of E1, E2, E3 and E4 Emergency Diesel Generators to supply power to unit 4 KV Safeguards Buses. **AND** 3. Failure to restore power to at least one unit 4KV Safeguard Bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.	**MA1** AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. AC power capability to unit 4KV Safeguard Buses reduced to only one of the following sources for **≥ 15 minutes**. • 2 Emergency Auxiliary Transformer (0AX04) • 3 Emergency Auxiliary Transformer (0BX04) • E1 Diesel Generator • E2 Diesel Generator • E3 Diesel Generator • E4 Diesel Generator **AND** 2. Any additional single power source failure will result in a unit blackout.	**MU1** Loss of all Off-Site AC power to busses for 15 minutes or longer. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of all off-site AC power to unit 4 KV Safeguards Buses for **≥ 15 minutes**.
RPS Failure / Inadvertent Criticality	**MG2** Automatic Scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists. 1 2 **EAL Threshold Values:** 1. Automatic scram was **not** successful as indicated by Reactor Power **> 4%.** **AND** 2. Manual scram/ARI actions were **not** successful as indicated by Reactor Power **> 4%.** **AND** 3. **EITHER** of the following exists: • RPV level **cannot** be restored and maintained **> - 195 inches**. **OR** • Heat Capacity Temperature Limit (T-102 Curve T/T-1) exceeded.	**MS2** Automatic Scram fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor. 1 2 **EAL Threshold Values:** 1. Automatic scram was **not** successful as indicated by Reactor Power **> 4%.** **AND** 2. Manual scram/ARI actions were **not** successful from the Reactor Console as indicated by Reactor Power **> 4%.**	**MA2** Automatic Scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor. 1 2 **EAL Threshold Values:** 1. Automatic scram was **not** successful as indicated by Reactor Power **> 4%.** **AND** 2. Manual scram/ARI actions were successful from Reactor Console as indicated by Reactor Power **≤ 4%.**	**MU2** Inadvertent criticality. 3 **EAL Threshold Values:** UNPLANNED sustained positive period observed on nuclear instrumentation.

Modes: 1 – Power Operation, 2 – Startup, 3 –Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Table PBAPS 3-1: Emergency Action Levels (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
DC Power		**MS3** Loss of all vital DC power for 15 minutes or longer. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of all vital DC power based on **< 107.5 VDC** on unit 125 VDC battery busses 2(3)0D021, 2(3)0D022, 2(3)0D023, and 2(3)0D024 for **≥ 15 minutes**.		
Annunciators		**MS4** Inability to monitor a SIGNIFICANT TRANSIENT in progress. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1) **AND** 2. SIGNIFICANT TRANSIENT in progress (Table M2). **AND** 3. Compensatory indications (computer points) are unavailable.	**MA4** UNPLANNED Loss of safety system annunciation or indication in the control room with EITHER (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1) **AND** 2. a. SIGNIFICANT TRANSIENT in progress (Table M2). **OR** b. Compensatory indications (computer points) are unavailable.	**MU4** UNPLANNED loss of safety system annunciation or indication in the control room for 15 minutes or longer. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1)
		Table M1 - Safety Systems • ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring	**Table M2 - Significant Transients** • Turbine trip • Reactor scram • ECCS actuation • Recirc Runback >25% power change • Thermal power oscillations > 10 % Reactor Power change	

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Table PBAPS 3-1: Emergency Action Levels (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
RCS Leak				**MU5** RCS leakage. 1 2 3 **EAL Threshold Values:** 1. Unidentified or pressure boundary leakage into the Drywell **> 10 gpm**. **OR** 2. Identified leakage into the Drywell **> 25 gpm**.
Communications		**Table M3 - Communications Capability** System / Onsite / Offsite Station Radio System: X / Plant Public Address (PA): X / OMNI System: X / X Station Phones: X / X Satellite Phones: X / X NRC (ENS): / X		**MU6** Loss of all On-site or Off-site communications capabilities. 1 2 3 **EAL Threshold Values:** 1. Loss of all Table M3 **Onsite** communications capability affecting the ability to perform routine operations. **OR** 2. Loss of all Table M3 **Offsite** communications capability affecting the ability to perform offsite notifications.
T. S. Time				**MU7** Inability to reach required shutdown within Technical Specification limits. 1 2 3 **EAL Threshold Values:** Plant is **not** brought to required operating mode within Technical Specifications LCO Action Statement Time.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Table PBAPS 3-1: Emergency Action Levels (EAL) Matrix

Hazards and Other Conditions Affecting Plant Safety

Security

GENERAL EMERGENCY

HG1 HOSTILE ACTION resulting in loss of physical control of the facility. 1 2 3 4 5 D

EAL Threshold Values:

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1).

   OR

2. A HOSTILE ACTION has:
   - Caused failure of Spent Fuel Pool Cooling Systems

     AND

   - IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).

SITE AREA EMERGENCY

HS1 HOSTILE ACTION within the PROTECTED AREA. 1 2 3 4 5 D

EAL Threshold Values:

A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.

ALERT

HA1 HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. 1 2 3 4 5 D

EAL Threshold Values:

1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site.

   OR

2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.

UNUSUAL EVENT

HU1 Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant. 1 2 3 4 5 D

EAL Threshold Values:

1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities.

   OR

2. A validated notification from NRC providing information of an aircraft threat.

   OR

3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

C. R. Evacuation

Table H1 - Safety Functions

- Reactivity Control (ability to shut down the reactor and keep it shutdown)
- RCS Inventory (ability to cool the core)
- Decay Heat Removal (ability to maintain heat sink)

SITE AREA EMERGENCY

HS2 Control Room evacuation has been initiated and plant control cannot be established. 1 2 3 4 5 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Control Room evacuation has been initiated.

   AND

2. Control of the plant **cannot** be established per SE-1 or SE-10 in **< 15 minutes**.

ALERT

HA2 Control Room evacuation has been initiated. 1 2 3 4 5 D

EAL Threshold Values:

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

Fire / Explosion

Table H2 – Vital Areas

- Reactor Building
- Control Room
- Diesel Generator Building
- Emergency Pump Structure
- Inner Screen Structure
- Emergency Cooling Tower
- Emergency Switchgear/Battery Rooms
- Cable Spread Room

ALERT

HA3 FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown. 1 2 3 4 5 D

EAL Threshold Values:

FIRE or EXPLOSION resulting in any of the following:

- VISIBLE DAMAGE to a Table H2 permanent structure.

  OR

- VISIBLE DAMAGE to safety system equipment contained within a Table H2 area.

  OR

- Control Room indication of degraded safety system equipment performance contained within a Table H2 area.

UNUSUAL EVENT

HU3 FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA. 1 2 3 4 5 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm.

   OR

2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Table PBAPS 3-1: Emergency Action Levels (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Natural / Destructive Phenomena	**Table H2 - Vital Areas** • Reactor Building • Control Room • Diesel Generator Building • Emergency Pump Structure • Inner Screen Structure • Emergency Cooling Tower • Emergency Switchgear/Battery Rooms • Cable Spread Room **Table H3 – Internal Flooding Areas** • HPCI Room • RCIC Room • RHR Room • Core Spray Room • Torus Room • Emergency Pump Structure ▪ Reactor Building Sump Room		**HA4** Natural and destructive phenomena affecting VITAL AREAS 1 2 3 4 5 D **EAL Threshold Values:** 1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by seismic instrumentation **> 0.05 g** horizontal **OR > 0.033g** vertical. **AND** b. Confirmed by **EITHER:** • Earthquake felt in plant. **OR** • National Earthquake Center. **OR** • Control Room indication of degraded performance of systems required for the safe shutdown of the plant. **OR** 2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area: • Tornado strike **OR** • High winds **> 87 mph** **OR** • Vehicle crash **OR** • Turbine failure-generated PROJECTILES **OR** 3. Flooding in any Table H3 area that results in **ANY** of the following: • Degraded safety system performance as indicated in the Control Room. **OR** • Industrial safety hazards (e.g., electric shock) that preclude access necessary to operate or monitor safety equipment. **OR** • Water level **> T-103 Action Level**. **OR** 4. Abnormal River level as indicated by **EITHER**: • High river water level **> 116 ft**. **OR** • Low river water level **< 92.5 ft**.	**HU4** Natural and destructive phenomena affecting the PROTECTED AREA. 1 2 3 4 5 D **EAL Threshold Values:** 1. a. Seismic event as indicated by seismic instrumentation **> 0.01 g**. **AND** b. Confirmed by **EITHER:** • Earthquake felt in plant. **OR** • National Earthquake Center. **OR** 2. **EITHER** of the following occurring within the PROTECTED AREA boundary: • Tornado strike **OR** • Sustained **(> 15 minutes)** high winds **> 87 mph** **OR** 3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals. **OR** 4. Flooding in any Table H3 area that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode. **OR** 5. Abnormal River level, as indicated by **EITHER**: • **> 112 ft**. (high level) **OR** • **< 98.5 ft**. (low level)

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Table PBAPS 3-1: Emergency Action Levels (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Toxic / Flammable Gas	**Table H2 - Vital Areas** • Reactor Building • Control Room • Diesel Generator Building • Emergency Pump Structure • Inner Screen Structure • Emergency Cooling Tower • Emergency Switchgear/Battery Rooms • Cable Spread Room		**HA5** Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event. Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.	**HU5** Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS. 1 2 3 4 5 D **EAL Threshold Values:** 1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS. **OR** 2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.
Judgment	**HG6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**HS6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	**HA6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an ALERT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**HU6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Table PBAPS 3-1: Emergency Action Levels (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
ISFSI MALFUNCTION				
ISFSI				**E-HU1** Damage to a loaded cask CONFINEMENT BOUNDARY [1][2][3][4][5][D] **EAL Threshold Values:** Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Table PBAPS 3-1: Emergency Action Levels (EAL) Matrix

Abnormal Rad Levels / Radiological Effluent

Radiological Effluents

GENERAL EMERGENCY

RG1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. [1] [2] [3] [4] [5] [D]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**:

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 1000 mRem TEDE**
      OR
   b. **> 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**.
      OR
   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

SITE AREA EMERGENCY

RS1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. [1] [2] [3] [4] [5] [D]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**:

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 100 mRem TEDE**
      OR
   b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.
      OR
   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

ALERT

RA1 Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer. [1] [2] [3] [4] [5] [D]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **200 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 15 minutes**.
   - Radwaste Discharge effluent monitor (RIS-0-17-350)
     OR
   - Discharge Permit specified monitor

   OR

2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**.

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.

UNUSUAL EVENT

RU1 Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer. [1] [2] [3] [4] [5] [D]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **2 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 60 minutes**.
   - Radwaste Discharge effluent monitor (RIS-0-17-350)
     OR
   - Discharge Permit specified monitor

   OR

2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 60 minutes**.

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Table R1 -- Effluent Monitor Thresholds

Release Path	General Emergency	Site Area Emergency	Alert	Unusual Event
Main Stack (RI-0-17-050B Common)	5.57 E+09 μCi/sec	5.57 E+08 μCi/sec	6.36 E+07 μCi/sec	6.36 E+05 μCi/sec
Vent Stack (RI-2979B Unit 2 or RI-3979B Unit 3)	1.60 E+08 μCi/sec	1.60 E+07 μCi/sec	1.82 E+06 μCi/sec	1.82 E+04 μCi/sec

Table PBAPS 3-1: Emergency Action Levels (EAL) Matrix

Abnormal Rad Levels / Radiological Effluent

Abnormal Rad Levels

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
	Table R2 - Refuel Floor ARMs • Steam Separator Pool, 234 ELEV, 3.7 (7.9) • Refuel Slot, 234 ELEV, 3.8 (7.10) • Fuel Pool, 234 ELEV, 3.9 (7.11) • Refueling Bridge, 234 ELEV, 3.10 (7.12)	**RA2** Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel. 1 2 3 4 5 D **EAL Threshold Values:** 1. VALID reading **> 1000 mR/hr** on any Table R2 Radiation Monitor due to **EITHER**: • Damaged irradiated fuel. **OR** • Water level drop. **OR** 2. Water level drop in the Reactor Refueling Cavity or Spent Fuel Pool that will result in irradiated fuel becoming uncovered.	**RU2** UNPLANNED rise in plant radiation levels. 1 2 3 4 5 D **EAL Threshold Values:** 1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by: • Refueling Cavity water level **< 458 inches** on Shutdown/Refuel Range indicator LI-2(3)-2-3-86 or PR/FR-2(3)-06-097. **OR** • Spent Fuel Pool level **< 232 ft 3 inches** plant elevation. **OR** • Report of visual observation of a drop in water level in the Reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal. **AND** b. VALID Area Radiation Monitor reading rise on one or more radiation monitor in Table R2. **OR** 2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.
	Table R3 **Areas Requiring Continuous Occupancy** • Main Control Room • Central Alarm Station - (by survey)	**RA3** Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. 1 2 3 4 5 D **EAL Threshold Values:** Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R3) to maintain plant safety functions.	

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Table PBAPS 3-1: Emergency Action Levels (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS				
Loss of AC Power			**CA1** Loss of all Off-Site and all On-Site AC power to emergency busses for 15 minutes or longer. 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to unit 4 KV Safeguards Buses. **AND** 2. Failure of E1, E2, E3 and E4 Emergency Diesel Generators to supply power to unit 4 KV Safeguards Buses. **AND** 3. Failure to restore power to at least one unit 4KV Safeguard Bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.	**CU1** AC power capibilty to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout. 4 5 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. AC power capability to unit 4KV Safeguard Buses reduced to only one of the following sources for **≥ 15 minutes**. • 2 Emergency Auxiliary Transformer (0AX04) • 3 Emergency Auxiliary Transformer (0BX04) • E1 Diesel Generator • E2 Diesel Generator • E3 Diesel Generator • E4 Diesel Generator **AND** 2. Any additional single power source failure will result in a unit blackout.
Inadvertent Criticality				**CU2** Inadvertent criticality. 4 5 **EAL Threshold Values:** UNPLANNED sustained positive period observed on nuclear instrumentation.
DC Power				**CU3** Loss of required DC power for 15 minutes or longer. 4 5 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of required DC power based on **< 107.5 VDC** on unit 125 VDC battery buses 2(3)0D021, 2(3)0D022, 2(3)0D023, and 2(3)0D024 for **≥ 15 minutes**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Table PBAPS 3-1: Emergency Action Levels (EAL) Matrix

COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

Communications

Table C1 - Communications Capability

System	Onsite	Offsite
Station Radio System	X	
Plant Public Address (PA)	X	
OMNI System	X	X
Station Phones	X	X
Satellite Phones	X	X
NRC (ENS)		X

UNUSUAL EVENT

CU4 Loss of all On-site or Off-site communications capabilities. 4 5 D

EAL Threshold Values:

1. Loss of all Table C1 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table C1 **Offsite** communications capability affecting the ability to perform offsite notifications.

Heat Sink

Table C2 – RCS Reheat Duration Thresholds

RCS	Containment Closure	Duration
Intact	N/A	60 minutes*
Not Intact	Established	20 minutes*
	Not Established	0 minutes

*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then EAL Threshold #1 is **not** applicable.

ALERT

CA5 Inability to maintain plant in cold shutdown. 4 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 212°F** for **> Table C2 duration**.

   OR

2. UNPLANNED RPV pressure rise **> 10 psig** as a result of temperature rise due to loss of decay heat removal.

UNUSUAL EVENT

CU5 UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV. 4 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 212°F**.

   OR

2. Loss of the following for **≥ 15 minutes:**
   - All RCS temperature indications

     AND

   - All RPV level indications

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Table PBAPS 3-1: Emergency Action Levels (EAL) Matrix

COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

RCS Leakage / Inventory

GENERAL EMERGENCY

CG6 Loss of RPV inventory affecting fuel clad integrity with containment challenged. [4] [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. RPV level **< - 172 inches** for **≥ 30 minutes**.

   AND

   b. Any Containment Challenge Indication (Table C5).

   OR

2. a. RPV level unknown for **≥ 30 minutes.**

   AND

   b. Loss of RPV inventory as indicated by any of the following:

   - Table C3 indication.

     OR

   - Erratic Wide Range Neutron Monitor indication.

     OR

   - Any Table C4 Refuel Floor Area Radiation Monitor reading **> 3 R/hr.**

   AND

   c. Any Containment Challenge Indication (Table C5)

SITE AREA EMERGENCY

CS6 Loss of RPV inventory affecting core decay heat removal capability. [4] [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. With CONTAINMENT CLOSURE **not** established, RPV level **< - 54 inches**.

   OR

2. With CONTAINMENT CLOSURE established, RPV level **< - 172 inches.**

   OR

3. a. RPV level unknown for **≥ 30 minutes.**

   AND

   b. Loss of RPV inventory as indicated by any of the following:

   - Table C3 indications.

     OR

   - Erratic Wide Range Neutron Monitor indication.

     OR

   - Any Table C4 Refuel Floor Area Radiation Monitor reading **> 3 R/hr.**

ALERT

CA6 Loss of RPV inventory. [4] [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. RPV level **< - 48 inches**.

   OR

2. a. RPV level unknown for **≥ 15 minutes**.

   AND

   b. Loss of RPV inventory per Table C3 indications.

UNUSUAL EVENT

CU6 RCS leakage. [4]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

RCS leakage results in the inability to restore and maintain RPV level **> 1 inch** for **≥ 15 minutes**.

Table C5 – Containment Challenge Indications

- Primary Containment Hydrogen concentration **> 6%** and Oxygen **> 5%**.
- UNPLANNED rise in containment pressure.
- CONTAINMENT CLOSURE **not** established.
- Any Secondary Containment radiation monitors reading **> T-103 Action Level.**

Table C4 – Refuel Floor ARMs

- Refuel Slot, 234 ELEV, 3.8 (7.10)
- Fuel Pool, 234 ELEV, 3.9 (7.11)
- Refueling Bridge, 234 ELEV, 3.10 (7.12)

Table C3 – Indications of RCS Leakage

- UNPLANNED floor or equipment sump level rise
- UNPLANNED Suppression Pool level rise
- UNPLANNED vessel make-up rise
- Observation of leakage or Inventory loss

CU7 UNPLANNED loss of RPV inventory. [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED Reactor Cavity or Vessel level drop that meets **EITHER**:

   - When controlling level above the RPV flange, Reactor Cavity level drop below the RPV flange for **≥ 15 minutes**.

     OR

   - When controlling level below the RPV flange, vessel level drop below the procedurally established limit **≥ 15 minutes**.

   OR

2. a. RPV level unknown.

   AND

   b. Loss of RPV inventory per Table C3 indications.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Table PBAPS 3-1: Emergency Action Levels (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Security	**HG1** HOSTILE ACTION resulting in loss of physical control of the facility. 1 2 3 4 5 D **EAL Threshold Values:** 1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1). **OR** 2. A HOSTILE ACTION has: • Caused failure of Spent Fuel Pool Cooling Systems **AND** • IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).	**HS1** HOSTILE ACTION within the PROTECTED AREA. 1 2 3 4 5 D **EAL Threshold Values:** A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.	**HA1** HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. 1 2 3 4 5 D **EAL Threshold Values:** 1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site. **OR** 2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.	**HU1** Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant. 1 2 3 4 5 D **EAL Threshold Values:** 1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities. **OR** 2. A validated notification from NRC providing information of an aircraft threat. **OR** 3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.
C. R. Evacuation	**Table H1 - Safety Functions** • Reactivity Control (ability to shut down the reactor and keep it shutdown) • RCS Inventory (ability to cool the core) • Decay Heat Removal (ability to maintain heat sink)	**HS2** Control Room evacuation has been initiated and plant control cannot be established. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Control Room evacuation has been initiated. **AND** 2. Control of the plant **cannot** be established per SE-1 or SE-10 in **< 15 minutes**.	**HA2** Control Room evacuation has been initiated. 1 2 3 4 5 D **EAL Threshold Values:** Entry into SE-1 or SE-10 for Control Room evacuation.	
Fire / Explosion		**Table H2 – Vital Areas** • Reactor Building • Control Room • Diesel Generator Building • Emergency Pump Structure • Inner Screen Structure • Emergency Cooling Tower • Emergency Switchgear/Battery Rooms • Cable Spread Room	**HA3** FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown. 1 2 3 4 5 D **EAL Threshold Values:** FIRE or EXPLOSION resulting in any of the following: • VISIBLE DAMAGE to a Table H2 permanent structure. **OR** • VISIBLE DAMAGE to safety system equipment contained within a Table H2 area. **OR** • Control Room indication of degraded safety system equipment performance contained within a Table H2 area.	**HU3** FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm. **OR** 2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Table PBAPS 3-1: Emergency Action Levels (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Natural / Destructive Phenomena	**Table H2 - Vital Areas** • Reactor Building • Control Room • Diesel Generator Building • Emergency Pump Structure • Inner Screen Structure • Emergency Cooling Tower • Emergency Switchgear/Battery Rooms • Cable Spread Room **Table H3 – Internal Flooding Areas** • HPCI Room • RCIC Room • RHR Room • Core Spray Room • Torus Room • Emergency Pump Structure ▪ Reactor Building Sump Room		**HA4** Natural and destructive phenomena affecting VITAL AREAS 1 2 3 4 5 D **EAL Threshold Values:** 1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by seismic instrumentation **> 0.05 g** horizontal **OR > 0.033g** vertical. **AND** b. Confirmed by **EITHER:** • Earthquake felt in plant. **OR** • National Earthquake Center. **OR** • Control Room indication of degraded performance of systems required for the safe shutdown of the plant. **OR** 2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area: • Tornado strike **OR** • High winds **> 87 mph** **OR** • Vehicle crash **OR** • Turbine failure-generated PROJECTILES **OR** 3. Flooding in any Table H3 area that results in **ANY** of the following: • Degraded safety system performance as indicated in the Control Room. **OR** • Industrial safety hazards (e.g., electric shock) that preclude access necessary to operate or monitor safety equipment. **OR** • Water level **> T-103 Action Level**. **OR** 4. Abnormal River level as indicated by **EITHER**: • High river water level **> 116 ft**. **OR** • Low river water level **< 92.5 ft**.	**HU4** Natural and destructive phenomena affecting the PROTECTED AREA. 1 2 3 4 5 D **EAL Threshold Values:** 1. a. Seismic event as indicated by seismic instrumentation **> 0.01 g**. **AND** b. Confirmed by **EITHER:** • Earthquake felt in plant. **OR** • National Earthquake Center. **OR** 2. **EITHER** of the following occurring within the PROTECTED AREA boundary: • Tornado strike **OR** • Sustained **(> 15 minutes)** high winds **> 87 mph** **OR** 3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals. **OR** 4. Flooding in any Table H3 area that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode. **OR** 5. Abnormal River level, as indicated by **EITHER**: • **> 112 ft**. (high level) **OR** • **< 98.5 ft**. (low level)

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Table PBAPS 3-1: Emergency Action Levels (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Toxic / Flammable Gas	**Table H2 - Vital Areas** • Reactor Building • Control Room • Diesel Generator Building • Emergency Pump Structure • Inner Screen Structure • Emergency Cooling Tower • Emergency Switchgear/Battery Rooms • Cable Spread Room		**HA5** Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event. Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.	**HU5** Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS. 1 2 3 4 5 D **EAL Threshold Values:** 1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS. **OR** 2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.
Judgment	**HG6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**HS6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	**HA6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an ALERT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**HU6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Table PBAPS 3-1: Emergency Action Levels (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
ISFSI MALFUNCTION				
ISFSI				**E-HU1** Damage to a loaded cask CONFINEMENT BOUNDARY 1 2 3 4 5 D **EAL Threshold Values:** Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Table PBAPS 3-2: EAL Technical Basis

Emergency Action Level Technical Basis Page Index

General		Site Area		Alert		Unusual Event	
EAL	**Pg.**	**EAL**	**Pg.**	**EAL**	**Pg.**	**EAL**	**Pg.**
RG1	3-29	RS1	3-32	RA1	3-35	RU1	3-38
				RA2	3-41	RU2	3-44
				RA3	3-47	RU3	3-48
FG1	3-49	FS1	3-50	FA1	3-51	FU1	3-52

Fuel Clad		RCS		Containment	
FC1	3-53				
FC2	3-54	RC2	3-58	CT2	3-65
		RC3	3-59	CT3	3-66
		RC4	3-60		
FC5	3-56	RC5	3-63	CT5	3-68
				CT6	3-69
FC7	3-57	RC7	3-64	CT7	3-72

MG1	3-73	MS1	3-75	MA1	3-76	MU1	3-78
MG2	3-79	MS2	3-81	MA2	3-82	MU2	3-83
		MS3	3-84				
		MS4	3-85	MA4	3-88	MU4	3-91
						MU5	3-93
						MU6	3-94
						MU7	3-96
				CA1	3-97	CU1	3-99
						CU2	3-101
						CU3	3-102
						CU4	3-103
				CA5	3-105	CU5	3-108
CG6	3-110	CS6	3-113	CA6	3-116	CU6	3-118
						CU7	3-119
HG1	3-122	HS1	3-124	HA1	3-126	HU1	3-129
		HS2	3-132	HA2	3-134		
				HA3	3-135	HU3	3-138
				HA4	3-141	HU4	3-146
				HA5	3-151	HU5	3-154
HG6	3-156	HS6	3-157	HA6	3-158	HU6	3-159
						E-HU1	3-160

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RG1

Initiating Condition

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**:

Table R1 - Effluent Monitor Thresholds	
Release Path	**General Emergency**
Main Stack (RI-0-17-050B Common)	5.57 E+09 μCi/sec
Vent Stack (RI-2979B Unit 2 or RI-3979B Unit 3)	1.60 E+08 μCi/sec

OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:

   a. **> 1000 mRem TEDE**

   OR

   b. **> 5000 mRem CDE Thyroid**

OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**.

   OR

   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RG1 (cont)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed the EPA Protective Action Guides (PAGs). Public protective actions will be necessary. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public and likely involve fuel damage.

While these failures are addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

Threshold #1 Basis:

The site-specific monitors listed include effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading threshold is not, the results from dose assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency-implementing procedures call for the timely performance of dose assessments using actual meteorology and release information. If the results of dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading threshold.

Threshold #2 Basis:

The "site boundary" is the nearest distance from potential release points at which protective actions would be required for members of the public.

Threshold #3 Basis:

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. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption on sample media followed by field analysis are used for determining the iodine (CDE) thyroid value.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RG1 (cont)

Basis: (References)

1 EP-AA-112-500, Emergency Environmental Monitoring

2. Peach Bottom ODCM

3. NEI 99-01, Rev. 5 AG1

4. EP-EAL-0607 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values, Peach Bottom Atomic Power Station

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RS1

Initiating Condition

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**:

Table R1 - Effluent Monitor Thresholds	
Release Path	**Site Area Emergency**
Main Stack (RI-0-17-050B Common)	5.57 E+08 μCi/sec
Vent Stack (RI-2979B Unit 2 or RI-3979B Unit 3)	1.60 E+07 μCi/sec

OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:

   a. **> 100 mRem TEDE**

   OR

   b. **> 500 mRem CDE Thyroid**

OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.

   OR

   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RS1 (cont)

Basis

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed 10% of the EPA Protective Action Guides (PAGs). Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

While these failures are addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

Threshold #1 Basis:

The site specific monitors listed include effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading threshold is not, the results from dose assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency-implementing procedures call for the timely performance of dose assessments using actual meteorology and release information. If the results of dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading threshold.

Threshold #2 Basis:

The "site boundary" is the nearest distance from potential release points at which Protective Actions would be required for members of the public.

Threshold #3 Basis:

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. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption on sample media followed by field analysis are used for determining the iodine (CDE) thyroid value.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RS1 (cont)

Basis: (References)

1. EP-AA-112-500, Emergency Environmental Monitoring
2. Peach Bottom ODCM
3. NEI 99-01, Rev. 5 AS1
4. EP-EAL-0607 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values, Peach Bottom Atomic Power Station

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA1

Initiating Condition

Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors **> 200 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 15 minutes**.

   - Radwaste Discharge effluent monitor (RIS-0-17-350)

   OR

   - Discharge Permit specified monitor

   OR

2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**.

Table R1 - Effluent Monitor Thresholds	
Release Path	**Alert**
Main Stack (RI-0-17-050B Common)	6.36 E+07 μCi/sec
Vent Stack (RI-2979B Unit 2 or RI-3979B Unit 3)	1.82 E+06 μCi/sec

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA1 (cont)

Basis

VALID: An indication, report, or condition, is considered to be VALID when it is 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.
This EAL addresses an actual or substantial potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in RU1 and RA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases are not to be prorated or averaged. For example, a release exceeding 600 times ODCM for 5 minutes does not meet the threshold

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

Threshold #1 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

The effluent monitors listed are those normally used for planned discharges. If a discharge is performed using a different flowpath or effluent monitor other than those listed (e.g., a portable or temporary effluent monitor), then the declaration criteria will be based on the monitor specified in the Discharge Permit.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA1 (cont)

Basis (cont):

Threshold #2 Basis:

This threshold is intended for effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

Threshold #3 Basis:

This threshold addresses uncontrolled releases that are detected by sample analyses, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

Basis: (References)

1. Peach Bottom ODCM
2. NEI 99-01, Rev. 5 AA1
3. EP-EAL-0607 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values, Peach Bottom Atomic Power Station

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU1

Initiating Condition

Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Value

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors **> 2 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 60 minutes**.

   - Radwaste Discharge effluent monitor (RIS-0-17-350)

   OR

   - Discharge Permit specified monitor

OR

2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 60 minutes**.

Table R1 - Effluent Monitor Thresholds	
Release Path	**Unusual Event**
Main Stack (RI-0-17-050B Common)	6.36 E+05 μCi/sec
Vent Stack (RI-2979B Unit 2 or RI-3979B Unit 3)	1.82 E+04 μCi/sec

OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU1 (cont)

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses a potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in RU1 and RA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases are not to be prorated or averaged. For example, a release exceeding 4 times ODCM for 30 minutes does not meet the threshold.

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

Threshold #1 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

The effluent monitors listed are those normally used for planned discharges. If a discharge is performed using a different flowpath or effluent monitor other than those listed (e.g., a portable or temporary effluent monitor), then the declaration criteria will be based on the monitor specified in the Discharge Permit.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU1 (cont)

Basis: (cont)

Threshold #2 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL.

This threshold is intended for effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

Threshold #3 Basis:

This threshold addresses uncontrolled releases that are detected by sample analyses, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

Basis: (References)

1. Peach Bottom ODCM
2. NEI 99-01, Rev. 5 AU1
3. EP-EAL-0607 Revision 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values, Peach Bottom Atomic Power Station

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA2

Initiating Condition

Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values

1. VALID reading **> 1000 mR/hr** on any Table R2 Radiation Monitor due to **EITHER**:

   - Damaged irradiated fuel.

     OR

   - Water level drop.

Table R2 – Refuel Floor ARMs
• Steam Separator Pool, 234 ELEV, 3.7 (7.9)
• Refuel Slot, 234 ELEV, 3.8 (7.10)
• Fuel Pool, 234 ELEV, 3.9 (7.11)
• Refueling Bridge, 234 ELEV, 3.10 (7.12)

   OR

2. Water level drop in the Reactor Refueling Cavity or Spent Fuel Pool that will result in irradiated fuel becoming uncovered.

Basis

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses increases in radiation dose rates within plant buildings, and may be a precursor to a radioactivity release to the environment. These events represent a loss of control over radioactive material and represent an actual or substantial potential degradation in the level of safety of the plant.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA2 (cont)

Basis (cont)

These events escalate from RU2 in that fuel activity has been released, or is anticipated due to fuel heatup. This EAL applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage.

Threshold #1 Basis:

This EAL addresses radiation monitor indications of fuel uncovery and/or fuel damage.

Uncovering spent fuel represents a substantial degradation of the level of safety of the plant and warrants an Alert classification. Visual observation of spent fuel uncovery represents a major ALARA concern in that radiation levels could exceed 10,000 R/hr on the refuel bridge when fuel uncovery begins. The value of 1000 mR/hr was conservatively chosen for classification purposes.

Radiation monitor readings are used to provide indication of fuel uncovery and/or fuel damage. High monitor readings associated with the transfer or relocation of a source, stored in or near the pool or readings responding to a planned evolution such as removal of the reactor head or equipment relocation are not classified under this threshold since the reading would not be indicative of fuel uncovery and/or fuel damage.

Dropping heavy loads onto the spent fuel can cause significant damage to the spent fuel and an Alert is also warranted under these conditions provided that the above radiation monitor threshold readings are reached.

Escalation of this emergency classification level, if appropriate, would be based on RS1 or RG1.

Threshold #2 Basis:

Once Spent Fuel Pool water level drops below the low level alarm setpoint, further drops can be monitored only by visual observation unless the Spent Fuel Pool is in communication with the Refueling Cavity.

If available, video cameras may allow remote observation. Depending on available level instrumentation, the declaration threshold may need to be based on indications of water makeup rate.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA2 (cont)

Basis Reference(s):

1. ON-124, Fuel Floor and Fuel Handling Problems
2. P-S-43, Radiation Monitoring System
3. ARC 003-00C214 B-4, Refueling Floor Area Hi Radiation
4. ARC 20C075 C-1, Fuel Storage Pool Hi Radiation
5. NEI 99-01, Rev. 5 AA2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU2

Initiating Condition

UNPLANNED rise in plant radiation levels.

Operating Mode Applicability

1, 2, 3, 4, 5, D

EAL Threshold Value

1. a. UNPLANNED water level drop in the Reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by:

   - Refueling Cavity water level **< 458 inches** on Shutdown/Refuel Range indicator LI-2(3)-2-3-86 or PR/FR-2(3)-06-097.

     OR

   - Spent Fuel Pool level **< 232 ft 3 inches** plant elevation.

     OR

   - Report of visual observation of a drop in water level in the Reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal.

   AND

   b. VALID Area Radiation Monitor reading rise on one or more radiation monitor in Table R2.

Table R2 – Refuel Floor ARMs
• Steam Separator Pool, 234 ELEV, 3.7 (7.9)
• Refuel Slot, 234 ELEV, 3.8 (7.10)
• Fuel Pool, 234 ELEV, 3.9 (7.11)
• Refueling Bridge, 234 ELEV, 3.10 (7.12)

   OR

2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU2 (cont)

Basis (cont)

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

NORMAL LEVELS: Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

This EAL addresses increased radiation levels as a result of water level decreases above irradiated fuel or events that have resulted, or may result, in UNPLANNED increases in radiation dose rates within plant buildings. These radiation increases represent a loss of control over radioactive material and represent a potential degradation in the level of safety of the plant.

Threshold #1 Basis:

Level indications may include installed or temporary water level instrumentation. If available, video cameras may allow remote observation for determining water level changes.

This EAL addresses unplanned lowering of level in the refueling pathway and a corresponding rise in refuel floor radiation readings. For events in Refuel mode where the water level drops with no corresponding rise in refuel floor radiation readings classification would be via CU7. This event escalates to an Alert per RA2 if irradiated fuel outside the reactor vessel is uncovered.

Threshold #2 Basis:

This EAL addresses increases in plant radiation levels that represent a loss of control of radioactive material resulting in a potential degradation in the level of safety of the plant.

This EAL excludes radiation level increases that result from planned activities such as use of radiographic sources and movement of radioactive waste materials. A specific list of ARMs is not required, as it would restrict the applicability of the threshold. The intent is to identify loss of control of radioactive material in any monitored area. Survey results are not required for confirmation of area radiation monitor readings but are applicable to areas where area radiation monitors do not have sufficient range to indicate a rise by a factor of 1000 over NORMAL LEVELS.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU2 (cont)

Basis (References)

1. ON-124, Fuel Floor and Fuel Handling Problems
2. P-S-43, Radiation Monitoring System
3. ARC 003-00C214 B-4, Refueling Floor Area Hi Radiation
4. ARC 20C075 C-1, Fuel Storage Pool Hi Radiation
5. Technical Specification 3.9.6, Reactor Pressure Vessel (RPV) Water Level
6. GP-6, Refueling Operations
7. NEI 99-01, Rev. 5 AU2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA3

Initiating Condition

Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values

Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R3) to maintain plant safety functions.

Table R3 - Areas Requiring Continuous Occupancy
• Main Control Room • Central Alarm Station (by survey)

Basis

This EAL addresses increased radiation levels that impact continued operation in areas requiring continuous occupancy to maintain safe operation or to perform a safe shutdown.

The cause and/or magnitude of the increase in radiation levels is not a concern of this EAL. The Emergency Director must consider the source or cause of the increased radiation levels and determine if any other EAL may be involved.

Areas requiring continuous occupancy include Main Control Room and the Central Alarm Station (CAS).

Basis (References):

1. P-S-43, Radiation Monitoring System
2. T-300, Fire Guides
3. FSAR section describing Class I structures
4. Appendix R Analysis defining Safe Shutdown Area
5. NEI 99-01, Rev. 5 AA3

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU3

Initiating Condition

Fuel Clad degradation.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values

Fuel clad degradation resulting in **EITHER**:

- Air Ejector discharge radiation monitor RIS-2(3)-17-150 A/B **Hi-Hi** alarm.

  OR

- Coolant activity **> 4.0 µCi/gm** Dose Equivalent I-131.

Basis:

This EAL is included because it is a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant.

Escalation of this EAL to the Alert level is via the Fission Product Barriers.

Threshold #1 Basis:

Conditions that cause the monitor to alarm that are not related to fuel clad degradation should not result in the declaration of an Unusual Event.

This threshold addresses site-specific radiation monitor readings that provide indication of a degradation of fuel clad integrity.

Threshold #2 Basis:

An Unusual Event is only warranted when actual fuel clad damage is the cause of the elevated coolant sample (as determined by laboratory confirmation). Fuel clad damage should be assumed to be the cause of elevated Reactor Coolant activity unless another cause is known.

This threshold addresses coolant samples exceeding coolant technical specifications for transient iodine spiking limits.

Basis (References)

1. Technical Specifications 3.4.6, RCS Specific Activity
2. Technical Specifications 3.7.5, Main Condenser Offgas
3. DBD P-S-30, Offgas System
4. ARC 218 20C210 E-1, Air Ejector Discharge Radiation High-High
5. NEI 99-01, Rev. 5 SU4

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FG1

Initiating Condition

Loss of ANY two barriers AND Loss or Potential Loss of third barrier.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss Threshold Values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the General Emergency classification level each barrier is weighted equally.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FS1

Initiating Condition

Loss or Potential Loss of ANY two barriers.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss Threshold Values to determine barrier status.

Basis

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the Site Area Emergency classification level, each barrier is weighted equally.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FA1

Initiating Condition

ANY Loss or ANY Potential Loss of EITHER Fuel Clad or RCS.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss Threshold Values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the Alert classification level, Fuel Cladding and RCS barriers are weighted more heavily than the Containment barrier. Unlike the Containment barrier, loss or potential loss of either the Fuel Cladding or RCS barrier may result in the relocation of radioactive materials or degradation of core cooling capability. Note that the loss or potential loss of Containment barrier in combination with loss or potential loss of either Fuel Cladding or RCS barrier results in declaration of a Site Area Emergency under EAL FS1.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FU1

Initiating Condition

ANY Loss or ANY Potential Loss of Containment.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss Threshold Values to determine barrier status.

Basis:

The Primary Containment Barrier includes the drywell, respective interconnecting paths, and other connections up to and including the outermost containment isolation valves. Containment Barrier thresholds are used primarily as discriminators for escalation from an Alert to a Site Area Emergency or a General Emergency.

The Containment Barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (i.e., Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment Barrier status is addressed by Technical Specifications.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FC1

Initiating Condition

Primary Coolant Activity Level.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Value

LOSS:

Coolant Activity **> 300 µCi/gm** Dose Equivalent I-131.

Basis:

300 uCi/gm Dose Equivalent I-131 is well above that expected for iodine spikes and corresponds to less than 5% fuel clad damage. This amount of radioactivity indicates significant clad damage and thus the Fuel Clad Barrier is considered lost.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FC2

Initiating Condition

Reactor Vessel Water Level.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Value

LOSS:

1. RPV level **cannot** be restored and maintained **> - 195 inches**.

POTENTIAL LOSS:

2. RPV level **cannot** be restored and maintained **> - 172 inches.**

   OR

3. RPV level **cannot** be determined.

Basis:

Determination of “restore and maintained” is based on the actions driven by Emergency Operating Procedures to restore level. The inability to reverse the RPV level lowering trend after lining up injection sources and injecting, including the use of low pressure systems following an Emergency Depressurization would warrant classification.

Loss Threshold #1 Basis:

This corresponds to the level used in EOPs to indicate challenge of core cooling.

Potential Loss Thresholds #2 and #3 Basis:

This threshold is the same as the RCS barrier Loss threshold and corresponds to the water level at the top of the active fuel. Thus, this threshold indicates a Potential Loss of the Fuel Clad barrier and a Loss of RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

Entry into the "Steam Cooling" leg of the Emergency Operating Procedures would be an example of an inability to "restore and maintain" level above TAF resulting in this threshold being met.

Since the loss of ability to determine if adequate core cooling is being provided presents a significant challenge to the fuel clad barrier, a potential loss of the fuel clad barrier is specified.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FC2

Basis Reference(s):

1. T-BAS INTRO, INTRODUCTION TO TRIPS AND SAMPS - BASES, Definition of adequate core cooling
2. T-101, RPV Control Bases, Step RC/L-Leg
3. T-111, Level Restoration
4. NEI 99-01, Rev. 5 Table 5-F-2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FC5

Initiating Condition

Primary Containment Radiation Monitoring.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Value

LOSS:

Drywell radiation monitor reading **> 9.55E+02 R/hr**.

Basis:

The Drywell radiation monitor reading is a value, which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the drywell.

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 Loss threshold. Thus, this threshold indicates a loss of both Fuel Clad barrier and RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. Core Damage Assessment Methodology (CDAM)
2. ARC-005-00C226D-B-5, Unit 3 Containment Radiation Monitor Hi-Rad
3. DBD P-S-43, Radiation Monitoring System
4. NEI 99-01, Rev. 5 Table 5-F-1

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FC7

Initiating Condition

Emergency Director Judgment

Operating Mode Applicability:

1, 2, 3

EAL Threshold Value

LOSS:

1. Any condition in the opinion of the Emergency Director that indicates a Loss of the Fuel Clad Barrier.

POTENTIAL LOSS:

2. Any condition in the opinion of the Emergency Director that indicates a Potential Loss of the Fuel Clad Barrier.

Basis:

These thresholds address 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 threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC2

Initiating Condition

Reactor Vessel Water Level.

Operating Mode Applicability

1, 2, 3

EAL Threshold Value

LOSS:

1. RPV level **cannot** be restored and maintained **> - 172 inches.**

   OR

2. RPV level **cannot** be determined.

Basis:

Determination of “restore and maintained” is based on the actions driven by Emergency Operating Procedures to restore level. The inability to reverse the RPV level lowering trend after lining up injection sources and injecting, including the use of low pressure systems following an Emergency Depressurization would warrant classification.

This threshold is the same as Fuel Clad Barrier Potential Loss threshold and corresponds to a challenge to core cooling. Thus, this threshold indicates a Loss of RCS barrier and Potential Loss of Fuel Clad barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

Entry into the "Steam Cooling" leg of the Emergency Operating Procedures would be an example of an inability to "restore and maintain" level above TAF resulting in this threshold being met.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. T-BAS INTRO, INTRODUCTION TO TRIPS AND SAMPS - BASES, Definition of adequate core cooling
2. T 101, RPV Control Bases, Step RC/L-Leg
3. T-111, Level Restoration
4. NEI 99-01, Rev. 5 Table 5-F-2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC3

Initiating Condition

Primary Containment Conditions

Operating Mode Applicability

1, 2, 3

EAL Threshold Value

LOSS:

1. Drywell pressure **> 2.0 psig.**

   AND

2. Drywell Pressure rise due to RCS leakage.

Basis:

The primary containment pressure is based on the drywell high pressure set point which indicates a LOCA by automatically initiating ECCS.

The second threshold focuses the fission product barrier loss threshold on a failure of the RCS instead of the non-LOCA malfunctions that may adversely affect primary containment pressure. Pressures of this magnitude can be caused by non-LOCA events such as a loss of drywell cooling or inability to control primary containment vent/purge.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. T-101, RPV Control
2. T-102, Primary Containment Control - Bases
3. NEI 99-01, Rev. 5 Table 5-F-2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC4

Initiating Condition

RCS Leak Rate

Operating Mode Applicability

1, 2, 3

EAL Threshold Value

LOSS:

1. UNISOLABLE Main Steam Line (MSL), HPCI, Feedwater, RWCU or RCIC line break.

   OR

2. Emergency RPV Depressurization is required.

POTENTIAL LOSS:

3. RCS leakage **> 50 gpm** inside the Drywell.

   OR

4. UNISOLABLE primary system leakage outside drywell resulting in **EITHER:**

   - Secondary Containment area temperatures **> T-103 Alarm Setpoint**.

     OR

   - Secondary Containment area radiation levels **> T-103 Alarm Setpoint**.

Basis:

UNISOLABLE – is a breach or leak that cannot be promptly isolated.

Promptly allows for actions to be taken to isolate the leak. Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

Loss Thresholds #1 Basis :

An UNISOLABLE MSL break is a breach of the RCS barrier. Thus, this threshold is included for consistency with the Alert emergency classification level.

Other large high-energy line breaks such as HPCI, Feedwater, RWCU, or RCIC that are UNISOLABLE also represent a significant loss of the RCS barrier and should be considered for purposes of classification.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC4 (cont)

Basis (cont)

Classification of a system break over system leakage is based on information available to the Control Room from the event. Indications that should be considered are:

- Reports describing magnitude of steam or water release.
- Use of system high flow alarms / indications, if available,
- Significant changes in makeup requirements,
- Abnormal reactor water level changes in response to the event.

The use of the above indications provides the Control Room the bases to determine that the on going event is more significant than the indications that would be expected from system leakage and therefore should be considered a system break.

Loss Thresholds #2 Basis:

Plant symptoms requiring Emergency RPV Depressurization per the EOPs are indicative of a loss of the RCS barrier. If Emergency RPV depressurization is required, the plant operators are directed to open safety relief valves (SRVs) and keep them open. Even though the RCS is being vented into the torus, a loss of the RCS should be considered to exist due to the diminished effectiveness of the RCS pressure barrier to a release of fission products beyond its boundary.

Potential Loss Threshold #3 Basis:

This threshold is based on leakage 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 uncovery is not a significant concern for a 50 gpm leak, however, break propagation leading to significantly larger loss of inventory is possible.

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.

If primary system leak rate information is unavailable, other indicators of RCS leakage should be used.

Potential Loss Threshold #4 Basis:

Potential loss of RCS based on primary system leakage outside the primary containment is determined from site specific temperature or area radiation Alarm setpoints in the areas of the main steam line tunnel, main turbine generator, RCIC, HPCI, etc., which indicate a direct path from the RCS to areas outside primary containment.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC4 (cont)

Basis (cont)

The indicators reaching the threshold values and confirmed to be caused by unisolable RCS leakage warrant an Alert classification. An unisolable leak which is indicated by a Action Level setpoint escalates to a Site Area Emergency when combined with Containment Barrier Loss threshold (after a containment isolation) and a General Emergency when the Fuel Clad Barrier criteria is also exceeded.

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.

Basis Reference(s):

1. T-103, Secondary Containment Control
2. NEI 99-01, Rev. 5 Table 5-F-2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC5

Initiating Condition

Primary Containment Radiation Monitoring

Operating Mode Applicability

1, 2, 3

EAL Threshold Value

LOSS:

Drywell radiation monitor reading **> 100 R/hr**.

Basis:

The Drywell Radiation monitor reading is a value, which indicates the release of reactor coolant to the primary containment.

This reading is less than that specified for Fuel Clad barrier Loss. Thus, this threshold would be indicative of a RCS leak only. If the radiation monitor reading increased to that value specified by Fuel Clad Barrier threshold, fuel damage would also be indicated.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. EP-EAL-0611, Criteria for Choosing Containment Radiation Monitor Reading Indicative of Loss of RCS Barrier
2. NEI 99-01, Rev. 5 Table 5-F-2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC7

Initiating Condition

Emergency Director Judgment

Operating Mode Applicability

1, 2, 3

EAL Threshold Value

LOSS:

1. Any condition in the opinion of the Emergency Director that indicates a Loss of the Reactor Coolant System Barrier.

POTENTIAL LOSS:

2. Any condition in the opinion of the Emergency Director that indicates a Potential Loss of the Reactor Coolant System Barrier.

Basis:

These thresholds address 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 threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT2

Initiating Condition

Reactor Vessel Water Level

Operating Mode Applicability

1, 2, 3

EAL Threshold Value

POTENTIAL LOSS:

Plant conditions indicate that Primary containment flooding is required.

Basis:

There is no Loss threshold associated with this item.

The potential loss requirement for Primary Containment Flooding indicates adequate core cooling cannot be established and maintained and that core melt is possible. Entry into Severe Accident Management Guidelines is a logical escalation in response to the inability to maintain adequate core cooling.

The condition in this potential loss threshold represents a potential core melt sequence which, if not corrected, could lead to vessel failure and increased potential for containment failure. In conjunction with Reactor Vessel water level “Loss” thresholds in the Fuel Clad and RCS barrier columns, this threshold will result in the declaration of a General Emergency -- loss of two barriers and the potential loss of a third.

Basis Reference(s):

1. T-BAS (INTRO), Introduction To Trips And Samps - Bases
2. T-111, Level Restoration (LR)- Bases
3. T-116, RPV Flooding - Bases
4. T-117, Level/Power Control – Bases
5. TRIP/SAMP Curves, Tables, And Limits - Bases
6. NEI 99-01, Rev. 5 Table 5-F-2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT3

Initiating Condition

Primary Containment Conditions

Operating Mode Applicability

1, 2, 3

EAL Threshold Value

LOSS:

1. Rapid unexplained drop in Drywell pressure following an initial pressure rise.

   OR

2. Drywell pressure response **not** consistent with LOCA conditions.

POTENTIAL LOSS:

3. Drywell pressure **> 56 psig** and rising.

   OR

4. a. Drywell or Torus Hydrogen concentration **> 6%.**

      AND

   b. Drywell or Torus Oxygen concentration **> 5%.**

   OR

5. Heat Capacity Temperature Limit (T-102 Curve T/T-1) exceeded.

Basis

Loss Threshold #1 and #2 Basis

Rapid unexplained drop in pressure (i.e., not attributable to drywell spray or condensation effects) following an initial pressure rise from a high energy line break indicates a loss of containment integrity. Primary containment pressure should rise as a result of mass and energy release into containment from a LOCA. Thus, primary containment pressure not rising under these conditions indicates a loss of containment integrity.

This indicator relies on operator recognition of an unexpected response for the condition and therefore does not have a specific value associated with it. The unexpected response is important because it is the indicator for a containment breach condition.

Potential Loss Threshold #3 Basis:

Drywell pressure is based on the primary containment design pressure.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT3 (cont)

Basis: (cont)

Potential Loss Threshold #4 Basis:

Explosive mixtures in the primary containment are assumed to be elevated concentrations of hydrogen and oxygen.

Potential Loss Threshold #5 Basis:

The Heat Capacity Limit is a function of torus temperature and water level. It is utilized to preclude failure of the containment and equipment in the containment necessary for the safe shutdown of the plant and therefore, the inability to maintain plant parameters below the limit constitutes a potential loss of containment.

Basis Reference(s):

1. UFSAR Section 5.2.4, Primary Containment Safety Evaluation.
2. DBD P-T-12, Design Basis Accidents, Transients and Events
3. DBD P-T-02, Containment, Section 3.2.14
4. T-102, Primary Containment Control – Bases
5. TRIP/SAMP CURVES, TABLES, AND LIMITS – BASES
6. NEI 99-01, Rev. 5 Table 5-F-2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT5

Initiating Condition

Primary Containment Radiation Monitoring

Operating Mode Applicability

1, 2, 3

EAL Threshold Value

POTENTIAL LOSS:

Drywell radiation monitor reading **> 2.20 E+03 R/hr**.

Basis

The Drywell radiation monitor reading is a value that indicates significant fuel damage well in excess of that required for loss of RCS and Fuel Clad.

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.

There is no Loss threshold associated with this item.

Basis Reference(s):

1. Core Damage Assessment Methodology (CDAM)
2. ARC-005-00C226D-B-5 Unit 3 Containment Radiation Monitor Hi-Rad
3. DBD P-S-43, Radiation Monitoring System
4. NEI 99-01, Rev. 5 Table 5-F-2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT6

Initiating Condition

Primary Containment Isolation Failure or Bypass

Operating Mode Applicability

1, 2, 3

EAL Threshold Value

LOSS:

1. a. Failure of isolation valves in any one line to close.

   AND

   b. Direct downstream pathway to the environment exists after a primary containment isolation signal.

   OR

2. Intentional venting/purging of Primary Containment per TRIPs or SAMPs due to accident conditions.

   OR

3. UNISOLABLE primary system leakage outside of drywell resulting in **EITHER:**

   - Secondary Containment area temperatures **> T-103 Action Level**.

     OR

   - Secondary Containment area radiation levels **> T-103 Action Level**.

Basis:

UNISOLABLE – is a breach or leak that cannot be promptly isolated.

Promptly allows for actions to be taken to isolate the leak. Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

These thresholds address incomplete containment isolation that allows direct release to the environment.

Loss Threshold #1 Basis

This threshold addresses failure of open isolation devices, which should close upon receipt of a manual or automatic containment isolation signal resulting in a significant radiological release pathway to the environment. The concern is the unisolable open pathway to the environment. A failure of the ability to isolate any one line indicates a breach of primary containment integrity.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT6 (cont)

Basis: (cont)

Failure of containment isolation valves to isolate with a downstream pathway to the environment following an automatic or manual isolation signal is only a concern during an event requiring mitigation by the Primary Containment barrier. If this condition exists during normal Power Operation, a Technical Specification Action Statement will address it. However, during events requiring Primary Containment integrity, this will represent a breach of Primary Containment.

The use of the modifier “direct” in defining the release path discriminates against release paths through interfacing liquid systems. The existence of an in–line charcoal filter does not make a release path indirect since the filter is not effective at removing fission product noble gases. Typical filters have an efficiency of 95-99% removal of iodine. Given the magnitude of the core inventory of iodine, significant releases could still occur. In addition, since the fission product release would be driven by boiling in the reactor vessel, the high humidity in the release stream can be expected to render the filters ineffective in a short period.

Leakage into a closed system is to be considered only if the closed system is breached and thereby creates a significant pathway to the environment. Examples include unisolable Main Steamline, HPCI or RCIC steamline breaks, unisolable RWCU system breaks, and unisloable containment atmosphere vent paths. Minor release paths such as instrument and sample lines are not considered under this threshold.

Examples of “downstream pathway to the Environment” could be through Turbine/Condenser, or direct release to the Turbine or Reactor Building.

Loss Threshold #2 Basis:

EOPs may direct containment isolation valve logic(s) to be intentionally bypassed, regardless of radioactivity release rates. Under these conditions with a valid containment isolation signal, the containment should also be considered lost if containment venting is actually performed.

Intentional venting of primary containment for primary containment pressure or combustible gas control per EOPs to the secondary containment and/or the environment is considered a loss of containment. Containment venting for pressure control when not in an accident situation should not be considered.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT6 (cont)

Basis: (cont)

Loss Threshold #3 Basis:

The presence of area radiation or temperature above Action Level setpoints indicating unisolable primary system leakage outside the primary containment are addressed after a containment isolation. The indicators should be confirmed to be caused by RCS 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.

There is no Potential Loss threshold associated with this item.

Basis References:

1. T-103 Secondary Containment Control
2. T-102 Primary Containment Control
3. T-200-3, Primary Containment Venting
4. NEI 99-01, Rev. 5 Table 5-F-2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT7

Initiating Condition

Emergency Director Judgment

Operating Mode Applicability

1, 2, 3

Threshold Value

LOSS:

1. Any condition in the opinion of the Emergency Director that indicates a Loss of the Primary Containment Barrier.

POTENTIAL LOSS:

2. Any condition in the opinion of the Emergency Director that indicates a Potential Loss of the Primary Containment Barrier.

Basis:

These thresholds address any other factors that are to be used by the Emergency Director in determining whether the Containment barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

The Containment barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment barrier status is addressed by Technical Specifications.

Basis References:

1. NEI 99-01, Rev. 5 Table 5-F-2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG1

Initiating Condition

Prolonged loss of all Off-Site and all On-Site AC power to emergency busses.

Operating Mode Applicability:

1, 2, 3,

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to unit 4 KV Safeguards Buses.

   AND

2. Failure of E1, E2, E3 and E4 Emergency Diesel Generators to supply power to unit 4 KV Safeguards Buses.

   AND

3. a. Restoration of at least one unit 4 KV Safeguards Bus in **< 2 hours** is **not** likely.

      OR

   b. RPV level **cannot** be determined to be **> -172 inches.**

Basis:

Loss of all AC power to emergency busses 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 to emergency busses will lead to loss of fuel clad, RCS, and containment, thus warranting declaration of a General Emergency.

This EAL is specified to assure that in the unlikely event of a prolonged station blackout, timely recognition of the seriousness of the event occurs and that declaration of a General Emergency occurs as early as is appropriate, based on a reasonable assessment of the event trajectory.

The likelihood of restoring at least one emergency bus should be based on a realistic appraisal of the situation since a delay in an event classification escalation decision based on only a chance of mitigating the event could result in a loss of valuable time in preparing and implementing public protective actions.

In addition, under these conditions, fission product barrier monitoring capability may be degraded.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG1 (cont)

Basis References:

1. UFSAR Section 8.4, Auxiliary Power Systems
2. UFSAR Figure 8.3.1, Transmission System
3. SE-11, LOSS OF OFF-SITE POWER - BASES
4. DBD P-S-05, 4KV SYSTEM
5. T-101 RPV Control
6. NEI 99-01, Rev. 5 SG1

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS1

Initiating Condition

Loss of all Off-Site and all On-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to unit 4 KV Safeguards Buses.

   AND

2. Failure of E1, E2, E3 and E4 Emergency Diesel Generators to supply power to unit 4 KV Safeguards Buses.

   AND

3. Failure to restore power to at least one unit 4 KV Safeguards Bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.

Basis:

Loss of all AC power to emergency busses 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 to emergency busses will lead to loss of Fuel Clad, RCS, and Containment, thus this event can escalate to a General Emergency.

Fifteen minutes was selected as a threshold to exclude momentary losses of off-site power.

Escalation to General Emergency is via Fission Product Barrier Degradation or MG1, "Prolonged Loss of All Off-site Power and Prolonged Loss of All On-site AC Power."

Basis References

1. UFSAR Section 8.4, Auxiliary Power Systems
2. UFSAR Figure 8.3.1, Transmission System
3. SE-11 LOSS OF OFF-SITE POWER - BASES
4. DBD P-S-05, 4KV SYSTEM
5. T-101 RPV Control
6. NEI 99-01, Rev. 5 SS1

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA1

Initiating Condition

AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. AC power capability to unit 4 KV Safeguards Buses reduced to only one of the following sources for **≥ 15 minutes**.

   - 2 Emergency Auxiliary Transformer (0AX04)
   - 3 Emergency Auxiliary Transformer (0BX04)
   - E1 Diesel Generator
   - E2 Diesel Generator
   - E3 Diesel Generator
   - E4 Diesel Generator

   AND

2. Any additional single power source failure will result in a unit blackout,

Basis:

Capability: (pertaining to electrical power supplies) is equipment that is available to provide and maintain AC power at the required voltage and frequency for the required load.

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. Another related condition could be the loss of all off-site power and loss of on-site emergency generators with only one train of emergency busses being backfed from the unit main generator, or the loss of on-site emergency generators with only one train of emergency busses being backfed from off-site power. The subsequent loss of this single power source would escalate the event to a Site Area Emergency in accordance with MS1.

Fifteen minutes was selected as a threshold to exclude momentary losses of power.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA1 (cont)

Basis References:

1. UFSAR Figure 8.3.1, Transmission System
2. UFSAR Section 8.5.3, Standby AC Power Supply and Distribution
3. SE-11 LOSS OF OFF-SITE POWER – BASES
4. DBD P-S-05, 4KV SYSTEM
5. DBD P-T-13, Station Blackout
6. NEI 99-01, Rev. 5 SA5

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU1

Initiating Condition

Loss of all Off-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of all off-site AC power to unit 4 KV Safeguards Buses for **≥ 15 minutes**.

Basis:

Prolonged loss of off-site 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 to emergency busses.

Fifteen minutes was selected as a threshold to exclude momentary losses of off-site power.

Basis Reference(s):

1. UFSAR Figure 8.3.1, Transmission System
2. UFSAR Section 8.5.3, Standby AC Power Supply and Distribution
3. SE-11 LOSS OF OFF-SITE POWER - BASES
4. DBD P-S-05, 4KV SYSTEM
5. DBD P-T-13, Station Blackout
6. NEI 99-01, Rev. 5 SU1

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG2

Initiating Condition

Automatic Scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic scram was **not** successful as indicated by Reactor Power **> 4%.**

   AND

2. Manual scram/ARI actions were **not** successful as indicated by Reactor Power **> 4%.**

   AND

3. **EITHER** of the following exists:

   - RPV level **cannot** be restored and maintained **> - 195 inches**.

     OR

   - Heat Capacity Temperature Limit (T-102 Curve T/T-1) exceeded.

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful.

The third condition of this EAL indicates an extreme challenge to the ability to cool the core as indicated when RPV level cannot be restored and maintained above the Minimum Steam Cooling RPV Water Level or a challenge to Containment for energy transfer from the RPV as indicated by exceeding the Heat Capacity Limit.

In the event either of these challenges exists at a time that the reactor has not been brought below the power associated with the safety system design a core melt sequence exists. In this situation, core degradation can occur rapidly. For this reason, the General Emergency declaration is intended to be anticipatory of the fission product barrier table declaration to permit maximum off-site intervention time.

Determination of “restore and maintained” is based on the actions driven by Emergency Operating Procedures to restore level. The inability to reverse the RPV level lowering trend after lining up injection sources and injecting, including the use of low pressure systems following an Emergency Depressurization would warrant classification.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG2 (cont)

Basis Reference(s):

1. T-101, RPV Control
2. T-117, Level/Power Control
3. T-102, Primary Containment Control
4. NEI 99-01, Rev. 5 SG2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS2

Initiating Condition

Automatic Scram fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic scram was **not** successful as indicated by Reactor Power **> 4%.**

   AND

2. Manual scram/ARI actions were **not** successful from the Reactor Console as indicated by Reactor Power **> 4%.**

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful. A Site Area Emergency is warranted because conditions exist that lead to IMMINENT loss or potential loss of both fuel clad and RCS.

Manual actions taken at the reactor control console are any set of actions by the reactor operator(s) at which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

Manual actions are not considered successful if action away from the reactor control console is required to scram the reactor. This EAL is still applicable even if actions taken away from the reactor control console are successful in shutting the reactor down because the design limits of the fuel may have been exceeded or because of the gross failure of the Reactor Protection System to shutdown the plant.

Escalation of this event to a General Emergency would be due to a prolonged condition leading to an extreme challenge to either core-cooling or heat removal.

Basis Reference(s):

1. T-101, RPV Control
2. T-117, Level/Power Control
3. NEI 99-01, Rev. 5 SS2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA2

Initiating Condition

Automatic Scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic scram was **not** successful as indicated by Reactor Power **> 4%.**

   AND

2. Manual scram/ARI actions were successful from Reactor Console as indicated by Reactor Power **≤ 4%.**

Basis:

Manual actions taken at the reactor control console are any set of actions by the reactor operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

This condition indicates failure of the automatic protection system to scram the reactor in response to exceeding reactor protective system setpoints during a plant transient. Associated RPS instrument failures during non-transient plant conditions would be addressed by Technical Specifications. This condition is more than a potential degradation of a safety system in that a front line automatic protection system did not function in response to a plant transient. Thus the plant safety has been compromised because design limits of the fuel may have been exceeded. An Alert is indicated because conditions may exist that lead to potential loss of fuel clad or RCS and because of the failure of the Reactor Protection System to automatically shutdown the plant.

If manual actions taken at the reactor control console fail to shutdown the reactor, the event would escalate to a Site Area Emergency.

Basis Reference(s):

1. T-101, RPV Control
2. Technical Specifications Table 3.3.1.1-1, Reactor Protection System Instrumentation
3. NEI 99-01, Rev. 5 SA2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU2

Initiating Condition

Inadvertent criticality.

Operating Mode Applicability:

3

EAL Threshold Values:

UNPLANNED sustained positive period observed on nuclear instrumentation.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL addresses inadvertent criticality events. This EAL excludes inadvertent criticalities that occur during planned reactivity changes associated with reactor startups (e.g., criticality earlier than estimated). This condition can be identified using period monitors. The term “sustained“ is used in order to allow exclusion of expected short term positive periods from planned control rod movements. Escalation would be by the Fission Product Barrier.

This EAL indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification.

Basis Reference(s):

1. DBD P-S-20, Neutron Monitoring System
2. ARC –210(310) 20C205 (30C205)-F3 WRNM SHORT PERIOD TROUBLE
3. NEI 99-01, Rev. 5 SU8

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS3

Initiating Condition

Loss of all vital DC power for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of all vital DC power based on **< 107.5 VDC** on unit 125 VDC battery busses 2(3)0D021, 2(3)0D022, 2(3)0D023, and 2(3)0D024 for **≥ 15 minutes**.

Basis:

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power will cause core uncovering and loss of containment integrity when there is significant decay heat and sensible heat in the reactor system.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Escalation to a General Emergency would occur by Abnormal Rad Levels/Radiological Effluent, Fission Product Barrier Degradation.

Basis Reference(s):

1. DBD P-S-01A, 125/250 Vdc Station Batteries Including 125Vdc Batteries & Chargers, Table T3.2-1, MCCs, and DC Distribution
2. SE-13 LOSS OF A 125 OR 250 VDC SAFETY RELATED BUS
3. ARC-220-20C209R H-3, 2B DC Power Panel Lo Voltage
4. NEI 99-01, Rev. 5 SS3

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS4

Initiating Condition

Inability to monitor a SIGNIFICANT TRANSIENT in progress.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**
   - Safety System annunciators (Table M1)

     OR

   - Safety System indications (Table M1)

   AND

2. SIGNIFICANT TRANSIENT in progress (Table M2).

   AND

3. Compensatory indications (computer points) are unavailable.

Table M1 – Safety System
• ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring

Table M2- Significant Transients
• Turbine trip • Reactor scram • ECCS activation • Recirc Runback >25% power change • Thermal power oscillations > 10 % Reactor Power change

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS4 (cont)

Basis:

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) Turbine Trip (2) Reactor Scram (3) ECCS Activation, (4) Recirc. Runback > 25% Reactor Power change, or (5) thermal power oscillations > 10% Reactor Power change.

This EAL is intended to recognize the threat to plant safety associated with the complete loss of capability of the control room staff to monitor plant response to a SIGNIFICANT TRANSIENT.

"Planned" and “UNPLANNED” actions are not differentiated since the loss of instrumentation of this magnitude is of such significance during a transient that the cause of the loss is not a factor.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

A Site Area Emergency is considered to exist if the control room staff cannot monitor safety systems needed for protection of the public while a significant transient is in progress.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS4 (cont)

Basis: (cont)

Indications needed to monitor safety systems necessary for protection of the public must include control room indications; computer generated indications and dedicated annunciation capability. The specific parameters are those used to determine such functions as the ability to shut down the reactor, maintain the core cooled and in a coolable geometry, remove heat from the core, and maintain the reactor coolant system and primary containment.

"Compensatory indications" in this context includes computer based information. This includes all computer systems available for this use.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Basis References

1. UFSAR Section 7.16, Redundant System Wiring Independent, Protection and Marking
2. T-101, RPV Control
3. T-102, Primary Containment Control
4. T-BAS INTRODUCTION TO TRIPS AND SAMPS - BASES
5. ON-123, Loss of Main Control Room Annunciators
6. NEI 99-01, Rev. 5 SS6

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA4

Initiating Condition

UNPLANNED Loss of safety system annunciation or indication in the control room with EITHER (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**

   - Safety System annunciators (Table M1)

     OR

   - Safety System indications (Table M1)

Table M1 – Safety System
• ECCS
• Containment Isolation
• Reactor Scram
• Process/Area Radiation Monitoring

AND

2. a. SIGNIFICANT TRANSIENT in progress (Table M2).

Table M2 - Significant Transients
• Turbine trip
• Reactor scram
• ECCS activation
• Recirc Runback > 25% power change
• Thermal power oscillations > 10 % Reactor Power change

OR

b. Compensatory indications (computer points) are unavailable.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA4 (cont)

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) Turbine Trip (2) Reactor Scram (3) ECCS Activation, (4) Recirc. Runback > 25% Reactor Power change, or (5) thermal power oscillations > 10% Reactor Power change

This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a SIGNIFICANT TRANSIENT.

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

"Compensatory indications" in this context includes computer based information. If both a major portion of the annunciation system and all computer monitoring are unavailable, the Alert is required.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

This Alert will be escalated to a Site Area Emergency if the operating crew cannot monitor the transient in progress due to a concurrent loss of compensatory indications with a SIGNIFICANT TRANSIENT in progress during the loss of annunciation or indication.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA4 (cont)

Basis Reference(s):

1. UFSAR Section 7.16, Redundant System Wiring Independent, Protection and Marking
2. DBD P-S-16, REACTOR INSTRUMENTATION SYSTEM
3. ON-123, Loss of Main Control Room Annunciators
4. NEI 99-01, Rev. 5 SA4

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU4

Initiating Condition

UNPLANNED loss of safety system annunciation or indication in the control room for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**

- Safety System annunciators (Table M1)

OR

- Safety System indications (Table M1)

Table M1 – Safety System
• ECCS
• Containment Isolation
• Reactor Scram
• ProcessArea Radiation Monitoring

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment.

Recognition of the availability of computer based indication equipment is considered.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU4 (cont)

Basis (cont)

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

Fifteen minutes was selected as a threshold to exclude momentary power losses.

This Unusual Event will be escalated to an Alert based on a concurrent loss of compensatory indications or if a SIGNIFICANT TRANSIENT is in progress during the loss of annunciation or indication.

Basis Reference(s):

1. UFSAR Section 7.16, Redundant System Wiring Independent, Protection and Marking
2. DBD P-S-16, REACTOR INSTRUMENTATION SYSTEM
3. ON-123, Loss of Main Control Room Annunciators
4. NEI 99-01, Rev. 5 SU3

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU5

Initiating Condition

RCS leakage.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

1. Unidentified or pressure boundary leakage into the Drywell **> 10 gpm**.

   OR

2. Identified leakage into the Drywell **> 25 gpm**.

Basis:

This EAL is included as an Unusual Event because it may be a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified or pressure boundary leakage was selected as it is observable with normal control room indications. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances).

Relief valve operation should be excluded from this EAL.

The EAL for identified leakage is set at a higher value due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage. In either case, escalation of this EAL to the Alert level is via Fission Product Barrier.

Basis Reference(s):

1. ST-O-020-560-2/3, Reactor Coolant Leakage Test
2. Technical Specification 3.4.4, RCS Operational Leakage
3. UFSAR 5.2.5, Primary Containment – Inspection and Testing
4. UFSAR 4.10.3, Nuclear System Leakage Detection and Leakage Rate Limits
5. DBD P-S-34 Radwaste System, 3.3.1.3.1 Drywell Floor Drain Sump Operation
6. DBD P-S-34 Radwaste System, 3.3.1.3.2 Drywell Equipment Drain Sump Operation
7. NEI 99-01, Rev. 5 SU5

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU6

Initiating Condition

Loss of all On-site or Off-site communications capabilities.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

1. Loss of all Table M3 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table M3 **Offsite** communications capability affecting the ability to perform offsite notifications.

Table M3 - Communications Capability

System	Onsite	Offsite
Station Radio System	X	
Plant Public Address (PA)	X	
OMNI System	X	X
Station Phones	X	X
Satellite Phones	X	X
NRC (ENS)		X

Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU6 (cont)

Basis Reference(s):

1. EP-MA-124-1001 Facility Inventories and Equipment Tests
2. UFSAR Section 10.21, Communication System
3. NE-CG-400-19 Lighting and Communication Drawings
4. NEI 99-01, Rev. 5 SU6

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU7

Initiating Condition

Inability to reach required shutdown within Technical Specification limits.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Plant is **not** brought to required operating mode within Technical Specifications LCO Action Statement Time.

Basis:

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 Unusual Event is required when the plant is not brought 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.

Basis Reference(s):

1. PBAPS Technical Specifications
2. NEI 99-01, Rev. 5 SU2

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA1

Initiating Condition

Loss of all Off-site and all On-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to unit 4 KV Safeguards Buses.

   AND

2. Failure of E1, E2, E3 and E4 Emergency Diesel Generators to supply power to unit 4 KV Safeguards Buses.

   AND

3. Failure to restore power to at least one unit 4 KV Safeguards Bus **< 15 minutes** from the time of loss of both offsite and onsite AC power.

Basis:

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.

The event can be classified as an Alert when in cold shutdown, refueling, or defueled mode because of the significantly reduced decay heat and lower temperature and pressure, increasing the time to restore one of the emergency busses, relative to that specified for the Site Area Emergency EAL.

Escalating to Site Area Emergency, if appropriate, is by Abnormal Rad Levels / Radiological Effluent EALs.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA1 (cont)

Basis Reference(s):

1. UFSAR Figure 8.3.1, Transmission System
2. UFSAR Section 8.5.3, Standby AC Power Supply and Distribution
3. SE-11 LOSS OF OFF-SITE POWER - BASES
4. DBD P-S-05, 4KV SYSTEM
5. DBD P-T-13, Station Blackout
6. NEI 99-01, Rev. 5 CA3

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU1

Initiating Condition

AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. AC power capability to unit 4 KV Safeguards Buses reduced to only one of the following sources for **≥ 15 minutes**.

   - 2 Emergency Auxiliary Transformer (0AX04)
   - 3 Emergency Auxiliary Transformer (0BX04)
   - E1 Diesel Generator
   - E2 Diesel Generator
   - E3 Diesel Generator
   - E4 Diesel Generator

   AND

2. Any additional single power source failure will result in a unit blackout,

Basis:

Capability: (pertaining to electrical power supplies) is equipment that is available to provide and maintain AC power at the required voltage and frequency for the required load.

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. The subsequent loss of this single power source would escalate the event to an Alert in accordance with CA1.

Fifteen minutes was selected as a threshold to exclude momentary losses of power.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU1

Basis References:

1. UFSAR Figure 8.3.1, Transmission System
2. UFSAR Section 8.5.3, Standby AC Power Supply and Distribution
3. SE-11 LOSS OF OFF-SITE POWER – BASES
4. DBD P-S-05, 4KV SYSTEM
5. DBD P-T-13, Station Blackout
6. NEI 99-01, Rev. 5 CU3

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU2

Initiating Condition

Inadvertent criticality.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

UNPLANNED sustained positive period observed on nuclear instrumentation.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL also addresses criticality events that occur in Cold Shutdown or Refueling modes such as fuel mis-loading events. This condition can be identified using period monitors. The term “sustained” is used in order to allow exclusion of expected short term positive periods from planned fuel bundle or control rod movements during core alteration.

This EAL indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification.

Basis Reference(s):

1. DBD P-S-20, Neutron Monitoring System
2. ARC –210(310) 20C205 (30C205)-F3 WRNM SHORT PERIOD TROUBLE
3. NEI 99-01, Rev. 5 CU8

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU3

Initiating Condition

Loss of required DC power for 15 minutes or longer.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of required DC power based on **< 107.5 VDC** on unit 125 VDC battery buses 2(3)0D021, 2(3)0D022, 2(3)0D023, and 2(3)0D024 for **≥ 15 minutes**.

Basis:

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.

The required busses are the minimum allowed by Technical Specifications for the mode of operation. It is intended that the loss of the operating (operable) train is to be considered. If this loss results in the inability to maintain cold shutdown, the escalation to an Alert will be per CA5.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Basis Reference(s):

1. DBD P-S-01A, 125/250 Vdc Station Batteries Including 125Vdc Batteries & Chargers, Table T3.2-1, MCCs, and DC Distribution
2. SE-13, LOSS OF A 125 OR 250 VDC SAFETY RELATED BUS
3. ARC-220-20C209R H-3, 2B DC Power Panel Lo Voltage
4. NEI 99-01, Rev. 5 CU7

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU4

Initiating Condition

Loss of all On-site or Off-site communications capabilities.

Operating Mode Applicability:

4, 5, D

EAL Threshold Values:

1. Loss of all Table C1 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table C1 **Offsite** communications capability affecting the ability to perform offsite notifications.

Table C1 - Communications Capability

System	Onsite	Offsite
Station Radio System	X	
Plant Public Address (PA)	X	
OMNI System	X	X
Station Phones	X	X
Satellite Phones	X	X
NRC (ENS)		X

Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU4 (cont)

Basis Reference(s):

1. EP-MA-124-1001 Facility Inventories and Equipment Tests
2. UFSAR Section 10.21, Communication System
3. NE-CG-400-19 Lighting and Communication Drawings
4. NEI 99-01, Rev. 5 CU6

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5

Initiating Condition

Inability to maintain plant in cold shutdown.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 212°F** for **> Table C2 duration**.

Table C2 – RCS Reheat Duration Thresholds		
RCS	**Containment Closure**	**Duration**
Intact	N/A	60 minutes*
Not Intact	Established	20 minutes*
	Not Established	0 minutes
*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then EAL Threshold #1 is **not** applicable.		

OR

2. UNPLANNED RPV pressure rise **> 10 psig** as a result of temperature rise due to loss of decay heat removal.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

RCS is intact when the RCS pressure boundary is in its normal condition for the Cold Shutdown mode of operation (e.g., no freeze seals or main steam line nozzle plugs, etc.).

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5 (cont)

Basis (cont)

Threshold #1 Basis:

The RCS Reheat Duration Threshold table addresses complete loss of functions required for core cooling for greater than 60 minutes during refueling and cold shutdown modes when RCS integrity is established. The status of CONTAINMENT CLOSURE in this condition is immaterial given that the RCS is providing a high pressure barrier to fission product release to the environment. The 60 minute time frame should allow sufficient time to restore cooling without there being a substantial degradation in plant safety.

The RCS Reheat Duration Threshold table also addresses the complete loss of functions required for core cooling for greater than 20 minutes during refueling and cold shutdown modes when CONTAINMENT CLOSURE is established but RCS integrity is not established. The allowed 20 minute time frame was included to allow operator action to restore the heat removal function, if possible.

Finally, complete loss of functions required for core cooling during refueling and cold shutdown modes when neither CONTAINMENT CLOSURE nor RCS integrity are established. No delay time is allowed because the evaporated reactor coolant that may be released into the Containment during this heatup condition could also be directly released to the environment.]

The note (*) indicates that this EAL is not applicable if actions are successful in restoring an RCS heat removal system to operation and RCS temperature is being reduced within the specified time frame.

Threshold #2 Basis:

The 10 psig pressure rise due to loss of decay heat removal infers an intact RCS with uncontrolled RPV temperature rise in excess of the Technical Specification cold shutdown limit (212° F) for which CA5 Threshold #1 would permit up to sixty minutes to restore RCS cooling before declaration of an Alert. This EAL therefore covers situations of high decay heat loads, in which the event should be declared without delay.

Escalation to Site Area Emergency would be via CS6 should boiling result in significant RPV level loss leading to core uncovery.

A loss of Technical Specification components alone is not intended to constitute an Alert. The same is true of a momentary UNPLANNED excursion above the Technical Specification cold shutdown temperature limit when the heat removal function is available.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5 (cont)

Basis reference(s):

1. Technical Specification 3.6.1.1, Primary Containment
2. Technical Specification 3.6.4.1, Secondary Containment
3. DBD P-S-16, REACTOR INSTRUMENTATION SYSTEM
4. DBD P-S-19, RECIRCULATION SYSTEM
5. SE-11, ATTACHMENT C - INSTRUMENT LIST
6. NEI 99-01, Rev. 5 CA4

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU5

Initiating Condition

UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 212°F**.

   OR

2. Loss of the following for **≥ 15 minutes:**

   - All RCS temperature indications

     AND

   - All RPV level indications

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL is be a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant.

In cold shutdown the ability to remove decay heat relies primarily on forced cooling flow. Operation of the systems that provide this forced cooling may be jeopardized due to the unlikely loss of electrical power or RCS inventory. Since the RCS usually remains intact in the cold shutdown mode a large inventory of water is available to keep the core covered.

During refueling the level in the RPV will normally be maintained above the RPV flange. Refueling evolutions that decrease water level below the RPV flange are carefully planned and procedurally controlled. Loss of forced decay heat removal at reduced inventory may result in more rapid increases in RCS/RPV temperatures depending on the time since shutdown.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU5 (cont)

Basis (cont)

Normal means of core temperature indication and RCS level indication may not be available in the refueling mode. Redundant means of RPV level indication are therefore procedurally installed to assure that the ability to monitor level will not be interrupted. However, if all level and temperature indication were to be lost in either the cold shutdown of refueling modes, Threshold #2 would result in declaration of an Unusual Event if both temperature and level indication cannot be restored within 15 minutes from the loss of both means of indication. Escalation to Alert would be via CA6 based on an inventory loss or CA5 based on exceeding its temperature criteria.

Basis Reference(s):

1. T-102, Primary Containment Control - Bases
2. T-103, Secondary Containment Control – Bases
3. DBD P-S-16, REACTOR INSTRUMENTATION SYSTEM
4. PBAPS 2/3 TRIP/SAMP CURVES, TABLES, & LIMITS - BASES
5. DBD P-S-19, RECIRCULATION SYSTEM
6. NEI 99-01, Rev. 5 CU4

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6

Initiating Condition

Loss of RPV inventory affecting fuel clad integrity with containment challenged.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. RPV level **< -172 inches** for **≥ 30 minutes**.

   AND

   b. Any Containment Challenge Indication (Table C5).

   OR

2. a. RPV level unknown for **≥ 30 minutes.**

   AND

   b. Loss of RPV inventory as indicated by any of the following:

   - Table C3 indication.

     OR

   - Erratic Wide Range Neutron Monitor indication.

     OR

   - Any Table C4 Refuel Floor Area Radiation Monitor reading **> 3 R/hr.**

   AND

   c. Any Containment Challenge Indication (Table C5)

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6 (cont.)

EAL Threshold Values: (cont)

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise
• UNPLANNED Torus level rise
• UNPLANNED vessel make-up rise
• Observation of leakage or Inventory loss

Table C4 – Refuel Floor ARMs
• Refuel Slot, 234 ELEV, 3.8 (7.10)
• Fuel Pool, 234 ELEV, 3.9 (7.11)
• Refueling Bridge, 234 ELEV, 3.10 (7.12)

Table C5 – Containment Challenge Indications
• Primary Containment Hydrogen concentration **> 6%** and Oxygen **> 5%**.
• UNPLANNED rise in containment pressure
• CONTAINMENT CLOSURE **not** established.
• Any Secondary Containment radiation monitors reading **> T-103 Action Level**.

Basis:

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6 (cont.)

Basis: (cont)

This EAL represents the inability to restore and maintain RPV level to above the top of active fuel with containment challenged. Fuel damage is probable if RPV level cannot be restored, as available decay heat will cause boiling, further reducing the RPV level. With the CONTAINMENT breached or challenged then the potential for unmonitored fission product release to the environment is high. This represents a direct path for radioactive inventory to be released to the environment. This is consistent with the definition of a General Emergency. The General Emergency is declared on the occurrence of the loss or IMMINENT loss of function of all three barriers.

A number of variables can have a significant impact on heat removal capability challenging the fuel clad barrier. Examples include initial vessel level and shutdown heat removal system design.

Analysis indicates that core damage may occur within an hour following continued core uncovery therefore, 30 minutes was conservatively chosen.

If CONTAINMENT CLOSURE is re-established prior to exceeding the 30 minute core uncovery time limit then escalation to a General Emergency would not occur.

When RPV level indication is unavailable, the inventory loss must be detected by erratic Source Range Monitor indication, elevated drywell radiation or unexplained rise in drywell floor or equipment drain sump pumpout rate. Post-TMI studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and that Source Range Monitors can be used as a tool for making such determinations.

As water level in the RPV lowers, the dose rate above the core will rise. Indication of > 3000 mR/hr is indicative of core uncovery (i.e. level at TAF).

Basis Reference(s):

1. T-101 RPV Control
2. T-102 Primary Containment Control
3. T-103 Secondary Containment Control
4. DBD P-S-20, Neurton Monitoring System
5. DBD P-T-02, Containment, Section 3.2.14
6. Technical Specifications 3.6.1.1, Primary Containment
7. Technical Specifications 3.6.4.1, Secondary Containment
8. UFSAR Table 5.2-1, Primary Containment
9. EP-AEL-0501, Estimation of Radiation Monitor Readings Indicating Core Uncovery During Refuel
10. NEI 99-01, Rev. 5 CG1

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6

Initiating Condition

Loss of RPV inventory affecting core decay heat removal capability.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. With CONTAINMENT CLOSURE **not** established, RPV level **< -54 inches**.

   OR

2. With CONTAINMENT CLOSURE established, RPV level **< -172 inches.**

   OR

3. a. RPV level unknown for **≥ 30 minutes.**

      AND

   b. Loss of RPV inventory as indicated by any of the following:

      - Table C3 indications.

        OR

      - Erratic Wide Range Neutron Monitor indication.

        OR

      - Any Table C4 Refuel Floor Area Radiation Monitor reading **> 3 R/hr.**

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise
• UNPLANNED Torus level rise
• UNPLANNED vessel make-up rise
• Observation of leakage or Inventory loss

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6 (cont)

EAL Threshold Values: (cont)

Table C4 – Refuel Floor ARMs
• Refuel Slot, 234 ELEV, 3.8 (7.10)
• Fuel Pool, 234 ELEV, 3.9 (7.11)
• Refueling Bridge, 234 ELEV, 3.10 (7.12)

Basis:

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

Under the conditions specified, a continued drop in RCS/RPV level is indicative of a loss of inventory control. Inventory loss may be due to an RCS breach, pressure boundary leakage, or continued boiling in the RPV. Thus, declaration of a Site Area Emergency is warranted.

Escalation to a General Emergency is via CG6 or RG1.

Threshold #1 and #2 Basis:

If a low-pressure boundary to fission product release does not exist (i.e., without containment closure established), the RPV level associated with this threshold is six inches below the low-low ECCS actuation setpoint. If containment closure is established, a low-pressure boundary to fission product release exists and RPV level can drop to the top of active fuel before a Site Area Emergency declaration is required. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further RPV level drop and potential core uncovery.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6 (cont)

EAL Threshold Values: (cont)

Threshold #3 Basis:

When RPV level indication is unavailable, the inventory loss must be detected by erratic Source Range Monitor indication, elevated drywell radiation or unexplained rise in drywell floor or equipment drain sump pumpout rate. Post-TMI studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and that Source Range Monitors can be used as a tool for making such determinations.

The 30-minute duration allows sufficient time for actions to be performed to recover inventory control equipment.

As water level in the RPV lowers, the dose rate above the core will rise. Indication of > 3000 mR/hr. is indicative of core uncovery (i.e. level at TAF).

Basis Reference(s):

1. Technical Specifications 3.6.4.1, Secondary Containment
2. Technical Specifications 3.6.1.1, Primary Containment
3. T-102, Primary Containment Control
4. Technical Specifications Table 3.3.5.1-1, Emergency Core Cooling System Instrumentation
5. DBD P-S-34, RADWASTE SYSTEM, 3.3.1.3.1 Drywell Floor Drain Sump Operation
6. DBD P-S-34, RADWASTE SYSTEM, 3.3.1.3.2 Drywell Equipment Drain Sump Operation
7. DBD P-S-20, Neutron Monitoring System
8. NEI 99-01, Rev. 5 CS1

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA6

Initiating Condition

Loss of RPV inventory.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. RPV level **< - 48 inches**.

   OR

2. a. RPV level unknown for **≥ 15 minutes**.

   AND

   b. Loss of RPV inventory per Table C3 indications.

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise
• UNPLANNED Torus level rise
• UNPLANNED vessel make-up rise
• Observation of leakage or Inventory loss

Basis:

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL serves as precursors to a loss of ability to adequately cool the fuel. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further RPV level decrease and potential core uncovery. This condition will result in a minimum emergency classification level of an Alert.

If RPV level continues to lower then escalation to Site Area Emergency will be via CS6.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA6 (cont)

Basis (cont)

Threshold #1 Basis:

The inability to restore and maintain level after reaching this setpoint would be indicative of a failure of the RCS barrier.

Threshold #2 Basis:

When RPV level indication is unavailable, the inventory loss must be detected by other means including rise in sump pumpout rates, changes in makeup or observation of leakage.

The 15-minute interval for the loss of level indication was chosen because it is half of the Site Area Emergency duration.

Basis Reference(s):

1. ST-O-020-560-2/3 REACTOR COOLANT LEAKAGE TEST
2. OT-101 HIGH DRYWELL PRESSURE - PROCEDURE
3. ARC 227-A4 Drywell Hi Pressure Sealed-In
4. ARC 210-A4 Drywell Hi-Lo Pressure
5. Technical Specifications 3.4.4, RCS Operational Leakage
6. UFSAR 5.2.5, Primary Containment
7. DBD P-S-34 RADWASTE SYSTEM, 3.3.1.3.1 Drywell Floor Drain Sump Operation
8. DBD P-S-34 RADWASTE SYSTEM, 3.3.1.3.2 Drywell Equipment Drain Sump Operation
9. T-102, Primary Containment Control
10. NEI 99-01, Rev. 5 CA1

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU6

Initiating Condition

RCS Leakage.

Operating Mode Applicability:

4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

RCS leakage results in the inability to restore and maintain RPV level **> 1 inch** for **≥ 15 minutes**.

Basis:

This EAL is considered to be a potential degradation of the level of safety of the plant. The inability to maintain or restore level is indicative of loss of RCS inventory.

Prolonged loss of RCS Inventory may result in escalation to the Alert emergency classification level via either CA6 or CA5.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU1

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU7

Initiating Condition

UNPLANNED loss of RPV inventory.

Operating Mode Applicability:

5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED Reactor Cavity or Vessel level drop that meets **EITHER**:

   - When controlling level above the RPV flange, Reactor Cavity level drop below the RPV flange for **≥ 15 minutes**.

     OR

   - When controlling level below the RPV flange, vessel level drop below the procedurally established limit **≥ 15 minutes**.

   OR

2. a. RPV level unknown.

   AND

   b. Loss of RPV inventory per Table C3 indications.

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise
• UNPLANNED Torus level rise
• UNPLANNED vessel make-up rise
• Observation of leakage or Inventory loss

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU7 (cont)

Basis (cont)

This EAL is a precursor of more serious conditions and considered to be a potential degradation of the level of safety of the plant.

Refueling evolutions that lowers RCS water level below the RPV flange are carefully planned and procedurally controlled. An UNPLANNED event that results in water level dropping below the RPV flange, or below the planned RCS water level for the given evolution (if the planned RCS water level is already below the RPV flange), warrants declaration of a UE due to the reduced RCS inventory that is available to keep the core covered.

The allowance of 15 minutes was chosen because it is reasonable to assume that level can be restored within this time frame using one or more of the redundant means of makeup that should be available. If level cannot be restored in this time frame then it may indicate a more serious condition exists.

Continued loss of RCS Inventory will result in escalation to the Alert emergency classification level via either CA6 or CA5.

Threshold #1 Basis:

This EAL involves a drop in RCS level below the top of the RPV flange that continues for 15 minutes due to an UNPLANNED event. This EAL is not applicable to level changes in flooded reactor cavity level, which is addressed by RU2, until such time as the level drop reaches the level of the vessel flange.

If RPV level continues to lower and reaches the Low-Low ECCS Actuation Setpoint then escalation to CA6 would be appropriate.

Threshold #2 Basis:

This EAL addresses conditions in the refueling mode when normal means of core temperature indication and RCS level indication may not be available. Redundant means of RPV level indication will normally be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that RPV inventory loss was occurring by observing other indications such as sump level changes, changes in makeup or observation of leakage. Sump level changes must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

Escalation to the Alert emergency classification level would be via either CA6 or CA5.

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU7 (cont)

Basis Reference(s):

1. UFSAR 5.2.5, Primary Containment
2. UFSAR 4.10.3, Nuclear System Leakage
3. DBD P-S-34 Radwaste System, 3.3.1.3.1 Drywell Floor Drain Sump Operation
4. DBD P-S-34 Radwaste System, 3.3.1.3.2 Drywell Equipment Drain Sump Operation
5. OT-101 High Drywell Pressure
6. GP-6 Refueling Operations
7. DBD P-S-16, Reactor Instrumentation System
8. NEI 99-01, Rev. 5 CU2

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1

Initiating Condition

HOSTILE ACTION resulting in loss of physical control of the facility.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Value:

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1).

   OR

2. A HOSTILE ACTION has:

   - Caused failure of Spent Fuel Pool Cooling Systems

     AND

   - IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).

Table H1 - Safety Functions
• Reactivity Control (ability to shut down the reactor and keep it shutdown) • RCS Inventory (ability to cool the core) • Decay Heat Removal (ability to maintain heat sink)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1 (cont)

Basis: (cont)

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

Threshold #1 Basis

This threshold encompasses conditions under which a HOSTILE ACTION has taken physical control of VITAL AREAS (containing vital equipment or controls of vital equipment) required to maintain any safety function. As a result, there is a loss of one or more of the Table H1 functions and equipment control cannot be transferred to and operated from another location.

If control of the plant equipment necessary to maintain all safety functions can be operated from the Control Room or transferred to another location, then the above EAL threshold is not met.

Threshold #2 Basis

This threshold addresses loss of physical control of spent fuel pool cooling systems if imminent fuel damage is likely because there is freshly off-loaded fuel in the pool. The condition “freshly off-loaded reactor fuel in pool” equates to fuel off-loaded within the last 120 days in NF-AA-309 Special Nuclear Material And Core Component Move Sheet Development.

Basis Reference(s):

1. SE-1 Plant Shutdown from the Remote Shutdown Panel
2. SE-10 Plant Shutdown from the Alternative Shutdown Panels
3. SE-23 Response to Security Threats
4. Station Security Plan – Appendix C
5. NF-AA-309 Special Nuclear Material And Core Component Move Sheet Development
6. NEI 99-01, Rev. 5 HG1

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS1

Initiating Condition

HOSTILE ACTION within the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

This condition represents an escalated threat to plant safety above that contained in the Alert in that a HOSTILE FORCE has progressed from the OWNER CONTROLLED AREA to the PROTECTED AREA.

This EAL addresses the contingency for a very rapid progression of events. It is not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS1 (cont)

Basis: (cont)

The fact that the site is under serious attack with minimal time available for further preparation or additional assistance to arrive requires Offsite Response Organizations (ORO) readiness and preparation for the implementation of protective measures.

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the PROTECTED AREA. Those events are adequately addressed by other EALs.

Escalation of this emergency classification level, if appropriate, would be based on actual plant status after impact or progression of attack.

Basis Reference(s):

1. SY-AA-101-132, Security Assessment and Response to Unusual Activities
2. Security And Safeguards Contingency Plan Station Security Plan – Appendix C
3. SE-23, Response to Security Threats
4. NEI 99-01 Rev 5, HS4

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1

Initiating Condition

HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site.

   OR

2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

OWNER CONTROLLED AREA (OCA): is the property associated with the station owned by the company. Access is normally limited to persons entering for official business.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1 (cont)

Basis: (cont)

Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

The fact that the site is under serious attack or is an identified attack target with minimal time available for further preparation or additional assistance to arrive requires a heightened state of readiness and implementation of protective measures that can be effective (such as on-site evacuation, dispersal or sheltering).

Threshold #1 Basis

This EAL addresses the immediacy of an expected threat arrival or impact on the site within a relatively short time.

The intent of this EAL is to ensure that notifications for the airliner attack threat are made in a timely manner and that Offsite Response Organizations (ORO) and plant personnel are at a state of heightened awareness regarding the credible threat. Airliner is meant to be a large aircraft with the potential for causing significant damage to the plant.

This EAL is met when a plant receives information regarding an airliner attack threat from NRC and the airliner is within 30 minutes of the plant. Only the plant to which the specific threat is made need declare the Alert.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Threshold #2 Basis

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the OCA. Those events are adequately addressed by other EALs.

Note that this EAL is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA. This includes ISFSI's that may be outside the PROTECTED AREA but still within the OWNER CONTROLLED AREA.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1 (cont)

Basis Reference(s):

1. SY-AA-101-132, Security Assessment and Response to Unusual Activities
2. SE-23, Response to Security Threats
3. Station Security Plan – Appendix C
4. NEI 99-01 Rev 5, HA4

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1

Initiating Condition

Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. A credible site specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities.

   OR

2. A validated notification from NRC providing information of an aircraft threat.

   OR

3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

Basis:

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1 (cont)

Basis: (cont)

Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

Security events assessed as HOSTILE ACTIONS are classifiable under HA1, HS1 and HG1.

A higher initial classification could be made based upon the nature and timing of the security threat and potential consequences. The licensee shall consider upgrading the emergency response status and emergency classification level in accordance with the site's Safeguards Contingency Plan and Emergency Plan.

Threshold #1 Basis

This threshold is included to ensure that appropriate notifications for the security threat are made in a timely manner. This includes information of a credible threat. Only the plant to which the specific threat is made need declare the Notification of an Unusual Event.

The determination of "credible" is made through use of information found in the Station Security Plan or SY-AA-101-132, "Security Assessment and Response to Unusual Activities" procedure.

Threshold #2 Basis

The intent of this EAL is to ensure that notifications for the aircraft threat are made in a timely manner and that Offsite Response Organizations (ORO) and plant personnel are at a state of heightened awareness regarding the credible threat. It is not the intent of this EAL to replace existing non-hostile related EALs involving aircraft.

This EAL is met when a plant receives information regarding an aircraft threat from NRC. Validation is performed by calling the NRC. Only the plant to which the specific threat is made need declare the Unusual Event.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Escalation to Alert emergency classification level would be via HA1 would be appropriate if the threat involves an airliner within 30 minutes of the plant.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1 (cont)

Basis: (cont)

Threshold #3 Basis

Reference is made to security force because these individuals are the designated personnel on-site qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the plant Safeguards Contingency Plan.

This threshold is based on Station Security Plan – Appendix C. 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 in some cases under 10 CFR 50.72.

Basis Reference(s):

1. SE-23, Response to Security Threats
2. Station Security Plan – Appendix C
3. NEI 99-01 Rev 5, HU4

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS2

Initiating Condition

Control Room evacuation has been initiated and plant control cannot be established.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Control Room evacuation has been initiated.

   AND

2. Control of the plant **cannot** be established per SE-1 or SE-10 in **< 15 minutes**.

Basis:

The time period to establish control of the plant starts when either:

a. Control of the plant is no longer maintained in the Main Control Room

   OR

b. The last Operator has left the Main Control Room.

The intent of this EAL is to capture those events where control of the plant cannot be reestablished in a timely manner. In this case, expeditious transfer of control of safety systems has not occurred (although fission product barrier damage may not yet be indicated).

The intent of the EAL is to establish control of important plant equipment and knowledge of important plant parameters in a timely manner. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions. Typically, these safety functions are reactivity control (ability to shutdown the reactor and maintain it shutdown), reactor water level (ability to cool the core), and decay heat removal (ability to maintain a heat sink).

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS2 (cont)

Basis: (cont)

The determination of whether or not control is established at the remote shutdown panel is based on Emergency Director (ED) judgment. The Emergency Director is expected to make a reasonable, informed judgment within the specified time for transfer that the licensee has control of the plant from the remote shutdown panel.

Escalation of this emergency classification level, if appropriate, would be by Fission Product Barrier or Abnormal Rad Levels/Radiological Effluent EALs.

Basis Reference(s):

1. NEI 99-01 Rev 5, HS2
2. SE-1, Plant Shutdown from the Remote Shutdown Panel - Bases
3. SE-10, Plant Shutdown from the Alternative Shutdown Panels - Bases

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA2

Initiating Condition

Control Room evacuation has been initiated.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

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

Basis:

With the control room evacuated, additional support, monitoring and direction through the Technical Support Center and/or other emergency response facilities may be necessary.

Inability to establish plant control from outside the control room will escalate this event to a Site Area Emergency.

Basis Reference(s):

1. SE-1, Plant Shutdown from the Remote Shutdown Panel - Bases
2. SE-10, Plant Shutdown from the Alternative Shutdown Panels - Bases
3. NEI 99-01, Rev. 5 HA5

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3

Initiating Condition

FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

FIRE or EXPLOSION resulting in any of the following:

- VISIBLE DAMAGE to a Table H2 permanent structure.

  OR

- VISIBLE DAMAGE to safety system equipment contained within a Table H2 area.

  OR

- Control Room indication of degraded safety system equipment performance contained within a Table H2 area.

Table H2 –Vital Areas
• Reactor Building
• Control Room
• Diesel Generator Building
• Emergency Pump Structure
• Inner Screen Structure
• Emergency Cooling Tower
• Emergency Switchgear/Battery Rooms
• Cable Spread Room

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3 (cont.)

Basis:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

The areas listed in Table H2 specify specific structures or areas that contain safety system, or component and functions required for safe shutdown of the plant.

VISIBLE DAMAGE is used to identify the magnitude of the FIRE or EXPLOSION and to discriminate against minor FIRES and EXPLOSIONS.

The reference to structures containing safety systems or components is included to discriminate against FIRES or EXPLOSIONS in areas having a low probability of affecting safe operation. The significance here is not that a safety system was degraded but the fact that the FIRE or EXPLOSION was large enough to cause damage to these systems.

An EXPLOSION due to failure of pressurized equipment that does not cause damage to other permanent structures or equipment associated with plant operations does not meet the criteria for declaration under this EAL, but may result in other declaration criteria being met (e.g., when the line is an element of a Fission Product Barrier, or the results in inventory loss).

The use of VISIBLE DAMAGE should not be interpreted as mandating a lengthy damage assessment prior to classification. The declaration of an Alert and the activation of the Technical Support Center will provide the Emergency Director with the resources needed to perform detailed damage assessments.

The Emergency Director also needs to consider any security aspects of the EXPLOSION.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions, Fission Product Barrier or Abnormal Rad Levels / Radiological Effluent EALs.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3 (cont.)

Basis Reference(s):

1. T-300 Bases, Fire Guides
2. ON-114, Actual Fire Reported in the Power Block, Diesel Generator Building, Emergency Pump, Inner Screen or Emergency Cooling Tower Structures
3. NEI 99-01, Rev. 5 HA2

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3

Initiating Condition

FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm.

Table H2 –Vital Areas
• Reactor Building
• Control Room
• Diesel Generator Building
• Emergency Pump Structure
• Inner Screen Structure
• Emergency Cooling Tower
• Emergency Switchgear/Battery Rooms
• Cable Spread Room

OR

2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3 (cont)

Basis:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

PROTECTED AREA: An area which normally encompasses all controlled areas within the security protected area fence.

This EAL addresses the magnitude and extent of FIRES or EXPLOSIONS that may be potentially significant precursors of damage to safety systems. It addresses the FIRE / EXPLOSION, and not the degradation in performance of affected systems that may result.

As used here, notification is visual observation and report by plant personnel or sensor alarm indication.

For the purposes of declaring an emergency event, the term “extinguished” means no visible flames.

Thresholds #1:

The 15 minute time period begins with a credible notification that a FIRE is occurring, or indication of a fire detection system alarm/actuation. Verification of a fire detection system alarm/actuation includes actions that can be taken within the control room or other nearby site specific location to ensure that it is not spurious. An alarm is assumed to be an indication of a FIRE unless it is disproved within the 15 minute period by personnel dispatched to the scene. In other words, a personnel report from the scene may be used to disprove a sensor alarm if received within 15 minutes of the alarm, but shall not be required to verify the alarm.

The intent of this 15 minute duration is to size the FIRE and to discriminate against small FIRES that are readily extinguished (e.g., smoldering waste paper basket). Such fires are excluded from consideration in this threshold since they have no safety consequence.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3 (cont)

Basis: (cont)

Threshold #2 Basis:

This EAL addresses only those EXPLOSIONS of sufficient force to damage permanent structures or equipment associated with plant operations within the PROTECTED AREA.

An EXPLOSION due to failure of pressurized equipment that does not cause damage to other permanent structures or equipment associated with plant operations does not meet the criteria for declaration under this EAL, but may result in other declaration criteria being met (e.g., when the line is an element of a Fission Product Barrier, or the results in inventory loss).

No attempt is made to assess the actual magnitude of the damage. The occurrence of the EXPLOSION is sufficient for declaration.

The Emergency director also needs to consider any security aspects of the EXPLOSION, if applicable.

Escalation of this emergency classification level, if appropriate, would be based on HA3.

Basis Reference(s):

1. T-300 Bases, Fire Guides
2. ON-114, Actual Fire Reported in the Power Block, Diesel Generator Building, Emergency Pump, Inner Screen or Emergency Cooling Tower Structures
3. NEI 99-01, Rev. 5 HU2

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4

Initiating Condition

Natural or destructive phenomena affecting VITAL AREAS.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by seismic instrumentation **> 0.05 g**. horizontal **OR > 0.033g** vertical**.**

   AND

   b. Confirmed by **ANY** of the following:

   - Earthquake felt in plant.

     OR

   - National Earthquake Center.

     OR

   - Control Room indication of degraded performance of systems required for the safe shutdown of the plant

   OR

2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area:

   - Tornado strike

     OR

   - High winds **> 87 mph**

     OR

   - Vehicle crash

     OR

   - Turbine failure-generated PROJECTILES

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4

Thresholds: (cont)

Table H2 –Vital Areas
• Reactor Building • Control Room • Diesel Generator Building • Emergency Pump Structure • Inner Screen Structure • Emergency Cooling Tower • Emergency Switchgear/Battery Rooms • Cable Spread Room

OR

3. Flooding in any Table H3 area that results in **ANY** of the following:

   a. Degraded safety system performance as indicated in the Control Room.

   OR

   b. Industrial safety hazards (e.g., electric shock) that preclude access necessary to operate or monitor safety equipment.

   OR

   c. Water level **> T-103 Action Level**.

Table H3 – Internal Flooding Areas
• HPCI Room • RCIC Room • RHR Room • Core Spray Room • Torus Room • Emergency Pump Structure • Reactor Building Sump Room

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4

Thresholds: (cont)

OR

4. Abnormal River level as indicated by **EITHER**:

   - High river water level **> 116 ft**.

     OR

   - Low river water level **< 92.5 ft**.

Basis:

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

These EALs escalate from HU4 in that the occurrence of the event has resulted in VISIBLE DAMAGE to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control room indications of degraded system response or performance. The occurrence of VISIBLE DAMAGE and/or degraded system response is intended to discriminate against lesser events. 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. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction EALs.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

Basis (cont)

Threshold #1 Basis:

This threshold addresses events that may have resulted in a Table H2 area being subjected to forces beyond design limits and thus damage may be assumed to have occurred to plant safety systems.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

Threshold #2 Basis:

This threshold addresses events within the PROTECTED AREA that results in VISIBLE DAMAGE to any Table H2 structure or Control Room indication of degraded performance of a safety system in any Table H2 area:

This threshold addresses the following events:

- Tornado strike.
- High winds.
- Vehicle crashes such as plane, helicopter, train, barge, car or truck crashes. The Emergency director also needs to consider any security aspects of the vehicle crash.
- Threat to safety-related equipment imposed by PROJECTILES generated by main turbine rotating component failures.

Threshold #3 Basis:

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. The actual component failure or equipment misalignment is addressed by Technical Specifications or plant procedures unless the resulting flooding causes degraded performance of safety systems, or has created industrial safety hazards (e.g., electrical shock) that preclude necessary access to operate or monitor safety equipment. The inability to access, operate or monitor safety equipment represents an actual or substantial potential degradation of the level of safety of the plant.

Flooding as used in this EAL describes a condition where water is entering the room faster than installed equipment is capable of removal, resulting in a rise of water level within the room. Classification of this EAL should not be delayed while corrective actions are being taken to isolate the water source.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

Basis (cont)

Threshold #4 Basis:

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 riverside 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.

Basis Reference(s):

1. UFSAR Section 2.2.3, Site Arrangement and Exclusion Area
2. UFSAR Section 2.7.6, Foundations for Structures
3. UFSAR Section 2.4.3.5.5, Emergency Shutdown due to High or Low Water Level in Conowingo Pond
4. UFSAR Appendix C Structural Design Criteria
5. UFSAR Section 2.4.3 and Table 2.3.9
6. SE-5, Earthquake - Bases
7. SE-4, Flood – Bases
8. DBD P-T-09, Internal Hazards
9. NEI 99-01, Rev. 5 HA1

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4

Initiating Condition

Natural or destructive phenomena affecting the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. a. Seismic event as indicated by seismic instrumentation **> 0.01 g**.

   AND

   b. Confirmed by **EITHER:**

   - Earthquake felt in plant.

     OR

   - National Earthquake Center.

   OR

2. **EITHER** of the following occurring within the PROTECTED AREA boundary:

   - Tornado strike

     OR

   - Sustained **(> 15 minutes)** high winds **> 87 mph**

   OR

3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont.)

EAL Threshold Value (cont)

OR

4. Flooding in any Table H3 area that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

Table H3 – Internal Flooding Areas
• HPCI Room • RCIC Room • RHR Room • Core Spray Room • Torus Room • Emergency Pump Structure • Reactor Building Sump Room

OR

5. Abnormal River level, as indicated by **EITHER**:

   - **> 112 ft**. (high level)

     OR

   - **< 98.5 ft**. (low level)

Basis:

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

These EALs are categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont)

Basis: (cont)

Threshold #1 Basis:

Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

Threshold #2 Basis:

This EAL is based on a tornado striking (touching down) or high winds within the PROTECTED AREA.

Escalation of this emergency classification level, if appropriate, would be based on VISIBLE DAMAGE, or by other in plant conditions, via HA4.

Threshold #3 Basis:

This EAL addresses main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Generator seal damage observed after generator purge does not meet the intent of this EAL because it did not impact normal operation of the plant.

Of major concern is the potential for leakage of combustible fluids (lubricating oils) and gases (hydrogen cooling) to the plant environs. Actual FIRES and flammable gas build up are appropriately classified via HU3 and HU5.

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 this emergency classification level, if appropriate, would be to HA4 based on damage done by PROJECTILES generated by the failure or by the radiological releases. The latter events would be classified by the radiological EALs or Fission Product Barrier.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont)

Basis: (cont)

Threshold #4 Basis:

The assessment of the potential for flooding to affect safety related equipment is based on the rate of level rise in the area and the ability to terminate the input prior to submerging or spraying the electrical portion of safety related equipment.

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. Minor leaks, such as valve packing or instrument line breaks would not constitute “Flooding.” The Internal Flooding Areas of concern for the Unusual Event declaration are those Table H3 areas that have the potential to affect safety related equipment needed for the current operating mode.

Escalation of this emergency classification level, if appropriate, would be based VISIBLE DAMAGE via HA4, or by other plant conditions.

Threshold #5 Basis:

Cooling water is pumped from the normal heat sink (Conowingo Pond) via the pump structure.

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 111 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 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 river level at 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.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont)

Basis Reference(s):

1. UFSAR Section 2.2.3, Site Arrangement and Exclusion Area
2. UFSAR Section 2.7.6, Foundations for Structures
3. UFSAR Section 2.4.3.5.5, Emergency Shutdown due to High or Low Water Level in Conowingo Pond
4. UFSAR Appendix C Structural Design Criteria
5. UFSAR Section 2.4.3 and Table 2.3.9
6. SE-5, Earthquake - Bases
7. SE-4, Flood – Bases
8. DBD P-T-09, Internal Hazards
9. NEI 99-01, Rev. 5 HU1
10. TRMS 3.15, River Level
11. T.S. 3.7.2, Emergency Service Water (ESW) System and Normal Heat Sink

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5

Initiating Condition

Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.

Table H2 –Vital Areas
▪ Reactor Building
▪ Control Room
▪ Diesel Generator Building
▪ Emergency Pump Structure
▪ Inner Screen Structure
▪ Emergency Cooling Tower
▪ Emergency Switchgear/Battery Rooms
▪ Cable Spread Room

Basis:

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5 (cont.)

Basis: (cont)

Gases in a VITAL AREA can affect the ability to safely operate or safely shutdown the reactor.

The fact that SCBA may be worn does not eliminate the need to declare the event.

A precautionary area evacuation for the purpose of atmospheric testing does not warrant declaration until test results are obtained unless access is required for operation of operable equipment to maintain safe operations or safely shutdown the reactor. Declaration should not be delayed for confirmation from atmospheric testing if the atmosphere poses an immediate threat to life and health or an immediate threat of severe exposure to gases. This could be based upon documented analysis, indication of personal ill effects from exposure, or operating experience with the hazards such as an inadvertent actuation of installed Cardox fire suppression system.

Station evaluations have shown installed Halon systems by design do not create an IDLH atmosphere when discharged. Therefore, when an installed Halon Fire Suppression system discharge occurs, an IDLH atmosphere should not be assumed, and declaration of a toxic or asphyxiant atmosphere must be based on representative sampling of the affected area, unless there are indications of personal ill effects result from exposure.

Areas directly associated with a fire that may be considered to have a hazardous environment (due to smoke, design fire suppression system actuation or administrative controls awaiting ventilation and/or testing) do not warrant declaration of an Alert under this EAL but should be evaluated against the fire EALs.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of 19.5%, which can lead to breathing difficulties, unconsciousness or even death.

An uncontrolled release of flammable gasses 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. Flammable gasses, such as hydrogen and acetylene, are routinely used to maintain plant systems (hydrogen) or to repair equipment/components (acetylene - used in welding). This EAL assumes concentrations of flammable gasses which can ignite/support combustion.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions, Fission Product Barrier or Abnormal Rad Levels / Radioactive Effluent EALs.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5 (cont.)

Basis Reference(s):

1. T-300 Bases
2. ON-114, Actual Fire Reported in the Power Block, Diesel Generator Building, Emergency Pump, Inner Screen or Emergency Cooling Tower Structures
3. NEI 99-01, Rev. 5 HA3
4. AR 660892, Station Halon and IDLH Evaluations
5. 29CFR1910.134(b) and 29CFR1910.134(d)(2)(iii)

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU5

Initiating Condition

Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS.

   OR

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

Basis:

NORMAL PLANT OPERATIONS: Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

This EAL is based on the release of toxic, corrosive, asphyxiant or flammable gases of sufficient quantity to affect NORMAL PLANT OPERATIONS.

The fact that SCBA may be worn does not eliminate the need to declare the event.

This EAL is not intended to require significant assessment or quantification. It assumes an uncontrolled process that has the potential to affect plant operations. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation.

The release may have originated within the Protected Area boundary, or it may have originated offsite and subsequently drifted inside the Protected Area boundary. Offsite events (e.g., tanker truck accident releasing toxic gases, etc.) resulting in the plant being within the evacuation area should also be considered in this EAL because of the adverse affect on NORMAL PLANT OPERATIONS.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU5

Basis: (cont)

Areas directly associated with a fire that may be considered to have a hazardous environment (due to smoke, design fire suppression system actuation or administrative controls awaiting ventilation and/or testing) do not warrant declaration of an Unusual Event under this EAL but should be evaluated against the fire EALs.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of 19.5%, which can lead to breathing difficulties, unconsciousness or even death.

Escalation of this emergency classification level, if appropriate, would be based on HA5.

Basis Reference(s):

1. NEI 99-01, Rev. 5 HU3

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG6

Initiating Condition

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the General Emergency class.

Basis Reference(s):

1. NEI 99-01, Rev 5 HG2

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS6

Initiating Condition

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a Site Area Emergency.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels, which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency class description for Site Area Emergency.

Basis Reference(s):

1. NEI 99-01, Rev 5 HS3

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA6

Initiating Condition

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the Alert emergency class.

Basis Reference(s):

1. NEI 99-01, Rev 5 HA6

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU6

Initiating Condition

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Unusual Event.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Basis:

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

Basis Reference(s):

1. NEI 99-01, Rev 5 HU5

Table PBAPS 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

E-HU1

Initiating Condition

Damage to a loaded cask CONFINEMENT BOUNDARY.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**

Basis:

CONFINEMENT BOUNDARY – is the barrier(s) between areas containing radioactive substances and the environment.

An Unusual Event in this EAL is categorized on the basis of the occurrence of an event of sufficient magnitude that a loaded cask CONFINEMENT BOUNDARY is damaged or violated. This includes classification based on a loaded fuel storage cask CONFINEMENT BOUNDARY loss leading to the degradation of the fuel during storage or posing an operational safety problem with respect to its removal from storage.

Basis Reference(s):

1. PBAPS ISFSI Certificate of Compliance
2. TN-68, Safety Analysis Report, Section 7
3. NEI 99-01, Rev 5 E-HU1

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 μCi/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 Core Damage Assessment Methodology

Core damage information is used to refine dose assessments and confirm or extend initial protective action recommendations. Peach Bottom Atomic Power Station utilizes NEDC-33045P-A, “Methods of Estimating Core Damage in BWRs” (Revision 0, July 2001), as the basis for the methodology for post-accident core damage assessment. This methodology utilizes real-time plant indications. In addition, PBAPS may use samples of plant fluids and atmospheres as inputs to the CDAM (Core Damage Assessment Methodology) program for core damage estimation.

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 ETE study used population data from the 2010 census which includes parts of three counties in Pennsylvania (Chester, Lancaster and York) and two counties in Maryland (Harford and Cecil). The evacuation times are based on a detailed consideration of the EPZ roadway network and population distribution. The ETE Study, contained in EP-AA-1007 Addendum 2, Evacuation Time Estimates for the Peach Bottom Station Plume Exposure Pathway Emergency Planning Zone, presents 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 Commonwealth of Pennsylvania and State of Maryland, PBAPS will recommend to government officials that the general public be notified to take KI at a General Emergency classification in those sectors were an evacuation or shelter 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, as defined by the Commonwealth of Pennsylvania, State of Maryland and risk counties.

These public information publications (including telephone book emergency information, etc.) instruct the public to go indoors 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 4-1, “Plant-Based PAR Determination Flowchart”, illustrates affected downwind sectors based on wind direction, using the generic plant-based event logic as outlined in Section J.10.m.1 of the Exelon Nuclear Standardized Radiological Emergency Plan.

Further evaluation of PAR based on dose assessments shall be performed in accordance with Section J.10.m.2 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 4-2. 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 out side 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 from the Peach Bottom Site 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.

The registering and monitoring of the general public evacuating from the Plume Exposure Pathway EPZ, as described in Section II.J.12 of the Exelon Nuclear Standardized Radiological Emergency Plan, will occur at designated facilities per the respective State and County Radiological Emergency Response Plans.

4.5 Severe Accident Management

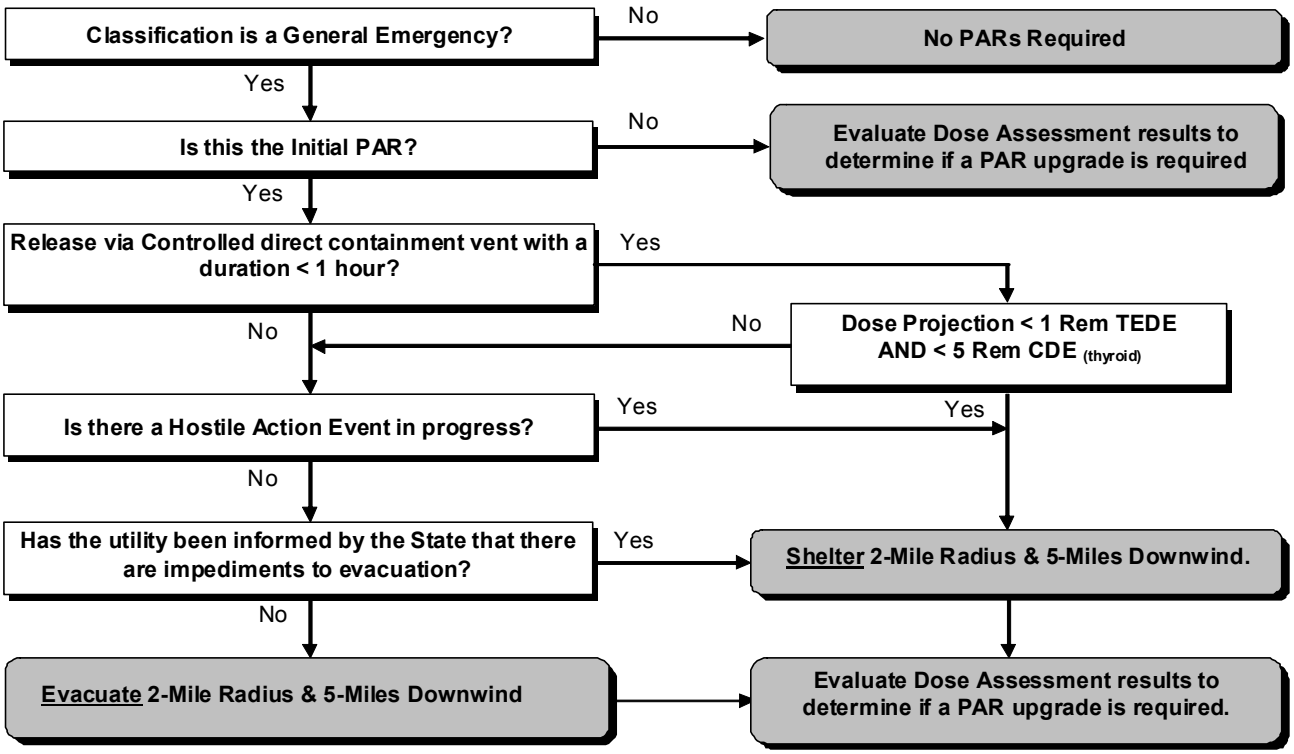
Accident management consists of those actions taken during the course of an accident, by the Emergency Response Organization (ERO), specifically: plant operations, technical support, and plant management staff in order to:

- 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).

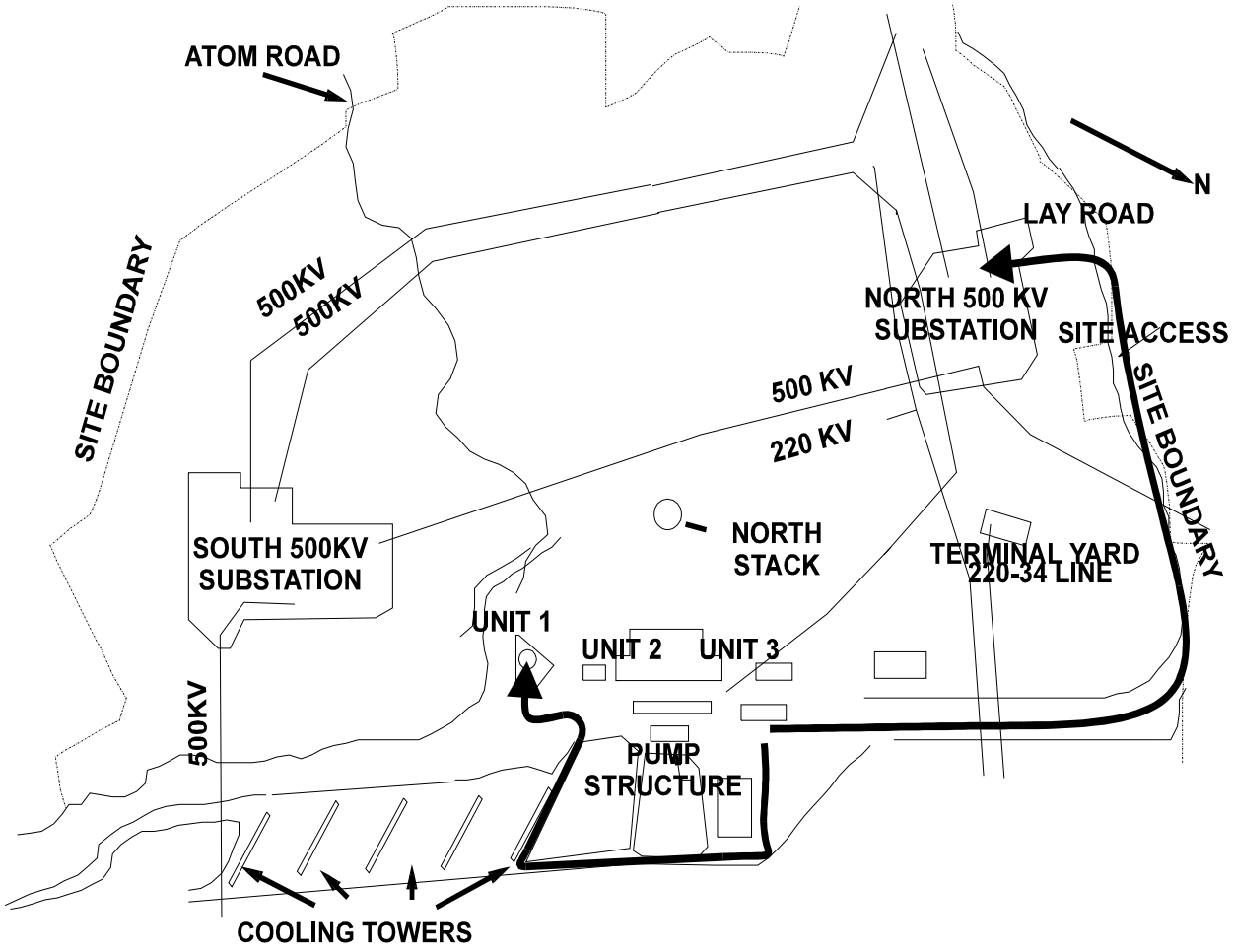
Figure PBAPS 4-1: Plant-Based PAR Determination Flowchart



Wind Directions (From)	Downwind Sectors*	Wind Directions (From)	Downwind Sectors*
355 to 005	SSE / **S** / SSW	175 to 185	NNW / **N** / NNE
006 to 017	SSE / **S / SSW** / SW	186 to 197	NNW / N / NNE / NE
018 to 027	S / **SSW** / SW	198 to 207	N / **NNE** / NE
028 to 039	S / **SSW / SW** / WSW	208 to 219	N / **NNE / NE** / ENE
040 to 050	SSW / **SW** / WSW	220 to 230	NNE / **NE** / ENE
051 to 062	SSW / **SW / WSW** / W	231 to 242	NNE / **NE / ENE** / E
063 to 072	SW / **WSW** / W	243 to 252	NE / **ENE** / E
073 to 084	SW / **WSW / W** / WNW	253 to 264	NE / **ENE / E** / ESE
085 to 095	WSW / **W** / WNW	265 to 275	ENE / **E** / ESE
096 to 107	WSW / **W / WNW** / NW	276 to 287	ENE / **E / ESE** / SE
108 to 117	W / **WNW** / NW	288 to 297	E / **ESE** / SE
118 to 129	W / **WNW / NW** / NNW	298 to 309	E / **ESE / SE** / SSE
130 to 140	WNW / **NW** / NNW	310 to 320	ESE / **SE** / SSE
141 to 152	WNW / **NW / NNW** / N	321 to 332	ESE / **SE / SSE** / S
153 to 162	NW / **NNW** / N	333 to 342	SE / **SSE** / S
163 to 174	NW / **NNW / N** / NNE	343 to 354	SE / **SSE / S** / SSW

***BOLD** refers to affected sectors. These sectors are based on a dose model stability class "D" and in some cases an extra sector was included for conservatism.

Figure PBAPS 4-2: 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 Three Mile Island, 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 Information Center (JIC)

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

5.1.6 Alternative Facility

The Alternative Facility maintains the capability for staging the TSC/OSC emergency response organization personnel in the event of a hostile action. This alternative facility has the capability for communications with the emergency operations facility, control room, and plant security. The Alternative Facility is located at Muddy Run Information Center 172 Bethesda Church Rd W, Holtwood, PA 17532.

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. 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.

b. 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.

c. 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} μCi/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 there 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

First Aid 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

Medical treatment given to injured persons at the station is of a "first aid" nature. When more professional care is needed, injured persons are transported to a local hospital. Letters of Agreement are established with primary and backup hospitals. Hospital facilities are listed in Appendix 2.

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 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 in-plant system and several remote buildings are powered from two separate emergency busses through automatic transfer switches. Other remote buildings are provided with local power.

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 JIC. Tie line access capability is provided both through the Peach Bottom main PBX switch and the Limerick dedicated emergency PBX switch. 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/JIC Private Branch Exchange (PBX)

A dedicated PBX is installed at the Coatesville EOF/JIC. 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/JIC 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/JIC.

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 LGS, 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 Fiber Optic / Microwave Tie Lines

Dedicated Fiber Optic lines exist between LGS, the Nuclear Group Headquarters (Kennett Square) and Berwyn. Also, dedicated microwave tie lines exist between PBAPS, the EOF/JIC, and Berwyn, where they are linked to the Fiber Optic lines. The microwave system is backed up by at least eight hours of battery. In addition, communication lines exist between LGS, PBAPS, Main Office, the Nuclear Group Headquarters, and the EOF/JIC.

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 PROTECTIVE	LOCATIONS STORED OR AVAIL
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 RADIATION MONITORING	LOCATIONS STORED OR AVAIL
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 SEARCH AND RESCUE	LOCATIONS STORED OR AVAIL
Flashlight	3
Blanket	3
Stretcher	3
Rope	3

4.0 DECISION AIDS	LOCATIONS STORED OR AVAIL
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	1, 4
Drawings	1, 4

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

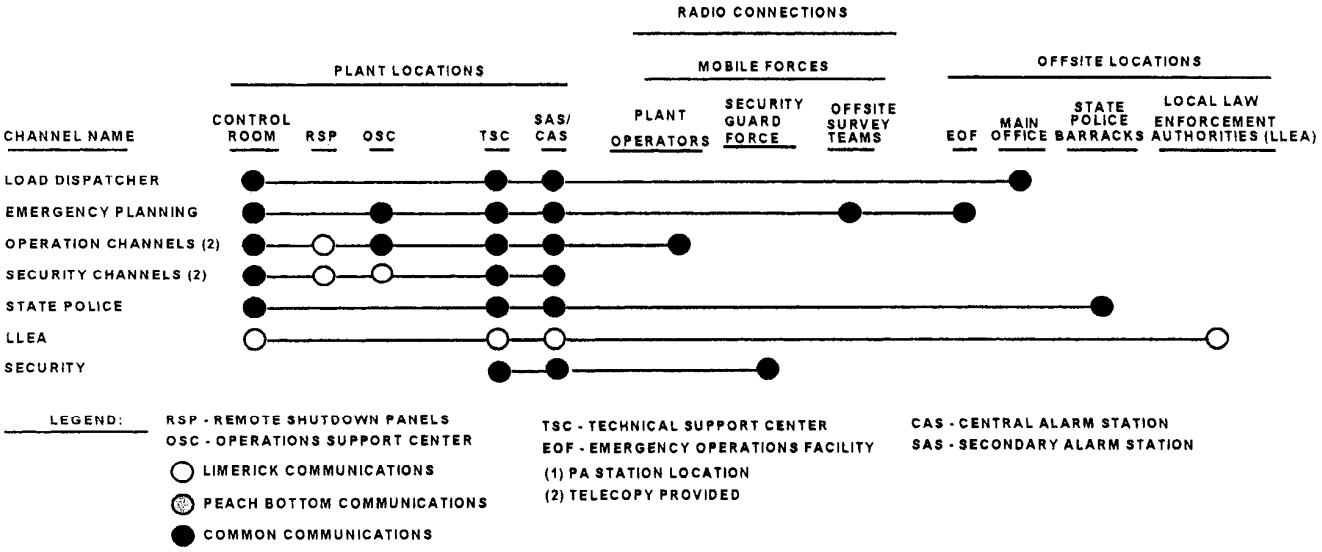
5.0 COMMUNICATIONS	LOCATIONS STORED OR AVAIL
Base Stations	1, 2, 4, 5, 14
Mobile Radios	1, 2, 5, 7, 14

6.0 DECONTAMINATION	LOCATIONS STORED OR AVAIL
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 Information Center
16 Decontamination Room

Figure PBAPS 5-1: Emergency Radio Links



APPENDIX 1: NUREG-0654 CROSS-REFERENCE

Annex Section	NUREG-0654
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, Sections I.2 & 3.a
4.4.2	Part II, Section J.5
4.4.3	Part II, Section J.3
Figure PBAPS 4-1	Part II, Section J.7
Figure PBAPS 4-2	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.

- Pennsylvania Emergency Management Agency Memorandum of Understanding (MOU) (Letter on File)

  NOTE: Documentation of agreement for Lancaster, Chester, and York counties are contained as part of the agreement with PEMA.

- 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

- 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.

ATTACHMENT 10

EP-AA-1008, Revision 26

Exelon Nuclear Radiological Emergency Plan Annex for
Limerick Generating Station

Exelon Generation®

EXELON NUCLEAR

RADIOLOGICAL EMERGENCY PLAN ANNEX
FOR
LIMERICK GENERATING STATION

Section 1: Introduction

Section 2: Organizational Control of Emergencies

Section 3: Classification of Emergencies

Section 4: Emergency Measures

Section 5: Emergency Facilities and Equipment

APPENDICES

ADDENDUMS

REVISION HISTORY

REVISION	REVISION DATE
0	August 2002
1	October 2002
2	November 2002
3	February 2003
4	September 2003
5	October 2003
6	December 2004
7	May 2005
8	September 2005
9	January 2006
10	December 2006
11	May 2007
12	September 2007
13	November 2007
14	July 2008
15	December 2008
16	August 2009
17	March 2010
18	July 2010
19	December 2010
20	May 2011
21	February 2012
22	February 2012
23	March 2012
24	November 2012
25	December 2012
26	June 2013

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 Limerick Generating 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 Limerick Generating Station (LGS) is a fixed nuclear electrical generating facility operated by Exelon Nuclear and licensed by the USNRC. The station includes two boiling water reactor (BWR) electrical generating units.

The Limerick station is located partly in Montgomery County and partly in Chester County Pennsylvania on the Schuylkill River about 1.7 miles southeast of the limits of the Borough of Pottstown. The Schuylkill River passes through the site and separates the western portion, which is located in East Coventry Township, Chester County, from the eastern portion, which is partly in Limerick Township and partly in Lower Pottsgrove Township, both in Montgomery County. Major plant structures are in Limerick Township.

For more specific site location information, refer to the Updated Final Safety Analysis Report (UFSAR) for Limerick Generating Station.

1.2 Emergency Planning Zones

The Plume Exposure Emergency Planning Zone (EPZ) for Limerick Generating 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 and affected Counties. Refer to Figure LGS 1-1.

The Ingestion Pathway Emergency Planning Zone (EPZ) for Limerick Generating Station shall be an area surrounding the Station with a radius of about 50 miles. Refer to Figure LGS 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 organizations having prime responsibility in matters of radiation hazards are the Pennsylvania Emergency Management Agency and the Bureau of Radiation Protection (BRP) of the Pennsylvania Department of Environmental Protection. 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 Maryland, 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 County Governments

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 LGS, the risk counties are:

a. Montgomery County

b. Chester County

c. Berks County

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

1.3.5 State Of Maryland

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

1.3.6 State Of New Jersey

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

1.3.7 State Of Delaware

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

Refer to Table LGS 1-1 for a list of offsite radiological emergency response organizations and response plans in support of the Limerick Generating Station's Emergency Preparedness Program.

Table LGS 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.
- Montgomery County Radiological Emergency Response Plan for Incidents at LGS.

Municipalities

Collegeville Borough	Douglass Township	Green Lane Borough
Limerick Township	Marlborough Township	Lower Pottsgrove Township
Lower Frederick Township	Lower Salford Township	Lower Providence Township
Perkiomen Township	New Hanover Township	Royersford Borough
Pottstown Borough	Skippack Township	Schwenksville Borough
Upper Frederick Township	Trappe Borough	Upper Providence Township
Upper Pottsgrove Township	West Pottsgrove Township	Upper Salford Township

School Districts

Methacton	Perkiomen Valley	Pottsgrove
Souderton	Pottstown	Spring-Ford
Upper Perkiomen		

- Chester County Radiological Emergency Response Plan for Incidents at LGS.

Municipalities

Charlestown Township	East Pikeland Township	East Coventry Township
East Nantmeal Township	East Vincent Township	North Coventry Township
Phoenixville Borough	Schuylkill Township	South Coventry Township
Spring City Borough	Upper Uwchlan Township	Uwchlan Township
Warwick Township	West Pikeland Township	West Vincent Township

School Districts

Downingtown	Great Valley
Phoenixville Area	Owen J. Roberts

- Berks County Radiological Emergency Response Plan for Incidents at LGS.

Municipalities

Amity Township	Boyertown Borough	Colebrookdale Township
Douglass Township	Earl Township	Union Township
Washington Township		

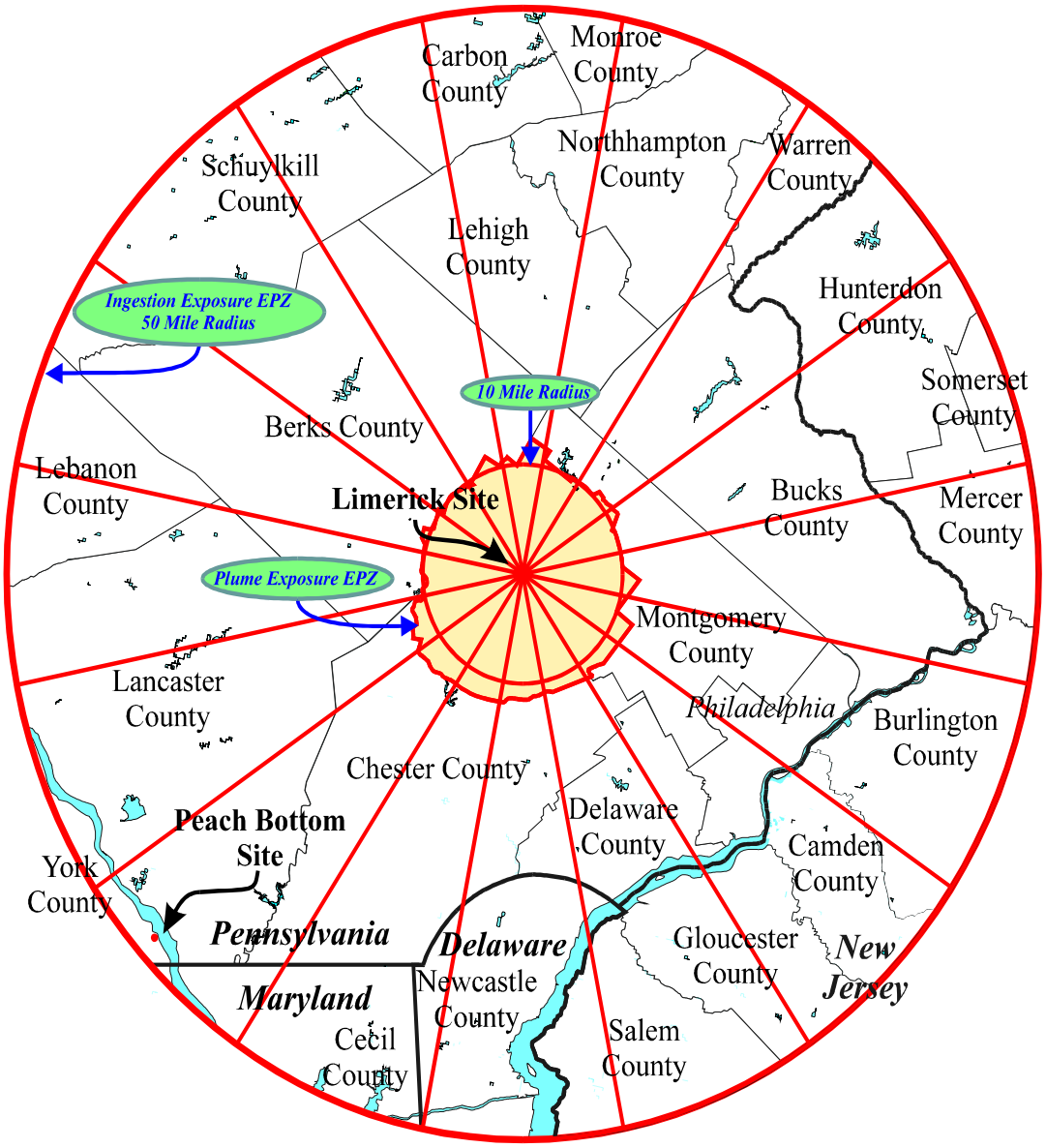
School Districts

Boyertown	Daniel Boone

- State of Delaware Emergency Plan
- State of New Jersey Emergency Plan
- State of Maryland Emergency Plan

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

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



Section 2: Organizational Control of Emergencies

This section describes the Emergency Response Organization (ERO) and its key positions. It outlines the staffing requirements which provide initial emergency response actions and provisions for timely augmentation of on-shift personnel when required. It also describes interfaces among Exelon Nuclear emergency response personnel and specifies the offsite support available to respond to the nuclear generating stations.

2.1 Shift Organization Staffing

Initial response to any emergency is by the normal plant organization present at the site. This organization includes positions that are onsite 24 hours per day and is described in Section B.1 of the Exelon Nuclear Standardized Radiological Emergency Plan. The Normal Shift Organization will be augmented, in an emergency, with designated/additional Emergency Response Organization (ERO) personnel within 60 minutes of notification as specified under Table LGS 2-1. ERO activation is described in Section H.4 of the Exelon Nuclear Standardized Radiological Emergency Plan.

Table LGS 2-1 outlines ERO positions required to meet minimum staffing and full augmentation of the on-shift complement at an Alert or higher classification, and the major tasks assigned to each position. Responsibilities for each position are described in Section B.5 of the Exelon Nuclear Standardized Radiological Emergency Plan.

2.1.1 Shift Dose Assessment

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

2.1.2 Shift Communicator

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.

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. Limerick Generating 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 LGS 2-1, 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 LGS 2-1 of the LGS 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 LGS 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 LGS 2-3)

Based on existing interface and staffing agreements, representatives from the Commonwealth of Pennsylvania 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.

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

No changes in augmentation positions or staffing levels for the Joint Information Center (JIC)) and Emergency News Center (ENC) from that specified in the Exelon Nuclear Standardized Radiological Emergency Plan.

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 + 3 months (25% grace period).

2.4 Non-Exelon Nuclear Support Groups

Agreements exist on file with or are verified current annually by the MA Region Corporate Emergency Preparedness Group for the support agencies listed in Appendix 2 of the Exelon Nuclear Radiological Emergency Plan Annex for LGS.

Additionally, Exelon Nuclear has contractual agreements common within Exelon Nuclear with several companies whose services would be available in the event of a radiological emergency. These agencies are also listed in Appendix 3 of the Exelon Nuclear Standardized Radiological Emergency Plan.

Emergency response coordination with governmental agencies and other support organizations is discussed in Section A of the Exelon Nuclear Standardized Radiological Emergency 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 LGS 2-1: Minimum Staffing Requirements

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

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

Functional Area	Major Tasks	Emergency Positions	Minimum Shift Size	[a]60 Minute Augmentation	Full Augmentation
5. Plant System Engineering, Repair and Corrective Actions	Technical Support	STA / Incident Assessor[k] (CR)	1		
		Technical Manager (TSC)		1	
		Core/Thermal Hydraulics Engineer (TSC)		1	
		Mechanical Engineer (TSC)		1	
		Electrical Engineer (TSC)		1	
		SAMG Decision Maker (TSC)		1[d]	
		SAMG Evaluator (TSC)		2[d]	
		Operations Manager (TSC)		1	
		Radiation Controls Engineer (TSC)			1
	Repair and Corrective Actions	Mechanical Maintenance (OSC)	1[d]	2	(e)
		Rad Waste Operator	1		(e)
		Electrical Maintenance (OSC)	1[d]	2	(e)
		Instrument & Control (I&C) (OSC)	1		
		Maintenance Manager (TSC)		1	
		OSC Director (OSC)		1	
		Assistant OSC Director (OSC)			1
		OPs Lead & Support Personnel (OSC)			(e)
	Accident Analysis	Technical Support Manager (EOF)			1
		Operations Advisor (EOF)			1
		Technical Advisor (EOF)			1
6. In-Plant Protective Actions	Radiation Protection	RP Personnel[c]	2[d]	4	(e)
7. Fire Fighting	--	Fire Brigade[g]	5		
8. First Aid and Rescue Operations	--	Plant Personnel	2[d]		(e)
9. Site Access Control and Personnel Accountability	Security & Accountability	Security Team Personnel	(h)	(h)	
	EOF Security	Security Coordinator[l] (TSC/EOF)			2
10. Resource Allocation and Administration	Logistics / Administration	Logistics Manager (EOF)		1	
		Logistics Coordinator (TSC)			1
		Administrative Coordinator (EOF)			1
		Clerical Staff (TSC/OSC/EOF)			(e)
		Events Recorder (EOF)			1
		Computer Specialist (EOF)			1
		SUB-TOTAL:	**23**	**34**	**26+**

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

Functional Area	Major Tasks	Emergency Positions		Minimum Shift Size	[a]60 Minute Augmentation	Full Augmentation
11. Public Information	Media Interface	Corporate Spokesperson	(JIC)		1	
		Rad Protection Spokesperson	(JIC)			1
		Technical Spokesperson	(JIC)			1
	Information Development	Public Information Director	(JIC)		1	
		News Writer	(JIC)			1
	Media Monitoring and Rumor Control	Communications Department	(JIC)			(e)
	Facility Operation and Control	JIC Director	(JIC)		1	
		JIC Coordinator	(JIC)			1
		Administrative Coordinator	(JIC)			1
		Events Recorder	(JIC)			1
		Clerical Support	(JIC)			(e)
		Access Control	(JIC)			1
		SUB-TOTAL:		**0**	**3[l]**	**7+**

	Minimum Shift Size	Total Minimum Staff	Total Full Augmentation
TOTAL:	**23**	**37**	**33+**

[a] Response time is based on optimum travel conditions.
[b] Refer to Section 2.1.2 for a description of shift communicator staffing.
[c] Refer to Section 2.1.1 for description of on-shift dose assessment staffing.
[d] May be provided by personnel assigned other functions. Personnel can fulfill multiple functions.
[e] Personnel numbers depend on the type and extent of the emergency.
[f] 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.
[g] Fire Brigade per FSAR / TRM, as applicable.
[h] Function performed by on-shift security personnel.
[i] 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 JIC Director.
[j] One member of each Field Survey Team is a Driver.
[k] Refer to Section 2.1.3 for description of on-shift STA/Incident Assessor staffing requirements.
[l] TSC Security Coordinator position will be staffed by LGS Security personnel. The EOF Security Coordinator position will be staffed by Corporate personnel.

Figure LGS 2-1: Exelon Overall ERO Command Structure

Bolded Boxes indicate minimum staffing positions.

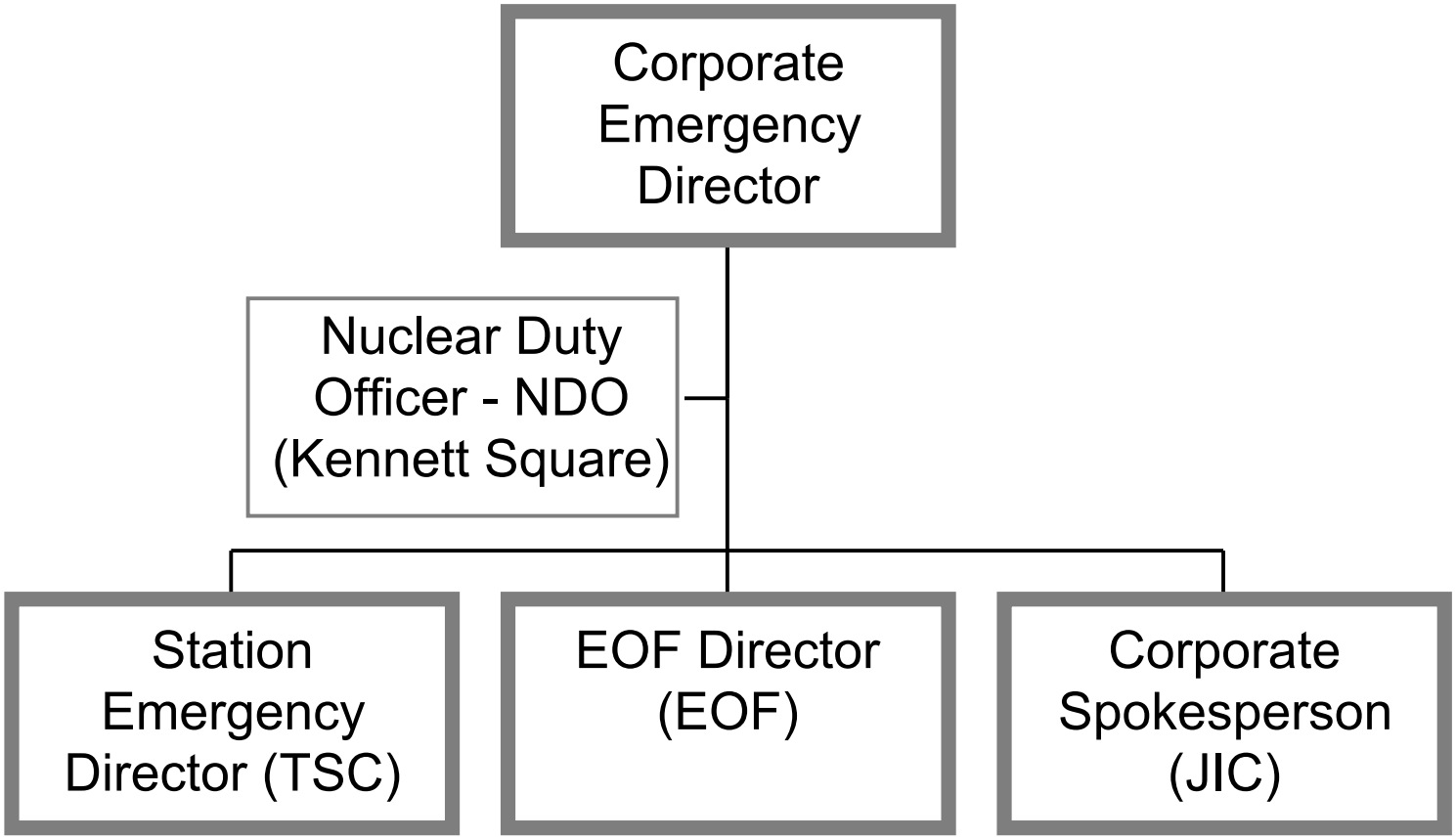
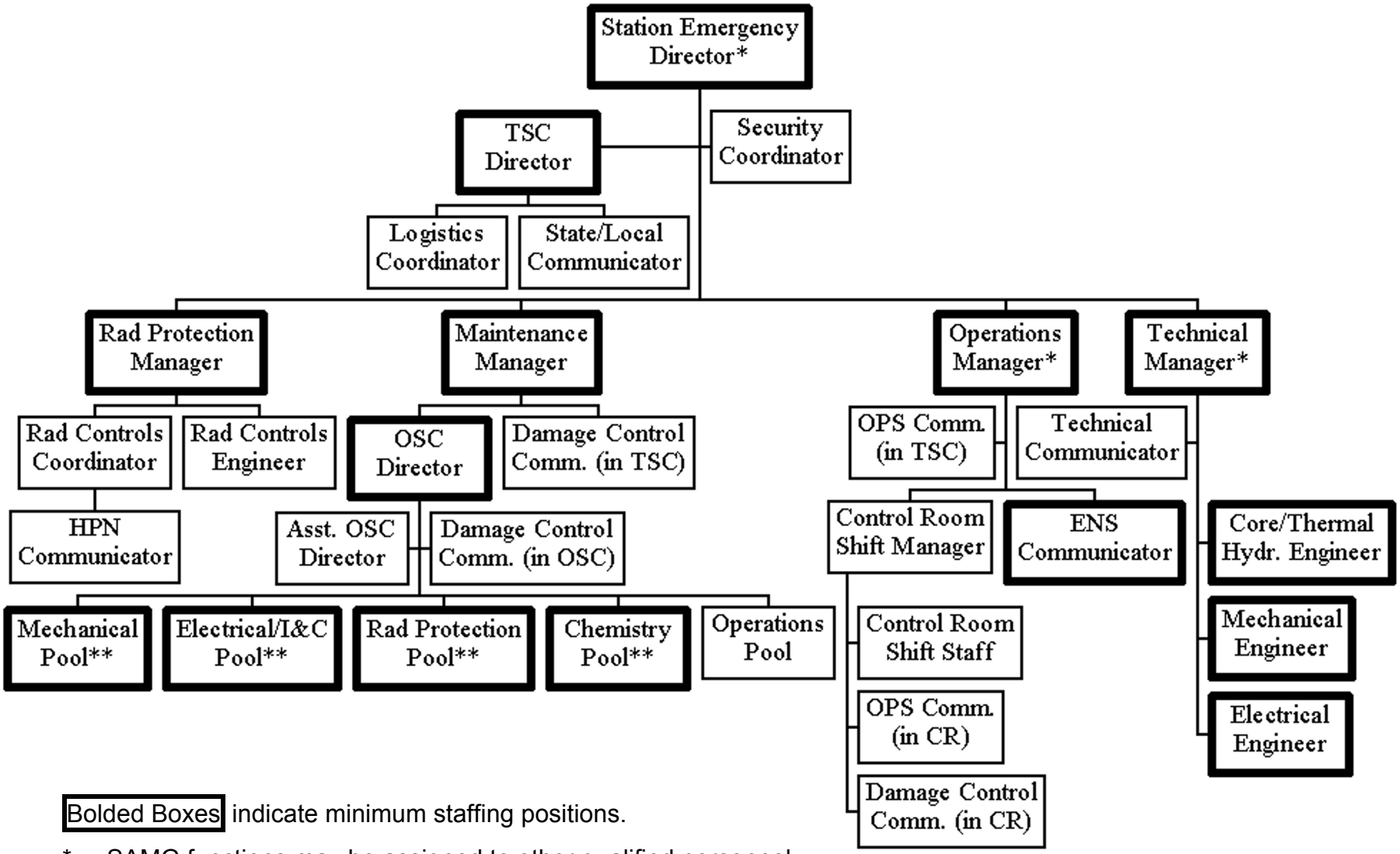


Figure LGS 2-2: Emergency Onsite Organization

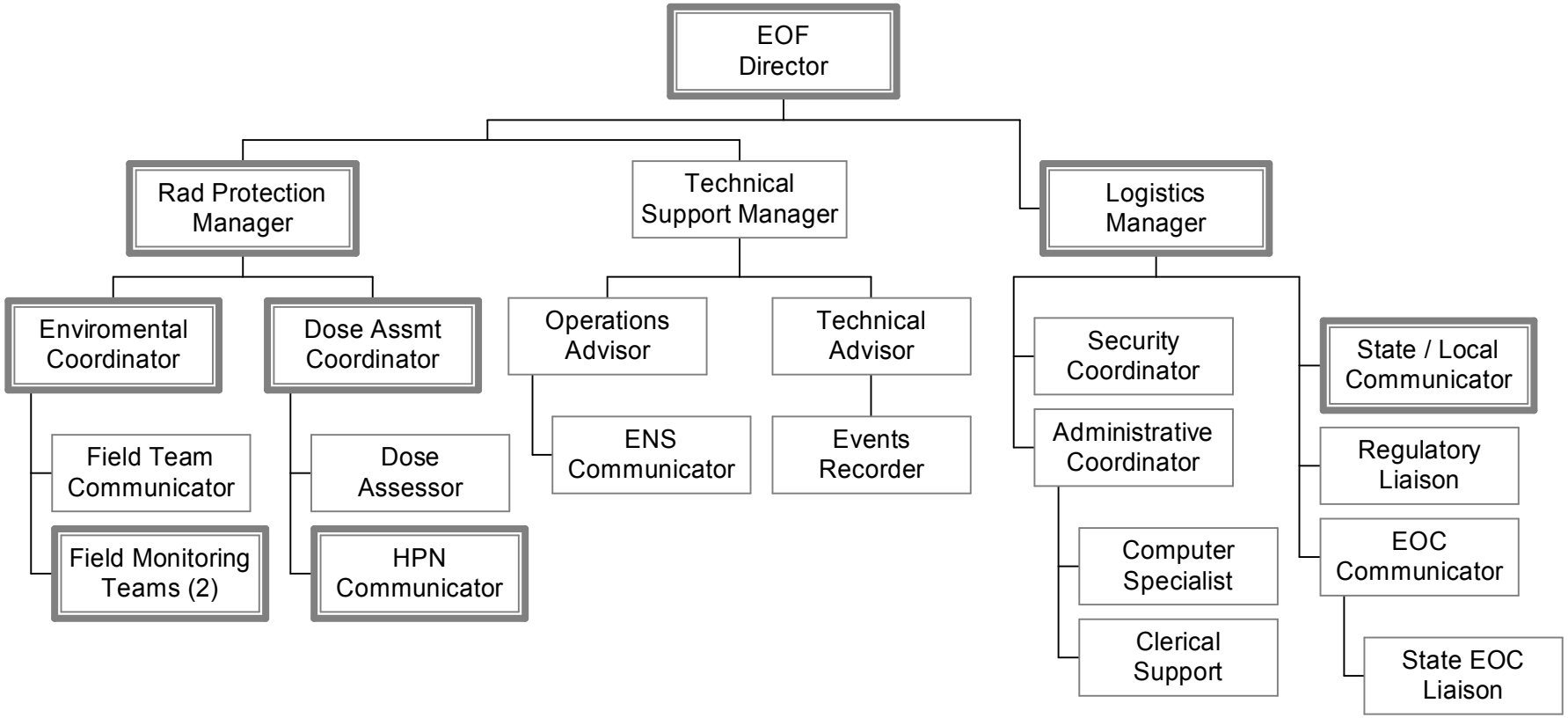


Bolded Boxes indicate minimum staffing positions.

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

** Refer to Table LGS 2-1 for required staffing levels

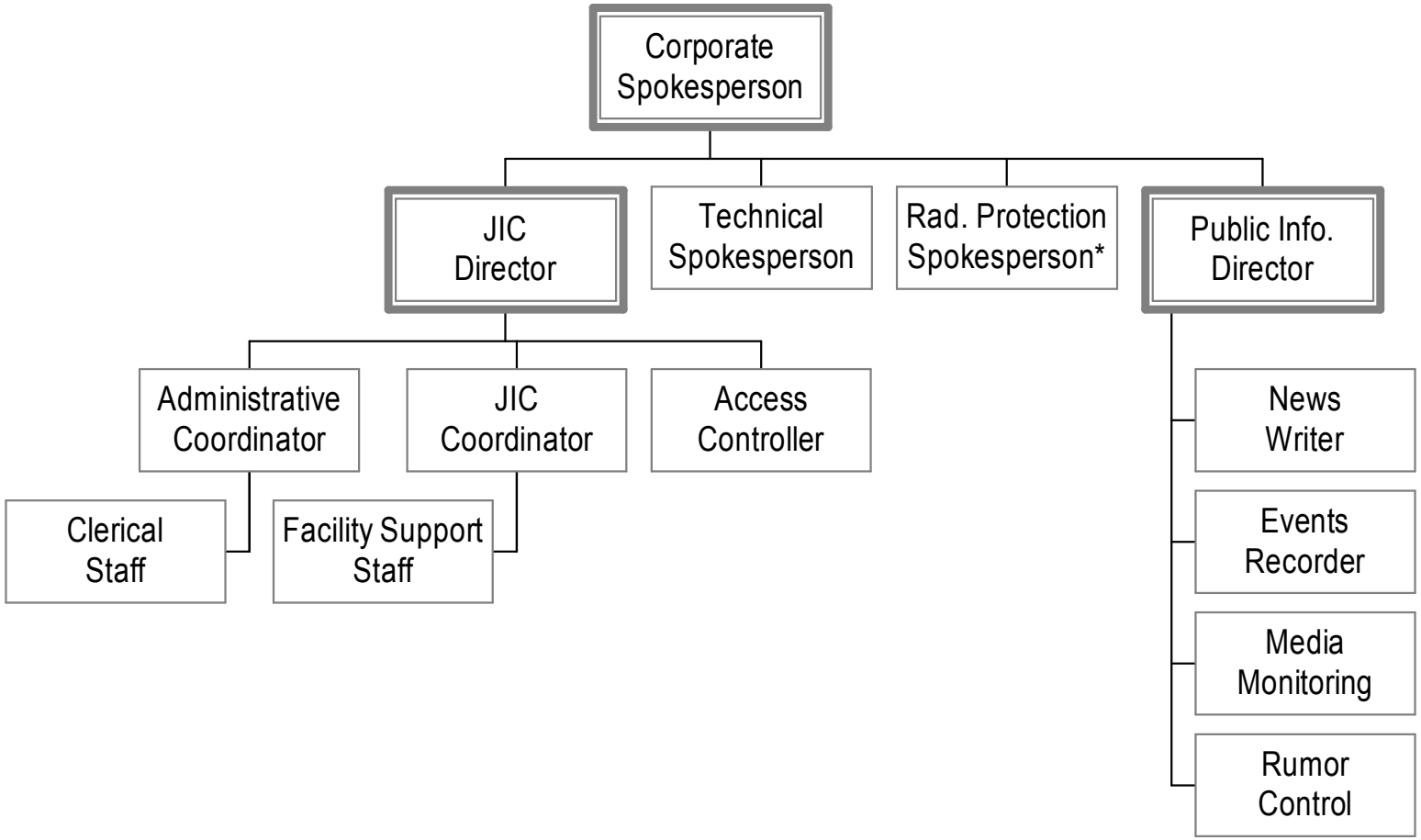
Figure LGS 2-3: Emergency Offsite Organization



Bolded Boxes indicate minimum staffing positions.

EOF Security Coordinator position staffed by Corporate personnel.

Figure LGS 2-4: Emergency Public Information Organization



Bolded Boxes indicate minimum staffing positions.

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

Section 3: Classification of Emergencies

3.1 General

Section D of the Exelon Nuclear Standardized Emergency Plan divides the types of emergencies into four Emergency Classification Levels (ECLs). They are the UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY, and GENERAL EMERGENCY. These ECLs are entered by meeting the Emergency Action Level (EAL) Threshold Values provided in this section of the Annex. The ECLs are escalated from least severe to most severe according to relative threat to the health and safety of the public and emergency workers. Depending on the severity of an event, prior to returning to a standard day-to-day organization, a state or phase called RECOVERY may be entered to provide dedicated resources and organization in support of restoration and communication activities following the termination of the emergency.

UNUSUAL EVENT: Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

ALERT: Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

SITE AREA EMERGENCY: Events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

GENERAL EMERGENCY: Events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

RECOVERY: Recovery can be considered as a phase of the emergency and is entered by meeting emergency termination criteria provided in EP-AA-111 Emergency Classification and Protective Action Recommendations.

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 (T.S.), for Units 1 and 2, based on Reactor Mode Switch Position and specific plant conditions. "Defueled" Mode was established for classification purposes to reflect conditions where all fuel has been removed from the Reactor Pressure Vessel.

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

Hot Matrix - applies in modes (1), (2), and (3)

Cold Matrix - applies in modes (4), (5), and (D)

Individuals responsible for the classification of events will refer to the Initiating Condition and Threshold Values on the matrix of the appropriate station Standardized Emergency Plan Annex (this document). This matrix will contain Initiating Conditions, EAL Threshold Values, Mode Applicability Designators, appropriate EAL numbering system, and additional guidance necessary to classify events. It may be provided as a user aid.

The matrix is set up in six Recognition Categories. The first is designated as "R" and relates to Abnormal Radiological Conditions / Abnormal Radiological Effluent Releases. The second is designated as "F" and relates to Fission Product Barrier Degradation. The third is designated as "M" and relates to hot condition System Malfunctions. The fourth is designated as "C" and relates to Cold Shutdown / Refueling System Malfunctions. The fifth is designated as "H" and relates to Hazards and Other Conditions. The sixth is designated "E-H" and relates to ISFSI Malfunctions.

The 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.

The Initiating Conditions are coded with a two letter and one number code. The first letter is the Recognition Category designator, the second letter is the Classification Level, "U" for (NOTIFICATION OF) UNUSUAL EVENT, "A" for ALERT, "S" for SITE AREA EMERGENCY and "G" for GENERAL EMERGENCY. The EAL number is a sequential number for that Recognition Category series. All Initiating Conditions that are describing the severity of a common condition (series) will have the same number.

The EAL number may then be used to reference a corresponding page(s), which provides the basis information pertaining to the Initiating Condition:

- Threshold Value
- Mode Applicability
- Basis

Emergency Action Levels are the measurable, observable detailed conditions that must be met in order to classify the event. Classification is not to be made without referencing, comparing and satisfying the Threshold Values specified in the Emergency Action Levels.

A list of definitions is provided as part of this document for terms having specific meaning to the Emergency Action Levels. Site specific definitions are provided for terms with the intent to be used for a particular Initiating Condition/Threshold Value and may not be applicable to other uses of that term at other sites, the Emergency Plan or procedures.

References are also included to documents that were used to develop the EAL Threshold Values.

References to the Emergency Director means the person in Command and Control as defined in the Emergency Plan. Classification of emergencies is a non-delegable responsibility of Command and Control for the onsite facilities with responsibility assigned to the Shift Emergency Director (Control Room Shift Manager) or the Station Emergency Director (TSC). Classification of emergencies remains the responsibility of the applicable onsite facility even after Command and Control is transferred to the Corporate Emergency Director (EOF).

3.2 Classification, Instrumentation and Transient Events

Although the majority of the EALs provide very specific thresholds, the Emergency Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL is IMMINENT. If, in the judgment of the Emergency Director, an IMMINENT situation is at hand, the classification should be made as if the threshold has been exceeded. While this is particularly prudent at the higher emergency classification levels (as the early classification may provide for more effective implementation of protective measures), it is nonetheless applicable to all emergency classification levels.

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 indications, or (3) by direct observation by plant personnel, such that doubt related to the indication's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

Indications used for monitoring and evaluation of plant conditions include the normally used instrumentation, backup or redundant instrumentation, and the use of other parameters that provide information that supports determination if an EAL threshold value has been reached. When an EAL refers to a specific instrument or indication that is determined to be inaccurate or unavailable, then alternate indications shall be used to monitor the specified condition.

During an event that results in changing parameters trending towards an EAL classification, and instrumentation that was available to monitor this parameter becomes unavailable or the parameter goes off scale, the parameter should be assumed to have been exceeded and the classification made if there are no other direct or indirect means available to determine if the threshold has not been exceeded.

Planned evolutions involve preplanning to address the limitations imposed by the condition, the performance of required surveillance testing, and the implementation of specific controls prior to knowingly entering the condition in accordance with the specific requirements of the site's Technical Specifications. Activities which cause the site to operate beyond that allowed by the site's Technical Specifications, planned or unplanned, may result in an EAL threshold being met or exceeded. Planned evolutions to test, manipulate, repair, perform maintenance or modifications to systems and equipment that result in an EAL value being met or exceeded are not subject to classification and activation requirements as long as the evolution proceeds as planned and is within the operational limitations imposed by the specific operating license. However, these conditions may be subject to the reporting requirements of 10 CFR 50.72.

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.

Concerning Classification Downgrading Exelon Nuclear policy is that emergency classifications shall not be downgraded to a lower classification. Once declared, the event shall remain in effect until no Classification is warranted or until such time as conditions warrant classification to Recovery.

There may be cases in which a plant condition that exceeded an EAL was not recognized at the time of occurrence but is identified well after the condition has occurred (e.g., as a result of routine log or record review), and the condition no longer exists. In these cases, an emergency should not be declared. Reporting requirements of 10 CFR 50.72 are applicable, the guidance of NUREG-1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73 and the Reportability Reference Manual, should be applied.

3.3 Mode Applicability

The plant-operating mode that existed at the time that the event occurred, prior to any protective system or operator action initiated in response to the condition, is compared to the mode applicability of the EALs. If an event occurs, and a lower or

higher plant-operating mode is reached before the emergency classification can be made, the declaration shall be based on the mode that existed at the time the event occurred.

For events that occur in Cold Shutdown or Refueling, escalation is via EALs that have Cold Shutdown or Refueling for mode applicability, even if Hot Shutdown (or a higher mode) is entered during any subsequent heat-up. In particular, the Fission Product Barrier Matrix EALs are applicable only to events that initiate in Hot Shutdown or higher.

If there is a change in Mode following the initial event declaration, any subsequent events will be evaluated on the existing Mode of the plant at the time the conditions occur.

3.4 Emergency Director Judgment

Emergency Director Judgment EALs are provided in the Hazards and Other Condition Affecting Plant Safety section and on the Fission Product Barrier Matrix. Both of the Emergency Director Judgment EALs have specific criteria for when they should be applied.

The Hazards Section Emergency Director Judgment EALs are intended to address unanticipated conditions which are not addressed explicitly by other EALs but warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under specific emergency classifications (UE, Alert, SAE or GE).

The FPB Matrix ED Judgment EALs are intended to include unanticipated conditions, which are not addressed explicitly by any of the other FPB threshold values, but warrant determination because conditions exist that fall under the broader definition for a significant Loss or Potential Loss of the barrier (equal to or greater than the defined FPB threshold values).

3.5 Fission Product Barrier Restoration

Fission Product Barrier (FPB) thresholds are not treated the same as EAL threshold values. Conditions warranting declaration of the loss or potential loss of a Fission Product Barrier may occur resulting in a specific classification. The condition that caused the loss or potential loss declaration could be rectified as the result of Operator action, automatic actions, or designed plant response. Barriers will be considered re-established when there are direct verifiable indications (containment penetration or open valve has been isolated, coolant sample results, etc) that the barrier has been restored and is capable of mitigating future events.

The reestablishment of a fission product barrier does not alter or lower the existing classification. Entry into Termination/Recovery phase is still required for exiting the present classification. However the reestablishment of the barrier should be considered in determining future classifications should plant conditions or events change.

3.6 Definitions

AFFECTING SAFE SHUTDOWN: Event in progress has adversely affected functions that are necessary to bring the plant to and maintain it in the applicable HOT or COLD SHUTDOWN condition. Plant condition applicability is determined by Technical Specification LCOs in effect.

Example 1: Event causes damage that results in entry into an LCO that requires the plant to be placed in HOT SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is not "AFFECTING SAFE SHUTDOWN."

Example 2: Event causes damage that results in entry into an LCO that requires the plant to be placed in COLD SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is "AFFECTING SAFE SHUTDOWN."

BOMB: An explosive device suspected of having sufficient force to damage plant systems or structures.

CIVIL DISTURBANCE: A group of persons violently protesting station operations or activities at the site.

CONFINEMENT BOUNDARY: The barrier(s) between areas containing radioactive substances and the environment.

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

EXTORTION: An attempt to cause an action at the station by threat of force.

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fire. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTILE FORCE: One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

INTRUSION: A person(s) present in a specified area without authorization. Discovery of a BOMB in a specified area is indication of INTRUSION into that area by a HOSTILE FORCE.

INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI): A complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage.

NORMAL LEVELS: Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

NORMAL PLANT OPERATIONS: Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

OWNER CONTROLLED AREA (OCA): The property associated with the station and owned by the company. Access is normally limited to persons entering for official business.

PROJECTILE: An object directed toward a NPP that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

SABOTAGE: A deliberate damage, mis-alignment, or mis-operation of plant equipment with the intent to render the equipment inoperable. Equipment found tampered with or damaged due to malicious mischief may NOT meet the definition of SABOTAGE until this determination is made by security supervision.

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

SIGNIFICANT TRANSIENT: is an UNPLANNED event involving one or more of the following: (1) Turbine Trip, (2) Reactor scram, (3) ECCS actuation, (4) Recirc Runback >25% power change, or (5) thermal power oscillations >10%.

STRIKE ACTION: A work stoppage within the PROTECTED AREA by a body of workers to enforce compliance with demands made on management. The STRIKE ACTION must threaten to interrupt NORMAL PLANT OPERATIONS.

UNISOLABLE: A breach or leak that cannot be promptly isolated.

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

TABLE LGS 3-1 Emergency Action Level (EAL) Matrix

Abnormal Rad Levels / Radiological Effluent

Radiological Effluents

GENERAL EMERGENCY

RG1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 5 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**:

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 1000 mRem TEDE**

      OR

   b. **> 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**.

      OR

   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

SITE AREA EMERGENCY

RS1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 5 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**:

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 100 mRem TEDE**

      OR

   b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.

      OR

   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

ALERT

RA1 Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer. 1 2 3 4 5 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **200 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 15 minutes**.
   - Radwaste Discharge effluent monitor (RR63-0R001)

     OR

   - Discharge Permit specified monitor

   OR

2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**.

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.

UNUSUAL EVENT

RU1 Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer. 1 2 3 4 5 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **2 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 60 minutes**.
   - Radwaste Discharge effluent monitor (RR63-0R001)

     OR

   - Discharge Permit specified monitor

   OR

2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 60 minutes**.

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Table R1 -- Effluent Monitor Thresholds

	General Emergency	Site Area Emergency	Alert	Unusual Event
North Stack	1.92 E+08 μCi/sec	1.92 E+07 μCi/sec	2.20 E+06 μCi/sec	2.20 E+04 μCi/sec
	(WR Monitor: RIX-26-076-4)			
South Stack	2.71 E-01 μCi/cc	2.71 E-02 μCi/cc	3.09 E-03 μCi/cc	3.09 E-05 μCi/cc
	(Unit 1: RY26-185A-3 / RY26-185-B-3 or Unit 2: RY26-285A-3 / RY26-285-B-3)			

TABLE LGS 3-1 Emergency Action Level (EAL) Matrix

Abnormal Rad Levels / Radiological Effluent

Abnormal Rad Levels

GENERAL EMERGENCY

SITE AREA EMERGENCY

Table R2 - Refuel Floor ARMs

- RIS29-M1-1(2)K600, Drywell Head Laydown
- RIS30-M1-1(2)K600, Dryer / Separator Area
- RIS31-M1-1(2)K600, Spent Fuel Pool
- RIS32-M1-1(2)K600, New Fuel Storage Vault
- RIS33-M1-1(2)K600, Pool Plug Laydown

ALERT

RA2 Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel. [1][2][3][4][5][D]

EAL Threshold Values:

1. VALID reading **> 1000 mR/hr** on any Table R2 Radiation Monitor due to **EITHER**:
   - Damaged irradiated fuel.

   OR
   - Water level drop.

   OR
2. Water level drop in the Reactor Refueling Cavity or Spent Fuel Pool that will result in irradiated fuel becoming uncovered.

UNUSUAL EVENT

RU2 UNPLANNED rise in plant radiation levels. [1][2][3][4][5][D]

EAL Threshold Values:

1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by:
   - Refueling Cavity water level **< 484 inches**.

     OR
   - Spent Fuel Pool level is **< 22 feet** above seated irradiated fuel.

     OR
   - Report of visual observation of a drop in water level in the Reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal.

   AND

   b. VALID Area Radiation Monitor reading rise on one or more radiation monitor in Table R2.

   OR
2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.

Table R3
Areas Requiring Continuous Occupancy

- Main Control Room
- Central Alarm Station - (by survey)

RA3 Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. [1][2][3][4][5][D]

EAL Threshold Values:

Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R3) to maintain plant safety functions.

RU3 Fuel Clad Degradation. [1][2][3]

EAL Threshold Values:

Fuel clad degradation resulting in **EITHER**:

- Air Ejector discharge radiation monitor (RISH 26 1(2)K601A, B) **Hi-Hi alarm**.

  OR
- Coolant activity **> 4.0 µCi/gm** Dose Equivalent I-131.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

TABLE LGS 3-1 Emergency Action Level (EAL) Matrix - Fission Product Barrier Matrix

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
FG1 Loss of ANY two barriers AND Loss or Potential Loss of third barrier. 1 2 3	**FS1** Loss or Potential Loss of. ANY two barriers. 1 2 3	**FA1** ANY Loss or ANY Potential Loss of either Fuel Clad or RCS. 1 2 3	**FU1** ANY Loss or ANY Potential Loss of Containment. 1 2 3

Sub-Category	FC - Fuel Clad		RC – Reactor Coolant System		CT - Containment	
	Loss	**Potential Loss**	**Loss**	**Potential Loss**	**Loss**	**Potential Loss**
1. Pri Coolant Activity	Coolant activity **> 300 uCi/gm** Dose Equivalent I-131	None	None	None	None	None
2. RPV Water Level	1. RPV level **cannot** be restored and maintained **> – 186 inches.**	2. RPV level **cannot** be restored and maintained **> – 161 inches.** **OR** 3. RPV level **cannot** be determined.	1. RPV level **cannot** be restored and maintained **> –161 inches**. **OR** 2. RPV level **cannot** be determined.	None	None	Plant conditions indicate that Primary Containment Flooding is required.
3. Primary Cont Conditions	None	None	1. Drywell pressure **> 1.68 psig**. **AND** 2. Drywell pressure rise due to RCS leakage.	None	1. Rapid unexplained drop in Drywell Pressure following initial pressure rise. **OR** 2. Drywell pressure response **not** consistent with LOCA conditions.	3. Drywell pressure **≥ 55 psig** and rising. **OR** 4. a. Drywell or Suppression Pool hydrogen concentration **> 6%.** **AND** b. Drywell or Suppression Pool oxygen concentration **> 5%.** **OR** 5. Heat Capacity Limit (T-102 Curve SP/T-1) exceeded.
4. RCS Leak Rate	None	None	1. UNISOLABLE Main Steam Line (MSL), HPCI, Feedwater, RWCU or RCIC line break. **OR** 2 Emergency RPV Depressurization is required.	3. RCS leakage **> 50 gpm** inside the drywell. **OR** 4. UNISOLABLE primary system leakage outside drywell resulting in **EITHER:** • Secondary Containment area temperatures **> T-103 / SAMP, Max Norm Op Value (MNO)**. **OR** • Secondary Containment radiation levels **> T-103 / SAMP, Max Norm Op Value (MNO)**.	None	None
5. Pri Cont Rad Monitoring	Drywell radiation monitor reading **> 1.90 E+02 R/hr**.	None	Drywell Radiation monitor reading **> 100 R/hr.**	None	None	Drywell radiation monitor reading **> 4.35 E+02 R/hr**.
6. Primary Cont Isolation Failure or Bypass	None	None	None	None	1. a. Failure of isolation valves in any one line to close. **AND** b. Direct downstream pathway to the environment exists after a primary containment isolation signal. **OR** 2. Intentional venting/purging of Primary Containment per TRIPs or SAMPs due to accident conditions. **OR** 3. UNISOLABLE primary system leakage outside drywell resulting in **EITHER:** • Secondary Containment area temperatures **> T-103 / SAMP Max Safe Op Value (MSO)**. **OR** • Secondary Containment area radiation levels **> T-103 / SAMP Max Safe Op Value (MSO)**.	None
7. ED Judgment	1. Any condition in the opinion of the Emergency Director that indicates Loss of the Fuel Clad Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Fuel Clad Barrier.	1. Any condition in the opinion of the Emergency Director that indicates Loss of the RCS Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the RCS Barrier.	1. Any condition in the opinion of the Emergency Director that indicates Loss of the Containment Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment Barrier.

TABLE LGS 3-1 Emergency Action Level (EAL) Matrix

System Malfunction

Loss of AC Power

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
MG1 Prolonged loss of all Off-Site power and all On-Site AC power to emergency busses. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to unit 4 KV Safeguards Buses. **AND** 2. Failure of D11(21), D12(22), D13(23), and D14(24) Emergency Diesel Generators to supply power to unit 4 KV Safeguard buses. **AND** 3. a. Restoration of at least one unit 4KV Safeguard Bus in **< 2 hours** is **not** likely. **OR** b. RPV level **cannot** be determined to be > - **161 inches.**	**MS1** Loss of all Off-Site and all On-Site AC power to emergency busses for 15 minutes or longer. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to unit 4 KV Safeguards Buses. **AND** 2. Failure of D11(21), D12(22), D13(23), and D14(24) Emergency Diesel Generators to supply power to unit 4 KV Safeguard buses. **AND** 3. Failure to restore power to at least one unit 4KV Safeguard Bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.	**MA1** AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. AC power capability to unit 4KV Safeguard Buses reduced to only one of the following sources for **≥ 15 minutes**. • 101 Safeguard Transformer • 201 Safeguard Transformer • D11(21) Diesel Generator • D12(22) Diesel Generator • D13(23) Diesel Generator • D14(24) Diesel Generator **AND** 2. Any additional single power source failure will result in a unit blackout.	**MU1** Loss of all Off-Site AC power to busses for 15 minutes or longer. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of all off-site AC power to unit 4 KV Safeguards Buses for **≥ 15 minutes**.

RPS Failure /Inadvertent Criticality

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
MG2 Automatic Scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists. 1 2 **EAL Threshold Values:** 1. Automatic scram was **not** successful as indicated by Reactor Power **> 4%.** **AND** 2. Manual scram/ARI actions were **not** successful as indicated by Reactor Power **> 4%.** **AND** 3. **EITHER** of the following exists: • RPV level **cannot** be restored and maintained **> - 186 inches**. **OR** • Heat Capacity Temperature Limit (T-102 Curve SP/T-1) exceeded.	**MS2** Automatic Scram fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor. 1 2 **EAL Threshold Values:** 1. Automatic scram was **not** successful as indicated by Reactor Power **> 4%.** **AND** 2. Manual scram/ARI actions were **not** successful from the Reactor Console as indicated by Reactor Power **> 4%.**	**MA2** Automatic Scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor. 1 2 **EAL Threshold Values:** 1. Automatic scram was **not** successful as indicated by Reactor Power **> 4%.** **AND** 2. Manual scram/ARI actions were successful from Reactor Console as indicated by Reactor Power **≤ 4%.**	**MU2** Inadvertent criticality. 3 **EAL Threshold Values:** UNPLANNED sustained positive period observed on nuclear instrumentation.

Modes: 1 – Power Operation, 2 – Startup, 3 –Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

TABLE LGS 3-1 Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
DC Power		**MS3** Loss of all vital DC power for 15 minutes or longer. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of all vital DC power based on **< 105 VDC** on unit 125 VDC battery busses 1(2)FA, B, C, and D for **≥ 15 minutes**.		
Annunciators		**MS4** Inability to monitor a SIGNIFICANT TRANSIENT in progress. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1) **AND** 2. SIGNIFICANT TRANSIENT in progress (Table M2). **AND** 3. Compensatory indications (computer points) are unavailable.	**MA4** UNPLANNED Loss of safety system annunciation or indication in the control room with EITHER (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1) **AND** 2. a. SIGNIFICANT TRANSIENT in progress (Table M2). **OR** b. Compensatory indications (computer points) are unavailable.	**MU4** UNPLANNED loss of safety system annunciation or indication in the control room for 15 minutes or longer. 1 2 3 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1)
		Table M1 - Safety Systems • ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring	**Table M2 - Significant Transients** • Turbine trip • Reactor scram • ECCS actuation • Recirc Runback >25% power change • Thermal power oscillations > 10 % Reactor Power change	

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

TABLE LGS 3-1 Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
RCS Leak				**MU5** RCS leakage. 1 2 3 **EAL Threshold Values:** 1. Unidentified or pressure boundary leakage into the Drywell **> 10 gpm**. **OR** 2. Identified leakage into the Drywell **> 25 gpm**.
Communications		**Table M3 – Communications Capability** System / Onsite / Offsite Station Radio: X / Plant Public Address (PA): X / Prelude System: X / X Station Phones: X / X Satellite Phones: X / X NRC (ENS): / X Cellular Phones: / X		**MU6** Loss of all On-site or Off-site communications capabilities. 1 2 3 **EAL Threshold Values:** 1. Loss of all Table M3 **Onsite** communications capability affecting the ability to perform routine operations. **OR** 2. Loss of all Table M3 **Offsite** communications capability affecting the ability to perform offsite notifications.
T. S. Time				**MU7** Inability to reach required shutdown within Technical Specification limits. 1 2 3 **EAL Threshold Values:** Plant is **not** brought to required operating mode within Technical Specifications LCO Action Statement Time.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

TABLE LGS 3-1 Emergency Action Level (EAL) Matrix

Hazards and Other Conditions Affecting Plant Safety

Security

GENERAL EMERGENCY

HG1 HOSTILE ACTION resulting in loss of physical control of the facility. 1 2 3 4 5 D

EAL Threshold Values:

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1).

   OR

2. A HOSTILE ACTION has:
   - Caused failure of Spent Fuel Pool Cooling Systems

     AND

   - IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).

SITE AREA EMERGENCY

HS1 HOSTILE ACTION within the PROTECTED AREA. 1 2 3 4 5 D

EAL Threshold Values:

A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.

ALERT

HA1 HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. 1 2 3 4 5 D

EAL Threshold Values:

1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site.

   OR

2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.

UNUSUAL EVENT

HU1 Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant. 1 2 3 4 5 D

EAL Threshold Values:

1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities.

   OR

2. A validated notification from NRC providing information of an aircraft threat.

   OR

3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

C. R. Evacuation

Table H1 - Safety Functions

- Reactivity Control (ability to shut down the reactor and keep it shutdown)
- RCS Inventory (ability to cool the core)
- Decay Heat Removal (ability to maintain heat sink)

SITE AREA EMERGENCY

HS2 Control Room evacuation has been initiated and plant control cannot be established. 1 2 3 4 5 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Control Room evacuation has been initiated.

   AND

2. Control of the plant **cannot** be established per SE-1 or SE-6 in **< 15 minutes**.

ALERT

HA2 Control Room evacuation has been initiated. 1 2 3 4 5 D

EAL Threshold Values:

Entry into SE-1 or SE-6 for Control Room evacuation.

Fire / Explosion

Table H2 – Vital Areas

- Reactor Enclosure
- Control Enclosure
- Diesel Generator Enclosure
- Spray Pond Pump House / Spray Network

ALERT

HA3 FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown. 1 2 3 4 5 D

EAL Threshold Values:

FIRE or EXPLOSION resulting in any of the following:

- VISIBLE DAMAGE to a Table H2 permanent structure.

  OR

- VISIBLE DAMAGE to safety system equipment contained within a Table H2 area.

  OR

- Control Room indication of degraded safety system equipment performance contained within a Table H2 area.

UNUSUAL EVENT

HU3 FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA. 1 2 3 4 5 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm.

   OR

2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

TABLE LGS 3-1 Emergency Action Level (EAL) Matrix

Hazards and Other Conditions Affecting Plant Safety

Natural / Destructive Phenomena

Table H2 - Vital Areas

- Reactor Enclosure
- Control Enclosure
- Diesel Generator Enclosure
- Spray Pond Pump House / Spray Network

Table H3 – Internal Flooding Areas

- Control Structure
- RHR compartment
- Core Spray compartment
- HPCI compartment
- RCIC compartment
- Spray Pond Pump House

ALERT

HA4 Natural and destructive phenomena affecting VITAL AREAS — 1 2 3 4 5 D

EAL Threshold Values:

1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by seismic instrumentation **> 0.075 g**.

   AND

   b. Confirmed by **EITHER:**

   - Earthquake felt in plant.

     OR

   - National Earthquake Center.

     OR

   - Control Room indication of degraded performance of systems required for the safe shutdown of the plant.

   OR

2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area:

   - Tornado strike

     OR

   - High winds **> 90 mph**

     OR

   - Vehicle crash

     OR

   - Turbine failure-generated PROJECTILES

   OR

3. Flooding in any Table H3 area that results in **ANY** of the following:

   - Degraded safety system performance as indicated in the Control Room.

     OR

   - Industrial safety hazards (e.g., electric shock) that preclude access necessary to operate or monitor safety equipment.

     OR

   - Water level **> T-103 / SAMP Max Safe Op Value (MSO)**.

UNUSUAL EVENT

HU4 Natural and destructive phenomena affecting the PROTECTED AREA. — 1 2 3 4 5 D

EAL Threshold Values:

1. a. Seismic event as indicated by seismic instrumentation **> 0.005 g**.

   AND

   b. Confirmed by **EITHER:**

   - Earthquake felt in plant.

     OR

   - National Earthquake Center.

   OR

2. **EITHER** of the following occurring within the PROTECTED AREA boundary:

   - Tornado strike

     OR

   - Sustained **(> 15 minutes)** high winds **> 90 mph**

   OR

3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

   OR

4. Flooding in any Table H3 area that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

TABLE LGS 3-1 Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Toxic / Flammable Gas	**Table H2 - Vital Areas** • Reactor Enclosure • Control Enclosure • Diesel Generator Enclosure • Spray Pond Pump House / Spray Network		**HA5** Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event. Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.	**HU5** Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS. 1 2 3 4 5 D **EAL Threshold Values:** 1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS. **OR** 2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.
Judgment	**HG6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**HS6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	**HA6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an ALERT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**HU6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

TABLE LGS 3-1 Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
ISFSI MALFUNCTION				
ISFSI				**E-HU1** Damage to a loaded cask CONFINEMENT BOUNDARY 1 2 3 4 5 D **EAL Threshold Values:** Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**.

TABLE LGS 3-1 Emergency Action Level (EAL) Matrix

Abnormal Rad Levels / Radiological Effluent

Radiological Effluents

GENERAL EMERGENCY

RG1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. [1][2][3][4][5][D]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**:

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 1000 mRem TEDE**

      OR

   b. **> 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**.

      OR

   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

SITE AREA EMERGENCY

RS1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. [1][2][3][4][5][D]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**:

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 100 mRem TEDE**

      OR

   b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.

      OR

   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

ALERT

RA1 Any release of gaseous or liquid radioactivity to the environment greater than 200 times the Radiological Effluent Technical Specifications for 15 minutes or longer. [1][2][3][4][5][D]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **200 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 15 minutes**.
   - Radwaste Discharge effluent monitor (RR63-0R001)

     OR

   - Discharge Permit specified monitor

   OR

2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**.

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.

UNUSUAL EVENT

RU1 Any release of gaseous or liquid radioactivity to the environment greater than 2 times the Radiological Effluent Technical Specifications for 60 minutes or longer. [1][2][3][4][5][D]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **2 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 60 minutes**.
   - Radwaste Discharge effluent monitor (RR63-0R001)

     OR

   - Discharge Permit specified monitor

   OR

2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 60 minutes**.

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Table R1 -- Effluent Monitor Thresholds

	General Emergency	Site Area Emergency	Alert	Unusual Event
North Stack	1.92 E+08 μCi/sec	1.92 E+07 μCi/sec	2.20 E+06 μCi/sec	2.20 E+04 μCi/sec
	(WR Monitor: RIX-26-076-4)			
South Stack	2.71 E-01 μCi/cc	2.71 E-02 μCi/cc	3.09 E-03 μCi/cc	3.09 E-05 μCi/cc
	(Unit 1: RY26-185A-3 / RY26-185-B-3 or Unit 2: RY26-285A-3 / RY26-285-B-3)			

TABLE LGS 3-1 Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Abnormal Rad Levels / Radiological Effluent				
Abnormal Rad Levels		**Table R2 - Refuel Floor ARMs** • RIS29-M1-1(2)K600, Drywell Head Laydown • RIS30-M1-1(2)K600, Dryer / Separator Area • RIS31-M1-1(2)K600, Spent Fuel Pool • RIS32-M1-1(2)K600, New Fuel Storage Vault • RIS33-M1-1(2)K600, Pool Plug Laydown	**RA2** Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel. 1 2 3 4 5 D **EAL Threshold Values:** 1. VALID reading **> 1000 mR/hr** on any Table R2 Radiation Monitor due to **EITHER**: • Damaged irradiated fuel. **OR** • Water level drop. **OR** 2. Water level drop in the Reactor Refueling Cavity or Spent Fuel Pool that will result in irradiated fuel becoming uncovered.	**RU2** UNPLANNED rise in plant radiation levels. 1 2 3 4 5 D **EAL Threshold Values:** 1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by: • Refueling Cavity water level **< 484 inches**. **OR** • Spent Fuel Pool level is **< 22 feet** above seated irradiated fuel. **OR** • Report of visual observation of a drop in water level in the Reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal. **AND** b. VALID Area Radiation Monitor reading rise on one or more radiation monitor in Table R2. **OR** 2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.
		Table R3 **Areas Requiring Continuous Occupancy** • Main Control Room • Central Alarm Station - (by survey)	**RA3** Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. 1 2 3 4 5 D **EAL Threshold Values:** Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R3) to maintain plant safety functions.	

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

TABLE LGS 3-1 Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS				
Loss of AC Power			**CA1** Loss of all Off-Site and all On-Site AC power to emergency busses for 15 minutes or longer. 4 5 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to unit 4 KV Safeguards Buses. **AND** 2. Failure of D11(21), D12(22), D13(23), and D14(24) Emergency Diesel Generators to supply power to unit 4 KV Safeguard buses. **AND** 3. Failure to restore power to at least one unit 4KV Safeguard Bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.	**CU1** AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout. 4 5 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. AC power capability to unit 4KV Safeguard Buses reduced to only one of the following sources for **≥ 15 minutes**. • 101 Safeguard Transformer • 201 Safeguard Transformer • D11(21) Diesel Generator • D12(22) Diesel Generator • D13(23) Diesel Generator • D14(24) Diesel Generator **AND** 2. Any additional single power source failure will result in a unit blackout.
Inadvertent Criticality				**CU2** Inadvertent criticality. 4 5 **EAL Threshold Values:** UNPLANNED sustained positive period observed on nuclear instrumentation.
DC Power				**CU3** Loss of required DC power for 15 minutes or longer. 4 5 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of required DC power based on **< 105 VDC** on unit 125 VDC battery buses 1(2)FA, FB, FC, and FD for **≥ 15 minutes**.

TABLE LGS 3-1 Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS				
Communications			**Table C1 - Communications Capability** System / Onsite / Offsite Station Radio: X / — Plant Public Address (PA): X / — Prelude System: X / X Station Phones: X / X Satellite Phones: X / X NRC (ENS): — / X Cellular Phones: — / X	**CU4** Loss of all On-site or Off-site communications capabilities. 4 5 D **EAL Threshold Values:** 1. Loss of all Table C1 **Onsite** communications capability affecting the ability to perform routine operations. **OR** 2. Loss of all Table C1 **Offsite** communications capability affecting the ability to perform offsite notifications.
Heat Sink		**Table C2 – RCS Reheat Duration Thresholds** RCS / Containment Closure / Duration Intact / N/A / 60 minutes* Not Intact / Established / 20 minutes* Not Intact / Not Established / 0 minutes *If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then EAL Threshold #1 is **not** applicable.	**CA5** Inability to maintain plant in cold shutdown. 4 5 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200°F** for **> Table C2 duration**. **OR** 2. UNPLANNED RPV pressure rise **> 10 psig** as a result of temperature rise due to loss of decay heat removal.	**CU5** UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV. 4 5 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200°F**. **OR** 2. Loss of the following for **≥ 15 minutes:** • All RCS temperature indications **AND** • All RPV level indications

TABLE LGS 3-1 Emergency Action Level (EAL) Matrix

COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

RCS Leakage / Inventory

GENERAL EMERGENCY

CG6 Loss of RPV inventory affecting fuel clad integrity with containment challenged. [4] [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. RPV level **< - 161 inches** for **≥ 30 minutes**.

   AND

   b. Any Containment Challenge Indication (Table C5).

   OR

2. a. RPV level unknown for **≥ 30 minutes.**

   AND

   b. Loss of RPV inventory as indicated by any of the following:

   - Table C3 indication.

     OR

   - Erratic Source Range Monitor indication.

     OR

   - Any Table C4 Refuel Floor Area Radiation Monitor reading **> 3 R/hr.**

   AND

   c. Any Containment Challenge Indication (Table C5)

SITE AREA EMERGENCY

CS6 Loss of RPV inventory affecting core decay heat removal capability. [4] [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. With CONTAINMENT CLOSURE **not** established, RPV level **< - 44 inches**.

   OR

2. With CONTAINMENT CLOSURE established, RPV level **< - 161 inches.**

   OR

3. a. RPV level unknown for **≥ 30 minutes.**

   AND

   b. Loss of RPV inventory as indicated by any of the following:

   - Table C3 indications.

     OR

   - Erratic Source Range Neutron Monitor indication.

     OR

   - Any Table C4 Refuel Floor Area Radiation Monitor reading **> 3 R/hr.**

ALERT

CA6 Loss of RPV inventory. [4] [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. RPV level **< - 38 inches**.

   OR

2. a. RPV level unknown for **≥ 15 minutes**.

   AND

   b. Loss of RPV inventory per Table C3 indications.

UNUSUAL EVENT

CU6 RCS leakage. [4]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

RCS leakage results in the inability to restore and maintain RPV level **> 12.5 inches** for **≥ 15 minutes**.

Table C5 – Containment Challenge Indications

- Primary Containment Hydrogen concentration **> 6%** and Oxygen **> 5%**.
- UNPLANNED rise in containment pressure
- CONTAINMENT CLOSURE **not** established.
- Any Secondary Containment radiation monitors reading **> T-103 / SAMP Max Safe Op Value (MSO)**.

Table C4 – Refuel Floor ARMs

- RIS29-M1-1(2)K600, Drywell Head Laydown
- RIS30-M1-1(2)K600, Dryer / Separator Area
- RIS31-M1-1(2)K600, Spent Fuel Pool
- RIS32-M1-1(2)K600, New Fuel Storage Vault
- RIS33-M1-1(2)K600, Pool Plug Laydown

Table C3 – Indications of RCS Leakage

- UNPLANNED floor or equipment sump level rise
- UNPLANNED Suppression Pool level rise
- UNPLANNED vessel make-up rise
- Observation of leakage or Inventory loss

CU7 UNPLANNED loss of RPV inventory. [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED Reactor Cavity or Vessel level drop that meets **EITHER**:

   - When controlling level above the RPV flange, Reactor Cavity level drop below the RPV flange for **≥ 15 minutes**.

     OR

   - When controlling level below the RPV flange, vessel level drop below the procedurally established limit **≥ 15 minutes**.

   OR

2. a. RPV level unknown.

   AND

   b. Loss of RPV inventory per Table C3 indications.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

TABLE LGS 3-1 Emergency Action Level (EAL) Matrix

Hazards and Other Conditions Affecting Plant Safety

Security

GENERAL EMERGENCY

HG1 HOSTILE ACTION resulting in loss of physical control of the facility. 1 2 3 4 5 D

EAL Threshold Values:

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1).

   OR

2. A HOSTILE ACTION has:
   - Caused failure of Spent Fuel Pool Cooling Systems

     AND

   - IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).

SITE AREA EMERGENCY

HS1 HOSTILE ACTION within the PROTECTED AREA. 1 2 3 4 5 D

EAL Threshold Values:

A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.

ALERT

HA1 HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. 1 2 3 4 5 D

EAL Threshold Values:

1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site.

   OR

2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.

UNUSUAL EVENT

HU1 Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant. 1 2 3 4 5 D

EAL Threshold Values:

1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities.

   OR

2. A validated notification from NRC providing information of an aircraft threat.

   OR

3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

C. R. Evacuation

Table H1 - Safety Functions

- Reactivity Control (ability to shut down the reactor and keep it shutdown)
- RCS Inventory (ability to cool the core)
- Decay Heat Removal (ability to maintain heat sink)

SITE AREA EMERGENCY

HS2 Control Room evacuation has been initiated and plant control cannot be established. 1 2 3 4 5 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Control Room evacuation has been initiated.

   AND

2. Control of the plant **cannot** be established per SE-1 or SE-6 in **< 15 minutes**.

ALERT

HA2 Control Room evacuation has been initiated. 1 2 3 4 5 D

EAL Threshold Values:

Entry into SE-1 or SE-6 for Control Room evacuation.

Fire / Explosion

Table H2 – Vital Areas

- Reactor Enclosure
- Control Enclosure
- Diesel Generator Enclosure
- Spray Pond Pump House / Spray Network

ALERT

HA3 FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown. 1 2 3 4 5 D

EAL Threshold Values:

FIRE or EXPLOSION resulting in any of the following:

- VISIBLE DAMAGE to a Table H2 permanent structure.

  OR

- VISIBLE DAMAGE to safety system equipment contained within a Table H2 area.

  OR

- Control Room indication of degraded safety system equipment performance contained within a Table H2 area.

UNUSUAL EVENT

HU3 FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA. 1 2 3 4 5 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm.

   OR

2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

TABLE LGS 3-1 Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Natural / Destructive Phenomena	**Table H2 - Vital Areas** • Reactor Enclosure • Control Enclosure • Diesel Generator Enclosure • Spray Pond Pump House / Spray Network **Table H3 – Internal Flooding Areas** ▪ Control Structure ▪ RHR compartment ▪ Core Spray compartment ▪ HPCI compartment ▪ RCIC compartment ▪ Spray Pond Pump House		**HA4** Natural and destructive phenomena affecting VITAL AREAS 1 2 3 4 5 D **EAL Threshold Values:** 1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by seismic instrumentation **> 0.075 g**. **AND** b. Confirmed by **EITHER:** • Earthquake felt in plant. **OR** • National Earthquake Center. **OR** • Control Room indication of degraded performance of systems required for the safe shutdown of the plant. **OR** 2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area: • Tornado strike **OR** • High winds **> 90 mph** **OR** • Vehicle crash **OR** • Turbine failure-generated PROJECTILES **OR** 3. Flooding in any Table H3 area that results in **ANY** of the following: • Degraded safety system performance as indicated in the Control Room. **OR** • Industrial safety hazards (e.g., electric shock) that preclude access necessary to operate or monitor safety equipment. **OR** • Water level **> T-103 / SAMP Max Safe Op Value (MSO)**.	**HU4** Natural and destructive phenomena affecting the PROTECTED AREA. 1 2 3 4 5 D **EAL Threshold Values:** 1. a. Seismic event as indicated by seismic instrumentation **> 0.005 g**. **AND** b. Confirmed by **EITHER:** • Earthquake felt in plant. **OR** • National Earthquake Center. **OR** 2. **EITHER** of the following occurring within the PROTECTED AREA boundary: • Tornado strike **OR** • Sustained **(> 15 minutes)** high winds **> 90 mph** **OR** 3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals. **OR** 4. Flooding in any Table H3 area that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

TABLE LGS 3-1 Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Toxic / Flammable Gas	**Table H2 - Vital Areas** • Reactor Enclosure • Control Enclosure • Diesel Generator Enclosure • Spray Pond Pump House / Spray Network		**HA5** Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor. 1 2 3 4 5 D **EAL Threshold Values:** **Note:** If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event. Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.	**HU5** Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS. 1 2 3 4 5 D **EAL Threshold Values:** 1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS. **OR** 2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.
Judgment	**HG6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**HS6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	**HA6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an ALERT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**HU6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT. 1 2 3 4 5 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

TABLE LGS 3-1 Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
ISFSI MALFUNCTION				
ISFSI				**E-HU1** Damage to a loaded cask CONFINEMENT BOUNDARY 1 2 3 4 5 D **EAL Threshold Values:** Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Shutdown, 4 – Cold Shutdown, 5 – Refueling, D – Defueled

Table LGS 3-2: LGS EAL Technical Basis

Emergency Action Level Technical Basis Page Index

General		Site Area		Alert		Unusual Event	
EAL	**Pg.**	**EAL**	**Pg.**	**EAL**	**Pg.**	**EAL**	**Pg.**
RG1	3-29	RS1	3-32	RA1	3-35	RU1	3-38
				RA2	3-41	RU2	3-44
				RA3	3-47	RU3	3-48
FG1	3-50	FS1	3-51	FA1	3-52	FU1	3-53

Fuel Clad		RCS		Containment	
FC1	3-54				
FC2	3-55	RC2	3-59	CT2	3-66
		RC3	3-60	CT3	3-67
		RC4	3-61		
FC5	3-57	RC5	3-64	CT5	3-69
				CT6	3-70
FC7	3-58	RC7	3-65	CT7	3-73

MG1	3-74	MS1	3-76	MA1	3-77	MU1	3-79
MG2	3-80	MS2	3-82	MA2	3-83	MU2	3-84
		MS3	3-85				
		MS4	3-86	MA4	3-89	MU4	3-92
						MU5	3-94
						MU6	3-95
						MU7	3-97
				CA1	3-98	CU1	3-100
						CU2	3-102
						CU3	3-103
						CU4	3-104
				CA5	3-106	CU5	3-109
CG6	3-111	CS6	3-115	CA6	3-118	CU6	3-120
						CU7	3-121
HG1	3-124	HS1	3-126	HA1	3-128	HU1	3-130
		HS2	3-133	HA2	3-135		
				HA3	3-136	HU3	3-138
				HA4	3-141	HU4	3-146
				HA5	3-150	HU5	3-153
HG6	3-155	HS6	3-156	HA6	3-157	HU6	3-158
						E-HU1	3-159

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RG1

Initiating Condition

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**:

Table R1 – Effluent Monitor Thresholds	
Release Path	**General Emergency**
North Stack (WR Monitor: RIX-26-076-4)	1.92 E+08 μCi/sec
South Stack (Unit 1: RY26-185A-3 / RY26-185-B-3 or Unit 2: RY26-285A-3 / RY26-285-B-3)	2.71 E-01 μCi/cc

OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 1000 mRem TEDE**

      OR

   b. **> 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for ≥ **60 minutes**.

      OR

   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RG1 (cont)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed the EPA Protective Action Guides (PAGs). Public protective actions will be necessary. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public and likely involve fuel damage.

While these failures are addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

Threshold #1 Basis:

The site-specific monitors listed include effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading threshold is not, the results from dose assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency-implementing procedures call for the timely performance of dose assessments using actual meteorology and release information. If the results of dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading threshold.

Threshold #2 Basis:

The "site boundary" is the nearest distance from potential release points at which protective actions would be required for members of the public.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RG1 (cont)

Basis: (cont)

Threshold #3 Basis:

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. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption on sample media followed by field analysis are used for determining the iodine (CDE) thyroid value.

Basis: (References)

1 DBD L-S-43, Radiation Monitoring System

2. LGS ODCM

3. NEI 99-01, Rev. 5 AG1

4. EP-EAL-0608, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values, Limerick Generating Station

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RS1

Initiating Condition

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values

NOTE: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**:

Table R1– Effluent Monitor Thresholds	
Release Path	**Site Area Emergency**
North Stack (WR Monitor: RIX-26-076-4)	1.92 E+07 μCi/sec
South Stack (Unit 1: RY26-185A-3 / RY26-185-B-3 OR Unit 2: RY26-285A-3 / RY26-285-B-3)	2.71 E-02 μCi/cc

OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 100 mRem TEDE**

      OR

   b. **> 500 mRem CDE Thyroid**

OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.

      OR

   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RS1 (cont)

Basis (cont):

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed 10% of the EPA Protective Action Guides (PAGs). Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

While these failures are addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

Threshold #1 Basis:

The site specific monitors listed include effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading threshold is not, the results from dose assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency-implementing procedures call for the timely performance of dose assessments using actual meteorology and release information. If the results of dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading threshold.

Threshold #2 Basis:

The "site boundary" is the nearest distance from potential release points at which Protective Actions would be required for members of the public.

Threshold #3 Basis:

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. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption on sample media followed by field analysis are used for determining the iodine (CDE) thyroid value.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RS1 (cont)

Basis: (References)

1. DBD L-S-43, Radiation Monitoring System
2. LGS ODCM
3. NEI 99-01, Rev. 5 AS1
4. EP-EAL-0608, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values, Limerick Generating Station

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA1

Initiating Condition

Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **200 times alarm setpoint** established by a current radioactivity discharge permit for ≥ **15 minutes**.

   - Radwaste Discharge effluent monitor (RR63-0R001)

   OR

   - Discharge Permit specified monitor

   OR

2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**.

Table R1– Effluent Monitor Thresholds	
Release Path	**Alert**
North Stack (WR Monitor: RIX-26-076-4)	2.20 E+06 μCi/sec
South Stack (Unit 1: RY26-185A-3 / RY26-185-B-3 or Unit 2: RY26-285A-3 / RY26-285-B-3)	3.09 E-03 μCi/cc

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA1 (cont)

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.
This EAL addresses an actual or substantial potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in RU1 and RA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases are not to be prorated or averaged. For example, a release exceeding 600 times ODCM for 5 minutes does not meet the threshold

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

Threshold #1 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the IC established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

The effluent monitors listed are those normally used for planned discharges. If a discharge is performed using a different flowpath or effluent monitor other than those listed (e.g., a portable or temporary effluent monitor), then the declaration criteria will be based on the monitor specified in the Discharge Permit.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA1 (cont)

Basis (cont):

Threshold #2 Basis:

This threshold is intended for effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

Threshold #3 Basis:

This threshold addresses uncontrolled releases that are detected by sample analyses, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

Basis: (References)

1. L-S-43 Radiation Monitoring System
2. ARC-BOP-0AC304 C1 Liquid Radwaste Discharge Rad Monitor Hi Hi
3. ARC-MCR-109 A2 1 Service Water Rad Monitor Hi-Hi
4. ARC-MCR-011 C-4 RHRSW Rad Monitor Hi-Hi
5. ARC-MCR-003 E1 North Stack Hi-Hi Radiation
6. ARC-MCR-003 F1 Units 1&2 South Stack Hi-Hi Radiation
7. NEI 99-01, Rev. 5 AA1
8. LGS ODCM
9. EP-EAL-0608, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values, Limerick Generating Station

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU1

Initiating Condition

Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Value

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **2 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 60 minutes**.

   - Radwaste Discharge effluent monitor (RR63-0R001)

     OR

   - Discharge Permit specified monitor

   OR

2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 60 minutes**.

Table R1– Effluent Monitor Thresholds	
Release Path	**Unusual Event**
North Stack (WR Monitor: RIX-26-076-4)	2.20 E+04 μCi/sec
South Stack (Unit 1: RY26-185A-3 / RY26-185-B-3 or Unit 2: RY26-285A-3 / RY26-285-B-3)	3.09 E-05 μCi/cc

OR

3. Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes.**

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU1 (cont)

Basis (cont):

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses a potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in RU1 and RA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases are not to be prorated or averaged. For example, a release exceeding 4 times ODCM for 30 minutes does not meet the threshold.

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

Threshold #1 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

The effluent monitors listed are those normally used for planned discharges. If a discharge is performed using a different flowpath or effluent monitor other than those listed (e.g., a portable or temporary effluent monitor), then the declaration criteria will be based on the monitor specified in the Discharge Permit.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU1 (cont)

Basis (cont):

Threshold #2 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL.

This threshold is intended for effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

Threshold #3 Basis:

This threshold addresses uncontrolled releases that are detected by sample analyses, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

Basis: (References)

1. L-S-43 Radiation Monitoring System
2. ARC-BOP-0AC304 C1 Liquid Radwaste Discharge Rad Monitor Hi Hi
3. ARC-MCR-109 A2 1 Service Water Rad Monitor Hi-Hi
4. ARC-MCR-011 C-4 RHRSW Rad Monitor Hi-Hi
5. ARC-MCR-003 E1 North Stack Hi-Hi Radiation
6. ARC-MCR-003 F1 Units 1&2 South Stack Hi-Hi Radiation
7. LGS ODCM
8. NEI 99-01, Rev. 5 AU1
9. EP-EAL-0608, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values, Limerick Generating Station

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA2

Initiating Condition

Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values

1. VALID reading **> 1000 mR/hr** on any Table R2 Radiation Monitor due to **EITHER**:

   - Damaged irradiated fuel.

   OR

   - Water level drop.

Table R2 - Refuel Floor ARMs
• RIS29-M1-1(2)K600, Drywell Head Laydown
• RIS30-M1-1(2)K600, Dryer / Separator Area
• RIS31-M1-1(2)K600, Spent Fuel Pool
• RIS32-M1-1(2)K600, New Fuel Storage Vault
• RIS33-M1-1(2)K600, Pool Plug Laydown

   OR

2. Water level drop in the Reactor Refueling Cavity or Spent Fuel Pool that will result in irradiated fuel becoming uncovered.

Basis

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA2 (cont)

Basis (cont)

This EAL addresses increases in radiation dose rates within plant buildings, and may be a precursor to a radioactivity release to the environment. These events represent a loss of control over radioactive material and represent an actual or substantial potential degradation in the level of safety of the plant.

These events escalate from RU2 in that fuel activity has been released, or is anticipated due to fuel heatup. This EAL applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage.

Threshold #1 Basis:

This EAL addresses radiation monitor indications of fuel uncovery and/or fuel damage.

Uncovering spent fuel represents a substantial degradation of the level of safety of the plant and warrants an Alert classification. Visual observation of spent fuel uncovery represents a major ALARA concern in that radiation levels could exceed 10,000 R/hr on the refuel bridge when fuel uncovery begins. The value of 1000 mR/hr was conservatively chosen for classification purposes.

Radiation monitor readings are used to provide indication of fuel uncovery and/or fuel damage. High monitor readings associated with the transfer or relocation of a source, stored in or near the pool or readings responding to a planned evolution such as removal of the reactor head or equipment relocation are not classified under this threshold since the reading would not be indicative of fuel uncovery and/or fuel damage.

Dropping heavy loads onto the spent fuel can cause significant damage to the spent fuel and an Alert is also warranted under these conditions provided that the above radiation monitor threshold readings are reached.

Escalation of this emergency classification level, if appropriate, would be based on RS1 or RG1.

Threshold #2 Basis:

Once Spent Fuel Pool water level drops below the low level alarm setpoint, further drops can be monitored only by visual observation unless the Spent Fuel Pool is in communication with the Refueling Cavity.

If available, video cameras may allow remote observation. Depending on available level instrumentation, the declaration threshold may need to be based on indications of water makeup rate.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA2 (cont)

Basis Reference(s):

1. ON-120 Fuel Handling Problems
2. DBD L-S-43, Radiation Monitoring System
3. ARC MCR 112-I5 Fuel Pool Storage Hi/Lo Level
4. DBD L-S-16, Reactor Instrumentation System (RIS)
5. DBD L-S-52, Fuel Pool Cooling and Cleanup System
6. NEI 99-01, Rev. 5 AA2

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU2

Initiating Condition

UNPLANNED rise in plant radiation levels.

Operating Mode Applicability

1, 2, 3, 4, 5, D

EAL Threshold Value

1. a. UNPLANNED water level drop in the reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by:

   - Refueling Cavity water level **< 484 inches**.

     OR

   - Spent Fuel Pool level is **< 22 feet** above seated irradiated fuel.

     OR

   - Report of visual observation of a drop in water level in the Reactor Refueling Cavity, Spent Fuel Pool or Fuel Transfer Canal.

   AND

   b. VALID Area Radiation Monitor reading rise on one or more radiation monitor in Table R2.

Table R2 - Refuel Floor ARMs
• RIS29-M1-1(2)K600, Drywell Head Laydown
• RIS30-M1-1(2)K600, Dryer / Separator Area
• RIS31-M1-1(2)K600, Spent Fuel Pool
• RIS32-M1-1(2)K600, New Fuel Storage Vault
• RIS33-M1-1(2)K600, Pool Plug Laydown

OR

2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU2 (cont)

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

NORMAL LEVELS: Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

This EAL addresses increased radiation levels as a result of water level decreases above irradiated fuel or events that have resulted, or may result, in UNPLANNED increases in radiation dose rates within plant buildings. These radiation increases represent a loss of control over radioactive material and represent a potential degradation in the level of safety of the plant.

Threshold #1 Basis:

Level indications may include installed or temporary water level instrumentation. If available, video cameras may allow remote observation for determining water level changes.

This EAL addresses unplanned lowering of level in the refueling pathway and a corresponding rise in refuel floor radiation readings. For events in Refuel mode where the water level drops with no corresponding rise in refuel floor radiation readings classification would be via CU7. This event escalates to an Alert per RA2 if irradiated fuel outside the reactor vessel is uncovered.

Threshold #2 Basis:

This EAL addresses increases in plant radiation levels that represent a loss of control of radioactive material resulting in a potential degradation in the level of safety of the plant.

This EAL excludes radiation level increases that result from planned activities such as use of radiographic sources and movement of radioactive waste materials. A specific list of ARMs is not required, as it would restrict the applicability of the threshold. The intent is to identify loss of control of radioactive material in any monitored area. Survey results are not required for confirmation of area radiation monitor readings but are applicable to areas where area radiation monitors do not have sufficient range to indicate a rise by a factor of 1000 over NORMAL LEVELS.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU2 (cont)

Basis (References)

1. ON-120 Fuel Handling Problems
2. DBD L-S-16, Reactor Instrumentation System (RIS)
3. DBD L-S-52, Fuel Pool Cooling and Cleanup System
4. ARC MCR 112-I5 Fuel Pool Storage Hi/Lo Level
5. Technical Specification 3.9.8
6. GP-6.1 U/1(2) Shutdown Operations - Refuel Core Alterations & Core Off-loading
7. NEI 99-01, Rev. 5 AU2

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA3

Initiating Condition

Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values

Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R3) to maintain plant safety functions.

Table R3 - Areas Requiring Continuous Occupancy
• Main Control Room • Central Alarm Station (by survey)

Basis

This EAL addresses increased radiation levels that impact continued operation in areas requiring continuous occupancy to maintain safe operation or to perform a safe shutdown.

The cause and/or magnitude of the increase in radiation levels is not a concern of this EAL. The Emergency Director must consider the source or cause of the increased radiation levels and determine if any other EAL may be involved.

Areas requiring continuous occupancy include Main Control Room and the Central Alarm Station (CAS).

Basis (References):

1. DBD L-S-43, Radiation Monitoring System
2. UFSAR Table 7.7-2, Locations for Area Radiation Monitoring Sensors
3. SE-1 Remote Shutdown
4. SE-6 Alternate Remote Shutdown
5. SE-8 Fire
6. NEI 99-01, Rev. 5 AA3

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU3

Initiating Condition

Fuel Clad Degradation.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values

Fuel clad degradation resulting in **EITHER**:

- Air Ejector discharge radiation monitor (RISH 26 1(2)K601A, B) **Hi-Hi alarm**.

  OR

- Coolant activity **> 4.0 µCi/gm** Dose Equivalent I-131.

Basis:

This EAL is included because it is a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant.

Escalation of this EAL to the Alert level is via the Fission Product Barriers.

Threshold #1 Basis:

Conditions that cause the monitor to alarm that are not related to fuel clad degradation should not result in the declaration of an Unusual Event.

This threshold addresses site-specific radiation monitor readings that provide indication of a degradation of fuel clad integrity.

Threshold #2 Basis:

An Unusual Event is only warranted when actual fuel clad damage is the cause of the elevated coolant sample (as determined by laboratory confirmation). Fuel clad damage should be assumed to be the cause of elevated Reactor Coolant activity unless another cause is known.

This threshold addresses coolant samples exceeding coolant technical specifications for transient iodine spiking limits.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU3 (cont)

Basis (References)

1. Technical Specification 3.4.5, Specific Activity
2. Technical Specification 3.4.5 Bases
3. UFSAR Table 11.5-1, Process and Effluent Radiation Monitoring Systems
4. DBD L-S-43, Radiation Monitoring System
5. ARC MCR 109-G1, Air Ejector Offgas Discharge HI-HI Radiation
6. NEI 99-01, Rev. 5 SU4

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FG1

Initiating Condition

Loss of ANY Two Barriers AND Loss or Potential Loss of Third Barrier.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss Threshold Values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the General Emergency classification level each barrier is weighted equally.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FS1

Initiating Condition

Loss or Potential Loss of ANY Two Barriers.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss Threshold Values to determine barrier status.

Basis

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the Site Area Emergency classification level, each barrier is weighted equally.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FA1

Initiating Condition

ANY Loss or ANY Potential Loss of EITHER Fuel Clad OR RCS.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss Threshold Values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the Alert classification level, Fuel Cladding and RCS barriers are weighted more heavily than the Containment barrier. Unlike the Containment barrier, loss or potential loss of either the Fuel Cladding or RCS barrier may result in the relocation of radioactive materials or degradation of core cooling capability. Note that the loss or potential loss of Containment barrier in combination with loss or potential loss of either Fuel Cladding or RCS barrier results in declaration of a Site Area Emergency under EAL FS1.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FU1

Initiating Condition

ANY Loss or ANY Potential Loss of Containment.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss Threshold Values to determine barrier status.

Basis:

The Primary Containment Barrier includes the drywell, respective interconnecting paths, and other connections up to and including the outermost containment isolation valves. Containment Barrier thresholds are used primarily as discriminators for escalation from an Alert to a Site Area Emergency or a General Emergency.

The Containment Barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (i.e., Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment Barrier status is addressed by Technical Specifications.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FC1

Initiating Condition

Primary Coolant Activity Level

Operating Mode Applicability:

1, 2, 3

EAL Threshold Value

LOSS:

Coolant Activity **> 300 µCi/gm** Dose Equivalent I-131.

Basis:

300 uCi/gm Dose Equivalent I-131 is well above that expected for iodine spikes and corresponds to less than 5% fuel clad damage. This amount of radioactivity indicates significant clad damage and thus the Fuel Clad Barrier is considered lost.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FC2

Initiating Condition

Reactor Vessel Water Level

Operating Mode Applicability:

1, 2, 3

EAL Threshold Value

LOSS:

1. RPV level **cannot** be restored and maintained **> - 186 inches**

POTENTIAL LOSS:

2. RPV level **cannot** be restored and maintained **> - 161 inches**

OR

3. RPV level **cannot** be determined.

Basis:

Determination of “restore and maintained” is based on the actions driven by Emergency Operating Procedures to restore level. The inability to reverse the RPV level lowering trend after lining up injection sources and injecting, including the use of low pressure systems following an Emergency Depressurization would warrant classification.

Loss Threshold #1 Basis:

This corresponds to the level used in EOPs to indicate challenge of core cooling.

Potential Loss Thresholds #2 and #3 Basis:

This threshold is the same as the RCS barrier Loss threshold and corresponds to the water level at the top of the active fuel. Thus, this threshold indicates a Potential Loss of the Fuel Clad barrier and a Loss of RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

Entry into the "Steam Cooling" leg of the Emergency Operating Procedures would be an example of an inability to "restore and maintain" level above TAF resulting in this threshold being met.

Since the loss of ability to determine if adequate core cooling is being provided presents a significant challenge to the fuel clad barrier, a potential loss of the fuel clad barrier is specified.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FC2 (cont)

Basis Reference(s):

1. T-111 Level Restoration / Steam Cooling- BASES
2. T-117 Level/Power Control - BASES
3. NEI 99-01, Rev. 5 Table 5-F-2

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FC5

Initiating Condition

Primary Containment Radiation Monitoring

Operating Mode Applicability:

1, 2, 3

EAL Threshold Value

LOSS:

Drywell radiation monitor reading **> 1.90 E+02 R/hr**.

Basis:

The Drywell radiation monitor reading is a value, which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the drywell.

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 Loss threshold. Thus, this threshold indicates a loss of both Fuel Clad barrier and RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. Core Damage Assessment Methodology (CDAM)
2. Technical Specifications Table 3.3.7.5-1, Accident Monitoring Instrumentation
3. DBD L-S-43, Radiation Monitoring System
4. ST-2-026-418-1 Accident Monitoring – Primary Containment Post - LOCA Radiation Division III Calibration (RE-26-191A)
5. ST-0-026-640-* Alternate Monitoring for Inop Post-LOCA Radiation Monitors
6. NEI 99-01, Rev. 5 Table 5-F-2

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FC7

Initiating Condition

Emergency Director Judgment

Operating Mode Applicability:

1, 2, 3

EAL Threshold Value

LOSS:

1. Any condition in the opinion of the Emergency Director that indicates a Loss of the Fuel Clad Barrier.

POTENTIAL LOSS:

2. Any condition in the opinion of the Emergency Director that indicates a Potential Loss of the Fuel Clad Barrier.

Basis:

These thresholds address 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 threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC2

Initiating Condition

Reactor Vessel Water Level

Operating Mode Applicability

1, 2, 3

EAL Threshold Value

LOSS:

1. RPV level **cannot** be restored and maintained **> - 161 inches**

   OR

2. RPV level **cannot** be determined.

Basis:

Determination of “restore and maintained” is based on the actions driven by Emergency Operating Procedures to restore level. The inability to reverse the RPV level lowering trend after lining up injection sources and injecting, including the use of low pressure systems following an Emergency Depressurization would warrant classification.

This threshold is the same as Fuel Clad Barrier Potential Loss threshold and corresponds to a challenge to core cooling. Thus, this threshold indicates a Loss of RCS barrier and Potential Loss of Fuel Clad barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

Entry into the "Steam Cooling" leg of the Emergency Operating Procedures would be an example of an inability to "restore and maintain" level above TAF resulting in this threshold being met.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. T-BAS, TRIPS / SAMPS - Bases
2. T 101, RPV Control
3. T-111, Level Restoration / Steam Cooling
4. NEI 99-01, Rev. 5 Table 5-F-2

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC3

Initiating Condition

Primary Containment Conditions

Operating Mode Applicability

1, 2, 3

EAL Threshold Value

LOSS:

1. Drywell pressure **> 1.68 psig.**

   AND

2. Drywell pressure rise due to RCS leakage.

Basis:

The primary containment pressure is based on the drywell high pressure set point which indicates a LOCA by automatically initiating ECCS.

The second threshold focuses the fission product barrier loss threshold on a failure of the RCS instead of the non-LOCA malfunctions that may adversely affect primary containment pressure. Pressures of this magnitude can be caused by non-LOCA events such as a loss of drywell cooling or inability to control primary containment vent/purge.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. T-101 RPV Control
2. T-102 Primary Containment Control - Bases
3. NEI 99-01, Rev. 5 Table 5-F-2

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC4

Initiating Condition

RCS Leak Rate

Operating Mode Applicability

1, 2, 3

EAL Threshold Value

LOSS:

1. UNISOLABLE Main Steam Line (MSL), HPCI, Feedwater, RWCU or RCIC line break.

   OR

2. Emergency RPV Depressurization is required.

POTENTIAL LOSS:

3. RCS leakage **> 50 gpm** inside the Drywell.

   OR

4. UNISOLABLE primary system leakage outside drywell resulting in **EITHER:**

   - Secondary Containment area temperatures **> T-103 / SAMP, Max Norm Op Value (MNO)**.

     OR

   - Secondary Containment area radiation levels **> T-103 / SAMP, Max Norm Op Value (MNO)**.

Basis:

UNISOLABLE – is a breach or leak that cannot be promptly isolated.

Promptly allows for actions to be taken to isolate the leak. Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC4 (cont)

Basis (cont)

Classification of a system break over system leakage is based on information available to the Control Room from the event. Indications that should be considered are:

- Reports describing magnitude of steam or water release.
- Use of system high flow alarms / indications, if available,
- Significant changes in makeup requirements,
- Abnormal reactor water level changes in response to the event.

The use of the above indications provides the Control Room the bases to determine that the on going event is more significant than the indications that would be expected from system leakage and therefore should be considered a system break.

Loss Thresholds #1 Basis:

An UNISOLABLE MSL break is a breach of the RCS barrier. Thus, this threshold is included for consistency with the Alert emergency classification level.

Other large high-energy line breaks such as HPCI, Feedwater, RWCU, or RCIC that are UNISOLABLE also represent a significant loss of the RCS barrier and should be considered for purposes of classification.

Loss Thresholds #2 Basis:

Plant symptoms requiring Emergency RPV Depressurization per the EOPs are indicative of a loss of the RCS barrier. If Emergency RPV depressurization is required, the plant operators are directed to open safety relief valves (SRVs) and keep them open. Even though the RCS is being vented into the suppression pool, a loss of the RCS should be considered to exist due to the diminished effectiveness of the RCS pressure barrier to a release of fission products beyond its boundary.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC4 (cont)

Basis (cont)

Potential Loss Threshold #3 Basis:

This threshold is based on leakage 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 uncovery is not a significant concern for a 50 gpm leak, however, break propagation leading to significantly larger loss of inventory is possible.

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.

If primary system leak rate information is unavailable, other indicators of RCS leakage should be used.

Potential Loss Threshold #4 Basis:

Potential loss of RCS based on primary system leakage outside the primary containment is determined from site specific temperature or area radiation Maximum Normal setpoints in the areas of the main steam line tunnel, main turbine generator, RCIC, HPCI, etc., which indicate a direct path from the RCS to areas outside primary containment.

The indicators reaching the threshold values and confirmed to be caused by unisolable RCS leakage warrant an Alert classification. An unisolable leak which is indicated by a Maximum Safe setpoint escalates to a Site Area Emergency when combined with Containment Barrier Loss threshold (after a containment isolation) and a General Emergency when the Fuel Clad Barrier criteria is also exceeded.

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 Enclosure 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 Enclosure, an unexpected rise in Feedwater flowrate, or unexpected Main Turbine Control Valve closure) may indicate that a primary system is discharging into the Reactor Enclosure.

Basis Reference(s):

1. T-103, Secondary Containment Control
2. NEI 99-01, Rev. 5 Table 5-F-2
3. SAMP-2, Containment and Radioactivity Release Control

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC5

Initiating Condition

Primary Containment Radiation Monitoring

Operating Mode Applicability

1, 2, 3

EAL Threshold Value

LOSS:

Drywell radiation monitor reading **> 100 R/hr**.

Basis:

The Drywell Radiation monitor reading is a value, which indicates the release of reactor coolant to the primary containment.

This reading is less than that specified for Fuel Clad barrier Loss. Thus, this threshold would be indicative of a RCS leak only. If the radiation monitor reading increased to that value specified by Fuel Clad Barrier threshold, fuel damage would also be indicated.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. EP-EAL-0611, Criteria for Choosing Containment Radiation Monitor Reading Indicative of Loss of RCS Barrier
2. NEI 99-01, Rev. 5 Table 5-F-2

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC7

Initiating Condition

Emergency Director Judgment

Operating Mode Applicability

1, 2, 3

EAL Threshold Value

LOSS

1. Any condition in the opinion of the Emergency Director that Indicates a Loss of the Reactor Coolant System Barrier.

POTENTIAL LOSS

2. Any condition in the opinion of the Emergency Director that Indicates a Potential Loss of the Reactor Coolant System Barrier.

Basis:

These thresholds address 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 threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT2

Initiating Condition

Reactor Vessel Water Level

Operating Mode Applicability

1, 2, 3

EAL Threshold Value

POTENTIAL LOSS:

Plant conditions indicate that Primary containment flooding is required.

Basis:

There is no Loss threshold associated with this item.

The potential loss requirement for Primary Containment Flooding indicates adequate core cooling cannot be established and maintained and that core melt is possible. Entry into Severe Accident Management Procedures is a logical escalation in response to the inability to maintain adequate core cooling.

The condition in this potential loss threshold represents a potential core melt sequence which, if not corrected, could lead to vessel failure and increased potential for containment failure. In conjunction with Reactor Vessel water level “Loss” thresholds in the Fuel Clad and RCS barrier columns, this threshold will result in the declaration of a General Emergency -- loss of two barriers and the potential loss of a third.

Basis Reference(s):

1. T-BAS (INTRO) Introduction To Trips And Samps - Bases
2. T-111, Level Restoration / Steam Cooling - Bases
3. T-116, RPV Flooding - Bases
4. T-117, Level/Power Control – Bases
5. NEI 99-01, Rev. 5 Table 5-F-2

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT3

Initiating Condition

Primary Containment Conditions

Operating Mode Applicability

1, 2, 3

EAL Threshold Value

LOSS:

1. Rapid unexplained drop in Drywell pressure following an initial pressure rise.

   OR

2. Drywell pressure response **not** consistent with LOCA conditions.

POTENTIAL LOSS:

3 Drywell pressure **> 55 psig** and rising.

OR

4. a. Drywell or Suppression Pool Hydrogen concentration **> 6%.**

   AND

   b. Drywell or Suppression Pool Oxygen concentration **> 5%.**

   OR

5. Heat Capacity Temperature Limit (T-102 Curve SP/T-1) exceeded.

Basis

Loss Threshold #1 and #2 Basis

Rapid unexplained drop in pressure (i.e., not attributable to drywell spray or condensation effects) following an initial pressure rise from a high energy line break indicates a loss of containment integrity. Primary containment pressure should rise as a result of mass and energy release into containment from a LOCA. Thus, primary containment pressure not rising under these conditions indicates a loss of containment integrity.

This indicator relies on operator recognition of an unexpected response for the condition and therefore does not have a specific value associated with it. The unexpected response is important because it is the indicator for a containment breach condition.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT3 (cont)

Basis: (cont)

Potential Loss Threshold #3 Basis:

Drywell pressure is based on the primary containment design pressure.

Potential Loss Threshold #4 Basis:

Explosive mixtures in the primary containment are assumed to be elevated concentrations of hydrogen and oxygen.

Potential Loss Threshold #5 Basis:

The Heat Capacity Limit is a function of RPV pressure and suppression pool water level. It is utilized to preclude failure of the containment and equipment in the containment necessary for the safe shutdown of the plant and therefore, the inability to maintain plant parameters below the limit constitutes a potential loss of containment.

Basis Reference(s):

1. UFSAR Section 6.2.1
2. DBD L-T-12, Design Basis Accidents, Transients and Events
3. DBD L-S-25A, Primary Containment Pressure Suppression System
4. DBD L-T-02, Containment, Section 3.2.14
5. T-102 Primary Containment Control - Bases
6. NEI 99-01, Rev. 5 Table 5-F-2

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT5

Initiating Condition

Primary Containment Radiation Monitoring

Operating Mode Applicability

1, 2, 3

EAL Threshold Value

POTENTIAL LOSS:

Drywell radiation monitor reading **> 4.35 E+02 R/hr.**

Basis

The Drywell radiation monitor reading is a value that indicates significant fuel damage well in excess of that required for loss of RCS and Fuel Clad.

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.

There is no Loss threshold associated with this item.

Basis Reference(s):

1. Core Damage Assessment Methodology (CDAM)
2. Technical Specifications Table 3.3.7.5-1
3. DBD L-S-43, Radiation Monitoring System
4. ST-2-026-418-1 Accident Monitoring – Primary Containment Post - LOCA Radiation Division III Calibration (RE-26-191A)
5. ST-0-026-640-* Alternate Monitoring for Inop Post-LOCA Radiation Monitors
6. NEI 99-01, Rev. 5 Table 5-F-2

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT6

Initiating Condition

Primary Containment Isolation Failure or Bypass

Operating Mode Applicability

1, 2, 3

EAL Threshold Value

LOSS:

1. a. Failure of isolation valves in any one line to close.

   AND

   b. Direct downstream pathway to the environment exists after a primary containment isolation signal.

   OR

2. Intentional venting/purging of Primary Containment per TRIPs or SAMPs due to accident conditions.

   OR

3. UNISOLABLE primary system leakage outside of drywell resulting in **EITHER:**

   - Secondary Containment area temperatures **> T-103 / SAMP Max Safe Op Value (MSO)**.

     OR

   - Secondary Containment area radiation levels **> T-103 / SAMP Max Safe Op Value (MSO)**.

Basis:

UNISOLABLE – is a breach or leak that cannot be promptly isolated.

Promptly allows for actions to be taken to isolate the leak. Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

These thresholds address incomplete containment isolation that allows direct release to the environment.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT6 (cont)

Basis: (cont)

Loss Threshold #1 Basis

This threshold addresses failure of open isolation devices, which should close upon receipt of a manual or automatic containment isolation signal resulting in a significant radiological release pathway to the environment. The concern is the unisolable open pathway to the environment. A failure of the ability to isolate any one line indicates a breach of primary containment integrity.

Failure of containment isolation valves to isolate with a downstream pathway to the environment following an automatic or manual isolation signal is only a concern during an event requiring mitigation by the Primary Containment barrier. If this condition exists during normal Power Operation, a Technical Specification Action Statement will address it. However, during events requiring Primary Containment integrity, this will represent a breach of Primary Containment.

The use of the modifier “direct” in defining the release path discriminates against release paths through interfacing liquid systems. The existence of an in–line charcoal filter does not make a release path indirect since the filter is not effective at removing fission product noble gases. Typical filters have an efficiency of 95-99% removal of iodine. Given the magnitude of the core inventory of iodine, significant releases could still occur. In addition, since the fission product release would be driven by boiling in the reactor vessel, the high humidity in the release stream can be expected to render the filters ineffective in a short period.

Leakage into a closed system is to be considered only if the closed system is breached and thereby creates a significant pathway to the environment. Examples include unisolable Main Steamline, HPCI or RCIC steamline breaks, unisolable RWCU system breaks, and unisloable containment atmosphere vent paths. Minor release paths such as instrument and sample lines are not considered under this threshold.

Examples of “downstream pathway to the Environment” could be through Turbine/Condenser, or direct release to the Turbine or Reactor Building.

Loss Threshold #2 Basis:

EOPs may direct containment isolation valve logic(s) to be intentionally bypassed, regardless of radioactivity release rates. Under these conditions with a valid containment isolation signal, the containment should also be considered lost if containment venting is actually performed.

Intentional venting of primary containment for primary containment pressure or combustible gas control per EOPs to the secondary containment and/or the environment is considered a loss of containment. Containment venting for pressure control when not in an accident situation should not be considered.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT6 (cont)

Basis: (cont)

Loss Threshold #3 Basis:

The presence of area radiation or temperature above Maximum Safe Operating setpoints indicating unisolable primary system leakage outside the primary containment are addressed after a containment isolation. The indicators should be confirmed to be caused by RCS 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 Enclosure 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 Enclosure, an unexpected rise in Feedwater flowrate, or unexpected Main Turbine Control Valve closure) may indicate that a primary system is discharging into the Reactor Enclosure.

There is no Potential Loss threshold associated with this item.

Basis References:

1. T-103, Secondary Containment Control
2. T-102, Primary Containment Control
3. T-200, Primary Containment Emergency Vent Procedure
4. T-228, Inerting / Purging Primary Containment
5. NEI 99-01, Rev. 5 Table 5-F-2
6. SAMP-2, Containment and Radioactivity Release Control

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT7

Initiating Condition

Emergency Director Judgment

Operating Mode Applicability

1, 2, 3

EAL Threshold Value

LOSS:

1. Any condition in the opinion of the Emergency Director that indicates a Loss of the Primary Containment Barrier.

POTENTIAL LOSS:

2. Any condition in the opinion of the Emergency Director that indicates a Potential Loss of the Primary Containment Barrier.

Basis:

These thresholds address any other factors that are to be used by the Emergency Director in determining whether the Containment barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

The Containment barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment barrier status is addressed by Technical Specifications.

Basis References:

1. NEI 99-01, Rev. 5 Table 5-F-2

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG1

Initiating Condition

Prolonged loss of all Off-Site and all On-Site AC power to emergency busses.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to unit 4 KV Safeguards Buses.

   AND

2. Failure of D11(21), D12(22), D13(23), and D14(24) Emergency Diesel Generators to supply power to unit 4 KV Safeguard buses.

   AND

3. a. Restoration of at least one unit 4KV Safeguard Bus in **< 2 hours** is **not** likely.

      OR

   b. RPV level **cannot** be determined to be **> - 161 inches.**

Basis:

Loss of all AC power to emergency busses 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 to emergency busses will lead to loss of fuel clad, RCS, and containment, thus warranting declaration of a General Emergency.

This EAL is specified to assure that in the unlikely event of a prolonged station blackout, timely recognition of the seriousness of the event occurs and that declaration of a General Emergency occurs as early as is appropriate, based on a reasonable assessment of the event trajectory.

The likelihood of restoring at least one emergency bus should be based on a realistic appraisal of the situation since a delay in an event classification escalation decision based on only a chance of mitigating the event could result in a loss of valuable time in preparing and implementing public protective actions.

In addition, under these conditions, fission product barrier monitoring capability may be degraded.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG1 (cont)

Basis References:

1. UFSAR Section 8.2, Offsite Power System
2. E 10/20 Loss of Offsite Power
3. DBD L-S-05, 4KV System
4. DBD L-T-03, Electrical Issues
5. T-101 RPV Control
6. NEI 99-01, Rev. 5 SG1

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS1

Initiating Condition

Loss of all Off-Site and all On-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to unit 4 KV Safeguards Buses.

   AND

2. Failure of D11(21), D12(22), D13(23), and D14(24) Emergency Diesel Generators to supply power to unit 4 KV Safeguard buses.

   AND

3. Failure to restore power to at least one unit 4KV Safeguard Bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.

Basis:

Loss of all AC power to emergency busses 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 to emergency busses will lead to loss of Fuel Clad, RCS, and Containment, thus this event can escalate to a General Emergency.

Fifteen minutes was selected as a threshold to exclude momentary losses of off-site power.

Escalation to General Emergency is via Fission Product Barrier Degradation or MG1, "Prolonged Loss of All Off-site Power and Prolonged Loss of All On-site AC Power."

Basis Reference(s)

1. UFSAR Section 8.2
2. E 10-20 Loss of Offsite Power
3. DBD L-S-05, 4KV System
4. DBD L-T-03, Electrical Issues
5. T-101 RPV Control
6. NEI 99-01, Rev. 5 SS1

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA1

Initiating Condition

AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. AC power capability to unit 4KV Safeguard Buses reduced to only one of the following sources for **≥ 15 minutes**.
    - 101 Safeguard Transformer
    - 201 Safeguard Transformer
    - D11(21) Diesel Generator
    - D12(22) Diesel Generator
    - D13(23) Diesel Generator
    - D14(24) Diesel Generator

    AND

2. Any additional single power source failure will result in a unit blackout.

Basis:

Capability: (pertaining to electrical power supplies) is equipment that is available to provide and maintain AC power at the required voltage and frequency for the required load.

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. Another related condition could be the loss of all off-site power and loss of on-site emergency generators with only one train of emergency busses being backfed from the unit main generator, or the loss of on-site emergency generators with only one train of emergency busses being backfed from off-site power. The subsequent loss of this single power source would escalate the event to a Site Area Emergency in accordance with MS1.

Fifteen minutes was selected as a threshold to exclude momentary losses of power.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA1 (cont)

Basis References:

1. UFSAR Section 8.2
2. E 10-20 Loss of Offsite Power
3. DBD L-S-05, 4KV System
4. DBD L-T-03, Electrical Issues
5. NEI 99-01, Rev. 5 SA5

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU1

Initiating Condition

Loss of all Off-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of all off-site AC power to unit 4 KV Safeguards Buses for **≥ 15 minutes**.

Basis:

Prolonged loss of off-site 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 to emergency busses.

Fifteen minutes was selected as a threshold to exclude momentary losses of off-site power.

Basis Reference(s):

1. UFSAR Section 8.2
2. E 10-20 Loss of Offsite Power
3. DBD L-S-05, 4KV System
4. DBD L-T-03, Electrical Issues
5. NEI 99-01, Rev. 5 SU1

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG2

Initiating Condition

Automatic Scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic scram was **not** successful as indicated by Reactor Power **> 4%.**

   AND

2. Manual scram/ARI actions were **not** successful as indicated by Reactor Power **> 4%.**

   AND

3. **EITHER** of the following exists:

   - RPV level **cannot** be restored and maintained **> - 186 inches**.

     OR

   - Heat Capacity Temperature Limit (T-102 Curve SP/T-1) exceeded.

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful.

The third condition of this EAL indicates an extreme challenge to the ability to cool the core as indicated when RPV level cannot be restored and maintained above the Minimum Steam Cooling RPV Water Level or a challenge to Containment for energy transfer from the RPV as indicated by exceeding the Heat Capacity Limit. RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the SAMG program.

In the event either of these challenges exists at a time that the reactor has not been brought below the power associated with the safety system design a core melt sequence exists. In this situation, core degradation can occur rapidly. For this reason, the General Emergency declaration is intended to be anticipatory of the fission product barrier table declaration to permit maximum off-site intervention time.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG2 (cont)

Basis: (cont)

Determination of “restore and maintained” is based on the actions driven by Emergency Operating Procedures to restore level. The inability to reverse the RPV level lowering trend after lining up injection sources and injecting, including the use of low pressure systems following an Emergency Depressurization would warrant classification.

Basis Reference(s):

1. T-101 RPV Control - Bases
2. T-117 Level/Power Control - Bases
3. T-102 Primary Containment Control - Bases
4. NEI 99-01, Rev. 5 SG2

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS2

Initiating Condition

Automatic Scram fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic scram was **not** successful as indicated by Reactor Power **> 4%.**

   AND

2. Manual scram/ARI actions were **not** successful from the Reactor Console as indicated by Reactor Power **> 4%.**

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful. A Site Area Emergency is warranted because conditions exist that lead to IMMINENT loss or potential loss of both fuel clad and RCS.

Manual actions taken at the reactor control console are any set of actions by the reactor operator(s) at which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

Manual actions are not considered successful if action away from the reactor control console is required to scram the reactor. This EAL is still applicable even if actions taken away from the reactor control console are successful in shutting the reactor down because the design limits of the fuel may have been exceeded or because of the gross failure of the Reactor Protection System to shutdown the plant.

Escalation of this event to a General Emergency would be due to a prolonged condition leading to an extreme challenge to either core-cooling or heat removal.

Basis Reference(s):

1. T-101 RPV Control
2. T-117 Level/Power Control
3. NEI 99-01, Rev. 5 SS2

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA2

Initiating Condition

Automatic Scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic scram was **not** successful as indicated by Reactor Power **> 4%.**

   AND

2. Manual scram/ARI actions were successful from Reactor Console as indicated by Reactor Power **≤ 4%.**

Basis:

Manual actions taken at the reactor control console are any set of actions by the reactor operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

This condition indicates failure of the automatic protection system to scram the reactor in response to exceeding reactor protective system setpoints during a plant transient. Associated RPS instrument failures during non-transient plant conditions would be addressed by Technical Specifications. This condition is more than a potential degradation of a safety system in that a front line automatic protection system did not function in response to a plant transient. Thus the plant safety has been compromised because design limits of the fuel may have been exceeded. An Alert is indicated because conditions may exist that lead to potential loss of fuel clad or RCS and because of the failure of the Reactor Protection System to automatically shutdown the plant.

If manual actions taken at the reactor control console fail to shutdown the reactor, the event would escalate to a Site Area Emergency.

Basis Reference(s):

1. T-101 RPV Control
2. Technical Specifications Table 3.3.1.1-1
3. NEI 99-01, Rev. 5 SA2

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU2

Initiating Condition

Inadvertent Criticality.

Operating Mode Applicability:

3

EAL Threshold Values:

UNPLANNED sustained positive period observed on nuclear instrumentation.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL addresses inadvertent criticality events. This EAL excludes inadvertent criticalities that occur during planned reactivity changes associated with reactor startups (e.g., criticality earlier than estimated). This condition can be identified using period monitors. The term “sustained“ is used in order to allow exclusion of expected short term positive periods from planned control rod movements. Escalation would be by the Fission Product Barrier.

This EAL indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification.

Basis Reference(s):

1. DBD L-S-20, Neutron Monitoring System
2. ARC-MCR-*07 F4 SRM Period
3. NEI 99-01, Rev. 5 SU8

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS3

Initiating Condition

Loss of all vital DC power for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of all vital DC power based on **< 105 VDC** on unit 125 VDC battery busses 1(2)FA, B, C, and D for **≥ 15 minutes**.

Basis:

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power will cause core uncovering and loss of containment integrity when there is significant decay heat and sensible heat in the reactor system.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Escalation to a General Emergency would occur by Abnormal Rad Levels/Radiological Effluent, Fission Product Barrier Degradation.

Basis Reference(s):

1. UFSAR section 8.3.2, DC Power Systems
2. DBD P-L-01A, 125/250 VDC System
3. E-1(2)FA Loss of Division I Safeguard 125/250V DC BUS 1FA
4. E-1(2)FB Loss of Division II Safeguard 125/250V DC BUS 1FB
5. E-1(2)FC Loss of Division III Safeguard 125/250V DC BUS 1FC
6. E-1(2)FD Loss of Division IV Safeguard 125/250V DC BUS 1FD
7. NEI 99-01, Rev. 5 SS3

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS4

Initiating Condition

Inability to Monitor a SIGNIFICANT TRANSIENT in Progress.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**
   - Safety System annunciators (Table M1)

     OR

   - Safety System indications (Table M1)

   AND

2. SIGNIFICANT TRANSIENT in progress (Table M2).

   AND

3. Compensatory indications (computer points) are unavailable.

Table M1 – Safety System
• ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring

Table M2- Significant Transients
• Turbine trip • Reactor scram • ECCS actuation • Recirc Runback >25% power change • Thermal power oscillations > 10 % Reactor Power change

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS4 (cont)

Basis:

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) Turbine Trip (2) Reactor Scram (3) ECCS Activation, (4) Recirc. Runback > 25% Reactor Power change, or (5) thermal power oscillations > 10% Reactor Power change.

This EAL is intended to recognize the threat to plant safety associated with the complete loss of capability of the control room staff to monitor plant response to a SIGNIFICANT TRANSIENT.

"Planned" and “UNPLANNED” actions are not differentiated since the loss of instrumentation of this magnitude is of such significance during a transient that the cause of the loss is not a factor.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

A Site Area Emergency is considered to exist if the control room staff cannot monitor safety systems needed for protection of the public while a significant transient is in progress.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS4 (cont)

Basis (cont):

Indications needed to monitor safety systems necessary for protection of the public must include control room indications; computer generated indications and dedicated annunciation capability. The specific parameters are those used to determine such functions as the ability to shut down the reactor, maintain the core cooled and in a coolable geometry, remove heat from the core, and maintain the reactor coolant system and primary containment.

"Compensatory indications" in this context includes computer based information. This includes all computer systems available for this use.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Basis References

1. DBD L-T-06, Human Factors, Section 6.1.1
2. T-101 RPV Control
3. T-102 Primary Containment Control
4. ON-122, Loss of Main Control Room Annunciators - Bases
5. NEI 99-01, Rev. 5 SS6

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA4

Initiating Condition

UNPLANNED Loss of safety system annunciation or indication in the control room with EITHER (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**

   - Safety System annunciators (Table M1)

     OR

   - Safety System indications (Table M1)

Table M1 – Safety System
• ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring

AND

2. a. SIGNIFICANT TRANSIENT in progress (Table M2).

Table M2 - Significant Transients
• Turbine trip • Reactor scram • ECCS actuation • Recirc Runback > 25% power change • Thermal power oscillations > 10 % Reactor Power change

OR

b. Compensatory indications (computer points) are unavailable.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA4 (cont)

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) Turbine Trip (2) Reactor Scram (3) ECCS Activation, (4) Recirc. Runback > 25% Reactor Power change, or (5) thermal power oscillations > 10% Reactor Power change

This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a SIGNIFICANT TRANSIENT.

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

"Compensatory indications" in this context includes computer based information. If both a major portion of the annunciation system and all computer monitoring are unavailable, the Alert is required.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

This Alert will be escalated to a Site Area Emergency if the operating crew cannot monitor the transient in progress due to a concurrent loss of compensatory indications with a SIGNIFICANT TRANSIENT in progress during the loss of annunciation or indication.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA4 (cont)

Basis Reference(s):

1. DBD L-T-06, Human Factors, Section 6.1.1
2. T-101 RPV Control
3. T-102 Primary Containment Control
4. ON-122, Loss of Main Control Room Annunciators - Bases
5. NEI 99-01, Rev. 5 SA4

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU4

Initiating Condition

UNPLANNED loss of safety system annunciation or indication in the control room for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**

- Safety System annunciators (Table M1)

  OR

- Safety System indications (Table M1)

Table M1 – Safety System
• ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment.

Recognition of the availability of computer based indication equipment is considered.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU4 (cont)

Basis (cont)

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

Fifteen minutes was selected as a threshold to exclude momentary power losses.

This Unusual Event will be escalated to an Alert based on a concurrent loss of compensatory indications or if a SIGNIFICANT TRANSIENT is in progress during the loss of annunciation or indication.

Basis Reference(s):

1. DBD L-T-06, Human Factors, Section 6.1.1
2. T-101 RPV Control
3. T-102 Primary Containment Control
4. ON-122, Loss of Main Control Room Annunciators - Bases
5. NEI 99-01, Rev. 5 SU3

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU5

Initiating Condition

RCS Leakage.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

1. Unidentified or pressure boundary leakage into the Drywell **> 10 gpm**.

   OR

2. Identified leakage into the Drywell **> 25 gpm**.

Basis:

This EAL is included as an Unusual Event because it may be a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified or pressure boundary leakage was selected as it is observable with normal control room indications. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances).

Relief valve operation should be excluded from this EAL.

The EAL for identified leakage is set at a higher value due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage. In either case, escalation of this EAL to the Alert level is via Fission Product Barrier.

Basis Reference(s):

1. ST-6-107-596-* Drywell Floor Drain Sump/Equipment Drain Tank Surveillance Log
2. Technical Specification 3.4.3, Reactor Coolant System Leakage
3. Technical Specifications 3.9.8, Water Level – Reactor Vessel
4. DBD L-S-34, Radwaste System
5. OT-101 High Drywell Pressure
6. T-102 Primary Containment Control, Table DW/T-1
7. GP-6.1 U/1 (U/2) Shutdown Operations – Refueling, Core Alteration and Core Off-Loading
8. DBD L-S-16, Reactor Instrumentation System (RIS)
9. NEI 99-01, Rev. 5 SU5

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU6

Initiating Condition

Loss of all On-site or Off-site communications capabilities.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

1. Loss of all Table M3 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table M3 **Offsite** communications capability affecting the ability to perform offsite notifications.

Table M3 - Communications Capability

System	Onsite	Offsite
Station Radio	X	
Plant Public Address (PA)	X	
Prelude System	X	X
Station Phones	X	X
Satellite Phones	X	X
NRC (ENS)		X
Cellular Phones		X

Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU6 (cont)

Basis Reference(s):

1. SE-12 Loss of Communications
2. UFSAR Section 9.5.2, Communication Systems
3. DBD P-L-6, Human Factors
4. NEI 99-01, Rev. 5 SU6

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU7

Initiating Condition

Inability to reach required shutdown within Technical Specification limits.

Operating Mode Applicability:

1, 2, 3

EAL Threshold Values:

Plant is **not** brought to required operating mode within Technical Specifications LCO Action Statement Time.

Basis:

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 Unusual Event is required when the plant is not brought 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.

Basis Reference(s):

1. LGS Technical Specifications
2. NEI 99-01, Rev. 5 SU2

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA1

Initiating Condition

Loss of all Off-site and all On-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to unit 4 KV Safeguards Buses.

   AND

2. Failure of D11(21), D12(22), D13(23), and D14(24) Emergency Diesel Generators to supply power to unit 4 KV Safeguard buses.

   AND

3. Failure to restore power to at least one unit 4KV Safeguard Bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.

Basis:

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.

The event can be classified as an Alert when in cold shutdown, refueling, or defueled mode because of the significantly reduced decay heat and lower temperature and pressure, increasing the time to restore one of the emergency busses, relative to that specified for the Site Area Emergency EAL.

Escalating to Site Area Emergency, if appropriate, is by Abnormal Rad Levels / Radiological Effluent EALs.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA1 (cont)

Basis Reference(s):

1. UFSAR Section 8.2
2. E 10-20 Loss of Offsite Power
3. DBD L-S-05, 4KV System
4. DBD L-T-03, Electrical Issues
5. NEI 99-01, Rev. 5 CA3

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU1

Initiating Condition

AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. AC power capability to unit 4KV Safeguard Buses reduced to only one of the following sources for **≥ 15 minutes**.
    - 101 Safeguard Transformer
    - 201 Safeguard Transformer
    - D11(21) Diesel Generator
    - D12(22) Diesel Generator
    - D13(23) Diesel Generator
    - D14(24) Diesel Generator

    AND

2. Any additional single power source failure will result in a unit blackout.

Basis:

Capability: (pertaining to electrical power supplies) is equipment that is available to provide and maintain AC power at the required voltage and frequency for the required load.

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. The subsequent loss of this single power source would escalate the event to an Alert in accordance with CA1.

Fifteen minutes was selected as a threshold to exclude momentary losses of power.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU1 (cont)

Basis References:

1. UFSAR Section 8.2
2. E 10-20 Loss of Offsite Power
3. DBD L-S-05, 4KV System
4. DBD L-T-03, Electrical Issues
5. NEI 99-01, Rev. 5 CU3

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU2

Initiating Condition

Inadvertent Criticality.

Operating Mode Applicability:

4, 5,

EAL Threshold Values:

UNPLANNED sustained positive period observed on nuclear instrumentation.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL also addresses criticality events that occur in Cold Shutdown or Refueling modes such as fuel mis-loading events. This condition can be identified using period monitors. The term “sustained” is used in order to allow exclusion of expected short term positive periods from planned fuel bundle or control rod movements during core alteration.

This EAL indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification.

Basis Reference(s):

1. DBD L-S-20, Neutron Monitoring System
2. ARC-MCR-*07 F4 SRM Period
3. NEI 99-01, Rev. 5 CU8

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU3

Initiating Condition

Loss of required DC power for 15 minutes or longer.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of required DC power based on **< 105 VDC** on unit 125 VDC battery buses 1(2)FA, FB, FC, and FD for **≥ 15 minutes**.

Basis:

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.

The required busses are the minimum allowed by Technical Specifications for the mode of operation. It is intended that the loss of the operating (operable) train is to be considered. If this loss results in the inability to maintain cold shutdown, the escalation to an Alert will be per CA5.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Basis Reference(s):

1. UFSAR section 8.3.2, DC Power Systems
2. DBD P-L-01A, 125/250 VDC System
3. E-1(2)FA Loss of Division I Safeguard 125/250V DC BUS 1FA
4. E-1(2)FB Loss of Division II Safeguard 125/250V DC BUS 1FB
5. E-1(2)FC Loss of Division III Safeguard 125/250V DC BUS 1FC
6. E-1(2)FD Loss of Division IV Safeguard 125/250V DC BUS 1FD
7. NEI 99-01, Rev. 5 CU7

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU4

Initiating Condition

Loss of all On-site or Off-site communications capabilities.

Operating Mode Applicability:

4, 5, D

EAL Threshold Values:

1. Loss of all Table C1 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table C1 **Offsite** communications capability affecting the ability to perform offsite notifications.

Table C1 - Communications Capability

System	Onsite	Offsite
Station Radio	X	
Plant Public Address (PA)	X	
Prelude System	X	X
Station Phones	X	X
Satellite Phones	X	X
NRC (ENS)		X
Cellular Phones		X

Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU4 (cont)

Basis Reference(s):

1. SE-12 Loss of Communications
2. UFSAR Section 9.5.2, Communication Systems
3. DBD P-L-6, Human Factors
4. NEI 99-01, Rev. 5 CU6

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5

Initiating Condition

Inability to maintain plant in cold shutdown.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200°F** for **> Table C2 duration**.

Table C2 – RCS Reheat Duration Thresholds		
RCS	**Containment Closure**	**Duration**
Intact	N/A	60 minutes*
Not Intact	Established	20 minutes*
	Not Established	0 minutes
*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then EAL Threshold #1 is **not** applicable.		

OR

2. UNPLANNED RPV pressure rise **> 10 psig** as a result of temperature rise due to loss of decay heat removal.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

RCS is intact when the RCS pressure boundary is in its normal condition for the Cold Shutdown mode of operation (e.g., no freeze seals or main steam line nozzle plugs, etc.).

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5 (cont)

Basis (cont)

Threshold #1 Basis:

The RCS Reheat Duration Threshold table addresses complete loss of functions required for core cooling for greater than 60 minutes during refueling and cold shutdown modes when RCS integrity is established. The status of CONTAINMENT CLOSURE in this condition is immaterial given that the RCS is providing a high pressure barrier to fission product release to the environment. The 60 minute time frame should allow sufficient time to restore cooling without there being a substantial degradation in plant safety.

The RCS Reheat Duration Threshold table also addresses the complete loss of functions required for core cooling for greater than 20 minutes during refueling and cold shutdown modes when CONTAINMENT CLOSURE is established but RCS integrity is not established. The allowed 20 minute time frame was included to allow operator action to restore the heat removal function, if possible.

Finally, complete loss of functions required for core cooling during refueling and cold shutdown modes when neither CONTAINMENT CLOSURE nor RCS integrity are established. No delay time is allowed because the evaporated reactor coolant that may be released into the Containment during this heatup condition could also be directly released to the environment.]

The note (*) indicates that this EAL is not applicable if actions are successful in restoring an RCS heat removal system to operation and RCS temperature is being reduced within the specified time frame.

Threshold #2 Basis:

The 10 psig pressure rise due to loss of decay heat removal infers an intact RCS with uncontrolled RPV temperature rise in excess of the Technical Specification cold shutdown limit (200° F) for which CA5 Threshold #1 would permit up to sixty minutes to restore RCS cooling before declaration of an Alert. This EAL therefore covers situations of high decay heat loads, in which the event should be declared without delay.

Escalation to Site Area Emergency would be via CS6 should boiling result in significant RPV level loss leading to core uncovery.

A loss of Technical Specification components alone is not intended to constitute an Alert. The same is true of a momentary UNPLANNED excursion above the Technical Specification cold shutdown temperature limit when the heat removal function is available.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5 (cont)

Basis reference(s):

1. Technical Specifications LCO 3.6.1.1, Primary Containment Integrity
2. Technical Specifications LCO 3.6.5.1, Reactor Enclosure Secondary Containment Integrity
3. Technical Specifications Table 1.2, Operational Conditions
4. DBD L-S-16, Reactor Instrumentation System (RIS)
5. UFSAR Section 6.2, Containment Systems
6. UFSAR Section 6.3, Emergency Core Cooling Systems
7. NEI 99-01, Rev. 5 CA4
8. ST-6-107-640
9. ST-6-107-641
10. GP-6.2, Shutdown Operations-Shutdown Conditions Tech Spec Actions

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU5

Initiating Condition

UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200°F**.

   OR

2. Loss of the following for **≥ 15 minutes:**

   - All RCS temperature indications

     AND

   - All RPV level indications

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL is be a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant.

In cold shutdown the ability to remove decay heat relies primarily on forced cooling flow. Operation of the systems that provide this forced cooling may be jeopardized due to the unlikely loss of electrical power or RCS inventory. Since the RCS usually remains intact in the cold shutdown mode a large inventory of water is available to keep the core covered.

During refueling the level in the RPV will normally be maintained above the RPV flange. Refueling evolutions that decrease water level below the RPV flange are carefully planned and procedurally controlled. Loss of forced decay heat removal at reduced inventory may result in more rapid increases in RCS/RPV temperatures depending on the time since shutdown.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU5 (cont)

Basis (cont)

Normal means of core temperature indication and RCS level indication may not be available in the refueling mode. Redundant means of RPV level indication are therefore procedurally installed to assure that the ability to monitor level will not be interrupted. However, if all level and temperature indication were to be lost in either the cold shutdown of refueling modes, Threshold #2 would result in declaration of an Unusual Event if both temperature and level indication cannot be restored within 15 minutes from the loss of both means of indication. Escalation to Alert would be via CA5 based on an inventory loss or CA6 based on exceeding its temperature criteria.

Basis Reference(s):

1. T-102, Primary Containment Control - Bases
2. DBD L-S-16, Reactor Instrumentation System (RIS)
3. ST-6-107-640-* RX Vessel Temperature and Pressure Monitoring
4. GP-6.1 U/1(U/2) Shutdown Operations – Refueling, Core Alteration and Core Off-Loading
5. NEI 99-01, Rev. 5 CU4
6. ST-6-107-641*
7. GP-6.2, Shutdown Operations-Shutdown Conditions Tech Spec Actions

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6

Initiating Condition

Loss of RPV inventory affecting fuel clad integrity with containment challenged.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. RPV level **< - 161 inches** for **≥ 30 minutes**.

   AND

   b. Any Containment Challenge Indication (Table C5).

   OR

2. a. RPV level unknown for **≥ 30 minutes.**

   AND

   b. Loss of RPV inventory as indicated by any of the following:

   - Table C3 indication.

     OR

   - Erratic Source Range Monitor indication.

     OR

   - Any Table C4 Refuel Floor Area Radiation Monitor reading **> 3 R/hr.**

   AND

   c. Any Containment Challenge Indication (Table C5)

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6 (cont)

EAL Threshold Values:(cont)

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise
• UNPLANNED Suppression Pool level rise
• UNPLANNED vessel make-up rise
• Observation of leakage or Inventory loss

Table C4 – Refuel Floor ARMs
• RIS29-M1-1(2)K600, Drywell Head Laydown
• RIS30-M1-1(2)K600, Dryer / Separator Area
• RIS31-M1-1(2)K600, Spent Fuel Pool
• RIS32-M1-1(2)K600, New Fuel Storage Vault
• RIS33-M1-1(2)K600, Pool Plug Laydown

Table C5 – Containment Challenge Indications
• Primary Containment Hydrogen concentration **> 6%** and Oxygen **> 5%**.
• UNPLANNED rise in containment pressure
• CONTAINMENT CLOSURE **not** established.
• Any Secondary Containment radiation monitors reading **> T-103 / SAMP Max Safe Op Value (MSO)**.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6 (cont.)

Basis:

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the SAMG program.

This EAL represents the inability to restore and maintain RPV level to above the top of active fuel with containment challenged. Fuel damage is probable if RPV level cannot be restored, as available decay heat will cause boiling, further reducing the RPV level. With the CONTAINMENT breached or challenged then the potential for unmonitored fission product release to the environment is high. This represents a direct path for radioactive inventory to be released to the environment. This is consistent with the definition of a General Emergency. The General Emergency is declared on the occurrence of the loss or IMMINENT loss of function of all three barriers.

A number of variables can have a significant impact on heat removal capability challenging the fuel clad barrier. Examples include initial vessel level and shutdown heat removal system design.

Analysis indicates that core damage may occur within an hour following continued core uncovery therefore, 30 minutes was conservatively chosen.

If CONTAINMENT CLOSURE is re-established prior to exceeding the 30 minute core uncovery time limit then escalation to a General Emergency would not occur.

When RPV level indication is unavailable, the inventory loss must be detected by erratic Source Range Monitor indication, elevated drywell radiation or unexplained rise in drywell floor or equipment drain sump pumpout rate. Post-TMI studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and that Source Range Monitors can be used as a tool for making such determinations.

As water level in the RPV lowers, the dose rate above the core will rise. Indication of > 3000 mR/hr is indicative of core uncovery (i.e. level at TAF).

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6 (cont)

Basis Reference(s):

1. T-101 RPV Control – Bases
2. T-102 Primary Containment Control - Bases
3. T-103 Secondary Containment Control - Bases
4. DBD P-S-20, Neutron Monitoring System
5. DBD L-T-02, Containment, Section 3.2.14
6. Technical Specifications 3.6.1.1, Primary Containment Integrity
7. Technical Specifications 3.6.5.1, Reactor Enclosure Secondary Containment Integrity
8. UFSAR section 6.2.1.1.3.1, Summary Evaluation
9. EP-AEL-0501, Estimation of Radiation Monitor Readings Indicating Core Uncovery During Refuel
10. NEI 99-01, Rev. 5 CG1
11. SAMP-2, Containment and Radioactivity Release Control

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6

Initiating Condition

Loss of RPV inventory affecting core decay heat removal capability.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. With CONTAINMENT CLOSURE **not** established, RPV level **< - 44 inches**.

   OR

2. With CONTAINMENT CLOSURE established, RPV level **< - 161 inches.**

   OR

3. a. RPV level unknown for **≥ 30 minutes.**

      AND

   b. Loss of RPV inventory as indicated by any of the following:

      - Table C3 indications.

        OR

      - Erratic Source Range Neutron Monitor indication.

        OR

      - Any Table C4 Refuel Floor Area Radiation Monitor reading **> 3 R/hr.**

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise
• UNPLANNED Suppression Pool level rise
• UNPLANNED vessel make-up rise
• Observation of leakage or Inventory loss

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6 (cont)

EAL Threshold Values: (cont)

Table C4 – Refuel Floor ARMs
• RIS29-M1-1(2)K600, Drywell Head Laydown
• RIS30-M1-1(2)K600, Dryer / Separator Area
• RIS31-M1-1(2)K600, Spent Fuel Pool
• RIS32-M1-1(2)K600, New Fuel Storage Vault
• RIS33-M1-1(2)K600, Pool Plug Laydown

Basis:

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

Under the conditions specified, a continued drop in RCS/RPV level is indicative of a loss of inventory control. Inventory loss may be due to an RCS breach, pressure boundary leakage, or continued boiling in the RPV. Thus, declaration of a Site Area Emergency is warranted.

Escalation to a General Emergency is via CG6 or RG1.

Threshold #1 and #2 Basis:

If a low-pressure boundary to fission product release does not exist (i.e., without containment closure established), the RPV level associated with this threshold is six inches below the low-low ECCS actuation setpoint. If containment closure is established, a low-pressure boundary to fission product release exists and RPV level can drop to the top of active fuel before a Site Area Emergency declaration is required. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further RPV level drop and potential core uncovery.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6 (cont)

Basis: (cont)

Threshold #3 Basis:

When RPV level indication is unavailable, the inventory loss must be detected by erratic Source Range Monitor indication, elevated drywell radiation or unexplained rise in drywell floor or equipment drain sump pumpout rate. Post-TMI studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and that Source Range Monitors can be used as a tool for making such determinations.

The 30-minute duration allows sufficient time for actions to be performed to recover inventory control equipment.

As water level in the RPV lowers, the dose rate above the core will rise. Indication of > 3000 mR/hr. is indicative of core uncovery (i.e. level at TAF).

Basis Reference(s):

1. T-101 RPV Control - Bases
2. T-102 Primary Containment Control - Bases
3. T-103 Secondary Containment Control - Bases
4. DBD P-S-20, Neutron Monitoring System
5. DBD L-T-02, Containment, Section 3.2.14
6. Technical Specifications 3.6.1.1, Primary Containment Integrity
7. Technical Specifications 3.6.5.1, Reactor Enclosure Secondary Containment Integrity
8. DBD L-S-34, Radwaste System
9. NEI 99-01, Rev. 5 CS1

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA6

Initiating Condition

Loss of RPV inventory.

Operating Mode Applicability:

4, 5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. RPV level **< - 38 inches**.

   OR

2. a. RPV level unknown for **≥ 15 minutes**.

   AND

   b. Loss of RPV inventory per Table C3 indications.

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise
• UNPLANNED Suppression Pool level rise
• UNPLANNED vessel make-up rise
• Observation of leakage or Inventory loss

Basis:

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL serves as precursors to a loss of ability to adequately cool the fuel. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further RPV level decrease and potential core uncovery. This condition will result in a minimum emergency classification level of an Alert.

If RPV level continues to lower then escalation to Site Area Emergency will be via CS6.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA6 (cont)

Basis (cont)

Threshold #1 Basis:

The inability to restore and maintain level after reaching this setpoint would be indicative of a failure of the RCS barrier.

Threshold #2 Basis:

When RPV level indication is unavailable, the inventory loss must be detected by other means including rise in sump pumpout rates, changes in makeup or observation of leakage.

The 15-minute interval for the loss of level indication was chosen because it is half of the Site Area Emergency duration.

Basis Reference(s):

1. Technical Specification Table 3.3.3-2, Emergency Core Cooling System Actuation
2. Technical Specification 3.4.3, Reactor Coolant System Leakage
3. ARC-MCR-213-E3 Div 1 Reactor Lo-Lo-Lo Level
4. DBD L-S-16, Reactor Instrumentation System (RIS)
5. DBD L-S-34, Radwaste System
6. T-102 Primary Containment Control
7. NEI 99-01, Rev. 5 CA1

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU6

Initiating Condition

RCS Leakage.

Operating Mode Applicability:

4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

RCS leakage results in the inability to restore and maintain RPV level **> 12.5 inches** for **≥ 15 minutes**.

Basis:

This EAL is considered to be a potential degradation of the level of safety of the plant. The inability to maintain or restore level is indicative of loss of RCS inventory.

Prolonged loss of RCS Inventory may result in escalation to the Alert emergency classification level via either CA6 or CA5.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU1

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU7

Initiating Condition

UNPLANNED loss of RPV inventory.

Operating Mode Applicability:

5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED Reactor Cavity or Vessel level drop that meets **EITHER**:

   - When controlling level above the RPV flange, Reactor Cavity level drop below the RPV flange for **≥ 15 minutes**.

     OR

   - When controlling level below the RPV flange, vessel level drop below the procedurally established limit **≥ 15 minutes**.

   OR

2. a. RPV level unknown.

   AND

   b. Loss of RPV inventory per Table C3 indications.

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise
• UNPLANNED Suppression Pool level rise
• UNPLANNED vessel make-up rise
• Observation of leakage or Inventory loss

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU7 (cont)

Basis: (cont)

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL is a precursor of more serious conditions and considered to be a potential degradation of the level of safety of the plant.

Refueling evolutions that lowers RCS water level below the RPV flange are carefully planned and procedurally controlled. An UNPLANNED event that results in water level dropping below the RPV flange, or below the planned RCS water level for the given evolution (if the planned RCS water level is already below the RPV flange), warrants declaration of a UE due to the reduced RCS inventory that is available to keep the core covered.

The allowance of 15 minutes was chosen because it is reasonable to assume that level can be restored within this time frame using one or more of the redundant means of makeup that should be available. If level cannot be restored in this time frame then it may indicate a more serious condition exists.

Continued loss of RCS Inventory will result in escalation to the Alert emergency classification level via either CA6 or CA5.

Threshold #1 Basis:

This EAL involves a drop in RCS level below the top of the RPV flange that continues for 15 minutes due to an UNPLANNED event. This EAL is not applicable to level changes in flooded reactor cavity level, which is addressed by RU2, until such time as the level drop reaches the level of the vessel flange.

If RPV level continues to lower and reaches the Low-Low ECCS Actuation Setpoint then escalation to CA6 would be appropriate.

Threshold #2 Basis:

This EAL addresses conditions in the refueling mode when normal means of core temperature indication and RCS level indication may not be available. Redundant means of RPV level indication will normally be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that RPV inventory loss was occurring by observing other indications such as sump level changes, changes in makeup or observation of leakage. Sump level changes must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

Escalation to the Alert emergency classification level would be via either CA6 or CA5.

Table LGS 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU7 (cont)

Basis Reference(s):

1. ST-6-107-596-1 Drywell Floor Drain Sump/Equipment Drain Tank Surveillance
2. Technical Specification 3.4.3, Reactor Coolant Leakage
3. Technical Specifications 3.9.8, Water Level – Reactor Vessel
4. DBD L-S-34, Radwaste System
5. OT-101 High Drywell Pressure
6. T-102 Primary Containment Control, Table DW/T-1
7. GP-6.1 U/1(2) Shutdown Operations - Refuel Core Alterations & Core Off-loading
8. DBD L-S-16, Reactor Instrumentation System (RIS)
9. NEI 99-01, Rev. 5 CU2

Table 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1

Initiating Condition

HOSTILE ACTION resulting in loss of physical control of the facility.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Value:

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1).

   OR

2. A HOSTILE ACTION has:

   - Caused failure of Spent Fuel Pool Cooling Systems

     AND

   - IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).

Table H1 – Safety Functions
• Reactivity Control (ability to shut down the reactor and keep it shutdown)
• RCS Inventory (ability to cool the core)
• Decay Heat Removal (ability to maintain heat sink)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1 (cont)

Basis: (cont)

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

Threshold #1 Basis

This threshold encompasses conditions under which a HOSTILE ACTION has taken physical control of VITAL AREAS (containing vital equipment or controls of vital equipment) required to maintain any safety function. As a result, there is a loss of one or more of the Table H1 functions and equipment control cannot be transferred to and operated from another location.

If control of the plant equipment necessary to maintain all safety functions can be operated from the Control Room or transferred to another location, then the above EAL threshold is not met.

Threshold #2 Basis

This threshold addresses loss of physical control of spent fuel pool cooling systems if imminent fuel damage is likely because there is freshly off-loaded fuel in the pool. The condition “freshly off-loaded reactor fuel in pool” equates to fuel off-loaded within the last 120 days in NF-AA-309 Special Nuclear Material And Core Component Move Sheet Development.

Basis Reference(s):

1. SE-1 Remote Shutdown
2. SE-6 Alternative Shutdown
3. SE-23 Security Threat
4. Station Security Plan – Appendix C
5. NF-AA-309, Special Nuclear Material And Core Component Move Sheet Development
6. NEI 99-01, Rev. 5 HG1

Table 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS1

Initiating Condition

HOSTILE ACTION within the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

This condition represents an escalated threat to plant safety above that contained in the Alert in that a HOSTILE FORCE has progressed from the OWNER CONTROLLED AREA to the PROTECTED AREA.

This EAL addresses the contingency for a very rapid progression of events. It is not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS1 (cont)

Basis: (cont)

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. The fact that the site is under serious attack with minimal time available for further preparation or additional assistance to arrive requires Offsite Response Organizations (ORO) readiness and preparation for the implementation of protective measures.

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the PROTECTED AREA. Those events are adequately addressed by other EALs.

Escalation of this emergency classification level, if appropriate, would be based on actual plant status after impact or progression of attack.

Basis Reference(s):

1. SY-AA-101-132, Security Assessment and Response to Unusual Activities
2. Security And Safeguards Contingency Plan Station Security Plan – Appendix C
3. SE-23 Security Threat
4. NEI 99-01 Rev 5, HS4

Table 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1

Initiating Condition

HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site.

   OR

2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

OWNER CONTROLLED AREA (OCA): is the property associated with the station owned by the company. Access is normally limited to persons entering for official business.

Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

The fact that the site is under serious attack or is an identified attack target with minimal time available for further preparation or additional assistance to arrive requires a heightened state of readiness and implementation of protective measures that can be effective (such as on-site evacuation, dispersal or sheltering).

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1 (cont)

Basis: (cont)

Threshold #1 Basis

This EAL addresses the immediacy of an expected threat arrival or impact on the site within a relatively short time.

The intent of this EAL is to ensure that notifications for the airliner attack threat are made in a timely manner and that Offsite Response Organizations (ORO) and plant personnel are at a state of heightened awareness regarding the credible threat. Airliner is meant to be a large aircraft with the potential for causing significant damage to the plant.

This EAL is met when a plant receives information regarding an airliner attack threat from NRC and the airliner is within 30 minutes of the plant. Only the plant to which the specific threat is made need declare the Alert.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Threshold #2 Basis

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the OCA. Those events are adequately addressed by other EALs.

Note that this EAL is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA.

Basis Reference(s):

1. SY-AA-101-132, Security Assessment and Response to Unusual Activities
2. SE-23 Security Threat
3. Station Security Plan – Appendix C
4. NEI 99-01 Rev 5, HA4

Table 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1

Initiating Condition

Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. A credible site specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities.

   OR

2. A validated notification from NRC providing information of an aircraft threat.

   OR

3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

Basis:

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1 (cont)

Basis: (cont)

Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

Security events assessed as HOSTILE ACTIONS are classifiable under HA1, HS1 and HG1.

A higher initial classification could be made based upon the nature and timing of the security threat and potential consequences. The licensee shall consider upgrading the emergency response status and emergency classification level in accordance with the site's Safeguards Contingency Plan and Emergency Plan.

Threshold #1 Basis

This threshold is included to ensure that appropriate notifications for the security threat are made in a timely manner. This includes information of a credible threat. Only the plant to which the specific threat is made need declare the Notification of an Unusual Event.

The determination of "credible" is made through use of information found in the Station Security Plan or SY-AA-101-132, "Security Assessment and Response to Unusual Activities" procedure.

Threshold #2 Basis

The intent of this EAL is to ensure that notifications for the aircraft threat are made in a timely manner and that Offsite Response Organizations (ORO) and plant personnel are at a state of heightened awareness regarding the credible threat. It is not the intent of this EAL to replace existing non-hostile related EALs involving aircraft.

This EAL is met when a plant receives information regarding an aircraft threat from NRC. Validation is performed by calling the NRC. Only the plant to which the specific threat is made need declare the Unusual Event.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Escalation to Alert emergency classification level would be via HA1 would be appropriate if the threat involves an airliner within 30 minutes of the plant.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1 (cont)

Basis: (cont)

Threshold #3 Basis

Reference is made to security force because these individuals are the designated personnel on-site qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the plant Safeguards Contingency Plan.

This threshold is based on Station Security Plan – Appendix C. 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 in some cases under 10 CFR 50.72.

Basis Reference(s):

1. SE-23 Security Threat
2. Station Security Plan – Appendix C
3. NEI 99-01 Rev 5, HU4

Table 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS2

Initiating Condition

Control Room evacuation has been initiated and plant control cannot be established.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Control Room evacuation has been initiated.

   AND

2. Control of the plant **canno**t be established per SE-1 or SE-6 in **< 15 minutes**.

Basis:

The time period to establish control of the plant starts when either:

a. Control of the plant is no longer maintained in the Main Control Room

   OR

b. The last Operator has left the Main Control Room.

The intent of this EAL is to capture those events where control of the plant cannot be reestablished in a timely manner. In this case, expeditious transfer of control of safety systems has not occurred (although fission product barrier damage may not yet be indicated).

The intent of the EAL is to establish control of important plant equipment and knowledge of important plant parameters in a timely manner. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions. Typically, these safety functions are reactivity control (ability to shutdown the reactor and maintain it shutdown), reactor water level (ability to cool the core), and decay heat removal (ability to maintain a heat sink).

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS2 (cont)

Basis: (cont)

The determination of whether or not control is established at the remote shutdown panel is based on Emergency Director (ED) judgment. The Emergency Director is expected to make a reasonable, informed judgment within the specified time for transfer that the licensee has control of the plant from the remote shutdown panel.

Escalation of this emergency classification level, if appropriate, would be by Fission Product Barrier or Abnormal Rad Levels/Radiological Effluent EALs.

Basis Reference(s):

1. SE-1 Remote Shutdown
2. SE-6 Alternate Remote Shutdown
3. NEI 99-01, Rev. 5 HS2

Table 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA2

Initiating Condition

Control Room evacuation has been initiated.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Entry into SE-1 or SE-6 for Control Room evacuation.

Basis:

With the control room evacuated, additional support, monitoring and direction through the Technical Support Center and/or other emergency response facilities may be necessary.

Inability to establish plant control from outside the control room will escalate this event to a Site Area Emergency.

Basis Reference(s):

1. SE-1 Remote Shutdown
2. SE-6 Alternate Remote Shutdown
3. NEI 99-01, Rev. 5 HA5

Table 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3

Initiating Condition

FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

FIRE or EXPLOSION resulting in any of the following:

- VISIBLE DAMAGE to a Table H2 permanent structure.

  OR

- VISIBLE DAMAGE to safety system equipment contained within a Table H2 area.

  OR

- Control Room indication of degraded safety system equipment performance contained within a Table H2 area.

Table H2 – Vital Areas
• Reactor Enclosure • Control Enclosure • Diesel Generator Enclosure • Spray Pond Pump House / Spray Network

Basis:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

Table 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3 (cont.)

Bases: (cont)

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

The areas listed in Table H2 specify specific structures or areas that contain safety system, or component and functions required for safe shutdown of the plant.

VISIBLE DAMAGE is used to identify the magnitude of the FIRE or EXPLOSION and to discriminate against minor FIRES and EXPLOSIONS.

The reference to structures containing safety systems or components is included to discriminate against FIRES or EXPLOSIONS in areas having a low probability of affecting safe operation. The significance here is not that a safety system was degraded but the fact that the FIRE or EXPLOSION was large enough to cause damage to these systems.

An EXPLOSION due to failure of pressurized equipment that does not cause damage to other permanent structures or equipment associated with plant operations does not meet the criteria for declaration under this EAL, but may result in other declaration criteria being met (e.g., when the line is an element of a Fission Product Barrier, or the results in inventory loss).

The use of VISIBLE DAMAGE should not be interpreted as mandating a lengthy damage assessment prior to classification. The declaration of an Alert and the activation of the Technical Support Center will provide the Emergency Director with the resources needed to perform detailed damage assessments.

The Emergency Director also needs to consider any security aspects of the EXPLOSION.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions, Fission Product Barrier or Abnormal Rad Levels / Radiological Effluent EALs.

Basis Reference(s):

1. Specification NE-0294, “Fire Safe Shutdown Analysis Specification”
2. NEI 99-01, Rev. 5 HA2

Table 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3

Initiating Condition

FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm.

Table H2 – Vital Areas
• Reactor Enclosure • Control Enclosure • Diesel Generator Enclosure • Spray Pond Pump House / Spray Network

OR

2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

Basis:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

PROTECTED AREA: An area which normally encompasses all controlled areas within the security protected area fence.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3 (cont)

Basis: (cont)

This EAL addresses the magnitude and extent of FIRES or EXPLOSIONS that may be potentially significant precursors of damage to safety systems. It addresses the FIRE / EXPLOSION, and not the degradation in performance of affected systems that may result.

As used here, notification is visual observation and report by plant personnel or sensor alarm indication.

For the purposes of declaring an emergency event, the term “extinguished” means no visible flames.

Thresholds #1:

The 15 minute time period begins with a credible notification that a FIRE is occurring, or indication of a fire detection system alarm/actuation. Verification of a fire detection system alarm/actuation includes actions that can be taken within the control room or other nearby site specific location to ensure that it is not spurious. An alarm is assumed to be an indication of a FIRE unless it is disproved within the 15 minute period by personnel dispatched to the scene. In other words, a personnel report from the scene may be used to disprove a sensor alarm if received within 15 minutes of the alarm, but shall not be required to verify the alarm.

The intent of this 15 minute duration is to size the FIRE and to discriminate against small FIRES that are readily extinguished (e.g., smoldering waste paper basket). Such fires are excluded from consideration in this threshold since they have no safety consequence.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3 (cont)

Basis: (cont)

Threshold #2 Basis:

This EAL addresses only those EXPLOSIONS of sufficient force to damage permanent structures or equipment associated with plant operations within the PROTECTED AREA.

An EXPLOSION due to failure of pressurized equipment that does not cause damage to other permanent structures or equipment associated with plant operations does not meet the criteria for declaration under this EAL, but may result in other declaration criteria being met (e.g., when the line is an element of a Fission Product Barrier, or the results in inventory loss).

No attempt is made to assess the actual magnitude of the damage. The occurrence of the EXPLOSION is sufficient for declaration.

The Emergency director also needs to consider any security aspects of the EXPLOSION, if applicable.

Escalation of this emergency classification level, if appropriate, would be based on HA3.

Basis Reference(s):

1. Specification NE-0294, “Fire Safe Shutdown Analysis Specification”
2. NEI 99-01, Rev. 5 HU2

Table 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4

Initiating Condition

Natural or destructive phenomena affecting VITAL AREAS.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by seismic instrumentation **> 0.075 g**.

   AND

   b. Confirmed by **EITHER:**

   - Earthquake felt in plant.

     OR

   - National Earthquake Center.

     OR

   - Control Room indication of degraded performance of systems required for the safe shutdown of the plant.

   OR

2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area:

   - Tornado strike

     OR

   - High winds **> 90 mph**

     OR

   - Vehicle crash

     OR

   - Turbine failure-generated PROJECTILES

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

EAL Threshold Value (cont)

Table H2 – Vital Areas
• Reactor Enclosure • Control Enclosure • Diesel Generator Enclosure • Spray Pond Pump House / Spray Network

OR

3. Flooding in any Table H3 area that results in **ANY** of the following:

   a. Degraded safety system performance as indicated in the Control Room.

   OR

   b. Industrial safety hazards (e.g., electric shock) that preclude access necessary to operate or monitor safety equipment.

   OR

   c. Water level **> T-103 / SAMP Max Safe Op Value (MSO)**.

Table H3 – Internal Flooding Areas
▪ Control Structure ▪ RHR compartment ▪ Core Spray compartment ▪ HPCI compartment ▪ RCIC compartment ▪ Spray Pond Pump House

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

Basis: (cont)

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

These EALs escalate from HU4 in that the occurrence of the event has resulted in VISIBLE DAMAGE to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control room indications of degraded system response or performance. The occurrence of VISIBLE DAMAGE and/or degraded system response is intended to discriminate against lesser events. 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. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction EALs.

Threshold #1 Basis:

This threshold addresses events that may have resulted in a Table H2 area being subjected to forces beyond design limits and thus damage may be assumed to have occurred to plant safety systems.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

Basis (cont)

Threshold #2 Basis:

This threshold addresses events within the PROTECTED AREA that results in VISIBLE DAMAGE to any Table H2 structure or Control Room indication of degraded performance of a safety system in any Table H2 area:

This threshold addresses the following events:

- Tornado strike.
- High winds.
- Vehicle crashes such as plane, helicopter, train, barge, car or truck crashes. The Emergency director also needs to consider any security aspects of the vehicle crash.
- Threat to safety-related equipment imposed by PROJECTILES generated by main turbine rotating component failures.

Threshold #3 Basis:

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. The actual component failure or equipment misalignment is addressed by Technical Specifications or plant procedures unless the resulting flooding causes degraded performance of safety systems, or has created industrial safety hazards (e.g., electrical shock) that preclude necessary access to operate or monitor safety equipment. The inability to access, operate or monitor safety equipment represents an actual or substantial potential degradation of the level of safety of the plant.

Flooding as used in this EAL describes a condition where water is entering the room faster than installed equipment is capable of removal, resulting in a rise of water level within the room. Classification of this EAL should not be delayed while corrective actions are being taken to isolate the water source.

Table 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

Basis Reference(s):

1. UFSAR Section 2.5, Geology and Seimology
2. UFSAR Section 3.4.1, Flood Protection
3. UFSAR Section 6.2.1.1.1, Design Bases
4. UFSAR Section 9.2.6.4.2, Spray Pond Water Requirements
5. DBD L-S-46, Meteorological and Seismic Monitoring Systems
6. DBD L-T-17, Dynamic Qualification Program
7. Specification NE-0294, “Fire Safe Shutdown Analysis Specification”
8. SE-5 Earthquake
9. SE-4 Flood
10. SE-9, Preparation for Severe Weather
11. NEI 99-01, Rev. 5 HA1

Table 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4

Initiating Condition

Natural or destructive phenomena affecting the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. a. Seismic event as indicated by seismic instrumentation **> 0.005 g**.

   AND

   b. Confirmed by **EITHER:**

   - Earthquake felt in plant.

     OR

   - National Earthquake Center.

   OR

2. **EITHER** of the following occurring within the PROTECTED AREA boundary:

   - Tornado strike

     OR

   - Sustained **(> 15 minutes)** high winds **> 90 mph**

   OR

3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

Table 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont.)

EAL Threshold Value (cont)

OR

4. Flooding in any Table H3 area that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

Table H3 – Internal Flooding Areas
• Control Structure • RHR compartment • Core Spray compartment • HPCI compartment • RCIC compartment • Spray Pond Pump House

Basis:

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

These EALs are categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

Threshold #1 Basis:

Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont)

Basis: (cont)

Threshold #2 Basis:

This EAL is based on a tornado striking (touching down) or high winds within the PROTECTED AREA.

Escalation of this emergency classification level, if appropriate, would be based on VISIBLE DAMAGE, or by other in plant conditions, via HA4.

Threshold #3 Basis:

This EAL addresses main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Generator seal damage observed after generator purge does not meet the intent of this EAL because it did not impact normal operation of the plant.

Of major concern is the potential for leakage of combustible fluids (lubricating oils) and gases (hydrogen cooling) to the plant environs. Actual FIRES and flammable gas build up are appropriately classified via HU3 and HU5.

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 this emergency classification level, if appropriate, would be to HA4 based on damage done by PROJECTILES generated by the failure or by the radiological releases. The latter events would be classified by the radiological EALs or Fission Product Barrier.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont)

Basis: (cont)

Threshold #4 Basis:

The assessment of the potential for flooding to affect safety related equipment is based on the rate of level rise in the area and the ability to terminate the input prior to submerging or spraying the electrical portion of safety related equipment.

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. Minor leaks, such as valve packing or instrument line breaks would not constitute “Flooding.” The Internal Flooding Areas of concern for the Unusual Event declaration are those Table H3 areas that have the potential to affect safety related equipment needed for the current operating mode.

Escalation of this emergency classification level, if appropriate, would be based VISIBLE DAMAGE via HA4, or by other plant conditions.

Basis Reference(s):

1. UFSAR Section 2.5, Geology and Seimology
2. UFSAR Section 3.4.1, Flood Protection
3. UFSAR Section 6.2.1.1.1, Design Bases
4. UFSAR Section 9.2.6, Ultimate Heat sink
5. DBD L-S-46, Meteorological and Seismic Monitoring Systems
6. DBD L-T-17, Dynamic Qualification Program
7. Specification NE-0294, “Fire Safe Shutdown Analysis Specification”
8. SE-5 Earthquake
9 SE-4 Flood
10. OT-116 Loss of Condenser Vacuum
11. ON-126 Uncontrolled Main Generator Hydrogen Depressurization
12. NEI 99-01, Rev. 5 HU1

Table 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5

Initiating Condition

Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Note: If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.

Table H2 – Vital Areas
• Reactor Enclosure • Control Enclosure • Diesel Generator Enclosure • Spray Pond Pump House / Spray Network

Basis:

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5 (cont.)

Bases: (cont)

Gases in a VITAL AREA can affect the ability to safely operate or safely shutdown the reactor.

The fact that SCBA may be worn does not eliminate the need to declare the event.

A precautionary area evacuation for the purpose of atmospheric testing does not warrant declaration until test results are obtained unless access is required for operation of operable equipment to maintain safe operations or safely shutdown the reactor. Declaration should not be delayed for confirmation from atmospheric testing if the atmosphere poses an immediate threat to life and health or an immediate threat of severe exposure to gases. This could be based upon documented analysis, indication of personal ill effects from exposure, or operating experience with the hazards such as an inadvertent actuation of installed Cardox fire suppression system.

Station evaluations have shown that installed Halon systems by design do not create an IDLH atmosphere when discharged. Therefore, when an installed Halon Fire Suppression system discharge occurs, an IDLH atmosphere should not be assumed, and declaration of a toxic or asphyxiant atmosphere must be based on representative sampling of the affected area, unless there are indications of personnel ill effects resulting from exposure.

Areas directly associated with a fire that may be considered to have a hazardous environment (due to smoke, design fire suppression system actuation or administrative controls awaiting ventilation and/or testing) do not warrant declaration of an Alert under this EAL but should be evaluated against the fire EALs.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of 19.5%, which can lead to breathing difficulties, unconsciousness or even death.

An uncontrolled release of flammable gasses 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. Flammable gasses, such as hydrogen and acetylene, are routinely used to maintain plant systems (hydrogen) or to repair equipment/components (acetylene - used in welding). This EAL assumes concentrations of flammable gasses which can ignite/support combustion.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions, Fission Product Barrier or Abnormal Rad Levels / Radioactive Effluent EALs.

Table 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5 (cont.)

Basis Reference(s):

1. Specification NE-0294, “Fire Safe Shutdown Analysis Specification”
2. SE-2, Toxic Gas/Chlorine
3. NEI 99-01, Rev. 5 HA3
4. AR 660892, Station Halon and IDLH Evaluations
5. 29CFR1910.134(b) and 29CFR1910.134(d)(2)(iii)

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU5

Initiating Condition

Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS.

   OR

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

Basis:

NORMAL PLANT OPERATIONS: Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

This EAL is based on the release of toxic, corrosive, asphyxiant or flammable gases of sufficient quantity to affect NORMAL PLANT OPERATIONS.

The fact that SCBA may be worn does not eliminate the need to declare the event.

This EAL is not intended to require significant assessment or quantification. It assumes an uncontrolled process that has the potential to affect plant operations. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU5 (cont)

Basis: (cont)

The release may have originated within the Protected Area boundary, or it may have originated offsite and subsequently drifted inside the Protected Area boundary. Offsite events (e.g., tanker truck accident releasing toxic gases, etc.) resulting in the plant being within the evacuation area should also be considered in this EAL because of the adverse affect on NORMAL PLANT OPERATIONS.

Areas directly associated with a fire that may be considered to have a hazardous environment (due to smoke, design fire suppression system actuation or administrative controls awaiting ventilation and/or testing) do not warrant declaration of an Unusual Event under this EAL but should be evaluated against the fire EALs.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of 19.5%, which can lead to breathing difficulties, unconsciousness or even death.

Escalation of this emergency classification level, if appropriate, would be based on HA5.

Basis Reference(s):

1. ARC-MCR-002 E-1 High Toxic Chemical Conc.
2. SE-2 Toxic Gas/Chlorine
3. NEI 99-01, Rev. 5 HU3

Table 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG6

Initiating Condition

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the General Emergency class.

Basis Reference(s):

1. NEI 99-01, Rev 5 HG2

Table 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS6

Initiating Condition

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a Site Area Emergency.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency class description for Site Area Emergency.

Basis Reference(s):

1. NEI 99-01, Rev 5 HS3

Table 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA6

Initiating Condition

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the Alert emergency class.

Basis Reference(s):

1. NEI 99-01, Rev 5 HA6

Table 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU6

Initiating Condition

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Unusual Event.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Basis:

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

Basis Reference(s):

1. NEI 99-01, Rev 5 HU5

Table 3-2: LGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

E-HU1

Initiating Condition

Damage to a loaded cask CONFINEMENT BOUNDARY.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

EAL Threshold Values:

Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**

Basis:

CONFINEMENT BOUNDARY – is the barrier(s) between areas containing radioactive substances and the environment.

An Unusual Event in this EAL is categorized on the basis of the occurrence of an event of sufficient magnitude that a loaded cask CONFINEMENT BOUNDARY is damaged or violated. This includes classification based on a loaded fuel storage cask CONFINEMENT BOUNDARY loss leading to the degradation of the fuel during storage or posing an operational safety problem with respect to its removal from storage.

Basis Reference(s):

1. Standardized NUHOMS Certificate of Compliance 1004 and FSAR
2. NEI 99-01, Rev 5 E-HU1

Section 4: Emergency Measures

4.1 Notification of the Emergency Organization

Notifications for the Limerick Generating 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:

- Pennsylvania Emergency Management Agency (PEMA)
- Berks County Emergency Management Agency
- Chester County Emergency Services
- Montgomery County Office of Emergency Preparedness

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 Limerick Generating Station, the Pennsylvania Bureau of Radiation Protection (BRP) will contact the appropriate station to verify that an emergency exists and to obtain technical information, and then makes recommendations to PEMA regarding protective actions for the public. The BRP 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 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 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 μCi/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 LGS 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 Core Damage Assessment Methodology

Core damage information is used to refine dose assessments and confirm or extend initial protective action recommendations. Limerick Generating Station utilizes NEDC-33045P, "Methods of Estimating Core Damage in BWRs" (Revision 0, July 2001), as the basis for the methodology for post-accident core damage assessment. This methodology utilizes real-time plant indications. In addition, Limerick Generating Station may use samples of plant fluids and atmospheres as inputs to the CDAM (Core Damage Assessment Methodology) program for core damage estimation

4.3 Protective Actions for the Offsite Public

PEMA interface for incidents at Limerick Generating Station will be with Berks, Chester and Montgomery Counties. County and local governments have primary responsibilities for implementing protective measures for the public following a nuclear incident.

The BRP serves as lead Pennsylvania State agency 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 addresses 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) coordinates the activation of the siren system for Limerick Generating Station.

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

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 delineates 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 will notify other states within the Ingestion Pathway EPZ should such action be necessary.

Annex E calls 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 ETE study used population data from the 2010 census which includes parts of three counties in Pennsylvania (Berks, Chester, and Montgomery). The evacuation times are based on a detailed consideration of the EPZ roadway network and population distribution. The ETE Study, contained in EP-AA-1008 Addendum 2, Evacuation Time Estimates for the Limerick Station Plume Exposure Pathway Emergency Planning Zone, presents evacuation times for daytime and nighttime scenarios under various weather conditions for the evacuation of various areas around the Limerick Generating 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.

Based on the criteria established under the Appendix E of the Commonwealth of Pennsylvania Operations Plan, LGS will recommend to government officials that the general public be notified to take KI at a General Emergency classification in those sectors were an evacuation or shelter 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 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, as defined by the Commonwealth of Pennsylvania and risk counties.

These public information publications (including telephone book emergency information, etc.) instruct the public to go indoors 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 LGS 4-1, "Plant-Based PAR Determination Flowchart", illustrates affected downwind sectors based on wind direction, using the generic plant-based event logic as outlined in Section II.J.10.m.1 of the Exelon Nuclear Standardized Radiological Emergency Plan. Further evaluation of PAR based on dose assessments shall be performed in accordance with Section II.J.10.m.2 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 LGS 4-2. 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 are accounted for at the security exit point. Emergency response personnel are accounted for by badging into their assembly areas.

4.4.3 Monitoring of Evacuees

Evacuees from the Limerick Site 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.

The registering and monitoring of the general public evacuating from the Plume Exposure Pathway EPZ, as described in Section II.J.12 of the Exelon Nuclear Standardized Radiological Emergency Plan, will occur at designated facilities per the respective State and County Radiological Emergency Response Plans.

4.5 Severe Accident Management

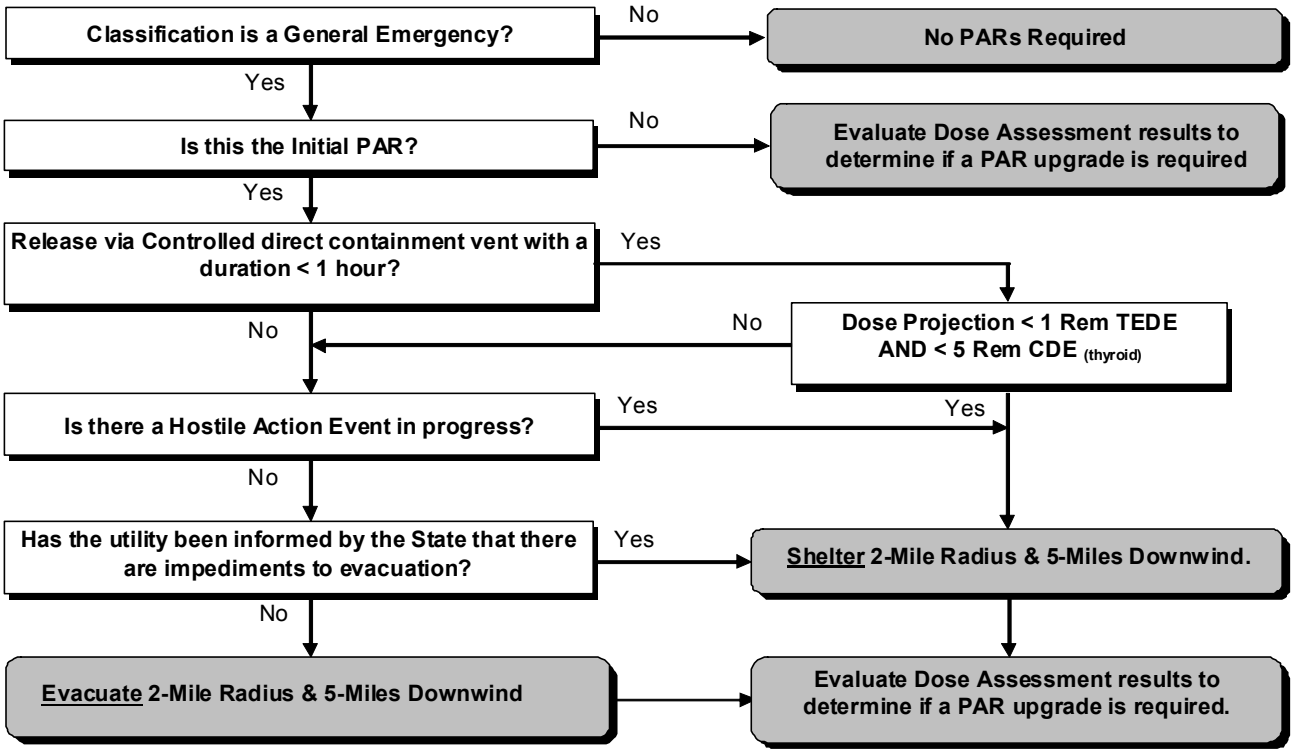
Accident management consists of those actions taken during the course of an accident, by the Emergency response Organization (ERO), specifically: plant operations, technical support, and plant management staff in order to:

- 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 Procedures (SAMPs) 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).

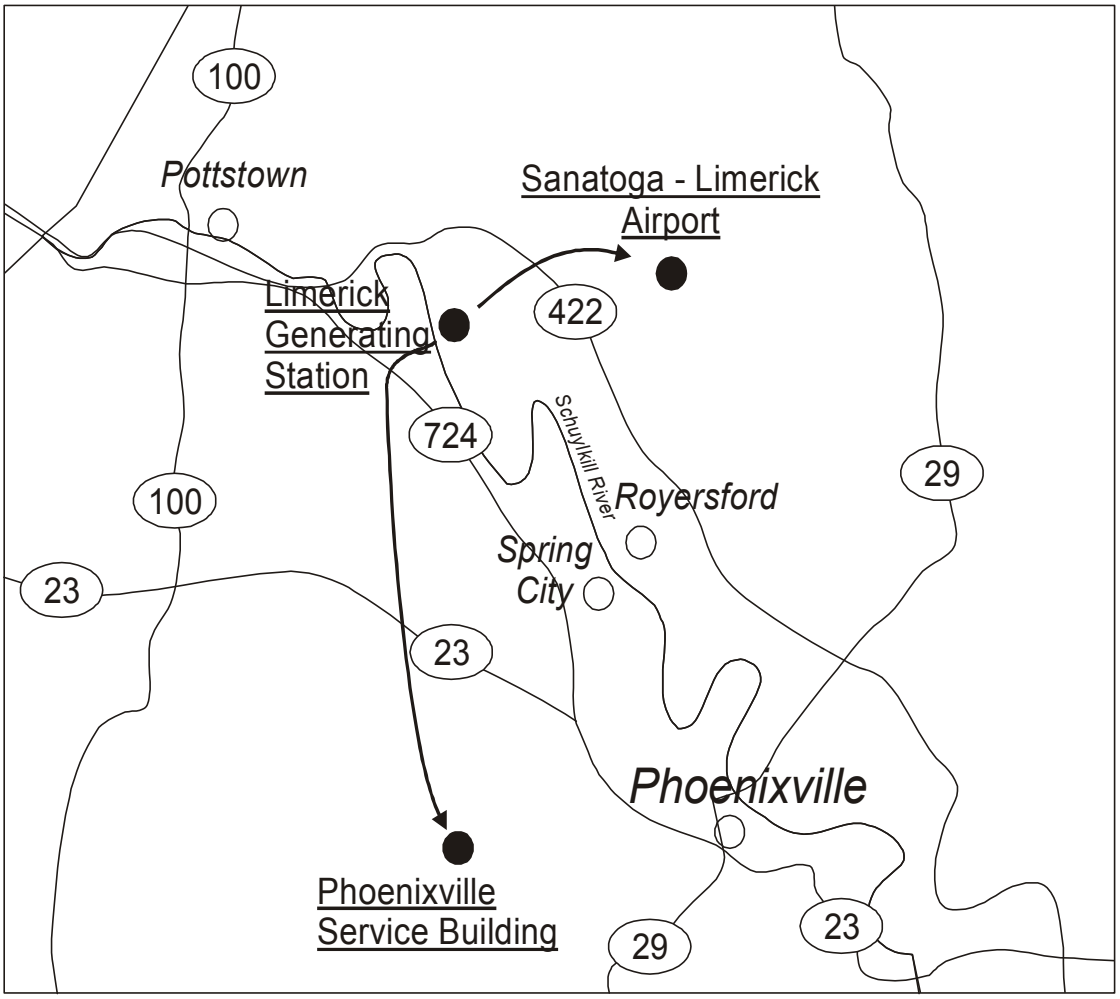
Figure LGS 4-1: Plant-Based PAR Determination Flowchart



Wind Directions (From)	Downwind Sectors*	Wind Directions (From)	Downwind Sectors*
355 to 005	SSE / **S** / SSW	175 to 185	NNW / **N** / NNE
006 to 017	SSE / **S** / **SSW** / SW	186 to 197	NNW / **N** / **NNE** / NE
018 to 027	S / **SSW** / SW	198 to 207	N / **NNE** / NE
028 to 039	S / **SSW** / **SW** / WSW	208 to 219	N / **NNE** / **NE** / ENE
040 to 050	SSW / **SW** / WSW	220 to 230	NNE / **NE** / ENE
051 to 062	SSW / **SW** / **WSW** / W	231 to 242	NNE / **NE** / **ENE** / E
063 to 072	SW / **WSW** / W	243 to 252	NE / **ENE** / E
073 to 084	SW / **WSW** / **W** / WNW	253 to 264	NE / **ENE** / **E** / ESE
085 to 095	WSW / **W** / WNW	265 to 275	ENE / **E** / ESE
096 to 107	WSW / **W** / **WNW** / NW	276 to 287	ENE / **E** / **ESE** / SE
108 to 117	W / **WNW** / NW	288 to 297	E / **ESE** / SE
118 to 129	W / **WNW** / **NW** / NNW	298 to 309	E / **ESE** / **SE** / SSE
130 to 140	WNW / **NW** / NNW	310 to 320	ESE / **SE** / SSE
141 to 152	WNW / **NW** / **NNW** / N	321 to 332	ESE / **SE** / **SSE** / S
153 to 162	NW / **NNW** / N	333 to 342	SE / **SSE** / S
163 to 174	NW / **NNW** / **N** / NNE	343 to 354	SE / **SSE** / **S** / SSW

***BOLD** refers to affected sectors. These sectors are based on a dose model stability class "D" and in some cases an extra sector was included for conservatism.

Figure LGS 4-2: Off – Site Assembly Location



TYPE OF EVACUATION
LOCAL EVACUATION
SITE EVACUATION

EVACUATION ASSEMBLY AREAS
Announced on PA System
Limerick Generating Station
Limerick Airport, Phoenixville Service Building, Other Designated Area

Section 5: Emergency Facilities and Equipment

5.1 Emergency Response Facilities

5.1.1 Station Control Room

The Limerick Generating Station Control Room shall be the initial onsite center of emergency control. The Control Room is located on the 269' elevation of the 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)

Limerick Generating Station has established a Technical Support Center (TSC) adjacent to the Protected Area Main Access Facility. 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)

Limerick Generating Station has designated an Operational Support Center (OSC). The OSC is located on the 217' elevation in the Health Physics Field Office, adjacent to the Turbine Enclosure. 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 Three Mile Island, Peach Bottom and Limerick, and is located approximately 20 miles from Limerick Generating 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 Information Center (JIC)

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

5.1.6 Alternative Facility

The Alternative Facility maintains the capability for staging the TSC/OSC emergency response organization personnel in the event of a hostile action. This alternative facility has the capability for communications with the emergency operations facility, control room, and plant security. The Alternative Facility 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 LGS 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 LGS 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 LGS UFSAR Sections 11, 12 and 15 for additional information). Data from these sources would be augmented by plant and field surveys for radiation and airborne levels.

a. Radiological Effluent Gaseous Monitoring

LGS has four monitored points of release of radioactive material to

the atmosphere. These are South Stack 1 and 2, Hot Maintenance Shop, and the North Stack. Sample systems are installed for these four pathways. The sample system consists of isokinetic sample lines containing particulate/iodine filters and separate sample lines to shielded gas chambers. Detector output data associated with the gas chambers are available in the Control Room.

The stacks radiation monitoring system continuously monitors the noble gas being discharged from Unit 1 and Unit 2. Each unit has two independent monitoring skid stations for its North and South stacks and a common North stack Wide Range Accident Monitor (WRAM). The monitoring stations use scintillation detectors which readout in the Main Control Room in uCi/sec and uCi/cc.

Gas chamber detectors readouts are in uCi/cc. The WRAM readout is in units of uCi/sec. The uCi/sec Iodine and particulate concentrations are determined from the filter and charcoal cartridge samples.

b. 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. Permits are prepared to authorize releases to the cooling tower blowdown line. Radiation monitors are located on certain process water systems, which indicate abnormal radioactivity levels. Procedures describe the technique for determining consequences of an abnormal release.

c. Laboratory Facilities

Chemical laboratories are located adjacent to the radwaste enclosure at LGS. 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 LGS 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 and RMMS plant parameters for display in the Technical Support Center and Emergency Operations Facility.

5.2.4 Onsite Fire Detection Instrumentation

LGS 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 LGS 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 LGS 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 radio iodine 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 radio iodine provides the capability to detect 10^{-7} μCi/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 there 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.

5.3 Protective Facilities and Equipment

5.3.1 Emergency Supplies

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

5.3.2 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

First Aid 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

An on-site personnel decontamination facility for emergency conditions include showers and sinks that 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

Medical treatment given to injured persons at the station is of a "first aid" nature. When more professional care is needed, injured persons are transported to a local hospital. Letters of Agreement are established with primary and backup hospitals. Hospital facilities are listed in Appendix 2.

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 Limerick 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

The LGS PA system is a six-channel system powered from a Class IE bus permitting simultaneous use of one page line and five party lines. Loudspeakers powered by individual amplifiers are located throughout the plant and in remote structures.

The LGS 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 LGS Public Address stations within the plant are equipped with two page buttons. One is for normal plant pages, and the other is for emergency pages to the Control Room. When used, the emergency page button unlocks the PA speakers in the Control Room for the incoming message. The Control Room speakers are silent (muted) for all normal plant pages. This arrangement allows for a more orderly Control Room and emphasizes the emergency pages made to the Control Room. A PA station is located in the Main Control Room, Operations Support Center, and TSC. Capability exists to warn individuals in the vicinity of the river through the river warning system utilizing the plant PA system.

The 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 LGS on-site commercial telephone system 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 two separate on-site sources. Both sources are supplied from motor control centers. The primary source is backed- up by an emergency diesel generator, and the secondary source is backed up by a 2 -hour uninterruptible power supply (UPS). The 2-hour UPS is designed to allow sufficient time to restore the diesel-generator supplied power source, if necessary. This power configuration is designed to maintain this communication system during a total station blackout.

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 LGS 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 JIC. Tie line access capability is provided both through the Limerick main PBX switch and the Peach Bottom dedicated emergency PBX switch.

The power supply for this system consists of two separate on-site sources, which are different than the sources for the main PBX switch. The primary source is backed-up by an emergency diesel generator. The secondary source backup is a 15-minute Uninterruptible Power Supply (UPS). The power configuration is designed to maintain this communication system during a total station blackout.

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/JIC Private Branch Exchange (PBX)

A dedicated PBX is installed at the Coatesville EOF/JIC. 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/JIC 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 Limerick, Peach Bottom, and EOF/JIC.

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 LGS, PBAPS, Corporate Main Office, Exelon Nuclear, and the EOF. 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 Limerick Generating 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 Fiber Optic / Microwave Tie Lines

Dedicated Fiber Optic lines exist between LGS, the Nuclear Group Headquarters (Kennett Square) and Berwyn. Also, dedicated microwave tie lines exist between PBAPS, the EOF/JIC, and Berwyn, where they are linked to the Fiber Optic lines. The microwave system is backed up by at least eight hours of battery. In addition, communication lines exist between LGS, PBAPS, Main Office, the Nuclear Group Headquarters, and the EOF/JIC.

5.5.11 Radio Equipment

A fixed base radio system with multiple channels provides primary/backup outside communication capability as shown in Figure LGS 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.

The LGS radio system was designed to maintain communications between facilities as described in the Fire Protection Evaluation Report, UFSAR.

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.

Table LGS 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.

I. PROTECTIVE	LOCATIONS STORED OR AVAILABLE
Anti-C Clothing	2, 5
Dosimeters	2, 3, 6
Dosimeter Charging Unit	2, 3, 6
Dosimeter of Legal Record (DLR)	2
Respirator/Filters	2
Self-Contained Breathing Apparatus	1, 2, 3
Radiation Signs, Rope & Tape	2, 3, 7, 8
Potassium Iodide	3

NOTE: Equipment from the above list utilized by field survey personnel is stored in Field Survey Kits in the Site Management Building.

II. RADIATION MONITORING	LOCATIONS STORED OR AVAILABLE
Air Sampler	2, 3, 5
G. M. Counter	2, 3, 5, 6, 7, 8
Ion Chamber	2, 3, 5
Frisker	2, 3, 5, 6, 7, 8, 10
Radiation Survey Forms	2, 3, 5, 7, 8, 9, 10
Smears	2, 3, 5, 7, 8, 9, 10
CAM	3
Area Monitors	2, 3, 10

NOTE: Equipment from the above list utilized by field survey personnel is stored in Field Survey Kits in the Site Management Building.

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

III.	SEARCH AND RESCUE	LOCATIONS STORED OR AVAILABLE
	Flashlight	10
	Blanket	10
	Stretcher	10
	Rope	10
	First Aid Kits	10

IV.	DECISION AIDS	LOCATIONS STORED OR AVAILABLE
	Nuclear Emergency Plan	1, 3, 4, 11
	LGS EP Procedures	1, 2, 3, 4, 11
	EP-Corporate Procedures	3, 4, 11
	Maps & Overlays	3, 4
	Prints	3, 4
	Drawings	3, 4
	P&ID	1, 2, 3, 4

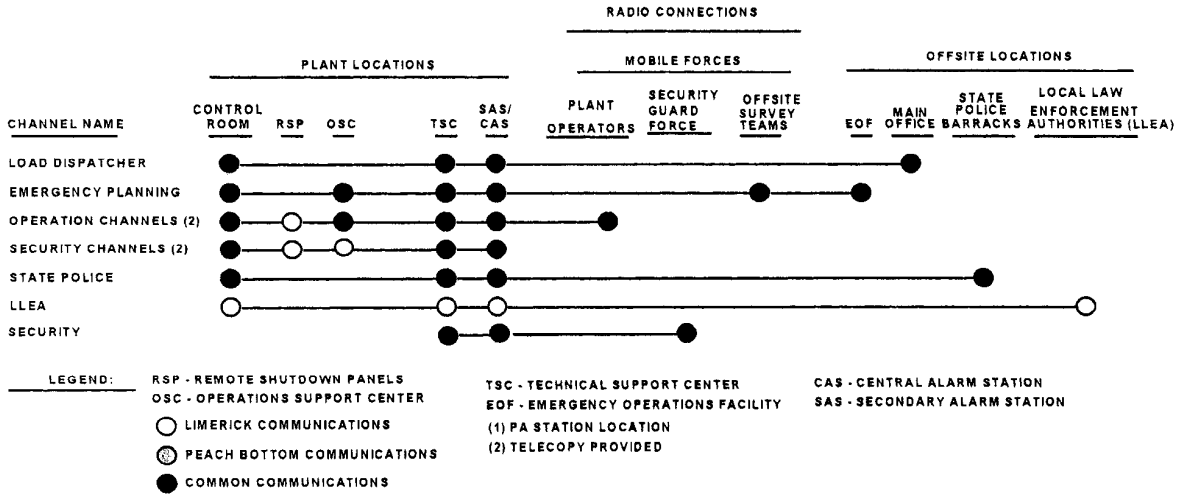
V.	COMMUNICATIONS	LOCATIONS STORED OR AVAILABLE
	Base Stations	1, 2, 3, 4,
	Mobile Radios	1, 2, 3

VI.	DECONTAMINATION	LOCATIONS STORED OR AVAILABLE
	Soap/Detergent	3, 6, 7, 8, 9
	Brushes or Sponges	3, 6, 7, 8, 9

LOCATION KEY

1. Control Room Area
2. Operations Support Center/ Health Physics Office
3. Technical Support Center
4. Emergency Operations Facility
5. Field Monitoring Kits
6. Support Hospitals
7. Phoenixville Service Building Station Kit
8. Limerick Airport Kit
9. Decontamination Room
10. Strategically located throughout Station
11. Joint Information Center

Figure LGS 5-1: Emergency Radio Links



APPENDIX 1: NUREG-0654 CROSS-REFERENCE

Annex Section	NUREG-0654
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 LGS 1-1	Part I, Section F
Figure LGS 1-1	Part II, Section J.10
Figure LGS 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, Sections I.2 & 3.a
4.4.2	Part II, Section J.5
4.4.3	Part II, Section J.3
Figure LGS 4-1	Part II, Section J.10.l & Appendix 4
Figure LGS 4-2	Part II, Section I. J.7
Figure LGS 4-3	Part II, Section I. 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 LGS 5-1	Part II, Section H.11
Figure LGS 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 Limerick Generating 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.

- Pennsylvania Emergency Management Agency Memorandum of Understanding (MOU) (Letter on File)

  NOTE: Documentation of agreement for Berks, Chester and Montgomery Counties are contained as part agreement with PEMA.

- Pennsylvania State Police#
- Limerick Township Police Dept.#
- Goodwill Ambulance Service (Letter on File)
- Linfield Fire Company (Letter on File)
- Limerick Fire Company (Letter on File)
- Einstein Medical Center Montgomery (Letter on File)
- Pottstown Memorial Medical Center (Letter on File)
- Trappe Fire Company Ambulance (Letter on File)
- Limerick Airport (Lease Agreement)
- Phoenixville Service Building (Lease Agreement)
- Affidavit, PECo Bus Driver Pool* [T04510]

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

* Refers to "Affidavit of Joseph W. Gallagher (VP, PECo Nuclear Operations) in Response to the Request in ALAB-857 for Confirmation of the Status of Licensee's Volunteer Employee Bus Driver Pool", dated January 12, 1987, to augment bus driver staffs for Spring-Ford Area School District and Owen J. Roberts School District. (NOTE: Bus driver pool was reduced from 200 to 100 under separate 10 CFR 50.54(q) and 10 CFR 50.59 evaluations approved by the LGS Plant Manager on 04/11/96 (PORC Mtg. #96-034, 04/04/96).

ATTACHMENT 11

EP-AA-1009, Revision 21

Exelon Nuclear Radiological Emergency Plan Annex for
Three Mile Island (TMI) Station

EXELON NUCLEAR

RADIOLOGICAL EMERGENCY PLAN ANNEX

FOR THREE MILE ISLAND (TMI) STATION

Table of Contents

Section **Page**

Table of Contents

Section **Page**

Section 5: Emergency Facilities and Equipment

APPENDICES

ADDENDUMS

Table of Contents

REVISION HISTORY

REVISION	REVISION DATE
0	February 2002
1	May 2003
2	September 2003
3	December 2004
4	November 2005
5	January 2006
6	February 2006
7	June 2006
8	May 2007
9	July 2007
10	January 2008
11	June 2008
12	August 2008
13	March 2009
14	March 2010
15	May 2010
17	March 2011
18	July 2012
19	November 2012
20	December 2012
21	June 2013

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 ("Standard Plan"), Station Annexes, emergency plan implementing procedures (EP-AA-11X Series), and associated program administrative procedures (EP-AA-12X Series). The Standard 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 Standard Plan.

This document serves as the Three Mile Island Station (TMI) Annex and contains information and guidance that is unique to the station. This includes on-shift staffing and augmentation, Emergency Action Levels (EALs), and facility geography and location which may differ from that contained under the Standard Plan. The Station Annex is subject to the same review and audit requirements as the Standard Plan.

1.1 Facility Description

TMI Unit 1 is operated by Exelon Nuclear. The TMI Unit #1 is an 870 Mwe, pressurized water-type, nuclear steam supply system supplied by Babcock & Wilcox Company.

TMI Unit 2 is owned by First Energy Corporation. The TMI Unit 2 reactor was damaged during an accident in 1979 and is currently defueled and the plant maintained in long-term monitored storage. Monitoring of this facility is performed by Exelon Nuclear through a service agreement with First Energy Corporation. The arrangement of the major TMI-1 and TMI-2 facilities is shown in Figures TMI 1-1 and TMI 1-2.

TMI Station is located in an area of low population density about 12 miles southeast of Harrisburg, Pennsylvania.

The area is in Londonderry Township, Dauphin County, about 2.5 miles from the southern tip of Dauphin County, where the county is coterminous with York and Lancaster Counties.

The TMI site is part of an 814-acre tract consisting of TMI and several adjacent islands, which were purchased by a predecessor. The island, which is situated about 900 feet from the east bank and approximately one mile from the west bank of the Susquehanna River, is elongated parallel to the flow of the river with its longest axis oriented approximately due north and south. The north and south ends of the island have access bridges, which connect the island to State Highway Route 441. The north access bridge is used daily. Route 441 is a two-lane highway, which runs parallel to TMI on the east bank of the Susquehanna River and is more than 2,000 feet from the TMI reactors at the closest point.

A Norfolk Southern one-track line runs adjacent and parallel to Route 441 on the east bank of the river. On the west bank of the river, there is a multi-track Norfolk Southern line at the river's edge about 1.25 miles west of the site and a black top, two lane road that runs parallel to it. There is a one-track railroad spur across the bridge on the north end of the island, which is used for site-related activities. A general area map showing the relative location of the TMI sites is shown as Figure TMI 1-2.

In addition to the information listed above, specific details concerning the TMI Site are included in the Updated Final Safety Analysis Report (UFSAR).

1.2 Emergency Planning Zones

TMI has taken into consideration the information and data presented above, guidance provided by the Environmental Protection Agency (EPA), NRC and the Pennsylvania Emergency Management Agency (PEMA), as well as other important factors such as organizational capabilities, availability of emergency facilities and equipment, and the methods for implementing the Emergency Plan in defining the Emergency Planning Zones (EPZs) for the TMI. As a result, an EPZ having an approximate radial distance of 10 miles from the site has been defined as the “Plume Exposure Pathway”. An EPZ having a radial distance of 50 miles from the site has been defined as the “Ingestion Exposure Pathway”.

Figure TMI 1-4 illustrates the respective boundaries of for the Plume Exposure and Ingestion Pathways.

1.2.1 Owner Controlled Area, Exclusion Area and Low Population Zone

1. The Owner Controlled Area for the TMI site includes all areas within the perimeter security fence. The minimum distance to the owner controlled area boundary is measured from the centerline of the Fuel Handling Building to the western shoreline of the island, which is approximately 675 feet.

2. The Exclusion Area for the TMI site is a 2,000 foot radius that includes a portion of TMI, the river surface around it, and a portion of Shelly Island. The minimum distance of 2,000 feet occurs on the shore of the mainland in a due easterly direction. The TMI-1 licensee retains complete authority to determine and maintain sufficient control of all activities including the authority to exclude or remove personnel and property for all land areas within the exclusion area. A map showing the exclusion area boundary is included as Figure TMI 1-3. For the purposes of Emergency Planning, the exclusion area boundary and the site boundary are considered the same.

3. The Low Population Zone (LPZ) has a minimum distance of 2 miles to its outer boundary. The area of the Low Population Zone is also shown in Figure TMI 1-3.

1.2.2 Population and Population Distribution

As previously discussed, LPZ has been defined with a minimum distance of 2 miles from its outer boundary to the TMI site. The nearest major population center is Harrisburg, Pennsylvania which is located approximately 12 miles northwest of TMI. This distance satisfies the requirements of 10 CFR 100 with respect to population center distance. The population of residential areas, typical enrollment in various schools, and the hospital patient capacity in the surrounding area can be found in the TMI Evacuation Time Estimate (ETE) Study.

Within the two-mile LPZ, there are no schools. There are several recreational areas (Falmouth Fish Commission Access Area, Tri-County Boat Club and Canal Lock Boat Launch Area). There is some seasonal shift in population within a 5-mile radius of TMI since there are over 100 summer cabins on the islands within the area. Additional transients participate in boating activities in the vicinity of TMI.

1.2.3 Local Industrial and Military Facilities

The TMI site is currently surrounded by farmlands within a 10-mile radius. Lands are used for dairy cattle, tobacco, poultry, vegetables, fruit, corn, wheat, and other products. A summary of land use for the risk counties is provided in Table 1 and the FSAR. The Susquehanna River is used for sport fishing and boating but is not used for commercial fishing. Manufacturing industries in the region produce clothing, wood products, shoes, electrical wiring devices, steel products, packed meat and other food. These activities, within a 10-mile radius of the site, are confined chiefly to the communities of Harrisburg, New Cumberland, Steelton, and Middletown. A listing of typical industries within 10 miles of TMI can be found in the site Updated Final Safety Analysis Report (UFSAR). There are gas and oil transmission lines located at a minimum distance of approximately 2 miles from TMI.

Approximately 3 miles downstream from the site is the York Haven hydro-electric project. The York Haven Station is operated on a "run-of-the-river" basis, and its power output is dependent primarily upon the water available. The reservoir is used for peaking operation during periods of low river flow. Brunner Island Station, a large steam-electric generating plant owned by the Pennsylvania Power & Light Company is located on the Susquehanna River approximately one mile downstream from the York Haven project. This station uses water from the river on a "once-through" basis for cooling water. Three other hydroelectric generating stations are also located downstream from TMI, with each project having a dam and reservoir on the Susquehanna River. The three stations are Safe Harbor, Holtwood, and Conowingo Hydroelectric Projects, located approximately 25, 31, and 47 miles south of TMI, respectively. There is also a coal fired, steam electric plant at Holtwood, and the Muddy Run Pumped Storage Project is associated with Conowingo Station. The Peach Bottom Atomic Power Station (PBAPS) is located along the west bank of the Susquehanna River, about 41 miles downstream of TMI, just north of the Maryland-Pennsylvania border and is the only nuclear plant within a 50-mile radius of TMI.

There are two airports within 10 miles of the TMI sites. Harrisburg International Airport (formerly Olmsted Air Force Base) is located on the east bank of the Susquehanna River approximately 2.5 miles northwest of the site. The Capital City Airport is located approximately 8 miles west-northwest of TMI. The vital areas of the TMI sites are designed to withstand a hypothetical aircraft accident.

Norfolk Southern lines are located on both sides of the Susquehanna River, the closest being the east bank, approximately 2,000 feet from the TMI Reactor Buildings. Routine traffic in liquified petroleum gas was identified on the railroad line, which passes along the east shore of the river. Analyses indicate that any missiles generated by this traffic would be less damaging than the postulated aircraft strike against which the plant is protected and that flammable gases would dissipate before reaching the TMI Nuclear Units.

The closest military installation to the site is the Air National Guard facility at Harrisburg International Airport. There are no military firing ranges or missile facilities within a 10-mile radius of TMI. Other military facilities, however, are Army and Navy depots located at New Cumberland and Mechanicsburg, Pennsylvania, respectively.

1.3 Participating Governmental Agencies

The Exelon Nuclear Radiological Emergency Plan (REP) Annex for TMI Station TMI Emergency Plan was developed in coordination with the Commonwealth of Pennsylvania Emergency plan. In addition, specific State requirements for reporting of emergencies, providing information and data, and recommending protective actions, have been integrated directly into the Emergency Plan Implementing Procedures. In considering the Plume Exposure Pathway, there are also county plans that have been considered in the development of the REP Annex for TMI Station. The State Plan designates PEMA as the lead state agency for radiological emergency response planning and the state agency through which the Governor will exercise coordination and control during emergency. The State Plan is an integrated document setting forth the resources and responsibilities of all relevant state agencies. Significant plans from the State Departments of Agriculture, Environmental Resources, Bureau of Radiation Protection (BRP) are included in the State Plan.

1.3.1 Federal Agencies

A summary of Federal response agencies, responsibilities and activities, as described under the National Response Framework (NRF), is contained in the Standard Plan. Specifics related to support for TMI Station are listed below.

1. **The Department of the Army (local Ordinance Detachment)** will provide an Explosive Ordinance Disposal capability in response to requests for assistance in the event of a bomb threat.

2. **The Federal Aviation Administration (FAA)** will ensure air traffic is diverted in the event of an emergency situation with a potential for radioactive release.

3. **National Weather Service (NWS)** will provide backup meteorological information upon request.

1.3.2 State Agencies

The planning for, and response to a radiological emergency at the TMI site is the joint responsibility of TMI and the state/county/local governmental agencies. TMI is responsible for onsite emergency response. In order to fulfill this responsibility, TMI relies on various offsite agencies, both governmental and private, to provide assistance beyond that available onsite. The Commonwealth of Pennsylvania, through the various state, county and local agencies, is responsible for offsite emergency response. In order to fulfill this responsibility, the state relies on TMI to provide necessary information on plant status and radiation releases. Recognizing the joint nature of their responsibilities, TMI and the relevant governmental agencies have coordinated their emergency planning and have provided for adequate and redundant communication systems to coordinate their response during an emergency event.

1. **Pennsylvania Emergency Management Agency (PEMA)**

   PEMA is responsible to coordinate emergency services in the Commonwealth of Pennsylvania. Should a radiological emergency occur at the TMI site that requires the implementation of state, county, and local government radiological emergency response plans, the state agency through which the Governor will exercise coordination/control will be PEMA. However, as in all emergencies, the Governor retains directional control. The State role is further defined in the State Disaster Operations Plan - Annex E.

   PEMA exercises authority over all non-licensee offsite organizations, who are a part of the emergency response team in the TMI Plume Exposure and Ingestion Pathways. This authority is based on the provisions of Section 7313 of the State of Pennsylvania Emergency Management Services Code 35 PA (C.S.A. Sections 7101-7707) also referred to as Pamphlet Law 1332. By law, PEMA is authorized to:

   - Provide emergency direction and control of Commonwealth of Pennsylvania and local disaster emergency operations.

   - Accept aid and coordinate assistance provided by Federal Agencies under provisions of the Federal Disaster Relief Act of 1974.

2. **Department of Environmental Protection**

   The Department of Environmental Protection (DEP), under the administration and technical direction of the Secretary, is responsible for gathering and evaluating technical information and for supplying such information and technical advice and recommendations to PEMA and the Pennsylvania Emergency Management Council.

   Within the DEP, the Bureau of Radiation Protection (BRP) has been delegated responsibility for radiological emergencies. Specific responsibilities assigned to the DEP/BRP that are appropriate to radiological emergencies are defined in the State Plan. To provide for emergency response capability, the BRP has made provisions for 24 hour per day interface with PEMA.

1.3.3 County Agencies

Pamphlet Law 1332 states that, "each political subdivision of this Commonwealth is directed and authorized to establish a local emergency management organization in accordance with the plan and program of the PEMA. Each local organization shall have responsibility for emergency management, response and recovery within the territorial limits of the political subdivision within which it is organized and, in addition, shall conduct such services outside of its jurisdictional limits as may be required under this part." Therefore, each County and Local Emergency Management Coordinator in the State is responsible for establishing an emergency management organization within their respective jurisdiction, developing plans and preparing for emergency operations.

With respect to the TMI Plume Exposure Pathway, Dauphin, York, Cumberland, Lancaster and Lebanon Counties have prepared Radiological Emergency Response Plans that are coordinated with both the State's Disaster Operations Plan and the REP Annex for TMI Station. Local government plans are either included directly within the respective County plan or are maintained as separate, but coordinated documents. The county Emergency Operations Centers (EOCs) are the location of the County dispatcher for police, fire, rescue and emergency medical services and is manned by dispatchers on a 24-hour basis. In the event of a PEMA communications breakdown, Dauphin County will act as the primary Communicator with PEMA, BRP, and the other four risk counties.

1.3.4 Additional Support Agencies

The nature of an emergency may require augmenting the emergency organizations with assistance from additional personnel and organizations. In order to ensure that support from local law enforcement, fire departments, hospitals, ambulance services and other organizations will be available on relatively short notice, agreements have been established with personnel and organizations. Agreements from offsite individuals, groups and agencies that support Three Mile Island may take one of the following forms:

- Contracts
- Letters of Agreement
- Memoranda of Understanding
- Formal Emergency Plans

Refer to Appendix 2 for a listing of offsite support organizations.

FIGURE TMI 1-1: TMI Site Arrangement

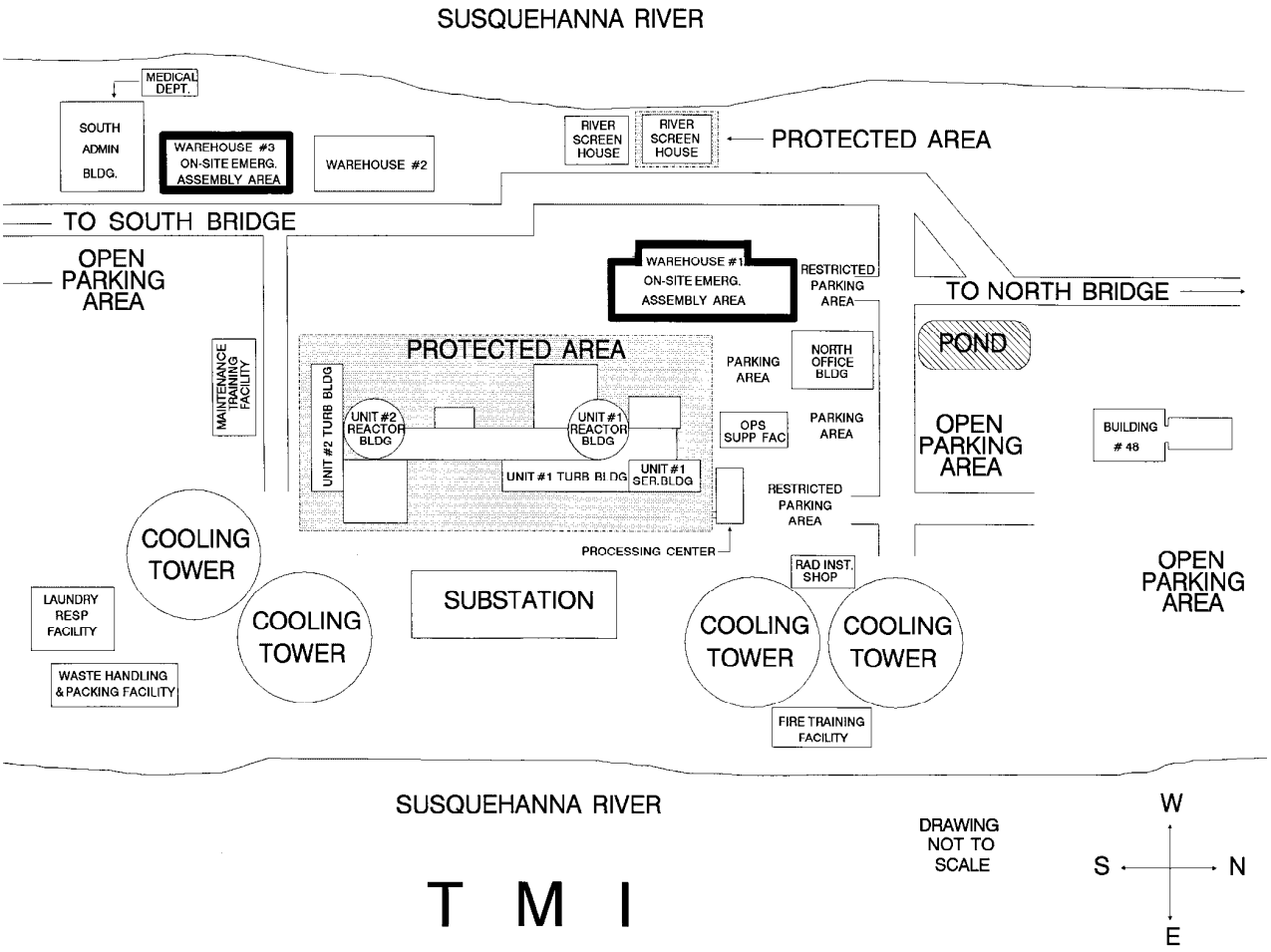


FIGURE TMI 1-2: Relative Location of the TMI Site

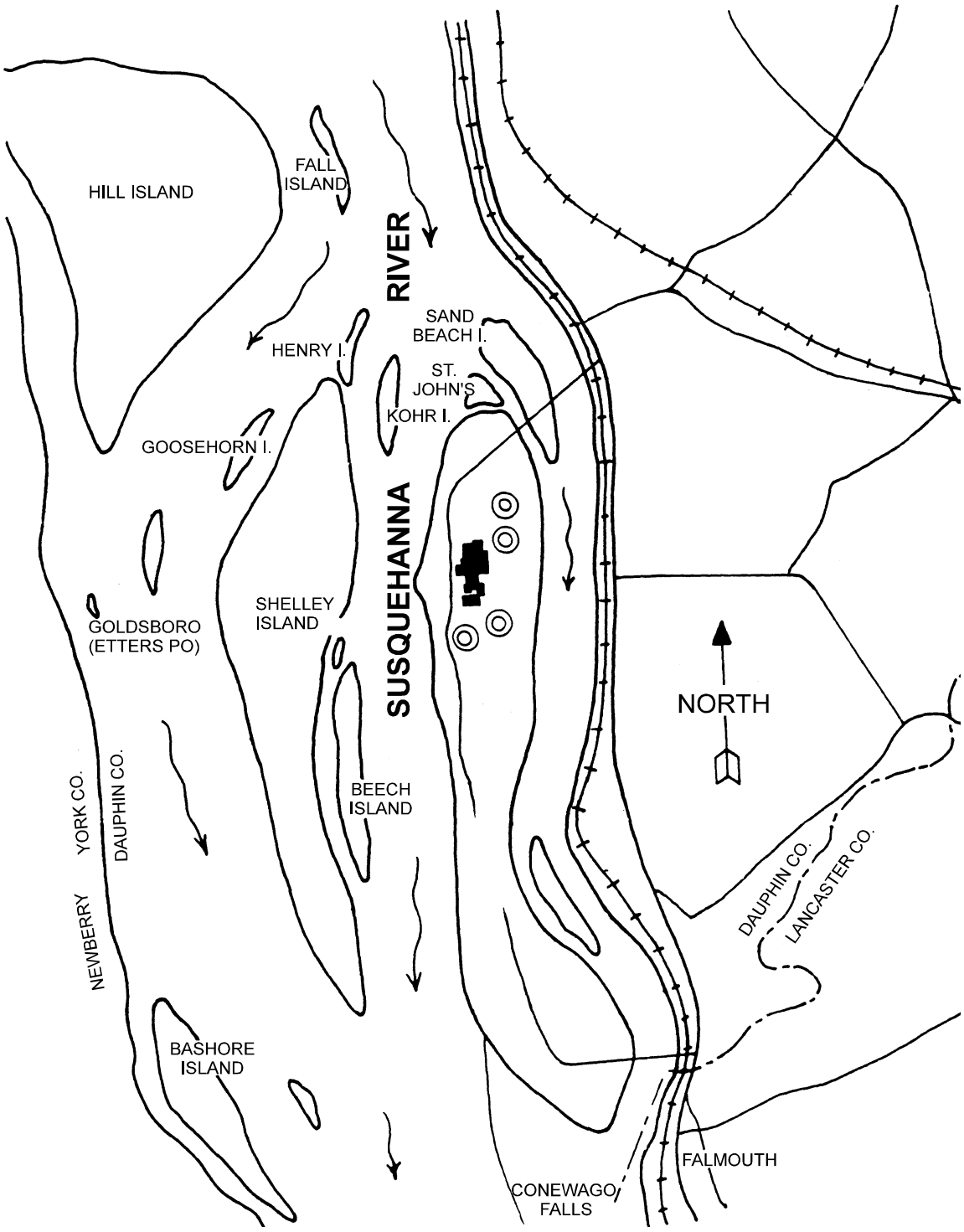


FIGURE TMI 1-3: TMI Site Exclusion Area and Low Population Zone

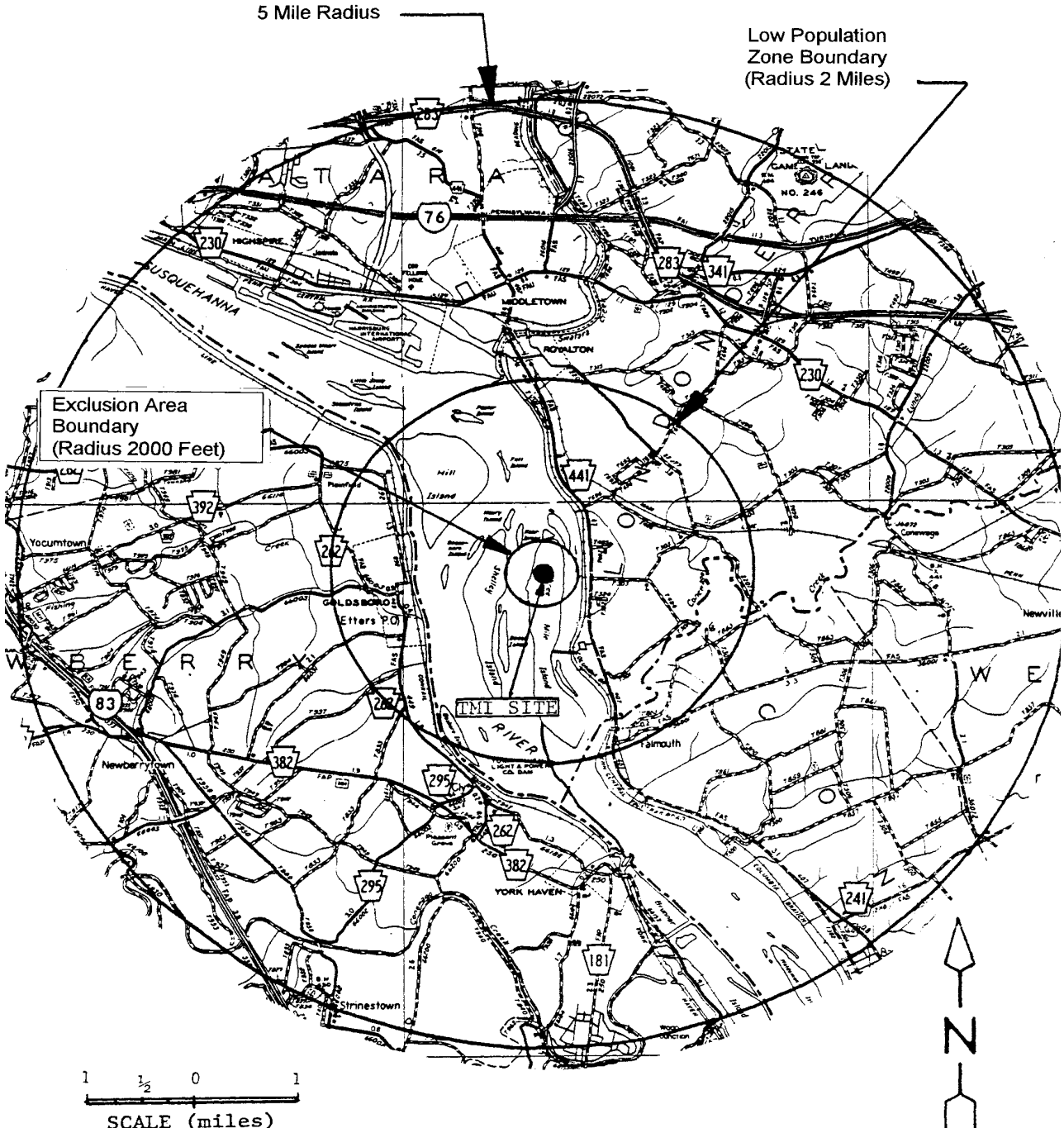
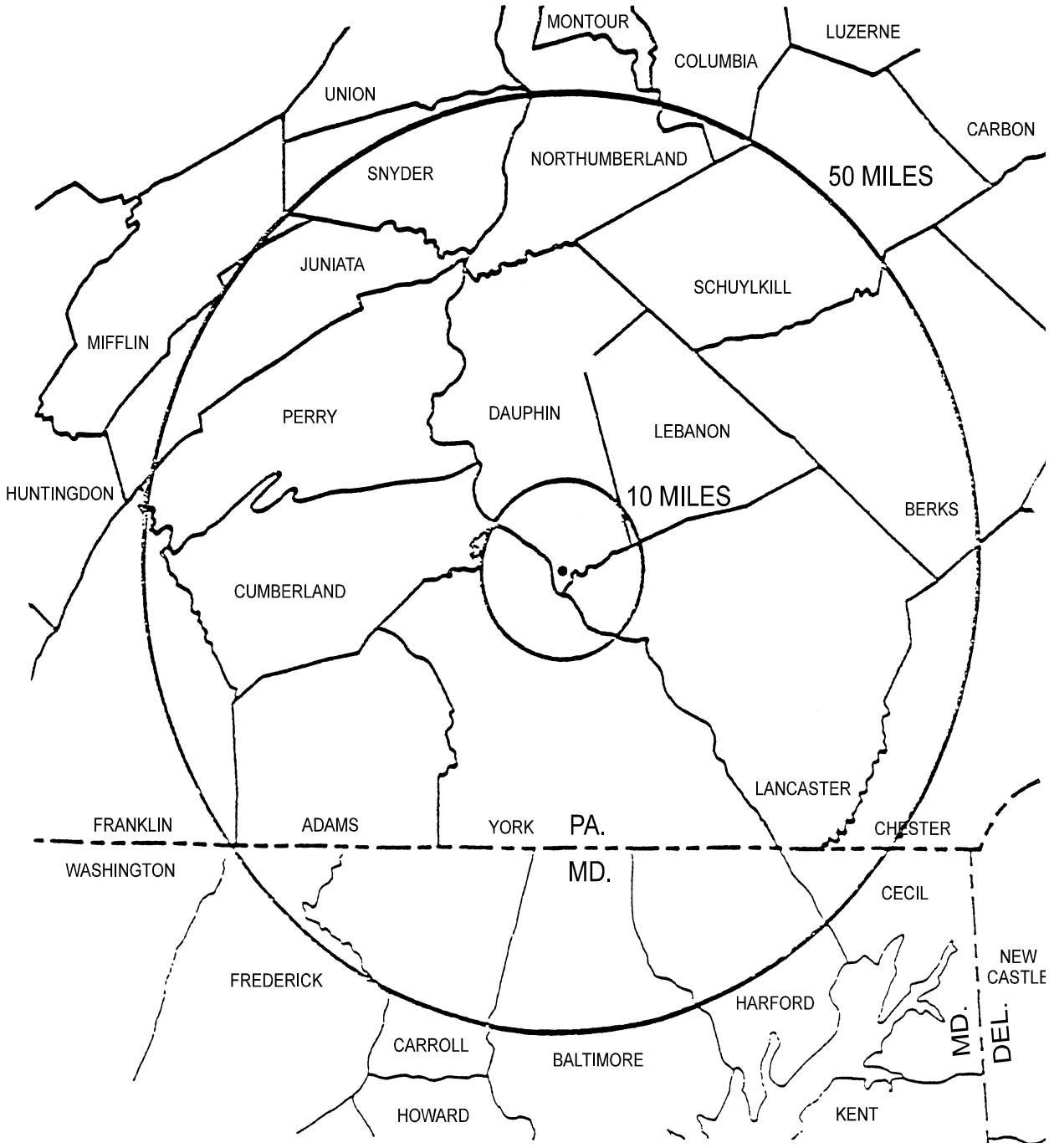


FIGURE TMI 1-4: Plume Exposure and Ingestion Pathway EPZs

Risk Counties: Cumberland, Dauphin, Lancaster, Lebanon, York



Section 2: Organizational Control of Emergencies

This section describes the Emergency Response Organization (ERO) and its key positions. It outlines the staffing requirements which provide initial emergency response actions and provisions for timely augmentation of on-shift personnel when required. It also describes interfaces among Exelon Nuclear emergency response personnel and specifies the offsite support available to respond to the nuclear generating stations.

2.1 Shift Organization Staffing

Initial response to any emergency is by the normal plant organization present at the site. This organization includes positions that are onsite 24 hours per day and is described in Section B.1 of the Exelon Nuclear Standardized Radiological Emergency Plan. The Normal Shift Organization will be augmented, in an emergency, with designated/additional Emergency Response Organization (ERO) personnel within 60 minutes of notification as specified under Table TMI 2-1. ERO activation is described in Section H.4 of the Exelon Nuclear Standardized Radiological Emergency Plan.

Table TMI 2-1 outlines ERO positions required to meet minimum staffing and full augmentation of the on-shift complement at an Alert or higher classification, and the major tasks assigned to each position. Responsibilities for each position are described in Section B.5 of the Exelon Nuclear Standardized Radiological Emergency Plan.

2.1.1 Shift Dose Assessment

A designated, qualified shift member will perform the on-shift dose assessment function. This **Shift Dose Assessor** will provide radiological assessment input and radiological support to the Control Room. This position reports to and advises the Shift Manager (Shift Emergency Director) in regards to in-plant, onsite and offsite radiological conditions.

He/She performs dose projections, coordinates the initial mobilization of field monitoring teams, if a release is underway, and assists in formulating dose-based Protective Action Recommendations (PARs).

2.1.2 Shift Communicator

This position is responsible to make notifications to offsite agencies until properly relieved by the TSC or EOF, and assisting in the activation of the ERO callout system as directed.

2.1.3 Shift Technical Advisor (STA) / Incident Assessor

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.

2.1.4 OSC Director

An on-shift Maintenance Team Leader shall fill the **Operations Support Center (OSC) Director** position until relieved by the ERO OSC Director. This position reports to the Shift Emergency Director until control of the OSC is transferred to the TSC.

2.1.5 The following functions will be performed by trained members of the normal shift complement:

1. **Firefighting**

   Specific personnel on each shift (Site Fire Brigade) are trained in firefighting to ensure such capability will be available 24 hours per day. The Fire Brigade, under the direction of the Fire Brigade Team Leader or another individual designated by him, shall respond to all confirmed fire alarms or as directed by the Control Room and report to the location of the fire with assigned equipment. During the normal work week, additional qualified firefighting personnel will, as necessary, be obtained from the normal on-site organization. Assistance will be requested from local fire departments through the county dispatcher / appropriate local dispatch system.

2. **First Aid and Search and Rescue**

   Medical emergencies and search and rescue operations will be the responsibility of the First Aid and Search and Rescue Teams. Specific personnel on each shift are trained in first aid techniques to ensure such assistance will be available 24 hours per day. Assistance will be requested from outside medical support personnel or organizations as deemed necessary.

2.2 Emergency Response Organization (ERO) Staffing

Refer to Table TMI 2-1 of the TMI Annex, "Minimum Staffing Requirements", for a comparison against the Exelon Nuclear Radiological Emergency Plan of 60-minute and full augmentation commitments. An illustration of the overall Exelon ERO command structure is provided in Figure TMI 2-1.

2.2.1 Emergency Onsite Organization (Figure TMI 2-2)

No changes in augmentation positions or staffing levels for the Technical Support Center (TSC) and Operations Support Center (OSC) from that specified in the Standard Plan.

2.2.2 Emergency Offsite Organization (Figure TMI 2-3)

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

An Operations Assistant has been added to augment EOF staffing and provide TMI specific Operations knowledge in support of the existing Technical Support Manager and Operations Advisor positions.

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

No changes in augmentation positions or staffing levels for the Joint Information Center (JIC)) and Emergency News Center (ENC) from that specified in the Exelon Nuclear Standardized Radiological Emergency Plan.

2.3 Emergency Response Organization (ERO) Training

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

TMI will offer training for hospital personnel, and ambulance and rescue, police and fire departments required to support implementation of the TMI Emergency Plan. This training shall include the procedures for notification, basic radiation protection and their expected roles. For those support organizations that must enter the site, training shall also include site access procedures and the identity (by title) of the individual in the site emergency organization who will control the organization's support activities.

2.4 Non-Exelon Nuclear Support Groups

The nature of an emergency may require augmenting the emergency organizations with assistance from additional personnel and organizations. In order to ensure that support from local law enforcement, fire departments, hospitals, ambulance services and other organizations will be available on relatively short notice, agreements have been established with personnel and organizations. Agreements from offsite individuals, groups and agencies that support TMI may take one of the following forms:

- Contracts
- Letters of Agreement
- Memoranda of Understanding
- Formal Emergency Plans

Refer to Appendix 2 for a listing of these support organizations.

2.4.1 Miscellaneous Organizations

- Other utilities
- Institute for Nuclear Power Operations (INPO)
- American Nuclear Insurers (ANI)
- AREVA
- Aviation services

2.4.2 Norfolk Southern Railroad Company

The Norfolk Southern Railway track crosses the access to the facility, and impeding site access could impact the implementation of time sensitive emergency actions. Theses emergency actions include augmentation of the Emergency Response Organization, use of off-site assistance, and evacuation of non-essential personnel. Therefore, a Memorandum Of Understanding (MOU) has been established with Norfolk Southern Railway Company. The purpose of the MOU is to ensure that stopped or disabled train traffic does not impede access to the island across the North Bridge for the duration of the emergency. This will provide reasonable assurances that there is sufficient time to allow implementation of emergency actions at TMI in the event of a declared emergency. The MOU with Norfolk Southern Railway Company will be reviewed every five years.

TABLE TMI 2-1: Minimum Staffing Requirements for TMI Station

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

TABLE TMI 2-1: Minimum Staffing Requirements for TMI Station (Cont'd)

Functional Area	Major Tasks	Emergency Positions	Minimum Staffing			Full Augmentation
			Shift Size	[a]60 Minute Augmentation	Other On-Call	
5. Plant System Engineering, Repair and Corrective Actions	Technical Support	STA / Incident Assessor[i] (CR)	1			
		Technical Manager (TSC)		1		
		Core/Thermal Hydraulics Engineer (TSC)		1		
		Mechanical Engineer (TSC)		1		
		Electrical Engineer (TSC)		1		
		SAMG Decision Maker (TSC)		1[b]		
		SAMG Evaluator (TSC)		2[b]		
		Operations Manager (TSC)		1		
		Radiation Controls Engineer (TSC)				1
	Repair and Corrective Actions[k]	Mechanical Maintenance [l] (OSC)	1 / 2[b]			(c)
		Electrical Maintenance / I&C [l] (OSC)	1 / 2[b]			(c)
		Maintenance Manager (TSC)		1		
		OSC Director (OSC)	1[b]	1		
		Assistant OSC Director (OSC)				1
		OPs Lead & Support Personnel (OSC)				(c)
	Accident Analysis	Technical Support Manager (EOF)				1
		Operations Advisor (EOF)				1
		Operations Assistant (EOF)				1
		Technical Advisor (EOF)				1
6. In-Plant Protective Actions	Radiation Protection	RP Technicians, or equivalent	2[b]	4		(c)
7. Fire Fighting	--	Fire Brigade[e]	6			
8. First Aid and Rescue Operations	--	Plant Personnel	2[b]			(c)
9. Site Access Control and Personnel Accountability	Security & Accountability	Security Team Personnel	(f)	(f)		
		Security Coordinator[q] (TSC/ EOF)				2
10. Resource Allocation and Administration	Logistics / Administration	Logistics Manager (EOF)		1		
		Logistics Coordinator (TSC)				1
		Administrative Coordinator (EOF)				1
		Clerical Staff (TSC/OSC/EOF)				(c)
		Events Recorder (EOF)				1
		Computer Specialist (EOF)				1

TABLE TMI 2-1: Minimum Staffing Requirements for TMI Station (Cont'd)

Functional Area	Major Tasks	Emergency Positions	Minimum Staffing			Full Augmentation
			Shift Size	[a]60 Minute Augmentation	[g]Other On-Call	
11. Public Information	Media Interface	Corporate Spokesperson (JIC)			1	
		Rad Protection Spokesperson (JIC)				1
		Technical Spokesperson (JIC)				1
	Information Development	Public Information Director (JIC)			1	
		News Writer (JIC)				1
	Media Monitoring and Rumor Control	Media Monitoring Staff (JIC)				(c)
		Rumor Control Staff (JIC(				(c)
	Facility Operation and Control	JIC Director (JIC)			1	
		JIC Coordinator (JIC)				1
		Administrative Coordinator (JIC)				1
		Events Recorder (JIC)				1
		Clerical Support (JIC)				(c)
		Access Control (JIC)				1
		TOTAL (Non-Collateral):	**20**	**30**	**3**	**34+**

Legend:

(a) Response time is based on optimum travel conditions.
(b) May be provided by personnel assigned other functions. Personnel can fulfill multiple functions.
(c) Personnel numbers depend on the type and extent of the emergency.
(d) 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.
(e) Fire Brigade per FSAR / TRM, as applicable. Includes one NSO for oversight in addition to the 5 Fire Brigade members per TMI Fire Plan.
(f) Function performed by on-shift security personnel.
(g) 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 JIC Director.
(h) Each Field Monitoring Team consists of a qualified Lead and Driver, trained in plume monitoring and air sample collection, as appropriate to designated task. Qualified on-shift personnel may also be mobilized, if required based on event, to support initial field monitoring requirements.
(i) Refer to Section 2.1.3 for description of on-shift STA/Incident Assessor staffing requirements.
(j) TSC Security Coordinator position will be staffed by TMI Security personnel. The EOF Security Coordinator position will be staffed by Corporate personnel.
(k) Must include one Senior Maintenance Technician on-shift.
(l) This function shall be one dedicated maintenance technician with two additional technicians that can be filled by personnel assigned other functions (i.e., Fire Brigade) one of which may be a non-licensed operator.

FIGURE TMI 2-1: Exelon Overall ERO Command Structure

Bolded Boxes indicate minimum staffing positions.

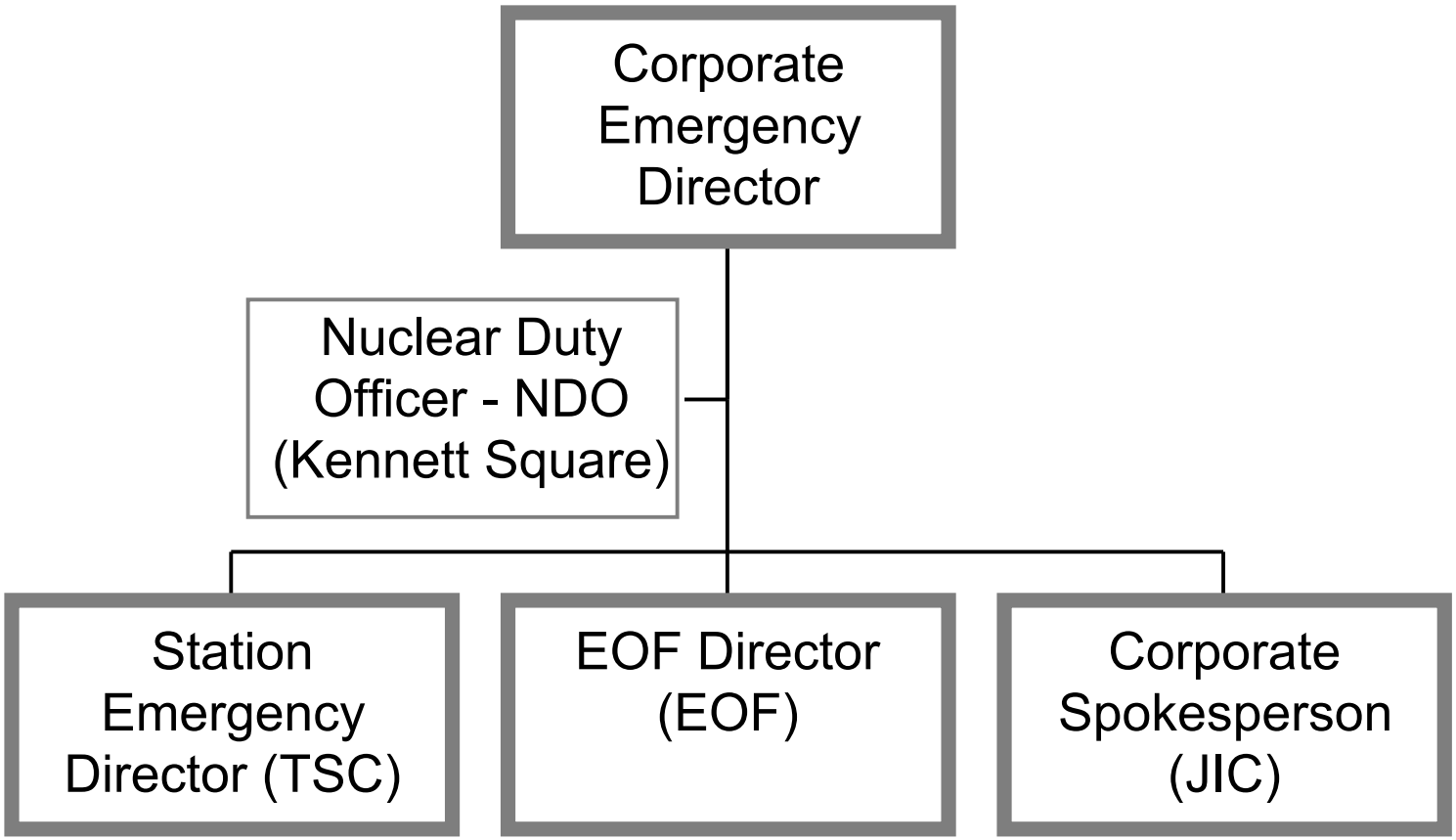
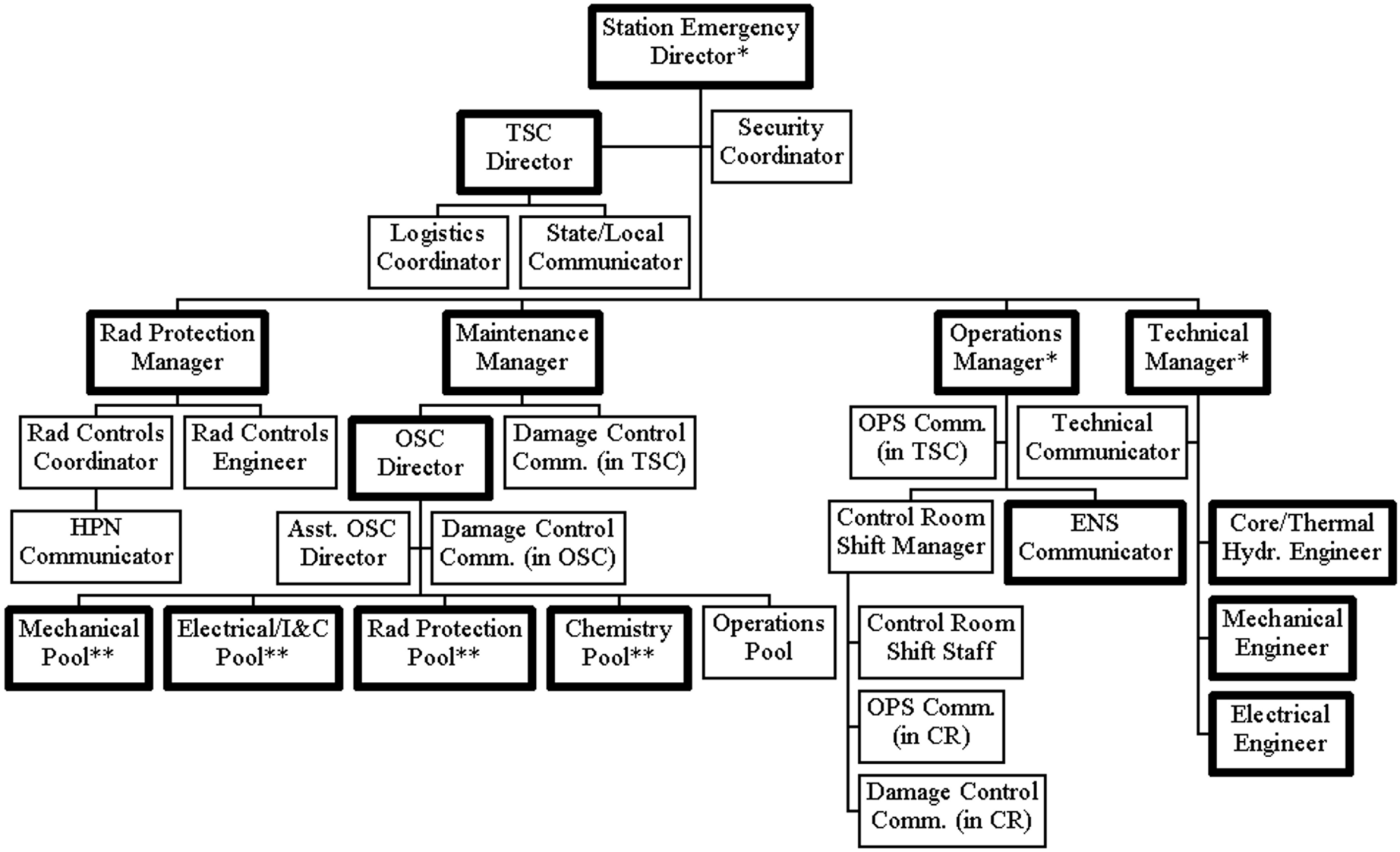


FIGURE TMI 2-2: Onsite ERO (Technical Support Center / Operations Support Center)

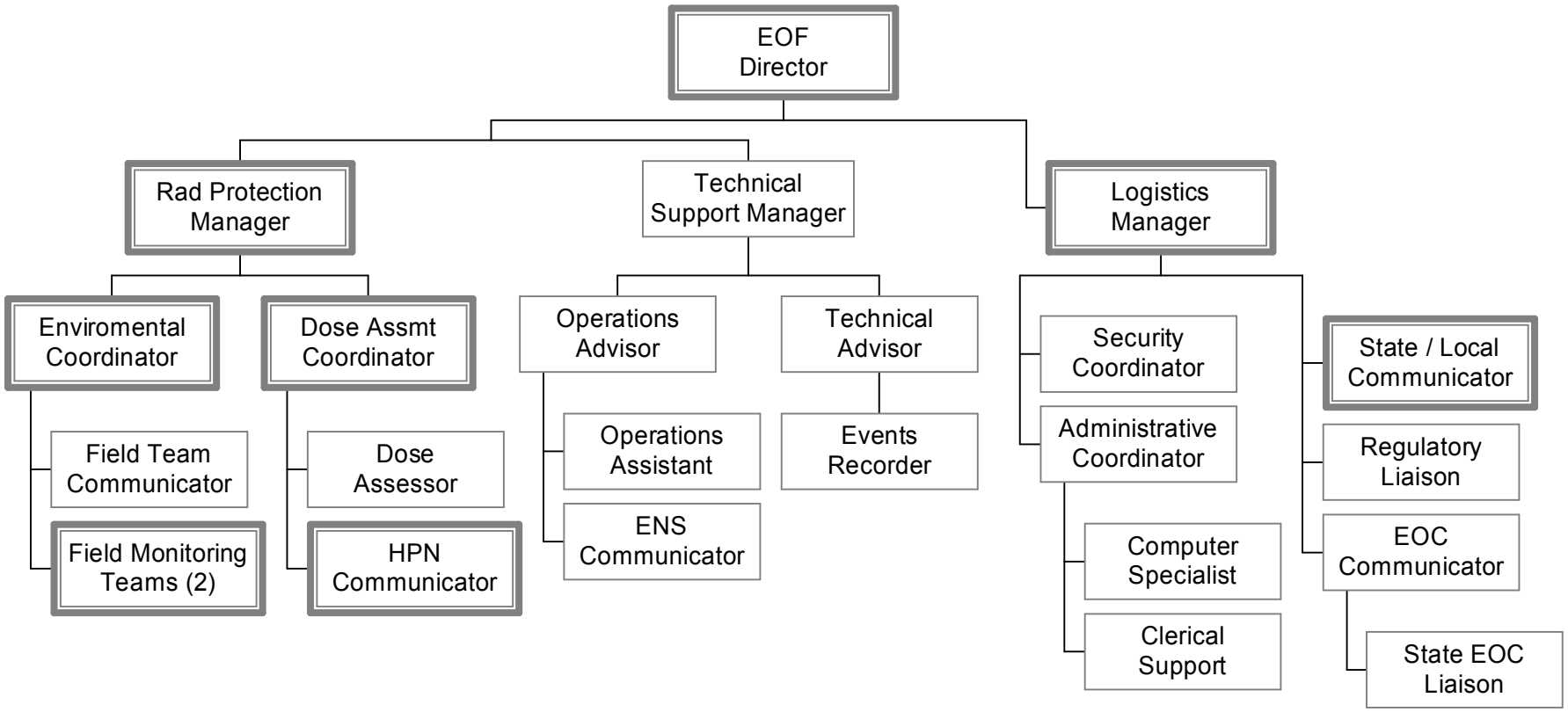


Bolded Boxes indicate minimum staffing positions.

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

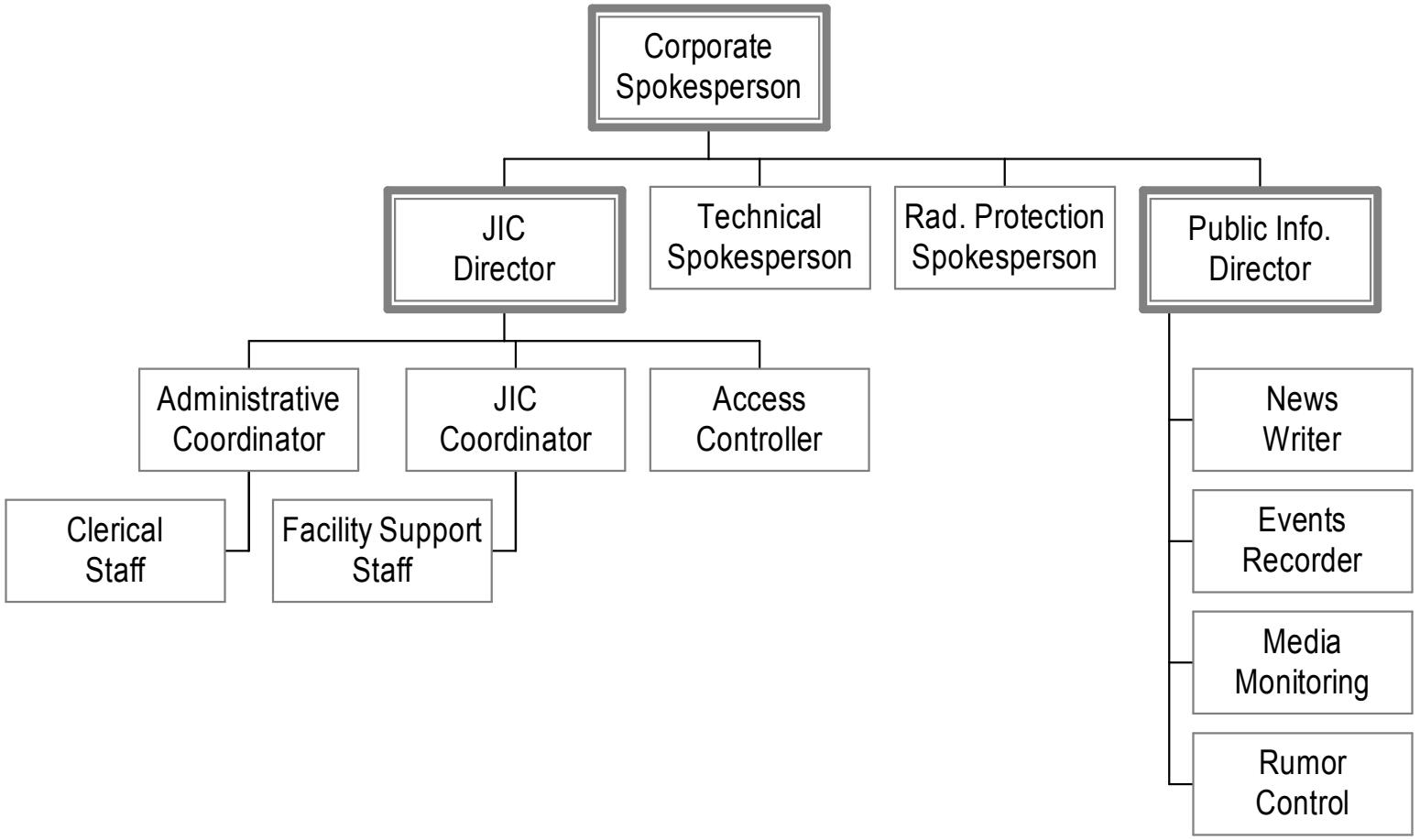
** Refer to Table TMI 2-1 for required staffing levels

FIGURE TMI 2-3: Offsite ERO (Emergency Operations Facility)



Bolded Boxes indicate minimum staffing positions.

FIGURE TMI 2-4: Emergency Public Information Organization



Bolded Boxes indicate minimum staffing positions.

Section 3: Classification of Emergencies

3.1 General

Section D of the Exelon Nuclear Standardized Emergency Plan divides the types of emergencies into four Emergency Classification Levels (ECLs). They are the UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY, and GENERAL EMERGENCY. These ECLs are entered by meeting the Emergency Action Level (EAL) Threshold Values provided in this section of the Annex. The ECLs are escalated from least severe to most severe according to relative threat to the health and safety of the public and emergency workers. Depending on the severity of an event, prior to returning to a standard day-to-day organization, a state or phase called RECOVERY may be entered to provide dedicated resources and organization in support of restoration and communication activities following the termination of the emergency.

UNUSUAL EVENT: Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

ALERT: Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

SITE AREA EMERGENCY: Events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels, which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

GENERAL EMERGENCY: Events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

RECOVERY: Recovery can be considered as a phase of the emergency and is entered by meeting emergency termination criteria provided in EP-AA-111 Emergency Classification and Protective Action Recommendations.

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 6 are defined in the Technical Specifications (T.S). "Defueled" Mode was established for classification purposes to reflect conditions where all fuel has been removed from the Reactor Pressure Vessel.

Mode	Description
1	**Power Operation:** The plant is in the Power Operation (PwrOps) condition when the indicated neutron power is two percent of rated power, or greater, as indicated on the power range channels.
2	**Startup / Hot Standby**: The plant shall be considered to be in the Startup (SU) mode when the shutdown margin is reduced with the intent of going critical. The plant is in the Hot Standby (HStby) condition when all of the following conditions exist: a. T_{avg} is greater than 525°F b. The reactor is critical c. Indicated neutron power on the power range channels is less than two percent of rated power.
3	**Hot Shutdown:** The plant is in the Hot Shutdown (HSD) condition when the reactor is subcritical by at least one percent delta k/k and T_{avg} is at or greater than 525°F.
4	**Heatup/Cooldown:** The plant is in the Heatup/Cooldown (HU/CD) condition when the reactor coolant temperature is greater than 200°F and less than 525°F.
5	**Cold Shutdown:** The plant is in the Cold Shutdown (CSD) Condition when the reactor is subcritical by at least one percent delta k/k and T_{avg} is no more than 200°F. Additionally the reactor coolant system pressure allowed is defined by Technical Specification 3.1.2.

6	**Refueling:** The plant is in the Refueling condition when, even with all of the control rods removed, the reactor would be subcritical by at least one percent delta k/k and the reactor coolant temperature at the decay heat removal pump suction is no more than 140°F. Additionally, the allowable reactor coolant system pressure is defined by Technical Specification 3.1.2.
D	**Defuel:** No fuel in the Reactor Vessel

Hot Matrix - applies in modes (1), (2), (3) and (4)

Cold Matrix - applies in modes (5), (6), and (D)

Individuals responsible for the classification of events will refer to the Initiating Condition and Threshold Values on the matrix of the appropriate station Standardized Emergency Plan Annex (this document). This matrix will contain Initiating Conditions, EAL Threshold Values, Mode Applicability Designators, appropriate EAL numbering system, and additional guidance necessary to classify events. It may be provided as a user aid.

The matrix is set up in five Recognition Categories. The first is designated as "R" and relates to Abnormal Radiological Conditions / Abnormal Radiological Effluent Releases. The second is designated as "F" and relates to Fission Product Barrier Degradation. The third is designated as "M" and relates to hot condition System Malfunctions. The fourth is designated as "C" and relates to Cold Shutdown / Refueling System Malfunctions. The fifth is designated as "H" and relates to Hazards and Other Conditions.

The 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.

The Initiating Conditions are coded with a two letter and one number code. The first letter is the Recognition Category designator, the second letter is the Classification Level, “U” for (NOTIFICATION OF) UNUSUAL EVENT, “A” for ALERT, “S” for SITE AREA EMERGENCY and “G” for GENERAL EMERGENCY. The EAL number is a sequential number for that Recognition Category series. All Initiating Conditions that are describing the severity of a common condition (series) will have the same number.

The EAL number may then be used to reference a corresponding page(s), which provides the basis information pertaining to the Initiating Condition:

- Threshold Value
- Mode Applicability
- Basis

Emergency Action Levels are the measurable, observable detailed conditions that must be met in order to classify the event. Classification is not to be made without referencing, comparing and satisfying the Threshold Values specified in the Emergency Action Levels.

A list of definitions is provided as part of this document for terms having specific meaning to the Emergency Action Levels. Site specific definitions are provided for terms with the intent to be used for a particular Initiating Condition/Threshold Value and may not be applicable to other uses of that term at other sites, the Emergency Plan or procedures.

References are also included to documents that were used to develop the EAL Threshold Values.

References to the Emergency Director means the person in Command and Control as defined in the Emergency Plan. Classification of emergencies is a non-delegable responsibility of Command and Control for the onsite facilities with responsibility assigned to the Shift Emergency Director (Control Room Shift Manager) or the Station Emergency Director (TSC). Classification of emergencies remains the responsibility of the applicable onsite facility even after Command and Control is transferred to the Corporate Emergency Director (EOF).

3.2 Classification, Instrumentation and Transient Events

Although the majority of the EALs provide very specific thresholds, the Emergency Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL is IMMINENT. If, in the judgment of the Emergency Director, an IMMINENT situation is at hand, the classification should be made as if the threshold has been exceeded. While this is particularly prudent at the higher emergency classification levels (as the early classification may provide for more effective implementation of protective measures), it is nonetheless applicable to all emergency classification levels.

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 indications, or (3) by direct observation by plant personnel, such that doubt related to the indication's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

Indications used for monitoring and evaluation of plant conditions include the normally used instrumentation, backup or redundant instrumentation, and the use

of other parameters that provide information that supports determination if an EAL threshold value has been reached. When an EAL refers to a specific instrument or indication that is determined to be inaccurate or unavailable, then alternate indications shall be used to monitor the specified condition.

During an event that results in changing parameters trending towards an EAL classification, and instrumentation that was available to monitor this parameter becomes unavailable or the parameter goes off scale, the parameter should be assumed to have been exceeded and the classification made if there are no other direct or indirect means available to determine if the threshold has not been exceeded.

Planned evolutions involve preplanning to address the limitations imposed by the condition, the performance of required surveillance testing, and the implementation of specific controls prior to knowingly entering the condition in accordance with the specific requirements of the site's Technical Specifications. Activities which cause the site to operate beyond that allowed by the site's Technical Specifications, planned or unplanned, may result in an EAL threshold being met or exceeded. Planned evolutions to test, manipulate, repair, perform maintenance or modifications to systems and equipment that result in an EAL value being met or exceeded are not subject to classification and activation requirements as long as the evolution proceeds as planned and is within the operational limitations imposed by the specific operating license. However, these conditions may be subject to the reporting requirements of 10 CFR 50.72.

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.

Concerning Classification Downgrading Exelon Nuclear policy is that emergency classifications shall not be downgraded to a lower classification. Once declared, the event shall remain in effect until no Classification is warranted or until such time as conditions warrant classification to Recovery.

There may be cases in which a plant condition that exceeded an EAL was not recognized at the time of occurrence but is identified well after the condition has occurred (e.g., as a result of routine log or record review), and the condition no longer exists. In these cases, an emergency should not be declared. Reporting requirements of 10 CFR 50.72 are applicable, the guidance of NUREG-1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73 and the Reportability Reference Manual, should be applied.

3.3 Mode Applicability

The plant-operating mode that existed at the time that the event occurred, prior to any protective system or operator action initiated in response to the condition, is compared to the mode applicability of the EALs. If an event occurs, and a lower or higher plant-operating mode is reached before the emergency classification can be made, the declaration shall be based on the mode that existed at the time the event occurred.

For events that occur in Cold Shutdown or Refueling, escalation is via EALs that have Cold Shutdown or Refueling for mode applicability, even if Mode 4 (or a higher mode) is entered during any subsequent heat-up. In particular, the Fission Product Barrier Matrix EALs are applicable only to events that initiate in Mode 4 or higher.

If there is a change in Mode following the initial event declaration, any subsequent events will be evaluated on the existing Mode of the plant at the time the conditions occur.

3.4 Emergency Director Judgment

Emergency Director Judgment EALs are provide in the Hazards and Other Condition Affecting Plant Safety section and on the Fission Product Barrier Matrix. Both of the Emergency Director Judgment EALs have specific criteria for when they should be applied.

The Hazards Section Emergency Director Judgment EALs are intended to address unanticipated conditions which are not addressed explicitly by other EALs but warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under specific emergency classifications (UE, Alert, SAE or GE).

The FPB Matrix ED Judgment EALs are intended to include unanticipated conditions, which are not addressed explicitly by any of the other FPB threshold values, but warrant determination because conditions exist that fall under the broader definition for a significant Loss or Potential Loss of the barrier (equal to or greater than the defined FPB threshold values).

3.5 Fission Product Barrier Restoration

Fission Product Barrier (FPB) thresholds are not treated the same as EAL threshold values. Conditions warranting declaration of the loss or potential loss of a Fission Product Barrier may occur resulting in a specific classification. The condition that caused the loss or potential loss declaration could be rectified as the result of Operator action, automatic actions, or designed plant response. Barriers will be considered re-established when there are direct verifiable indications (containment penetration or open valve has been isolated, coolant sample results, etc) that the barrier has been restored and is capable of mitigating future events.

The reestablishment of a fission product barrier does not alter or lower the existing classification. Entry into Termination/Recovery phase is still required for exiting the present classification. However the reestablishment of the barrier should be considered in determining future classifications should plant conditions or events change.

3.6 Definitions

AFFECTING SAFE SHUTDOWN: Event in progress has adversely affected functions that are necessary to bring the plant to and maintain it in the applicable HOT or COLD SHUTDOWN condition. Plant condition applicability is determined by Technical Specification LCOs in effect.

Example 1: Event causes damage that results in entry into an LCO that requires the plant to be placed in HOT SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is not "AFFECTING SAFE SHUTDOWN."

Example 2: Event causes damage that results in entry into an LCO that requires the plant to be placed in COLD SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is "AFFECTING SAFE SHUTDOWN."

BOMB: An explosive device suspected of having sufficient force to damage plant systems or structures.

CIVIL DISTURBANCE: A group of persons violently protesting station operations or activities at the site.

CONFINEMENT BOUNDARY: The barrier(s) between areas containing radioactive substances and the environment.

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

EXTORTION: An attempt to cause an action at the station by threat of force.

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fire. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTILE FORCE: One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

INTRUSION: A person(s) present in a specified area without authorization. Discovery of a BOMB in a specified area is indication of INTRUSION into that area by a HOSTILE FORCE.

NORMAL LEVELS: Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

NORMAL PLANT OPERATIONS: Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

OWNER CONTROLLED AREA (OCA): The property associated with the station and owned by the company. Access is normally limited to persons entering for official business.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

RUPTURED: In a steam generator, existence of primary-to-secondary leakage of a magnitude sufficient to require or cause a reactor trip and safety injection.

SABOTAGE: A deliberate damage, mis-alignment, or mis-operation of plant equipment with the intent to render the equipment inoperable. Equipment found tampered with or damaged due to malicious mischief may NOT meet the definition of SABOTAGE until this determination is made by security supervision.

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

SIGNIFICANT TRANSIENT: is an UNPLANNED event involving one or more of the following: (1) automatic runback >25% thermal reactor power, (2) electrical load rejection >25% full electrical load, (3) Reactor Trip, (4) Safety Injection Actuation, or (5) thermal power oscillations >10%.

STRIKE ACTION: A work stoppage within the PROTECTED AREA by a body of workers to enforce compliance with demands made on management. The STRIKE ACTION must threaten to interrupt NORMAL PLANT OPERATIONS.

UNISOLABLE: A breach or leak that cannot be promptly isolated.

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

3.7 Response to a TMI-2 Emergency

TMI-2 alarms will be monitored on a 24-hour a day basis remotely from Unit 1 or by another appropriate location in the event of a failure of the remote monitoring system. For failures of specific local alarm capabilities, local conditions will be monitored in accordance with the applicable procedures.

A TMI-2 related emergency will be reported to the TMI-1 Control Room. TMI-1 Control Room personnel will assess and evaluate the situation; classify the event as required based on impact to TMI-1 and the site per the EALs; and provide the appropriate response. When direct monitoring is in effect the individual may leave the monitoring point in order to provide direct assistance to the TMI response team provided that he/she does not leave the monitoring point unattended in excess of one hour for any single event.

3.8 State, County and Local Classification System

State, county and local emergency plans incorporate the same emergency classification system as that utilized by TMI in this Plan. Since both the State and TMI classification schemes include events, which have significant potential for radioactive releases, it is imperative that specific guidance for initiating protective actions be available to the "decision-making" personnel in emergency response organizations and agencies. The Commonwealth of Pennsylvania has, for planning purposes, adopted the Environmental Protection Agency (EPA) protective action guides (PAG's).

Table TMI 3-1: Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Abnormal Rad Levels / Radiological Effluent				
Radiological Effluents	**RG1** Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. [1][2][3][4][5][6][D] **EAL Threshold Values:** **Note**: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results. 1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**: **OR** 2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**: a. **> 1000 mRem TEDE** **OR** b. **> 5000 mRem CDE Thyroid** **OR** 3. Field survey results at or beyond Site Boundary indicate **EITHER**: a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**. **OR** b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.	**RS1** Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. [1][2][3][4][5][6][D] **EAL Threshold Values:** **Note**: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results. 1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**: **OR** 2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**: a. **> 100 mRem TEDE** **OR** b. **> 500 mRem CDE Thyroid** **OR** 3. Field survey results at or beyond Site Boundary indicate **EITHER**: a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**. **OR** b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.	**RA1** Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer. [1][2][3][4][5][6][D] **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown. 1. VALID reading on any of the following effluent monitors > **200 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 15 minutes**. • RM-L-6, Radwaste Discharge • RM-L-12, IWTS / IWFS Discharge • RM-A-7, Waste Gas Decay Tank Discharge • Discharge Permit specified monitor **OR** 2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**. **OR** 3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.	**RU1** Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer. [1][2][3][4][5][6][D] **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown. 1. VALID reading on any of the following effluent monitors > **2 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 60 minutes**. • RM-L-6, Radwaste Discharge • RM-L-12, IWTS / IWFS Discharge • RM-A-7, Waste Gas Decay Tank Discharge • Discharge Permit specified monitor **OR** 2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 60 minutes**. **OR** 3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Modes: **1** – Power Operations **2** – Startup / Hot Standby **3** – Hot Shutdown **4** – Heatup / Cooldown **5** – Cold Shutdown **6** – Refuel **D** – Defuel

Table R1 -- Effluent Monitor Thresholds

Monitor	General Emergency	Site Area Emergency	Alert	Unusual Event
RM-G-25 (Cond Offgas)	9.53 E+06 mR/hr	9.53 E+05 mR/hr	1.09 E+05 mR/hr	1.09 E+03 mR/hr
RM-A-8 GH (Station Vent)	3.09 E+05 cpm	3.09 E+04 cpm	3.57 E+03 cpm	7.03 E+01 cpm
RM-G-24 (RB Purge)	5.55 E+05 mR/hr	5.55 E+04 mR/hr	6.34 E+03 mR/hr	6.34 E+01 mR/hr
RM-A-14 (ESF Vent)	6.66 E+02 μCi/cc	6.66 E+01 μCi/cc	7.60 E+00 μCi/cc	7.60 E-02 μCi/cc

Table TMI 3-1: Emergency Action Level (EAL) Matrix

Abnormal Rad Levels / Radiological Effluent

GENERAL EMERGENCY

Table R2 - Radiation Monitors

RMS	Area Monitored	Mode
RM-G-9	FHB Bridge Rad Monitor	All
RM-G-6	RB Auxiliary Bridge Rad Monitor	5, 6
RM-G-7	RB Main Bridge Rad Monitor	5, 6

Table R3
Areas Requiring Continuous Occupancy

- Main Control Room
- Central Alarm Station - (by survey)

SITE AREA EMERGENCY

RA2 Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel. 1 2 3 4 5 6 D

EAL Threshold Values:

1. VALID reading **> 1000 mR/hr** on any Table R2 Radiation Monitor due to **EITHER**:
   - Damaged irradiated fuel.

   OR
   - Water level drop.

   OR
2. Water level drop in the Spent Fuel Pool or Fuel Transfer Canal that will result in irradiated fuel becoming uncovered.

RA3 Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. 1 2 3 4 5 6 D

EAL Threshold Values:

Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R3) to maintain plant safety functions.

ALERT

RA2 Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel. 1 2 3 4 5 6 D

EAL Threshold Values:

1. VALID reading **> 1000 mR/hr** on any Table R2 Radiation Monitor due to **EITHER**:
   - Damaged irradiated fuel.

   OR
   - Water level drop.

   OR
2. Water level drop in the Spent Fuel Pool or Fuel Transfer Canal that will result in irradiated fuel becoming uncovered.

RA3 Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. 1 2 3 4 5 6 D

EAL Threshold Values:

Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R3) to maintain plant safety functions.

UNUSUAL EVENT

RU2 UNPLANNED rise in plant radiation levels. 1 2 3 4 5 6 D

EAL Threshold Values:

1. a. UNPLANNED water level drop in the Spent Fuel Pool or Fuel Transfer Canal.

   AND

   b. VALID rise on one or more of the following radiation monitors in Table R2.

   OR
2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.

RU3 Fuel Clad Degradation. 1 2 3 4

EAL Threshold Values:

Fuel clad degradation resulting in:

- Letdown Monitor RM-L-1 **alert alarm** (high or low channel).

  OR
- Dose Equivalent I-131 specific coolant activity **> 60.0 µCi/gm**

  OR
- Dose Equivalent XE-133 specific coolant activity **> 797.0 µCi/gm**.

Modes: **1** – Power Operations **2** – Startup / Hot Standby **3** – Hot Shutdown **4** – Heatup / Cooldown **5** – Cold Shutdown **6** – Refuel **D** – Defuel

Fission Product Barrier Matrix

Hot Matrix

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
FG1 Loss of ANY Two Barriers AND Loss or Potential Loss of third barrier. 1 2 3 4	**FS1** Loss or Potential Loss of ANY two barriers. 1 2 3 4	**FA1** ANY Loss or ANY Potential Loss of either Fuel Clad or RCS. 1 2 3 4	**FU1** ANY Loss or ANY Potential Loss of Containment. 1 2 3 4

Sub-Category	FC - Fuel Clad		RC – Reactor Coolant System		CT - Containment	
	Loss	Potential Loss	Loss	Potential Loss	Loss	Potential Loss
1. RCS Activity	Coolant activity **> 300 uCi/gm** Dose Equivalent I-131.	None	None	None	None	None
2. Containment Pressure	None	None	None	None	1. Rapid unexplained drop in Containment pressure following initial pressure rise. **OR** 2. Containment pressure or water level response **not** consistent with LOCA conditions.	3. Containment pressure **≥ 55 psig** and rising. **OR** 4. Hydrogen concentration in Containment **≥ 4%.** **OR** 5. a. Containment pressure **≥ 30 psig.** **AND** b. RB Emergency Cooling is less than any one of the following conditions: SPRAY 2 0 1 / COOLERS 0 3 1
3. CETC Reading	1. T_{clad} **> 1400°F**	2. **> 25°F** Super Heat.	None	None	None	1. T_{clad} **≥ 1800°F** **AND** 2. EOP restoration procedures are **not** effective within **15 minutes**.
4. Reactor Vessel Water Level / RCS Leak Rate	None	1. RCITS hot leg instruments indicate **0 inches** after lowering trend. **AND** 2. In-core Thermocouples are unavailable. **AND** 3. All RCPs are secured.	1. RCS leakage results in **< 25°F** Sub-Cooled Margin.	2. UNISOLABLE leak **> 150 gpm**. **OR** 3. HPI-PORV Cooling in effect. **OR** 4. a. RCS pressure **> 2450 psig.** **AND** b. RCS pressure **not** lowering.	None	None
5. S/G Leakage / Rupture	None	None	Steam Generator Tube Rupture that requires/results in an ESAS Actuation.	None	1. Primary-to-Secondary leakrate **> 10 gpm**. **AND** 2. UNISOLABLE steam release from affected S/G to the environment.	None
6. Containment Isolation Valve Status	None	None	None	None	1. Failure of isolation valves in any one line to close. **AND** 2. Direct downstream pathway to the environment exists after a containment isolation signal.	None
7. Containment Rad Monitoring	Containment radiation (RM-G-22 or RM-G-23) reading **> 1.95E+03 R/hr**.	None	Containment radiation (RM-G-22 or RM-G-23) reading **> 25 R/hr.**	None	None	Containment radiation (RM-G-22 or RM-G-23) reading **> 4.40E+03 R/hr**
8. ED Judgment	1. Any condition in the opinion of the Emergency Director that indicates Loss of the Fuel Clad Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Fuel Clad Barrier.	1. Any condition in the opinion of the Emergency Director that indicates Loss of the RCS Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the RCS Barrier.	1. Any condition in the opinion of the Emergency Director that indicates Loss of the Containment Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment Barrier.

Modes: **1** – Power Operations **2** – Startup / Hot Standby **3** – Hot Shutdown **4** – Heatup / Cooldown **5** – Cold Shutdown **6** – Refuel **D** – Defuel

Table TMI 3-1: Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
Loss of AC Power	**MG1** Prolonged loss of all offsite power and all On-Site AC power to emergency busses. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to Emergency 4KV Buses. **AND** 2. Failure of EG-Y-1A, EG-Y-1B Emergency Diesel Generators and EG-Y-4 SBO Diesel Generator to supply power to Emergency 4KV Buses. **AND** 3. a. Restoration of at least one Emergency 4KV Bus in **< 4 hours** is **not** likely. **OR** b. **> 25°F superheat**	**MS1** Loss of all Off-site and all On-Site AC power to emergency busses for 15 minutes or longer. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to Emergency 4KV Buses. **AND** 2. Failure of EG-Y-1A, EG-Y-1B Emergency Diesel Generators and EG-Y-4 SBO Diesel Generator to supply power to Emergency 4KV Buses. **AND** 3. Failure to restore power to either Emergency 4KV Bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.	**MA1** AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. AC power capability to Emergency 4KV Buses reduced to only one of the following power sources for **≥ 15 minutes**: • Auxiliary Transformer 1A • Auxiliary Transformer 1B • Emergency Diesel EG-Y-1A • Emergency Diesel EG-Y-1B • SBO Diesel generator EG-Y-4 **AND** 2. Any additional single failure will result in station blackout.	**MU1** Loss of all Off-site AC power to busses for 15 minutes or longer. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of Offsite power to Emergency 4KV Buses for **≥ 15 minutes**.
RPS Failure / Inadvertent Criticality	**MG2** Automatic Trip and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists. 1 2 **EAL Threshold Values:** 1. Automatic Reactor Trip was **not** successful as indicated by Reactor Power **≥ 5%**. **AND** 2. Manual actions were **not** successful as indicated by Reactor Power **≥ 5%**. **AND** 3. **EITHER** of the following exists: • Tclad **> 1400 °F**. **OR** • ALL means of heat removal (MFW/EFW/HPI PORV Cooling) lost.	**MS2** Automatic Trip fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor. 1 2 **EAL Threshold Values:** 1. Automatic Reactor Trip was **not** successful as indicated by Reactor Power **≥ 5%**. **AND** 2. Manual Reactor Trip from Console Center was **not** successful as indicated by Reactor Power **≥ 5%**.	**MA2** Automatic Trip fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor. 1 2 **EAL Threshold Values:** 1. Automatic Reactor Trip was **not** successful as indicated by Reactor Power **≥ 5%**. **AND** 2. Manual Reactor Trip from Console Center was successful as indicated by Reactor Power **< 5%**.	**MU2** Inadvertent criticality. 3 4 **EAL Threshold Values:** UNPLANNED sustained positive startup rate observed on nuclear instrumentation.

Modes: **1** – Power Operations **2** – Startup / Hot Standby **3** – Hot Shutdown **4** – Heatup / Cooldown **5** – Cold Shutdown **6** – Refuel **D** – Defuel

Table TMI 3-1: Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
DC Power		**MS3** Loss of all vital DC power for 15 minutes or longer.. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of all vital DC power based on **< 105 VDC** on 125 VDC Distribution System 1A and 1B for **≥ 15 minutes**.		
Annunciators		**MS4** Inability to monitor a SIGNIFICANT TRANSIENT in progress. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1) **AND** 2. SIGNIFICANT TRANSIENT in progress (Table M2). **AND** 3. Compensatory indications (computer points) are unavailable.	**MA4** UNPLANNED Loss of safety system annunciation or indication in the control room with EITHER (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1) **AND** 2. a. SIGNIFICANT TRANSIENT in progress (Table M2). **OR** b. Compensatory indications (computer points) are unavailable.	**MU4** UNPLANNED loss of safety system annunciation or indication in the control room for 15 minutes or longer. 1 2 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1)

Table M1 - Safety Systems		Table M2 - Significant Transients
• ESAS • RPS • Radiation Monitors • Core Flood	• EFW / HSPS • Diesel Generators • ES Electrical • BWST	• Automatic Runback **> 25%** thermal reactor power • Electrical load rejection **> 25%** full electrical load • Reactor Trip • Safety Injection Actuation • Thermal power oscillations **> 10%**

Table TMI 3-1: Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
RCS Leak				**MU5** RCS leakage. 1 2 3 4 **EAL Threshold Values:** 1. Unidentified or pressure boundary leakage **> 10 gpm**. **OR** 2. Identified leakage **> 25 gpm**.
Communications		**Table M3 - Communications Capability** System / Onsite / Offsite Radios / X / Plant page / X / Plant Telephone System / X / Sound Powered Phones / X / Satellite Phones / / X ENS / / X Cellular Phones / / X Commercial Telephone System / / X		**MU6** Loss of all On-site or Off-site communications capabilities. 1 2 3 4 **EAL Threshold Values:** 1. Loss of all Table M3 **Onsite** communications capability affecting the ability to perform routine operations. **OR** 2. Loss of all Table M3 **Offsite** communications capability.
T. S. Time				**MU7** Inability to reach required shutdown within Technical Specification limits. 1 2 3 4 **EAL Threshold Values:** Plant is **not** brought to required operating mode within Technical Specifications LCO Action Statement Time.

Modes: **1** – Power Operations **2** – Startup / Hot Standby **3** – Hot Shutdown **4** – Heatup / Cooldown **5** – Cold Shutdown **6** – Refuel **D** – Defuel

Table TMI 3-1: Emergency Action Level (EAL)

Hazards and Other Conditions Affecting Plant Safety

Security

GENERAL EMERGENCY

HG1 HOSTILE ACTION resulting in loss of physical control of the facility. 1 2 3 4 5 6 D

EAL Threshold Values:

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1).

   OR

2. A HOSTILE ACTION has:
   - Caused failure of Spent Fuel Pool Cooling Systems

     AND

   - IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).

SITE AREA EMERGENCY

HS1 HOSTILE ACTION within the PROTECTED AREA. 1 2 3 4 5 6 D

EAL Threshold Values:

A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.

ALERT

HA1 HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. 1 2 3 4 5 6 D

EAL Threshold Values:

1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site.

   OR

2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.

UNUSUAL EVENT

HU1 Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant. 1 2 3 4 5 6 D

EAL Threshold Values:

1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities.

   OR

2. A validated notification from NRC providing information of an aircraft threat.

   OR

3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

C. R. Evacuation

Table H1 - Safety Functions

- Reactivity Control (ability to shut down the reactor and keep it shutdown)
- RCS Inventory (ability to cool the core)
- Secondary Heat Removal (ability to maintain heat sink)

SITE AREA EMERGENCY

HS2 Control Room evacuation has been initiated and plant control cannot be established. 1 2 3 4 5 6 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Control Room evacuation has been initiated.

   AND

2. Control of the plant **cannot** be established per OP-TM-EOP-020 **< 15 minutes**.

ALERT

HA2 Control Room evacuation has been initiated. 1 2 3 4 5 6 D

EAL Threshold Values:

Entry into OP-TM-EOP-020 and Control Room evacuation is required.

Fire / Explosion

Table H2 – Vital Areas

- Reactor Building
- Intake Building
- Intermediate Building
- Control Tower
- Auxiliary & Fuel Handling Buildings
- 1A and 1B Diesel Generator Buildings
- BWST
- CST

ALERT

HA3 FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown. 1 2 3 4 5 6 D

EAL Threshold Values:

FIRE or EXPLOSION resulting in any of the following:

- VISIBLE DAMAGE to a Table H2 permanent structure.

  OR

- VISIBLE DAMAGE to safety system equipment contained within a Table H2 area.

  OR

- Control Room indication of degraded safety system equipment performance contained within a Table H2 area.

UNUSUAL EVENT

HU3 FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA. 1 2 3 4 5 6 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm.

   OR

2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

Modes: **1** – Power Operations **2** – Startup / Hot Standby **3** – Hot Shutdown **4** – Heatup / Cooldown **5** – Cold Shutdown **6** – Refuel **D** – Defuel

Table TMI 3-1: Emergency Action Level (EAL) Matrix

Hazards and Other Conditions Affecting Plant Safety

Natural / Destructive Phenomena

Table H2 - Vital Areas

- Reactor Building
- Intake Building
- Intermediate Building
- Control Tower
- Auxiliary & Fuel Handling Buildings
- 1A and 1B Diesel Generator Buildings
- BWST
- CST

ALERT

HA4 Natural and destructive phenomena affecting VITAL AREAS [1][2][3][4][5][6][D]

EAL Threshold Values:

1. a. Seismic event **> Operating Basis Earthquake (OBE)** as indicated by seismic Alarm **PRF-1-3** Operating Basis Earthquake.

   AND

   b. Confirmed by **EITHER:**

   - Earthquake felt in plant.

     OR

   - National Earthquake Center.

     OR

   - Control Room indication of degraded performance of systems required for the safe shutdown of the plant.

   OR

2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area:

   - Tornado strike

     OR

   - High winds **> 80 mph**

     OR

   - Vehicle crash

     OR

   - Turbine failure-generated PROJECTILES

   OR

3. Flooding in Auxiliary or Intermediate Building that results in **EITHER**:

   - Degraded safety system performance as indicated in the Control Room.

     OR

   - Industrial safety hazards (e.g., electric shock) that preclude access to operate or monitor safety equipment.

   OR

4. Abnormal river water level at the Intake Pump and Screen House as indicated by **EITHER:**

   - **> 302 ft. el.** (high level)

     OR

   - **< 271 ft. el.** (low level)

UNUSUAL EVENT

HU4 Natural and destructive phenomena affecting the PROTECTED AREA. [1][2][3][4][5][6][D]

EAL Threshold Values:

1. a. Seismic event as indicated by seismic Alarm **PRF-1-2**, Threshold Seismic Condition.

   AND

   b. Confirmed by **EITHER**:

   - Earthquake felt in plant.

     OR

   - National Earthquake Center.

   OR

2. **EITHER** of the following occurring within the PROTECTED AREA boundary:

   - Tornado strike

     OR

   - Sustained **(> 15 minutes)** high winds **> 80 mph**

   OR

3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

   OR

4. Flooding that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode in **EITHER:**

   - Auxiliary Building

     OR

   - Intermediate Building

   OR

5. Abnormal river water level at the Intake Pump and Screen House as indicated by **EITHER:**

   - **> 300 ft. el.** (high level)

     OR

   - **< 274 ft. el.** (low level)

Modes: **1** – Power Operations **2** – Startup / Hot Standby **3** – Hot Shutdown **4** – Heatup / Cooldown **5** – Cold Shutdown **6** – Refuel **D** – Defuel

Table TMI 3-1: Emergency Action Level (EAL) Matrix

Hazards and Other Conditions Affecting Plant Safety

Toxic / Flammable Gas

Table H2 - Vital Areas

- Reactor Building
- Intake Building
- Intermediate Building
- Control Tower
- Auxiliary & Fuel Handling Buildings
- 1A and 1B Diesel Generator Buildings
- BWST
- CST

HA5 Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor. 1 2 3 4 5 6 D

EAL Threshold Values:

Note: If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.

HU5 Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS. 1 2 3 4 5 6 D

EAL Threshold Values:

1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS.

   OR

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

Judgment

HG6 Other conditions existing which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY. 1 2 3 4 5 6 D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

HS6 Other conditions existing which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY. 1 2 3 4 5 6 D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

HA6 Other conditions existing which in the judgment of the Emergency Director warrant declaration of an ALERT. 1 2 3 4 5 6 D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

HU6 Other conditions existing which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT. 1 2 3 4 5 6 D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Modes: **1** – Power Operations **2** – Startup / Hot Standby **3** – Hot Shutdown **4** – Heatup / Cooldown **5** – Cold Shutdown **6** – Refuel **D** – Defuel

Table TMI 3-1: Emergency Action Level (EAL) Matrix

Abnormal Rad Levels / Radiological Effluent

Radiological Effluents

GENERAL EMERGENCY

RG1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 5 6 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**:

OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 1000 mRem TEDE**

   OR

   b. **> 5000 mRem CDE Thyroid**

OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**.

   OR

   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

SITE AREA EMERGENCY

RS1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 5 6 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**:

OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:
   a. **> 100 mRem TEDE**

   OR

   b. **> 500 mRem CDE Thyroid**

OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.

   OR

   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

ALERT

RA1 Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer. 1 2 3 4 5 6 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **200 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 15 minutes**.
   - RM-L-6, Radwaste Discharge
   - RM-L-12, IWTS / IWFS Discharge
   - RM-A-7, Waste Gas Decay Tank Discharge
   - Discharge Permit specified monitor

OR

2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**.

OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.

UNUSUAL EVENT

RU1 Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer. 1 2 3 4 5 6 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **2 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 60 minutes**.
   - RM-L-6, Radwaste Discharge
   - RM-L-12, IWTS / IWFS Discharge
   - RM-A-7, Waste Gas Decay Tank Discharge
   - Discharge Permit specified monitor

OR

2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 60 minutes**.

OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Modes: **1** – Power Operations **2** – Startup / Hot Standby **3** – Hot Shutdown **4** – Heatup / Cooldown **5** – Cold Shutdown **6** – Refuel **D** – Defuel

Table R1 -- Effluent Monitor Thresholds

Monitor	General Emergency	Site Area Emergency	Alert	Unusual Event
RM-G-25 (Cond Offgas)	9.53 E+06 mR/hr	9.53 E+05 mR/hr	1.09 E+05 mR/hr	1.09 E+03 mR/hr
RM-A-8 GH (Station Vent)	3.09 E+05 cpm	3.09 E+04 cpm	3.57 E+03 cpm	7.03 E+01 cpm
RM-G-24 (RB Purge)	5.55 E+05 mR/hr	5.55 E+04 mR/hr	6.34 E+03 mR/hr	6.34 E+01 mR/hr
RM-A-14 (ESF Vent)	6.66 E+02 μCi/cc	6.66 E+01 μCi/cc	7.60 E+00 μCi/cc	7.60 E-02 μCi/cc

Table TMI 3-1: Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Abnormal Rad Levels / Radiological Effluent				
Abnormal Rad Levels		**Table R2 - Radiation Monitors** RMS / Area Monitored / Mode RM-G-9 — FHB Bridge Rad Monitor — All RM-G-6 — RB Auxiliary Bridge Rad Monitor — 5, 6 RM-G-7 — RB Main Bridge Rad Monitor — 5, 6	**RA2** Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. VALID reading **> 1000 mR/hr** on any Table R2 Radiation Monitor due to **EITHER**: • Damaged irradiated fuel. **OR** • Water level drop. **OR** 2. Water level drop in the Spent Fuel Pool or Fuel Transfer Canal that will result in irradiated fuel becoming uncovered.	**RU2** UNPLANNED rise in plant radiation levels. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. a. UNPLANNED water level drop in the Spent Fuel Pool or Fuel Transfer Canal. **AND** b. VALID rise on one or more of the following radiation monitors in Table R2. **OR** 2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.
		Table R3 **Areas Requiring Continuous Occupancy** • Main Control Room • Central Alarm Station - (by survey)	**RA3** Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. 1 2 3 4 5 6 D **EAL Threshold Values:** Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R3) to maintain plant safety functions.	

Modes: **1** – Power Operations **2** – Startup / Hot Standby **3** – Hot Shutdown **4** – Heatup / Cooldown **5** – Cold Shutdown **6** – Refuel **D** – Defuel

Table TMI 3-1: Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Cold Shutdown / Refueling System Malfunctions				
Loss of AC Power			**CA1** Loss of all Off-site and all On-Site AC power to emergency busses for 15 minutes or longer. 5 6 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to Emergency 4KV Buses. **AND** 2. Failure of EG-Y-1A, EG-Y-1B Emergency Diesel Generators and EG-Y-4 SBO Diesel Generator to supply power to Emergency 4KV Buses. **AND** 3. Failure to restore power to either Emergency 4KV Bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.	**CU1** AC power capibilty to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout. 5 6 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. AC power capability to Emergency 4KV Buses reduced to only one of the following power sources for **≥ 15 minutes**: • Auxiliary Transformer 1A • Auxiliary Transformer 1B • Emergency Diesel EG-Y-1A • Emergency Diesel EG-Y-1B • SBO Diesel generator EG-Y-4 **AND** 2. Any additional single failure will result in station blackout.
Inadvertent Criticality				**CU2** Inadvertent criticality. 5 6 **EAL Threshold Values:** UNPLANNED sustained positive startup rate observed on nuclear instrumentation.
DC Power				**CU3** Loss of required DC power for 15 minutes or longer. 5 6 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of required DC power based on **< 105 VDC** on 125 VDC Distribution System 1A and 1B for **≥ 15 minutes**.

Table TMI 3-1: Emergency Action Level (EAL) Matrix

Cold Shutdown / Refueling System Malfunctions

Communications

ALERT

Table C1 - Communications Capability

System	Onsite	Offsite
Radios	X	
Plant page	X	
Plant Telephone System	X	
Sound Powered Phones	X	
Satellite Phones		X
ENS		X
Cellular Phones		X
Commercial Telephone System		X

UNUSUAL EVENT

CU4 Loss of all On-site or Off-site communications capabilities. 5 6 D

EAL Threshold Values:

1. Loss of all Table C1 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table C1 **Offsite** communications capability affecting the ability to perform offsite notifications.

Heat Sink

SITE AREA EMERGENCY

Table C2 – RCS Reheat Duration Thresholds

RCS	Containment Closure	Duration
Intact	N/A	60 minutes*
Not Intact **OR** Reduced Inventory	Established	20 minutes*
	Not Established	0 minutes

*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then EAL Threshold #1 is **not** applicable.

ALERT

CA5 Inability to maintain plant in cold shutdown. 5 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200°F** for **> Table C2 duration**.

   OR

2. UNPLANNED RPV pressure rise **> 10 psig** as a result of temperature rise due to loss of decay heat removal. (This threshold does not apply in solid plant conditions.)

UNUSUAL EVENT

CU5 UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV. 5 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200°F**.

   OR

2. Loss of the following for **≥ 15 minutes:**
   - All RCS temperature indications

     AND
   - All RPV level indications

Table TMI 3-1: Emergency Action Level (EAL) Matrix

Cold Shutdown / Refueling System Malfunctions

RCS Leakage / Inventory

CG6 Loss of RCS/RPV inventory affecting fuel clad integrity with containment challenged. [5] [6]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. RCS level unknown for **≥ 30 minutes.**

   AND

2. Loss of RPV inventory as indicated by any of the following:
   - Table C3 indication.

     OR
   - Erratic Source Range Neutron Monitor indication.

     OR
   - Radiation Monitor reading **> 3R/hr** on RM-G-6 or RM-G-7.

   AND

3. Any Containment Challenge Indication (Table C4)

CS6 Loss of RCS/RPV inventory affecting core decay heat removal capability. [5] [6]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. RCS level unknown for **≥ 30 minutes.**

   AND

2. Loss of RPV inventory as indicated by any of the following:
   - Table C3 indication.

     OR
   - Erratic Source Range Neutron Monitor indication.

     OR
   - Radiation Monitor reading **> 3R/hr** on RM-G-6 or RM-G-7.

CA6 Loss of RCS/RPV inventory. [5] [6]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of RCS inventory as indicated by VALID RCS level **< 0 inches** on Draindown Level indicator.

   OR

2. a. RCS level unknown for **≥ 15 minutes**.

   AND

   b. Loss of RCS inventory per Table C3 Indications.

CU6 RCS leakage. [5]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

RCS leakage results in the inability to restore and maintain RCS or Pressurizer level **> procedurally established limit** for **≥ 15 minutes.**

Table C4 – Containment Challenge Indications

- Hydrogen concentration in Containment **≥ 4%**
- UNPLANNED rise in containment pressure
- CONTAINMENT CLOSURE **not** established.

Table C3 – Indications of RCS Leakage

- UNPLANNED rise in Reactor Bldg Sump, Aux Bldg Sump, BWST or RCDT.
- UNPLANNED rise in RCS make-up
- Observation of leakage or Inventory loss

RPS

CU7 UNPLANNED loss of RCS/RPV inventory. [6]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED Fuel Transfer Canal or Vessel level drop that meets **EITHER**:
   - When controlling level above the Reactor Vessel flange, Refueling Cavity level drop below the Reactor Vessel flange **(400 ft.)** for **≥ 15 minutes**.

     OR
   - When controlling level below the Reactor Vessel flange, vessel level drop below the procedurally established limit for **≥ 15 minutes**.

   OR

2. a. Reactor Vessel level unknown.

   AND

   b. Loss of RCS /Reactor Vessel inventory per Table C3 indications.

Modes: **1** – Power Operations **2** – Startup / Hot Standby **3** – Hot Shutdown **4** – Heatup / Cooldown **5** – Cold Shutdown **6** – Refuel **D** – Defuel

Table TMI 3-1: Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Security	**HG1** HOSTILE ACTION resulting in loss of physical control of the facility. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1). **OR** 2. A HOSTILE ACTION has: • Caused failure of Spent Fuel Pool Cooling Systems **AND** • IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).	**HS1** HOSTILE ACTION within the PROTECTED AREA. 1 2 3 4 5 6 D **EAL Threshold Values:** A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.	**HA1** HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site. **OR** 2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.	**HU1** Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities. **OR** 2. A validated notification from NRC providing information of an aircraft threat. **OR** 3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.
C. R. Evacuation	**Table H1 - Safety Functions** • Reactivity Control (ability to shut down the reactor and keep it shutdown) • RCS Inventory (ability to cool the core) • Secondary Heat Removal (ability to maintain heat sink)	**HS2** Control Room evacuation has been initiated and plant control cannot be established. 1 2 3 4 5 6 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Control Room evacuation has been initiated. **AND** 2. Control of the plant **cannot** be established per OP-TM-EOP-020 **< 15 minutes**.	**HA2** Control Room evacuation has been initiated. 1 2 3 4 5 6 D **EAL Threshold Values:** Entry into OP-TM-EOP-020 and Control Room evacuation is required.	
Fire / Explosion		**Table H2 – Vital Areas** • Reactor Building • Intake Building • Intermediate Building • Control Tower • Auxiliary & Fuel Handling Buildings • 1A and 1B Diesel Generator Buildings • BWST • CST	**HA3** FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown. 1 2 3 4 5 6 D **EAL Threshold Values:** FIRE or EXPLOSION resulting in any of the following: • VISIBLE DAMAGE to a Table H2 permanent structure. **OR** • VISIBLE DAMAGE to safety system equipment contained within a Table H2 area. **OR** • Control Room indication of degraded safety system equipment performance contained within a Table H2 area.	**HU3** FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA. 1 2 3 4 5 6 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm. **OR** 2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

Modes: **1** – Power Operations **2** – Startup / Hot Standby **3** – Hot Shutdown **4** – Heatup / Cooldown **5** – Cold Shutdown **6** – Refuel **D** – Defuel

Table TMI 3-1: Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Natural / Destructive Phenomena	**Table H2 - Vital Areas** • Reactor Building • Intake Building • Intermediate Building • Control Tower • Auxiliary & Fuel Handling Buildings • 1A and 1B Diesel Generator Buildings • BWST • CST		**HA4** Natural and destructive phenomena affecting VITAL AREAS [1][2][3][4][5][6][D] **EAL Threshold Values:** 1. a. Seismic event **> Operating Basis Earthquake (OBE)** as indicated by seismic Alarm **PRF-1-3** Operating Basis Earthquake. **AND** b. Confirmed by **EITHER:** • Earthquake felt in plant. **OR** • National Earthquake Center. **OR** • Control Room indication of degraded performance of systems required for the safe shutdown of the plant. **OR** 2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area: • Tornado strike **OR** • High winds **> 80 mph** **OR** • Vehicle crash **OR** • Turbine failure-generated PROJECTILES **OR** 3. Flooding in Auxiliary or Intermediate Building that results in **EITHER**: • Degraded safety system performance as indicated in the Control Room. **OR** • Industrial safety hazards (e.g., electric shock) that preclude access to operate or monitor safety equipment. **OR** 4. Abnormal river water level at the Intake Pump and Screen House as indicated by **EITHER:** • **> 302 ft. el.** (high level) **OR** • **< 271 ft. el.** (low level)	**HU4** Natural and destructive phenomena affecting the PROTECTED AREA. [1][2][3][4][5][6][D] **EAL Threshold Values:** 1. a. Seismic event as indicated by seismic Alarm **PRF-1-2**, Threshold Seismic Condition. **AND** b. Confirmed by **EITHER**: • Earthquake felt in plant. **OR** • National Earthquake Center. **OR** 2. **EITHER** of the following occurring within the PROTECTED AREA boundary: • Tornado strike **OR** • Sustained **(> 15 minutes)** high winds **> 80 mph** **OR** 3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals. **OR** 4. Flooding that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode in **EITHER:** • Auxiliary Building **OR** • Intermediate Building **OR** 5. Abnormal river water level at the Intake Pump and Screen House as indicated by **EITHER:** • **> 300 ft. el.** (high level) **OR** • **< 274 ft. el.** (low level)

Modes: **1** – Power Operations **2** – Startup / Hot Standby **3** – Hot Shutdown **4** – Heatup / Cooldown **5** – Cold Shutdown **6** – Refuel **D** – Defuel

Table TMI 3-1: Emergency Action Level (EAL) Matrix

Hazards and Other Conditions Affecting Plant Safety

Toxic / Flammable Gas

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Table H2 - Vital Areas • Reactor Building • Intake Building • Intermediate Building • Control Tower • Auxiliary & Fuel Handling Buildings • 1A and 1B Diesel Generator Buildings • BWST • CST		**HA5** Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor. 1 2 3 4 5 6 D **EAL Threshold Values:** **Note:** If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event. Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.	**HU5** Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS. 1 2 3 4 5 6 D **EAL Threshold Values:** 1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS. **OR** 2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.

Judgment

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
HG6 Other conditions existing which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY. 1 2 3 4 5 6 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**HS6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY. 1 2 3 4 5 6 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	**HA6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an ALERT. 1 2 3 4 5 6 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**HU6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT. 1 2 3 4 5 6 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Modes: **1** – Power Operations **2** – Startup / Hot Standby **3** – Hot Shutdown **4** – Heatup / Cooldown **5** – Cold Shutdown **6** – Refuel **D** – Defuel

Table TMI 3-2: EAL Technical Basis

Emergency Action Level Technical Basis Page Index

General		Site Area		Alert		Unusual Event	
EAL	Pg.	EAL	Pg.	EAL	Pg.	EAL	Pg.
RG1	3-29	RS1	3-32	RA1	3-35	RU1	3-38
				RA2	3-41	RU2	3-44
				RA3	3-46	RU3	3-47
FG1	3-49	FS1	3-50	FA1	3-51	FU1	3-52

Fuel Clad		RCS		Containment	
FC1	3-53				
				CT2	3-64
FC3	3-54			CT3	3-67
FC4	3-56	RC4	3-59		
		RC5	3-61	CT5	3-68
				CT6	3-70
FC7	3-57	RC7	3-62	CT7	3-72
FC8	3-58	RC8	3-63	CT8	3-73

MG1	3-74	MS1	3-76	MA1	3-78	MU1	3-80
MG2	3-81	MS2	3-83	MA2	3-85	MU2	3-86
		MS3	3-87				
		MS4	3-88	MA4	3-91	MU4	3-94
						MU5	3-96
						MU6	3-97
						MU7	3-99
				CA1	3-100	CU1	3-102
						CU2	3-104
						CU3	3-105
						CU4	3-106
				CA5	3-108	CU5	3-111
CG6	3-113	CS6	3-116	CA6	3-118	CU6	3-120
						CU7	3-121
HG1	3-124	HS1	3-126	HA1	3-128	HU1	3-130
		HS2	3-133	HA2	3-135		
				HA3	3-136	HU3	3-139
				HA4	3-142	HU4	3-147
				HA5	3-151	HU5	3-154
HG6	3-156	HS6	3-157	HA6	3-158	HU6	3-159

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RG1

Initiating Condition

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**:

Table R1 – Effluent Monitor Thresholds	
	General Emergency
RM-G-25 (Cond Offgas)	9.53 E+06 mR/hr
RM-A-8GH (Station Vent)	3.09 E+05 cpm
RM-G-24 (RB Purge)	5.55 E+05 mR/hr
RM-A-14 (ESF Vent)	6.66 E+02 μCi/cc

OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:

   a. **> 1000 mRem TEDE**

   OR

   b. **> 5000 mRem CDE Thyroid**

OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**.

   OR

   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RG1 (cont.)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed the EPA Protective Action Guides (PAGs). Public protective actions will be necessary. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public and likely involve fuel damage.

While these failures are addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

Threshold #1 Basis:

The site-specific monitors listed include effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading Threshold is not, the results from dose assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency-implementing procedures call for the timely performance of dose assessments using actual meteorology and release information. If the results of dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading threshold.

Threshold #2 Basis:

The "site boundary" is the nearest distance from potential release points at which protective actions would be required for members of the public.

Threshold #3 Basis:

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. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption on sample media followed by field analysis are used for determining the iodine (CDE) thyroid value.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RG1 (cont.)

Basis Reference(s):

1. EP-AA-112-500 Emergency Environmental Monitoring
2. FSAR Section 11.4 Radiation Monitoring System
3. EP-AA-110-200 Dose Assessment
4. EP-AA-110-201 On Shift Dose Assessment
5. NEI 99-01, Rev. 5 AG1
6. EP-EAL-0609 Rev 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values, Three Mile Island

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RS1

Initiating Condition

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**:

Table R1 – Effluent Monitor Thresholds	
	Site Area Emergency
RM-G-25 (Cond Offgas)	9.53 E+05 mR/hr
RM-A-8GH (Station Vent)	3.09 E+04 cpm
RM-G-24 (RB Purge)	5.55 E+04 mR/hr
RM-A-14 (ESF Vent)	6.66 E+01 μCi/cc

OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:

   a. **> 100 mRem TEDE**

   OR

   b. **> 500 mRem CDE Thyroid**

OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.

   OR

   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RS1 (cont.)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed 10% of the EPA Protective Action Guides (PAGs). Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

While these failures are addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

Threshold #1 Basis:

The site specific monitors listed include effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading threshold is not, the results from dose assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency-implementing procedures call for the timely performance of dose assessments using actual meteorology and release information. If the results of dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading threshold.

Threshold #2 Basis:

The "site boundary" is the nearest distance from potential release points at which Protective Actions would be required for members of the public.

Threshold #3 Basis:

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. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption on sample media followed by field analysis are used for determining the iodine (CDE) thyroid value.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RS1 (cont.)

Basis Reference(s):

1. EP-AA-112-500 Emergency Environmental Monitoring
2. FSAR Section 11.4 Radiation Monitoring System
3. EP-AA-110-200 Dose Assessment
4. EP-AA-110-201 On Shift Dose Assessment
5. NEI 99-01, Rev. 5 AS1
6. EP-EAL-0609 Rev 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values, Three Mile Island

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA1

Initiating Condition

Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors **> 200 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 15 minutes**.

   - RM-L-6, Radwaste Discharge
   - RM-L-12, IWTS / IWFS Discharge
   - RM-A-7, Waste Gas Decay Tank Discharge
   - Discharge Permit specified monitor

   OR

2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**

Table R1 – Effluent Monitor Thresholds	
	Alert
RM-G-25 (Cond Offgas)	1.09 E+05 mR/hr
RM-A-8GH (Station Vent)	3.57 E+03 cpm
RM-G-24 (RB Purge)	6.34 E+03 mR/hr
RM-A-14 (ESF Vent)	7.60 E+00 μCi/cc

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA1 (cont.)

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses an actual or substantial potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in RU1 and RA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases are not to be prorated or averaged. For example, a release exceeding 600 times ODCM for 5 minutes does not meet the threshold

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

Threshold #1 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

The effluent monitors listed are those normally used for planned discharges. If a discharge is performed using a different flowpath or effluent monitor other than those listed (e.g., a portable or temporary effluent monitor), then the declaration criteria will be based on the monitor specified in the Discharge Permit.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA1 (cont.)

Basis: (cont)

Threshold #2 Basis:

This threshold is intended for effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

Threshold #3 Basis:

This threshold addresses uncontrolled releases that are detected by sample analyses, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

Basis Reference(s):

1. OP 1101-2.1 Radiation Monitoring System Setpoints
2. FSAR Section 11.4 Radiation Monitoring System
3. Offsite Dose Calculation (ODCM)
4. OP-TM-MAP-C0101, Radiation Level HI
5. NEI 99-01, Rev. 5 AA1
6. EP-EAL-0609 Rev 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values, Three Mile Island

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU1

Initiating Condition

Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors **> 2 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 60 minutes**.

   - RM-L-6, Radwaste Discharge
   - RM-L-12, IWTS / IWFS Discharge
   - RM-A-7, Waste Gas Decay Tank Discharge
   - Discharge Permit specified monitor

   OR

2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 60 minutes**.

Table R1 – Effluent Monitor Thresholds	
	Unusual Event
RM-G-25 (Cond Offgas)	1.09 E+03 mR/hr
RM-A-8GH (Station Vent)	7.03 E+01 cpm
RM-G-24 (RB Purge)	6.34 E+01 mR/hr
RM-A-14 (ESF Vent)	7.60 E-02 μCi/cc

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates in **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU1 (cont.)

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses a potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in RU1 and RA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases are not to be prorated or averaged. For example, a release exceeding 4 times ODCM for 30 minutes does not meet the threshold.

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

Threshold #1 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

The effluent monitors listed are those normally used for planned discharges. If a discharge is performed using a different flowpath or effluent monitor other than those listed (e.g., a portable or temporary effluent monitor), then the declaration criteria will be based on the monitor specified in the Discharge Permit.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU1 (cont.)

Basis (cont.):

Threshold #2 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL.

This threshold is intended for effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

Threshold #3 Basis:

This threshold addresses uncontrolled releases that are detected by sample analyses, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

Basis Reference(s):

1. OP 1101-2.1 Radiation Monitoring System Setpoints
2. FSAR Section 11.4 Radiation Monitoring System
3. Offsite Dose Calculation (ODCM)
4. OP-TM-MAP-C0101, Radiation Level HI
5. NEI 99-01, Rev. 5 AU1
6. EP-EAL-0609 Rev 1, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values, Three Mile Island

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA2

Initiating Condition

Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

1. VALID reading of **> 1000 mR/hr** on any Table R2 Radiation Monitor due to **EITHER:**

   - Damaged irradiated fuel.

     OR

   - Water level drop.

Table R2 - Radiation Monitors		
RMS	**Area Monitored**	**Mode**
RM-G-9	FHB Bridge Rad Monitor	All
RM-G-6	RB Auxiliary Bridge Rad Monitor	5, 6
RM-G-7	RB Main Bridge Rad Monitor	5, 6

   OR

2. Water level drop in the Spent Fuel Pool or Fuel Transfer Canal that will result in irradiated fuel becoming uncovered.

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses increases in radiation dose rates within plant buildings, and may be a precursor to a radioactivity release to the environment. These events represent a loss of control over radioactive material and represent an actual or substantial potential degradation in the level of safety of the plant.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA2 (cont.)

Basis (cont.):

These events escalate from RU2 in that fuel activity has been released, or is anticipated due to fuel heatup. This EAL applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage.

Threshold #1 Basis:

This EAL addresses radiation monitor indications of fuel uncovery and/or fuel damage.

Uncovering spent fuel represents a substantial degradation of the level of safety of the plant and warrants an Alert classification. Visual observation of spent fuel uncovery represents a major ALARA concern in that radiation levels could exceed 10,000 R/hr on the refuel bridge when fuel uncovery begins. The value of 1000 mR/hr was conservatively chosen for classification purposes.

Radiation monitor readings are used to provide indication of fuel uncovery and/or fuel damage. High monitor readings associated with the transfer or relocation of a source, stored in or near the pool or readings responding to a planned evolution such as removal of the reactor head or equipment relocation are not classified under this threshold since the reading would not be indicative of fuel uncovery and/or fuel damage.

Dropping heavy loads onto the spent fuel can cause significant damage to the spent fuel and an Alert is also warranted under these conditions provided that the above radiation monitor threshold readings are reached.

Escalation of this emergency classification level, if appropriate, would be based on RS1 or RG1.

Threshold #2 Basis:

Once Spent Fuel Pool water level drops below the low level alarm setpoint, further drops can be monitored only by visual observation unless the Spent Fuel Pool is in communication with the Refueling Cavity.

If available, video cameras may allow remote observation. Depending on available level instrumentation, the declaration threshold may need to be based on indications of water makeup rate.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA2 (cont.)

Basis Reference(s):

1. Operating Procedure OP 1101-2.1 Radiation Monitoring System Setpoints
2. Operating Procedure OP-TM-MAP-C0105 RCS Draindown LVL HI/LO
3. OP-TM-MAP-C0101, Radiation Level HI
4. UFSAR, Section 14.2.2.1 - “Fuel Handling Accident”
5 Technical Specification 3.8.11 (Reactor Cavity Level)
6. NEI 99-01, Rev. 5 AA2

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU2

Initiating Condition

UNPLANNED rise in plant radiation levels.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

1. a. UNPLANNED water level drop in the Spent Fuel Pool or Fuel Transfer Canal.

   AND

   b. VALID rise on one or more of the following radiation monitors in Table R2.

Table R2 - Radiation Monitors		
RMS	**Area Monitored**	**Mode**
RM-G-9	FHB Bridge Rad Monitor	All
RM-G-6	RB Auxiliary Bridge Rad Monitor	5, 6
RM-G-7	RB Main Bridge Rad Monitor	5, 6

   OR

2. UNPLANNED VALID Area Radiation Monitor reading or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.

Basis:

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

NORMAL LEVELS: Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU2 (cont.)

Basis:

This EAL addresses increased radiation levels as a result of water level decreases above irradiated fuel or events that have resulted, or may result, in UNPLANNED increases in radiation dose rates within plant buildings. These radiation increases represent a loss of control over radioactive material and represent a potential degradation in the level of safety of the plant.

Threshold #1 Basis:

Level indications may include installed or temporary water level instrumentation. If available, video cameras may allow remote observation for determining water level changes.

This EAL addresses unplanned lowering of level in the refueling pathway and a corresponding rise in refuel floor radiation readings. For events in Refuel mode where the water level drops with no corresponding rise in refuel floor radiation readings classification would be via CU7. This event escalates to an Alert per RA2 if irradiated fuel outside the reactor vessel is uncovered.

Threshold #2 Basis:

This EAL addresses increases in plant radiation levels that represent a loss of control of radioactive material resulting in a potential degradation in the level of safety of the plant.

This EAL excludes radiation level increases that result from planned activities such as use of radiographic sources and movement of radioactive waste materials. A specific list of ARMs is not required, as it would restrict the applicability of the threshold. The intent is to identify loss of control of radioactive material in any monitored area. Survey results are not required for confirmation of area radiation monitor readings but are applicable to areas where area radiation monitors do not have sufficient range to indicate a rise by a factor of 1000 over NORMAL LEVELS.

Basis Reference(s):

1. Technical Specification 3.8.11 (Reactor Cavity Level)
2. UFSAR, Section 14.2.2.1 - “Fuel Handling Accident”
3. OP-TM-MAP-C0105 RCS Draindown
4. OP 1202-12, Excessive Radiation Levels
5. OP 1101-2.1 Radiation Monitoring System Setpoints
6. NEI 99-01, Rev. 5 AU2

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA3

Initiating Condition

Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R2) to maintain plant safety functions.

Table R3 - Areas Requiring Continuous Occupancy
• Main Control Room • Central Alarm Station (by survey)

Basis:

This EAL addresses increased radiation levels that impact continued operation in areas requiring continuous occupancy to maintain safe operation or to perform a safe shutdown.

The cause and/or magnitude of the increase in radiation levels is not a concern of this EAL. The Emergency Director must consider the source or cause of the increased radiation levels and determine if any other EAL may be involved.

Areas requiring continuous occupancy include Main Control Room and the Central Alarm Station (CAS).

Basis Reference(s):

1. FSAR Section 5.01 Class I Structures, Components, and Systems
2. OP-TM-MAP-C0101, Radiation Level HI
3. NEI 99-01, Rev. 5 AA3

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU3

Initiating Condition

Fuel clad degradation.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Fuel clad degradation resulting in:

- Letdown Monitor RM-L-1 **alert alarm** (high or low channel).

  OR

- Dose Equivalent I-131 specific coolant activity **> 60.0 µCi/gm**

  OR

- Dose Equivalent XE-133 specific coolant activity **> 797.0 µCi/gm**.

Basis:

This EAL is included because it is a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant.

Escalation of this EAL to the Alert level is via the Fission Product Barriers.

Conditions that cause the monitor to alarm that are not related to fuel clad degradation should not result in the declaration of an Unusual Event.

This threshold addresses site-specific radiation monitor readings that provide indication of a degradation of fuel clad integrity.

This threshold addresses coolant samples exceeding coolant technical specifications for transient iodine spiking limits.

An Unusual Event is only warranted when actual fuel clad damage is the cause of the elevated coolant sample (as determined by laboratory confirmation). Fuel clad damage should be assumed to be the cause of elevated Reactor Coolant activity unless another cause is known.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU3 (cont)

Basis Reference(s):

1. Technical Specifications 3.1.4, Reactor Coolant System Activity
2. Operating Procedure 1101-2.1 Radiation Monitoring System Setpoints
3. FSAR Section 11.4.4, Liquid Monitoring Subsystem
4. OP-TM-MAP-C0101, Radiation Level HI
5. NEI 99-01, Rev. 5 SU4

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FG1

Initiating Condition

Loss of ANY Two Barriers AND Loss or Potential Loss of Third Barrier.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss Threshold Values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the General Emergency classification level each barrier is weighted equally.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FS1

Initiating Condition

Loss or Potential Loss of ANY Two Barriers.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss Threshold Values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.
At the Site Area Emergency classification level, each barrier is weighted equally.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FA1

Initiating Condition

ANY Loss or ANY Potential Loss of EITHER Fuel Clad OR RCS.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss Threshold Values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the Alert classification level, Fuel Cladding and RCS barriers are weighted more heavily than the Containment barrier. Unlike the Containment barrier, loss or potential loss of either the Fuel Cladding or RCS barrier may result in the relocation of radioactive materials or degradation of core cooling capability. Note that the loss or potential loss of Containment barrier in combination with loss or potential loss of either Fuel Cladding or RCS barrier results in declaration of a Site Area Emergency under EAL FS1.

Basis Reference(s):

1. NEI 99-01 Rev 5 Table 5-F-3

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FU1

Initiating Condition

ANY Loss or ANY Potential Loss of Containment.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss Threshold Values to determine barrier status.

Basis:

The Containment Barrier includes the containment building and connections up to and including the outermost containment isolation valves. This barrier also includes the main steam, feedwater, and letdown/make-up line extensions outside the containment building up to and including the outermost secondary side isolation valve.

The Containment Barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (i.e., Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment Barrier status is addressed by Technical Specifications.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FC1

Initiating Condition:

Primary Coolant Activity Level

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

Coolant activity **> 300 μCi/gm** Dose Equivalent I-131

Basis:

300 uCi/gm Dose Equivalent I-131 is well above that expected for iodine spikes and corresponds to less than 5% fuel clad damage. This amount of radioactivity indicates significant clad damage and thus the Fuel Clad Barrier is considered lost.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. OP-TM-MAP-C0101, Radiation Level HI
2. FSAR Section 11.4.4, Liquid Monitoring System Description
3. Calculation C3640-98-034, Prediction of the Response of RM-G-6 and 7 to Fuel Damage
4. NEI 99-01 Rev 5, Table 5-F-3

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FC3

Initiating Condition

Core Exit Thermocouple Readings

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. T_{clad} **> 1400°F**

POTENTIAL LOSS

2. **> 25°F** Superheat

Basis:

Loss Threshold #1 Basis

Projected clad temperature rather than actual core exit thermocouple readings alone are used for the loss of fuel clad and the potential loss of the containment barrier. The projected condition is a function of thermocouple indications and system pressure.

A correlation for clad temperature as a function of incore thermocouple temperature and RCS pressure has been developed. This provides a better indication of fuel damage then incore temperature alone, since clad rupture is a function of temperature and pressure.

Potential Loss Threshold #2 Basis

Valid indication of saturated or superheat is a potential Fuel Cladding barrier loss condition because the possible rapid rise in cladding temperatures may lead to actual cladding failure.

Wide range RCS pressure and the average of the five highest incore thermocouples are used to determine incore subcooling margin (SCM) and degree of superheat. Any of these conditions indicate subcooling has been lost and that some fuel cladding damage may potentially occur.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FC3 (cont.)

Basis Reference(s):

1. OP-TM-EOP-008, RCS Superheated
2. OP-TM-EOP-010, Emergency Procedure Rules, Guides And Graphs
3. NEI 99-01 Rev 5, Table 5-F-3
4. OS-24, Conduct of Operations during Abnormal and Emergency Events

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FC4

Initiating Condition

Reactor Vessel Water Level

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

POTENTIAL LOSS

1. RCITS hot leg instruments indicate **0 inches** after lowering trend.

   AND

2. In-core Thermocouples are unavailable.

   AND

3. All RCPs are secured.

Basis:

There is no Loss threshold associated with this item.

The value for the Potential Loss threshold corresponds to the top of the active fuel.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3
2. FSAR 7.3.2.2.c.10.d
3. OP-TM-EOP-008, RCS Superheated
4. OP-TM-EOP-010, Emergency Procedure Rules Guides and Graphs

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FC7

Initiating Condition

Containment Radiation Monitoring

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

Containment radiation monitor (RM-G-22 or RM-G-23) reading **> 1.95E+03 R/hr**.

Basis:

The reading is a value, which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the containment.

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 Loss threshold. Thus, this threshold indicates a loss of both the Fuel Clad barrier and RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3
2. Core Damage Assessment Methodology (CDAM)

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FC8

Initiating Condition

Emergency Director Judgment

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS:

1. Any condition in the opinion of the Emergency Director that indicates a Loss of the Fuel Clad Barrier.

POTENTIAL LOSS:

2. Any condition in the opinion of the Emergency Director that indicates a Potential Loss of the Fuel Clad Barrier.

Basis:

These thresholds address 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 threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC4

Initiating Condition

RCS Leak Rate

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. RCS leakage results in **< 25°F** Sub-Cooled Margin.

POTENTIAL LOSS

2. UNISOLABLE leak **> 150 gpm**.

   OR

3. HPI-PORV Cooling in effect.

   OR

4. a. RCS pressure **> 2450 psig**

      AND

   b. RCS pressure **not** lowering.

Basis:

UNISOLABLE: is a breach or leak that cannot be promptly isolated.

Promptly allows for actions to be taken to isolate the leak. Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

The RCS Barrier includes the RCS primary side and its connections up to and including the pressurizer safety and relief valves, and other connections up to and including the primary isolation valves.

Loss Threshold #1 Basis

This threshold addresses conditions where leakage from the RCS is greater than available inventory control capacity such that a loss of subcooling has occurred. The loss of subcooling is the fundamental indication that the inventory control systems are inadequate in maintaining RCS pressure and inventory against the mass loss through the leak.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC4 (cont.)

Basis (cont.):

Potential Loss Threshold #2 Basis

This threshold is based on the apparent inability to maintain normal liquid inventory within the Reactor Coolant System (RCS) by normal operation of the Make-Up (MU) System which is considered to be the flow rate equivalent to one charging pump discharging to the charging header. Isolating letdown is a standard abnormal operating procedure action and may prevent unnecessary classifications when a non-RCS leakage path such as a MU leak exists. The intent of this condition is met if attempts to isolate Letdown are NOT successful. Additional charging pumps being required is indicative of a substantial RCS leak.

Potential Loss Threshold #3 Basis

The initiation of HPI - PORV cooling creates a controlled opening of the RCS to the RB by an open PORV. The opening of the RCS and the pressure control mode through throttling of the HPI and or MU valves represents a potential challenge to the RCS barrier and is considered a potential loss.

Potential Loss Threshold #4 Basis

The pressurizer code safety valves will open between 2450 psig and 2510 psig (allowance for set pressure and Code Safety valve accumulation). This is the design limit for the RCS and well within tested values (2750 psig). If core cooling prevents the RCS heatup from keeping the pressurizer code safety valves open (lowering trend) then the RCS is considered to be intact since the valve should close and reestablish RCS integrity. If the RCS heatup is able to keep the pressurizer code safety valves open with pressure either rising or cycling then the RCS shall be considered potentially lost.

Basis Reference(s):

1. OP-TM-EOP-010 Emergency Procedure Rules, Guides And Graphs
2. OP-TM-EOP-002 Loss of 25°F Subcooled Margin
3. NEI 99-01 Rev 5, Table 5-F-3
4. OP-TM-MAP-D031, MU Flow HI

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC5

Initiating Condition

SG Tube Rupture

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

Steam Generator Tube Rupture that requires/results in an ESAS Actuation.

Basis:

RUPTURED: In a steam generator, existence of primary-to-secondary leakage of a magnitude sufficient to require or cause a reactor trip and safety injection.

The RCS Barrier includes the RCS primary side and its connections up to and including the pressurizer safety and relief valves, and other connections up to and including the primary isolation valves.

This threshold addresses the full spectrum of Steam Generator (SG) tube rupture events in conjunction with Containment barrier Loss thresholds. It addresses RUPTURED SG(s) for which the leakage is large enough to cause actuation of ESAS. This is consistent to the RCS leak rate barrier Potential Loss threshold.

By itself, this threshold will result in the declaration of an Alert. However, if the SG is also breached (i.e., two barriers failed), the declaration escalates to a Site Area Emergency per Containment barrier Loss thresholds.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. OP-TM-EOP-010, Emergency Procedure Rules, Guides And Graphs
2. OP-TM-EOP-005, OTSG Tube Leakage
3. NEI 99-01 Rev 5, Table 5-F-3

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC7

Initiating Condition

Containment Radiation Monitoring

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

Containment radiation (RM-G-22 or RM-G-23) reading **> 25 R/hr.**

Basis:

The RCS Barrier includes the RCS primary side and its connections up to and including the pressurizer safety and relief valves, and other connections up to and including the primary isolation valves.

This value indicates the release of reactor coolant to the containment.

This reading is less than that specified for Fuel Clad barrier threshold. Thus, this threshold would be indicative of a RCS leak only. If the radiation monitor reading increased to that specified by Fuel Clad barrier threshold, fuel damage would also be indicated.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. EP-EAL-0611, Criteria for Choosing Containment Radiation Monitor Reading Indicative of Loss of RCS Barrier
2. NEI 99-01 Rev 5, Table 5-F-3

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC8

Initiating Condition

Emergency Director Judgment

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS:

1. Any condition in the opinion of the Emergency Director that indicates a Loss of the Reactor Coolant System Barrier.

POTENTIAL LOSS:

2. Any condition in the opinion of the Emergency Director that indicates a Potential Loss of the Reactor Coolant System Barrier.

Basis:

The RCS Barrier includes the RCS primary side and its connections up to and including the pressurizer safety and relief valves, and other connections up to and including the primary isolation valves.

These thresholds address 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 threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT2

Initiating Condition

Containment Pressure

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. Rapid unexplained drop in Containment pressure following initial pressure rise.

   OR

2. Containment pressure or sump level response **not** consistent with LOCA conditions.

POTENTIAL LOSS

3. Reactor Building pressure **>55 psig** and rising.

   OR

4. Hydrogen concentration in Containment **≥ 4%.**

   OR

5. a. RB pressure **> 30 psig.**

      AND

   b. RB Emergency Cooling is less than any one of the following conditions:

SPRAY	COOLERS
2	0
0	3
1	1

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT2 (cont.)

Basis:

The Containment Barrier includes the containment building, its connections up to and including the outboard containment isolation valves. This barrier also includes the main steam, feedwater, and letdown/make-up line extensions outside the containment building up to and including the outboard secondary side isolation valve.

Loss Thresholds #1 and #2 Basis:

Rapid unexplained loss of pressure (i.e., not attributable to containment spray or condensation effects) following an initial pressure rise from a primary or secondary high energy line break indicates a loss of containment integrity. Containment pressure and sump levels should rise as a result of mass and energy release into containment from a LOCA. Thus, sump level or pressure not rising indicates containment breach and a loss of containment integrity.

This indicator relies on operator recognition of an unexpected response for the condition and therefore does not have a specific value associated with it. The unexpected response is important because it is the indicator for a containment breach condition.

Potential Loss Threshold #3 Basis:

The pressure is based on the containment design pressure.

Potential Loss Threshold #4 Basis:

If hydrogen concentration reaches or exceeds 4% in an oxygen rich environment, a potentially explosive mixture exists. If the combustible mixture ignites inside containment, loss of the Containment barrier could occur.

Potential Loss Threshold #5 Basis:

This threshold represents a potential loss of containment in that the containment heat removal/depressurization system are either lost or performing in a degraded manner, as indicated by containment pressure greater than the setpoint at which the equipment was supposed to have actuated.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT2 (cont.)

Basis Reference(s):

1. FSAR Section 5.2 Reactor Building
2. FSAR Section 6.6 Reactor Building Pressure-Time Response
3. Technical Specifications 3.5.3, Engineered Safeguards Protection System Actuation Setpoints
4. FSAR Section 6.3.3, Actuation
5. FSAR Section 6.5.3, Hydrogen Generation
6. OP-TM-EOP-006, LOCA Cooldown
7. 1302-5.25 Reactor Building Sump Level
8. NEI 99-01 Rev 5, Table 5-F-3

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT3

Initiating Condition

Core Exit Thermocouple Readings

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

POTENTIAL LOSS

1. T_{clad} **≥ 1800°F**

   AND

2. EOP Restoration procedures are **not** effective in **< 15 minutes**.

Basis:

Projected clad temperature rather than actual core exit thermocouple readings alone are used for the loss of fuel clad and the potential loss of the containment barrier. The projected condition is a function of thermocouple indications and system pressure.

The conditions in these thresholds represent an IMMINENT core melt sequence which, if not corrected, could lead to vessel failure and an increased potential for containment failure. In conjunction with the Core Cooling and RCS Leakage criteria in the Fuel and RCS barrier columns, this threshold would result in the declaration of a General Emergency -- loss of two barriers and the potential loss of a third. If the function restoration procedures are ineffective, there is no "success" path.

The restoration procedures are those emergency operating procedures that address the recovery of the core cooling critical safety functions. The procedure is considered effective if the temperature is lowering.

Whether or not the procedures will be effective should be apparent within 15 minutes. The Emergency Director should make the declaration as soon as it is determined that the procedures have been, or will be ineffective.

There is no Loss threshold associated with this item.

Basis Reference(s):

1. OP-TM-EOP-008, RCS Superheated
2. OP-TM-EOP-010, Emergency Procedure Rules, Guides And Graphs
3. NEI 99-01 Rev 5, Table 5-F-3
4. OP-TM-EOP-006, LOCA Cooldown

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT5

Initiating Condition

SG Secondary Side Release with Primary to Secondary Leakage

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. Primary-to-Secondary leakrate **> 10 gpm**.

   AND

2. UNISOLABLE steam release from affected S/G to the environment.

Basis:

UNISOLABLE: is a breach or leak that cannot be promptly isolated.

Promptly allows for actions to be taken to isolate the leak. Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

The loss threshold recognizes that SG tube leakage can represent a bypass of the Containment barrier as well as a loss of the RCS barrier.

This threshold results in an UE for smaller breaks that; (1) do not exceed the normal charging capacity threshold in RCS leak rate barrier Potential Loss threshold, or (2) do not result in ECCS actuation in RCS SG tube rupture barrier Loss threshold. For larger breaks, RCS barrier threshold criteria would result in an Alert. For SG tube ruptures which may involve multiple steam generators or unisolable secondary line breaks, this threshold would exist in conjunction with RCS barrier thresholds and would result in a Site Area Emergency. Escalation to General Emergency would be based on "Lost" or "Potential Loss" of the Fuel Clad Barrier.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT5 (cont.)

Basis: (cont)

This threshold addresses SG tube leaks that exceed 10 gpm in conjunction with an UNISOLABLE release path to the environment from the affected steam generator. The threshold for establishing the UNISOLABLE secondary side release is intended to be a prolonged release of radioactivity from the RUPTURED steam generator directly to the environment. This could be expected to occur when the main condenser is unavailable to accept the contaminated steam (i.e., SG tube rupture with concurrent loss of off-site power and the RUPTURED steam generator is required for plant cooldown or a stuck open relief valve). If the main condenser is available, there may be releases via vacuum pumps and other similar controlled, and often monitored, pathways. These pathways do not meet the intent of an UNISOLABLE release path to the environment. These minor releases are assessed using Abnormal Rad Levels / Radiological Effluent EALs.

The turbine EFW Pump is considered an UNISOLABLE steam release if the EOPs do not allow the pump to be shutdown.

Basis Reference(s):

1. OP-TM-EOP-010, Emergency Procedure Rules, Guides And Graphs
2. OP-TM-EOP-005, OTSG Tube Leakage
3. OP-TM-EOP-001, Reactor Trip
4. NEI 99-01 Rev 5, Table 5-F-3

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT6

Initiating Condition

Containment Isolation Failure or Bypass

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS

1. Failure of isolation valves in any one line to close.

   AND

2. Direct downstream pathway to the environment exists after a containment isolation signal.

Basis:

The Containment Barrier includes the containment building, its connections up to and including the outboard containment isolation valves. This barrier also includes the main steam, feedwater, and letdown/make-up line extensions outside the containment building up to and including the outboard secondary side isolation valve.

Failure of containment isolation valves to isolate with a downstream pathway to the environment is only a concern during an event requiring mitigation by the Containment Barrier. If this condition exists during normal power operations, a Technical Specification Action Statement will address it. However, during events requiring Containment Integrity, this will represent a breach of Containment.

This threshold addresses incomplete containment isolation that allows direct release (gaseous or liquid flowpath) to the environment outside of containment (for example into the Auxiliary Bldg, Turbine Bldg or outside atmosphere). It represents a loss of the containment barrier.

This threshold addresses failure of open isolation devices, which should close upon receipt of a manual or automatic containment isolation signal resulting in a radiological release pathway to the environment. The concern is the UNISOLABLE open pathway to the environment. A failure of the ability to close any open isolation valves in any one line indicates a breach of containment integrity.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT6 (cont)

Basis: (cont)

Leakage into a closed system is to be considered only if the closed system is breached and thereby creates a significant pathway to the environment. Examples include UNISOLABLE containment atmospheric vent paths as well as UNISOLABLE primary systems (RCS). If the primary system leakage outside containment cannot be isolated, a loss of both the RCS and the Containment barriers may exist. No leakage threshold is specified since leaks outside containment, particularly under dynamic conditions, are difficult to quantify and may manifest themselves with diverse symptoms.

The use of the modifier “direct” in defining the release path discriminates against release paths through interfacing liquid systems. The existence of an in–line charcoal filter does not make a release path indirect since the filter is not effective at removing fission product noble gases. Typical filters have an efficiency of 95-99% removal of iodine. Given the magnitude of the core inventory of iodine, significant releases could still occur. In addition, since the fission product release would be driven by boiling in the reactor vessel, the high humidity in the release stream can be expected to render the filters ineffective in a short period.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. FSAR Section 9.2, Chemical Addition and Sampling System
2. OP-TM-MAP-D0301, High Make-up Flow
3. NEI 99-01 Rev 5, Table 5-F-3
4. OP-TM-EOP-002, Loss of 25^0F Subcooling Margin
5. OP-TM-EOP-006, LOCA Cooldown
6. OP-TM-EOP-010, Emergency Procedure Rules, Guides and Graphs

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT7

Initiating Condition

Containment Radiation Monitoring

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

POTENTIAL LOSS

Containment radiation monitor (RM-G-22 or RM-G-23) reading **> 4.40E+03 R/hr**.

Basis:

The value indicates significant fuel damage well in excess of the thresholds associated with both loss of Fuel Clad and loss of RCS barriers.

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.

There is no Loss threshold associated with this item.

Basis Reference(s):

1. Core Damage Assessment Methodology (CDAM)
2. NEI 99-01 Rev 5, Table 5-F-3

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT8

Initiating Condition

Emergency Director Judgment

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

LOSS:

1. Any condition in the opinion of the Emergency Director that indicates a Loss of the Containment Barrier.

POTENTIAL LOSS:

2. Any condition in the opinion of the Emergency Director that indicates a Potential Loss of the Containment Barrier.

Basis:

The Containment Barrier includes the containment building, its connections up to and including the outboard containment isolation valves. This barrier also includes the main steam, feedwater, and letdown/make-up line extensions outside the containment building up to and including the outboard secondary side isolation valve.

These thresholds address any other factors that are to be used by the Emergency Director in determining whether the Containment barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

The Containment barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment barrier status is addressed by Technical Specifications.

Basis Reference(s):

1. NEI 99-01 Rev 5, Table 5-F-3

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MG1

Initiating Condition

Prolonged loss of all Off-site and all On-Site AC power to emergency busses.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to Emergency 4KV Buses.

   AND

2. Failure of EG-Y-1A, EG-Y-1B Emergency Diesel Generators and EG-Y-4 SBO Diesel Generator to supply power to Emergency 4KV Buses.

   AND

3. a. Restoration of at least one Emergency 4KV Bus in **< 4 hours** is **not** likely.

      OR

   b. **> 25°F superheat**

Basis:

Loss of all AC power to emergency busses compromises all plant safety systems requiring electric power. Prolonged loss of all AC power to emergency busses will lead to loss of fuel clad, RCS, and containment, thus warranting declaration of a General Emergency.

This EAL is specified to assure that in the unlikely event of a prolonged station blackout, timely recognition of the seriousness of the event occurs and that declaration of a General Emergency occurs as early as is appropriate, based on a reasonable assessment of the event trajectory.

The likelihood of restoring at least one emergency bus should be based on a realistic appraisal of the situation since a delay in an event classification escalation decision based on only a chance of mitigating the event could result in a loss of valuable time in preparing and implementing public protective actions.

In addition, under these conditions, fission product barrier monitoring capability may be degraded.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MG1 (cont.)

Basis Reference(s):

1. OP-TM-EOP-008 RCS Superheated
2. OP-TM-EOP-010 Emergency Procedure Rules, Guides And Graphs
3. FSAR Section 8.2.2 Unit Distribution System
4. FSAR Section 8.2.3 Sources of Auxiliary Power
5. FSAR Section 8.5 Station Blackout
6. Technical Specification Section 3.7, Unit Electric Power System
7. 1107-1 Normal Electrical System
8. 1107-2A Emergency Electrical - 4KV and 480 Volt
9. OP-TM-AOP-020 Loss Of Station Power
10. 1107-3 Diesel Generator
11. 1107-9 SBO Diesel Generator
12. NEI 99-01 Rev 5, SG1
13. OS-24, Conduct of Operation during Abnormal and Emergency Events

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MS1

Initiating Condition

Loss of all Off-site and all On-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to Emergency 4KV Buses.

   AND

2. Failure of EG-Y-1A, EG-Y-1B Emergency Diesel Generators and EG-Y-4 SBO Diesel Generator to supply power to Emergency 4KV Buses.

   AND

3. Failure to restore power to either Emergency 4KV Bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.

Basis:

Loss of all AC power to emergency busses compromises all plant safety systems requiring electric power. Prolonged loss of all AC power to emergency busses will lead to loss of Fuel Clad, RCS, and Containment, thus this event can escalate to a General Emergency.

Fifteen minutes was selected as a threshold to exclude momentary losses of off-site power.

Escalation to General Emergency is via Fission Product Barrier Degradation or MG1, "Prolonged Loss of All Off-site Power and Prolonged Loss of All On-site AC Power."

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MS1 (cont.)

Basis Reference(s):

1. FSAR Section 8.2.2, Unit Distribution System
2. FSAR Section 8.2.3, Sources of Auxiliary Power
3. Technical Specification Section 3.7, Unit Electric Power System
4. 1107-1 Normal Electrical System
5. 1107-2A Emergency Electrical - 4KV and 480 Volt
6. OP-TM-AOP-020 Loss Of Station Power
7. 1107-3 Diesel Generator
8. 1107-9 SBO Diesel Generator
9. NEI 99-01 Rev 5, SS1
10. FSAR Section 8.5, Station Blackout

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MA1

Initiating Condition

AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. AC power capability to Emergency 4KV Buses reduced to only one of the following power sources for **≥ 15 minutes**:

   - Auxiliary Transformer 1A
   - Auxiliary Transformer 1B
   - Emergency Diesel EG-Y-1A
   - Emergency Diesel EG-Y-1B
   - SBO Diesel generator EG-Y-4

   AND

2. Any additional single failure will result in station blackout.

Basis:

Capability: (pertaining to electrical power supplies) is equipment that is available to provide and maintain AC power at the required voltage and frequency for the required load.

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. Another related condition could be the loss of all off-site power and loss of on-site emergency generators with only one train of emergency busses being backfed from the unit main generator, or the loss of on-site emergency generators with only one train of emergency busses being backfed from off-site power. The subsequent loss of this single power source would escalate the event to a Site Area Emergency in accordance with MS1.

Fifteen minutes was selected as a threshold to exclude momentary losses of power.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MA1 (cont.)

Basis Reference(s):

1. FSAR Section 8.2.2, Unit Distribution System
2. FSAR Section 8.2.3, Sources of Auxiliary Power
3. FSAR Section 8.5, Station Blackout
4. Technical Specification Section 3.7, Unit Electric Power System
5. 1107-1 Normal Electrical System
6. 1107-2A Emergency Electrical - 4KV and 480 Volt
7. OP-TM-AOP-020 Loss Of Station Power
8. 1107-3 Diesel Generator
9. 1107-9 SBO Diesel Generator
10. NEI 99-01 Rev 5, SA5

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MU1

Initiating Condition

Loss of all Off-site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of Offsite power to Emergency 4KV Buses for **≥ 15 minutes**.

Basis:

Prolonged loss of off-site 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 to emergency busses.

Fifteen minutes was selected as a threshold to exclude momentary losses of off-site power.

Basis Reference(s):

1. FSAR Section 8.2.2, Unit Distribution System
2. FSAR Section 8.2.3, Sources of Auxiliary Power
3. Technical Specification Section 3.7, Unit Electric Power System
4. 1107-1 Normal Electrical System
5. 1107-2A Emergency Electrical - 4KV and 480 Volt
6. OP-TM-AOP-020 Loss Of Station Power
7. 1107-3 Diesel Generator
8. 1107-9 SBO Diesel Generator
9. NEI 99-01 Rev 5, SU1

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MG2

Initiating Condition

Automatic Trip and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic Reactor Trip was **not** successful as indicated by Reactor Power **≥ 5%**.

   AND

2. Manual actions were **not** successful as indicated by Reactor Power **≥ 5%**.

   AND

3. **EITHER** of the following exists:

   - Tclad **> 1400 °F**.

     OR

   - ALL means of heat removal (MFW/EFW/HPI PORV Cooling) lost.

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful.

The third condition of this EAL indicates an extreme challenge to the ability to cool the core. In the event either of these challenges exists at a time that the reactor has not been brought below the power associated with the safety system design, a core melt sequence exists. In this situation, core degradation can occur rapidly. For this reason, the General Emergency declaration is intended to be anticipatory of the fission product barrier table declaration to permit maximum off-site intervention time.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MG2 (cont.)

Basis Reference(s):

1. OP-TM-EOP-004, Lack of Primary-to-Secondary Heat Transfer
2. OP-TM-EOP-010, Emergency Procedure Rules, Guides And Graphs
3. OP-TM-EOP-001, Reactor Trip
4. 1102-4 Power Operation
5. NEI 99-01 Rev 5, SG2
6. OP-TM-641-000- Reactor Protection System (RPS/DSS)

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MS2

Initiating Condition

Automatic Trip fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic Reactor Trip was **not** successful as indicated by Reactor Power **≥ 5%**.

   AND

2. Manual Reactor Trip from Console Center were **not** successful as indicated by Reactor Power **≥ 5%**.

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful. A Site Area Emergency is warranted because conditions exist that lead to IMMINENT loss or potential loss of both fuel clad and RCS.

Manual Trip actions taken at the Console Center are any set of actions by the reactor operator(s) at which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

Manual Trip actions are not considered successful if action away from the Console Center is required to trip the reactor. This EAL is still applicable even if actions taken away from the Console Center are successful in shutting the reactor down because the design limits of the fuel may have been exceeded or because of the gross failure of the Reactor Protection System to shutdown the plant.

Escalation of this event to a General Emergency would be due to a prolonged condition leading to an extreme challenge to either core-cooling or heat removal.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MS2 (cont.)

Basis Reference(s):

1. OP-TM-EP-008, RCS Superheat
2. OP-TM-EP-004, Lack of Primary-to-Secondary Heat Transfer
3. OP-TM-EOP-010, Emergency Procedure Rules, Guides And Graphs
4. OP-TM-EOP-001, Reactor Trip
5. OP-TM-641-000- Reactor Protection System (RPS/DSS)
6. 1102-4 Power Operation
7. NEI 99-01 Rev 5, SS2

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MA2

Initiating Condition

Automatic Trip fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Automatic Reactor Trip was **not** successful as indicated by Reactor Power **≥ 5%**.

   AND

2. Manual Reactor Trip from Console Center was successful as indicated by Reactor Power **< 5%**.

Basis:

Manual Trip actions taken at the Console Center are any set of actions by the reactor operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

This condition indicates failure of the automatic protection system to trip the reactor in response to exceeding reactor protective system setpoints during a plant transient. Associated RPS instrument failures during non-transient plant conditions would be addressed by Technical Specifications. This condition is more than a potential degradation of a safety system in that a front line automatic protection system did not function in response to a plant transient. Thus the plant safety has been compromised because design limits of the fuel may have been exceeded. An Alert is indicated because conditions may exist that lead to potential loss of fuel clad or RCS and because of the failure of the Reactor Protection System to automatically shutdown the plant.

If manual actions taken at the Console Center fail to shutdown the reactor, the event would escalate to a Site Area Emergency.

Basis Reference(s):

1. OP-TM-EOP-010, Emergency Procedure Rules, Guides and Graphs
2. OP-TM-EOP-001, Reactor Trip
3. OP-TM-641-000 Reactor Protection System
4. 1102-4 Power Operation
5. NEI 99-01 Rev 5, SA2

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MU2

Initiating Condition

Inadvertent Criticality.

Operating Mode Applicability:

3, 4

EAL Threshold Values:

UNPLANNED sustained positive startup rate observed on nuclear instrumentation.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

The term “sustained” is used in order to allow exclusion of expected short term positive startup rates from planned fuel bundle or control rod movements during core alteration. These short term positive startup rates are the result of the increase in neutron population due to subcritical multiplication]

This EAL addresses inadvertent criticality events. This EAL excludes inadvertent criticalities that occur during planned reactivity changes associated with reactor startups (e.g., criticality earlier than estimated).

This EAL indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification.

Basis Reference(s):

1. 1102-2 Plant Startup
2. 1103-8 Approach to Criticality
3. NEI 99-01 Rev 5, SU8

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MS3

Initiating Condition

Loss of all vital DC power for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of all vital DC power based on **< 105 VDC** on 125 VDC Distribution System 1A and 1B for **≥ 15 minutes**.

Basis:

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power will cause core uncovering and loss of containment integrity when there is significant decay heat and sensible heat in the reactor system.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Escalation to a General Emergency would occur by Abnormal Rad Levels/Radiological Effluent, Fission Product Barrier Degradation.

Basis Reference(s):

1. FSAR Section 8.2.2.6, 250/125 VDC System
2. 1107-2C Vital DC Electrical System
3. OP-TM-AOP-023, A DC System Failure
4. OP-TM-AOP-024, B DC System Failure
5. NEI 99-01 Rev 5, SS3

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MS4

Initiating Condition

Inability to monitor a SIGNIFICANT TRANSIENT in progress.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of **greater than approximately 75%** of the following for **> 15 minutes:**
   - Safety System annunciators (Table M1)

     OR

   - Safety System indications (Table M1)

   AND

2. SIGNIFICANT TRANSIENT in progress (Table M2).

   AND

3. Compensatory indications (computer points) are unavailable.

Table M1 – Safety System	
• ESAS • RPS • Radiation Monitors • Core Flood	• EFW / HSPS • Diesel Generators • ES Electrical • BWST

Table M2 - Significant Transients
• Automatic Runback > 25% thermal reactor power • Electrical load rejection > 25% full electrical load • Reactor Trip • Safety Injection Actuation • Thermal power oscillations >10%

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MS4 (cont.)

Basis (cont.):

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) automatic turbine runback > 25% thermal reactor power, (2) electrical load rejection > 25% full electrical load, (3) Reactor Trip, (4) Safety Injection Actuation, or (5) thermal power oscillations >10%.

This EAL is intended to recognize the threat to plant safety associated with the complete loss of capability of the control room staff to monitor plant response to a SIGNIFICANT TRANSIENT.

"Planned" and “UNPLANNED” actions are not differentiated since the loss of instrumentation of this magnitude is of such significance during a transient that the cause of the loss is not a factor.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

A Site Area Emergency is considered to exist if the control room staff cannot monitor safety systems needed for protection of the public while a significant transient is in progress.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MS4 (cont.)

Basis (cont):

Indications needed to monitor safety systems necessary for protection of the public must include control room indications; computer generated indications and dedicated annunciation capability. The specific parameters are those used to determine such functions as the ability to shut down the reactor, maintain the core cooled and in a coolable geometry, remove heat from the core, and maintain the reactor coolant system and primary containment.

"Compensatory indications" in this context includes computer based information. This includes all computer systems available for this use.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Basis Reference(s):

1. OP-TM-602, Plant Process Computer (PPC) Operation
2. 1105-10A Plant Computer Alarm Attributes
3. 1105-21 Main Annunciator Panel Beta Control System
4. FSAR Section 7.3.4, Safety Parameter Display System
5. FSAR Section 7.4.2.1, Console and Panel Layout
6. OP-TM-AOP-025, Loss of ICS Hand and Auto Power
7. OP-TM-AOP-026, Loss of ATB or ICS Hand Power
8. OP-TM-AOP-027, Loss of ATA or ICS Auto Power
9. Drawing IE-155-02-003
10. NEI 99-01 Rev 5, SS6

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MA4

Initiating Condition

UNPLANNED Loss of safety system annunciation or indication in the control room with EITHER (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**

   - Safety System annunciators (Table M1)

     OR

   - Safety System indications (Table M1)

Table M1 – Safety System	
• ESAS	• EFW / HSPS
• RPS	• Diesel Generators
• Radiation Monitors	• ES Electrical
• Core Flood	• BWST

AND

2. a. SIGNIFICANT TRANSIENT in progress (Table M2).

Table M2- Significant Transients
• Automatic Runback > 25% thermal reactor power
• Electrical load rejection > 25% full electrical load
• Reactor Trip
• Safety Injection Actuation
• Thermal power oscillations >10%

OR

b. Compensatory indications (computer points) are unavailable.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MA4 (cont.)

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) automatic turbine runback > 25% thermal reactor power, (2) electrical load rejection > 25% full electrical load, (3) Reactor Trip, (4) Safety Injection Actuation, or (5) thermal power oscillations > 10%.

This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a SIGNIFICANT TRANSIENT.

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

"Compensatory indications" in this context includes computer based information. If both a major portion of the annunciation system and all computer monitoring are unavailable, the Alert is required.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MA4 (cont.)

Basis Reference(s):

1. OP-TM-602, Plant Process Computer (PPC) Operation
2. 1105-10A Plant Computer Alarm Attributes
3. 1105-21 Main Annunciator Panel Beta Control System
4. FSAR Section 7.3.4, Safety Parameter Display System
5. FSAR Section 7.4.2.1, Console and Panel Layout
6. OP-TM-AOP-025, Loss of ICS Hand and Auto Power
7. OP-TM-AOP-026, Loss of ATB or ICS Hand Power
8. OP-TM-AOP-027, Loss of ATA or ICS Auto Power
9. Drawing IE-155-02-003
10. NEI 99-01 Rev 5, SA4

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MU4

Initiating Condition

UNPLANNED loss of safety system annunciation or indication in the control room for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**

- Safety System annunciators (Table M1)

  OR

- Safety System indications (Table M1)

Table M1 – Safety System	
• ESAS • RPS • Radiation Monitors • Core Flood	• EFW / HSPS • Diesel Generators • ES Electrical • BWST

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment.

Recognition of the availability of computer based indication equipment is considered.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MU4 (cont.)

Basis: (cont)

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

Fifteen minutes was selected as a threshold to exclude momentary power losses.

This Unusual Event will be escalated to an Alert based on a concurrent loss of compensatory indications or if a SIGNIFICANT TRANSIENT is in progress during the loss of annunciation or indication.

Basis Reference(s):

1. OP-TM-602, Plant Process Computer (PPC) Operation
2. 1105-10A Plant Computer Alarm Attributes
3. 1105-21 Main Annunciator Panel Beta Control System
4. FSAR Section 7.3.4, Safety Parameter Display System
5. FSAR Section 7.4.2.1, Console and Panel Layout
6. OP-TM-AOP-025, Loss of ICS Hand and Auto Power
7. OP-TM-AOP-026, Loss of ATB or ICS Hand Power
8. OP-TM-AOP-027, Loss of ATA or ICS Auto Power
9. Drawing IE-155-02-003
10. NEI 99-01 Rev 5, SU3

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MU5

Initiating Condition

RCS Leakage.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

1. Unidentified or pressure boundary leakage **> 10 gpm**.

   OR

2. Identified leakage **> 25 gpm**.

Basis:

This EAL is included as an Unusual Event because it may be a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified or pressure boundary leakage was selected as it is observable with normal control room indications. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances).

Relief valve operation should be excluded from this EAL. However, a relief valve that operates and fails to close per design should be considered applicable to this EAL if the relief valve cannot be isolated.

The EAL for identified leakage is set at a higher value due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage. In either case, escalation of this EAL to the Alert level is via Fission Product Barrier.

Basis Reference(s):

1. Technical Specification 3.1.6, Leakage and Table 4.1-2, Minimum Equipment Test Frequency
2. OP-TM-220-251 RCS Leak Rate Determination
3. OP-TM-220-252, Primary – To – Secondary Leakrate Determination
4. OP-TM-PRF1-0405 RB Sump Level HI
5. UFSAR 6.4.3, Bases of Leakage Estimate
6. UFSAR 6.4.4, Design Basis Leakage
7. OP-TM-AOP-050, Reactor Coolant Leakage
8. NEI 99-01 Rev 5, SU5

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MU6

Initiating Condition

Loss of all On-site or Off-site communications capabilities.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

1. Loss of all Table M3 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table M3 **Offsite** communications capability affecting the ability to perform offsite notifications.

Table M3 - Communications Capability		
System	**Onsite**	**Offsite**
Radios	X	
Plant page	X	
Plant Telephone System	X	
Sound Powered Phones	X	
Satellite Phones		X
ENS		X
Cellular Phones		X
Commercial Telephone System		X

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MU6 (cont.)

Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

Basis Reference(s):

1. 1105-12 Communications System
2. FSAR Section 7.4.4, Communication
3. NEI 99-01 Rev 5, SU6

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTION

MU7

Initiating Condition

Inability to reach required shutdown within Technical Specification limits.

Operating Mode Applicability:

1, 2, 3, 4

EAL Threshold Values:

Plant is **not** brought to required operating mode within Technical Specifications LCO Action Statement Time.

Basis:

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 Unusual Event is required when the plant is not brought 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.

Basis Reference(s):

1. TMI Technical Specifications
2. NEI 99-01 Rev 5, SU2

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CA1

Initiating Condition

Loss of all Off-site and all On-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

5, 6, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to Emergency 4KV Buses.

   AND

2. Failure of EG-Y-1A, EG-Y-1B Emergency Diesel Generators and EG-Y-4 SBO Diesel Generator to supply power to Emergency 4KV Buses.

   AND

3. Failure to restore power to either Emergency 4KV Bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.

Basis:

Loss of all AC power compromises all plant safety systems requiring electric power.

The event can be classified as an Alert when in cold shutdown, refueling, or defueled mode because of the significantly reduced decay heat and lower temperature and pressure, increasing the time to restore one of the emergency busses, relative to that specified for the Site Area Emergency EAL.

Escalating to Site Area Emergency, if appropriate, is by Abnormal Rad Levels / Radiological Effluent EALs.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CA1 (cont.)

Basis Reference(s):

1. FSAR Section 8.2.2, Unit Distribution System
2. FSAR Section 8.2.3, Sources of Auxiliary Power
3. Technical Specification Section 3.7, Unit Electric Power System
4. 1107-1 Normal Electrical System
5. 1107-2A Emergency Electrical - 4KV and 480 Volt
6. OP-TM-AOP-020 Loss Of Station Power
7. 1107-3 Diesel Generator
8. 1107-9 SBO Diesel Generator
9. NEI 99-01 Rev 5, CA3
10. FSAR Section 8.5, Station Blackout

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CU1

Initiating Condition

AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. AC power capability to Emergency 4KV Buses reduced to only one of the following power sources for **≥ 15 minutes**:

   - Auxiliary Transformer 1A
   - Auxiliary Transformer 1B
   - Emergency Diesel EG-Y-1A
   - Emergency Diesel EG-Y-1B
   - SBO Diesel generator EG-Y-4

   AND

2. Any additional single failure will result in station blackout.

Basis:

Capability: (pertaining to electrical power supplies) is equipment that is available to provide and maintain AC power at the required voltage and frequency for the required load.

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. The subsequent loss of this single power source would escalate the event to an Alert in accordance with CA1.

Fifteen minutes was selected as a threshold to exclude momentary losses of power.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CU1 (cont.)

Basis Reference(s):

1. FSAR Section 8.2.2, Unit Distribution System
2. FSAR Section 8.2.3, Sources of Auxiliary Power
3. FSAR Section 8.5, Station Blackout
4. Technical Specification Section 3.7, Unit Electric Power System
5. 1107-1 Normal Electrical System
6. 1107-2A Emergency Electrical - 4KV and 480 Volt
7. OP-TM-AOP-020 Loss Of Station Power
8. 1107-3 Diesel Generator
9. 1107-9 SBO Diesel Generator
10. NEI 99-01 Rev 5, CU3

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CU2

Initiating Condition

Inadvertent Criticality.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

UNPLANNED sustained positive startup rate observed on nuclear instrumentation.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

The term “sustained” is used in order to allow exclusion of expected short term positive startup rates from planned fuel bundle or control rod movements during core alteration. These short term positive startup rates are the result of the increase in neutron population due to subcritical multiplication]

This EAL addresses criticality events that occur in Cold Shutdown or Refueling modes such as fuel mis-loading events and inadvertent dilution events.

This EAL indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification.

Basis Reference(s):

1. 1102-2 Plant Startup
2. 1103-8 Approach to Criticality
3. NEI 99-01 Rev 5, CU8

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CU3

Initiating Condition

Loss of required DC power for 15 minutes or longer.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of required DC power based on **< 105 VDC** on 125 VDC Distribution System 1A and 1B for **≥ 15 minutes**.

Basis:

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.

The required busses are the minimum allowed by Technical Specifications for the mode of operation. It is intended that the loss of the operating (operable) train is to be considered. If this loss results in the inability to maintain cold shutdown, the escalation to an Alert will be per CA5.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Basis Reference(s):

1. FSAR Section 8.2.2.6, 250/125 VDC System
2. 1107-2C Vital DC Electrical System
3. OP-TM-AOP-023, A DC System Failure
4. OP-TM-AOP-024, B DC System Failure
5. NEI 99-01 Rev 5, CU7

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CU4

Initiating Condition

Loss of all On-site or Off-site communications capabilities.

Operating Mode Applicability:

5, 6, D

EAL Threshold Values:

1. Loss of all Table C1 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table C1 **Offsite** communications capability affecting the ability to perform offsite notifications.

Table C1 - Communications Capability		
System	**Onsite**	**Offsite**
Radios	X	
Plant page	X	
Plant Telephone System	X	
Sound Powered Phones	X	
Satellite Phones		X
ENS		X
Cellular Phones		X
Commercial Telephone System		X

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CU4 (cont.)

Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

Basis Reference(s):

1. 1105-12 Communications System
2. FSAR Section 7.4.4, Communication
3. NEI 99-01 Rev 5, CU6

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CA5

Initiating Condition

Inability to maintain plant in cold shutdown.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200°F** for **> Table C2 duration**.

Table C2 – RCS Reheat Duration Thresholds		
RCS	**Containment Closure**	**Duration**
Intact	N/A	60 minutes*
Not Intact	Established	20 minutes*
OR Reduced Inventory	Not Established	0 minutes
* If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then EAL Threshold #1 is **not** applicable.		

OR

2. UNPLANNED RPV pressure rise **> 10 psig** as a result of temperature rise due to loss of decay heat removal. (This threshold does not apply in solid plant conditions.)

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

RCS is intact when the RCS pressure boundary is in its normal condition for the Cold Shutdown mode of operation (e.g., no freeze seals, etc.).

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CA5 (cont.)

Basis (cont.):

Threshold #1 Basis:

The RCS Reheat Duration Threshold table addresses complete loss of functions required for core cooling for greater than 60 minutes during refueling and cold shutdown modes when RCS integrity is established. The status of CONTAINMENT CLOSURE in this condition is immaterial given that the RCS is providing a high pressure barrier to fission product release to the environment. The 60 minute time frame should allow sufficient time to restore cooling without there being a substantial degradation in plant safety.

The RCS Reheat Duration Threshold table also addresses the complete loss of functions required for core cooling for greater than 20 minutes during refueling and cold shutdown modes when CONTAINMENT CLOSURE is established but RCS integrity is not established. The allowed 20 minute time frame was included to allow operator action to restore the heat removal function, if possible.

Finally, complete loss of functions required for core cooling during refueling and cold shutdown modes when neither CONTAINMENT CLOSURE nor RCS integrity are established. No delay time is allowed because the evaporated reactor coolant that may be released into the Containment during this heatup condition could also be directly released to the environment.]

The note (*) indicates that this EAL is not applicable if actions are successful in restoring an RCS heat removal system to operation and RCS temperature is being reduced within the specified time frame.

Threshold #2 Basis:

The 10 psig pressure rise due to loss of decay heat removal infers an intact RCS with uncontrolled RCS temperature rise in excess of the Technical Specification cold shutdown limit (200° F) for which CA5 threshold #1 would permit up to sixty minutes to restore RCS cooling before declaration of an Alert. This EAL therefore covers situations of high decay heat loads, in which the event should be declared without delay.

Escalation to Site Area Emergency would be via CS6 should boiling result in significant RPV level loss leading to core uncovery.

A loss of Technical Specification components alone is not intended to constitute an Alert. The same is true of a momentary UNPLANNED excursion above the Technical Specification cold shutdown temperature limit when the heat removal function is available.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CA5 (cont)

Basis Reference(s):

1. Technical Specifications sections: 1.2.1, 1.7.a and c
2. Technical Specifications sections: 3.6.12.a
3. Technical Specifications sections: 3.6.5
4. Technical Specifications sections: 3.8.6
5. Technical Specifications sections: 1.2.1, 1.7.a and c, 3.6.12.a, 3.6.5, 3.8.6
6. 1101-3 Containment Integrity and Access Limits
7. OP-TM-EOP-030, Loss of Decay Heat Removal
8. Outage Fuel Protection Criteria Document
9. NEI 99-01 Rev 5, CA4

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CU5

Initiating Condition

UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 200 °F**.

   OR

2. Loss of the following for **≥ 15 minutes:**

   - All RCS temperature indications

     AND

   - All RCS level indications

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL is be a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant.

In cold shutdown the ability to remove decay heat relies primarily on forced cooling flow. Operation of the systems that provide this forced cooling may be jeopardized due to the unlikely loss of electrical power or RCS inventory. Since the RCS usually remains intact in the cold shutdown mode a large inventory of water is available to keep the core covered.

During refueling the level in the RPV will normally be maintained above the RPV flange. Refueling evolutions that decrease water level below the RPV flange are carefully planned and procedurally controlled. Loss of forced decay heat removal at reduced inventory may result in more rapid increases in RCS/RPV temperatures depending on the time since shutdown.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CU5 (cont.)

Basis (cont.):

Normal means of core temperature indication and RCS level indication may not be available in the refueling mode. Redundant means of RPV level indication are therefore procedurally installed to assure that the ability to monitor level will not be interrupted. However, if all level and temperature indication were to be lost in either the cold shutdown of refueling modes, Threshold #2 would result in declaration of an Unusual Event if both temperature and level indication cannot be restored within 15 minutes from the loss of both means of indication. Escalation to Alert would be via CA6 based on an inventory loss or CA5 based on exceeding its temperature criteria.

Basis Reference(s):

1. 1103-11 RCS Water Level Control
2. FSAR Section 7.3.2, Non-Nuclear Instrumentation
3. 1302-6.6 RCS Temp/Press, TSAT Monitor, ATWS and DSS Calibration
4. NEI 99-01 Rev 5, CU4
5. OP-TM-EOP-030, Loss of Decay Heat Removal

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CG6

Initiating Condition

Loss of RPV inventory affecting fuel clad integrity with containment challenged.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. RCS level unknown for **≥ 30 minutes.**

   AND

2. Loss of RPV inventory as indicated by any of the following:

   - Table C3 indication.

     OR

   - Erratic Source Range Neutron Monitor indication.

     OR

   - Radiation Monitor reading **> 3R/hr** on RM-G-6 or RM-G-7.

   AND

3. Any Containment Challenge Indication (Table C4)

Table C3 – Indications of RCS Leakage
• UNPLANNED rise in Reactor Bldg Sump, Aux Bldg Sump, BWST or RCDT.
• UNPLANNED rise in RCS make-up
• Observation of leakage or Inventory loss

Table C4 – Containment Challenge Indications
• Hydrogen concentration in Containment **≥ 4%**
• UNPLANNED rise in containment pressure
• CONTAINMENT CLOSURE **not** established.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CG6 (cont.)

Basis:

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL represents the inability to restore and maintain RPV level to above the top of active fuel with containment challenged. Fuel damage is probable if RPV level cannot be restored, as available decay heat will cause boiling, further reducing the RPV level. With the CONTAINMENT breached or challenged then the potential for unmonitored fission product release to the environment is high. This represents a direct path for radioactive inventory to be released to the environment. This is consistent with the definition of a General Emergency. The General Emergency is declared on the occurrence of the loss or IMMINENT loss of function of all three barriers.

A number of variables can have a significant impact on heat removal capability challenging the fuel clad barrier. Examples include mid-loop, reduced level/flange level, head in place, cavity flooded, RCS venting strategy, decay heat removal system design, and vortexing pre-disposition.

Analysis indicates that core damage may occur within an hour following continued core uncovery therefore, 30 minutes was conservatively chosen.

If CONTAINMENT CLOSURE is re-established prior to exceeding the 30 minute core uncovery time limit then escalation to GE would not occur.

When RPV level indication is unavailable, the inventory loss must be detected by erratic Source Range Monitor indication, elevated containment radiation or unexplained rise in tank or sump level. Post-TMI studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and that Source Range Monitors can be used as a tool for making such determinations.

Sump level rises must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

As water level in the RPV lowers, the dose rate above the core will increase. Indication of **>** 3R/hr is indicative of core uncovery.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CG6 (cont.)

Basis Reference(s):

1. 1301-1 Shift and Daily Checks, Data Sheet 3
2. 1103-11 RCS Water Level Control
3. 1101-3 Containment Integrity and Access Limits
4. OP-TM-EOP-030, Loss of Decay Heat Removal
5. FSAR Sections 5.2, Reactor Building
6. FSAR Sections 6.5.2, Hydrogen Monitoring
7. FSAR Sections 6.5.3, Hydrogen Generation
8. Technical Specifications 3.5.5, Accident Monitoring Instrumentation
9. EP-AEL-0501, Estimation of Radiation Monitor Readings Indicating Core Uncovery During Refuel
10. NEI 99-01 Rev 5, CG1

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CS6

Initiating Condition

Loss of RPV inventory affecting core decay heat removal capability.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. RCS level unknown for **≥ 30 minutes.**

   AND

2. Loss of RPV inventory as indicated by any of the following:

   - Table C3 indication.

     OR

   - Erratic Source Range Neutron Monitor indication.

     OR

   - Radiation Monitor reading **> 3R/hr** on RM-G-6 or RM-G-7.

Table C3 – Indications of RCS Leakage
• UNPLANNED rise in Reactor Bldg Sump, Aux Bldg Sump, BWST or RCDT.
• UNPLANNED rise in RCS make-up
• Observation of leakage or Inventory loss

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CS6 (cont.)

Basis:

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

Under the conditions specified, a continued drop in RCS/RPV level is indicative of a loss of inventory control. Inventory loss may be due to an RCS breach, pressure boundary leakage, or continued boiling in the RPV. Thus, declaration of a Site Area Emergency is warranted.

Escalation to a General Emergency is via CG6 or RG1.

When RPV level indication is unavailable, the inventory loss must be detected by erratic Source Range Monitor indication, elevated containment radiation or unexplained rise in tank or sump level. Post-TMI studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and that Source Range Monitors can be used as a tool for making such determinations.

The 30-minute duration allows sufficient time for actions to be performed to recover inventory control equipment.

As water level in the RPV lowers, the dose rate above the core will rise. Indication of > 3 R/hr. is indicative of core uncovery.

Basis Reference(s):

1. OP-TM-PRF1-0405 RB Sump Level Hi
2. 1101-3 Containment Integrity and Access Limits
3. 1301-1 Shift and Daily Checks, Data Sheet 3
4. 1103-11 RCS Water Level Control
5. OP-TM-EOP-030, Loss of Decay Heat Removal
6. NEI 99-01 Rev 5, CS1

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CA6

Initiating Condition

Loss of RPV inventory.

Operating Mode Applicability:

5, 6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of RCS inventory as indicated by VALID RCS level **< 0 inches** on Draindown Level indicator.

   OR

2. a. RCS level unknown for **≥ 15 minutes**.

   AND

   b. Loss of RCS inventory per Table C3 Indications.

Table C3 – Indications of RCS Leakage
• UNPLANNED rise in Reactor Bldg Sump, Aux Bldg Sump, BWST or RCDT. • UNPLANNED rise in RCS make-up • Observation of leakage or Inventory loss

Basis:

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CA6 (cont.)

Basis: (cont)

This EAL serves as precursors to a loss of ability to adequately cool the fuel. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further RPV level decrease and potential core uncovery. This condition will result in a minimum emergency classification level of an Alert.

If RPV level continues to lower then escalation to Site Area Emergency will be via CS6.

Threshold #1 Basis:

The inability to restore and maintain level after reaching this setpoint would be indicative of a failure of the RCS barrier.

Threshold #2 Basis:

When RPV level indication is unavailable, the inventory loss must be detected by other means including rise in sump and tank levels, changes in makeup or observation of leakage.

The 15-minute interval for the loss of level indication was chosen because it is half of the Site Area Emergency duration.

Basis Reference(s):

1. OP-TM-PRF1-0405 RB Sump Level Hi
2. 1301-1 Shift and Daily Checks, Data Sheet 3
3. 1103-11 RCS Water Level Control
4. OP-TM-EOP-030, Loss of Decay Heat Removal
5. NEI 99-01 Rev 5, CA1

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CU6

Initiating Condition

RCS Leakage.

Operating Mode Applicability:

5

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

RCS leakage results in the inability to restore and maintain RCS or Pressurizer level **> procedurally established limit** for **≥ 15 minutes.**

Basis:

This EAL is considered to be a potential degradation of the level of safety of the plant. The inability to maintain or restore level is indicative of loss of RCS inventory.

Relief valve operation should be excluded from this EAL. However, a relief valve that operates and fails to close per design should be considered applicable to this EAL if the relief valve cannot be isolated.

Prolonged loss of RCS Inventory may result in escalation to the Alert emergency classification level via either CA6 or CA5.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU1

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CU7

Initiating Condition

UNPLANNED loss of RPV inventory.

Operating Mode Applicability:

6

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED Fuel Transfer Canal or Vessel level drop that meets **EITHER**:

   - When controlling level above the RPV flange, Fuel Transfer Canal level drop below the RPV flange for **≥ 15 minutes.**

   OR

   - When controlling level below the RPV flange, vessel level drop below the procedurally established limit **≥ 15 minutes.**

   OR

2. a. RCS level unknown.

   AND

   b. Loss of RCS inventory per Table C3 Indications.

Table C3 – Indications of RCS Leakage
• UNPLANNED rise in Reac Bldg Sump, Aux Bldg Sump, BWST or RCDT. • UNPLANNED rise in RCS make-up • Observation of leakage or Inventory loss

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CU7 (cont.)

Basis: (cont)

This EAL is a precursor of more serious conditions and considered to be a potential degradation of the level of safety of the plant.

Refueling evolutions that lowers RCS water level below the RPV flange are carefully planned and procedurally controlled. An UNPLANNED event that results in water level dropping below the RPV flange, or below the planned RCS water level for the given evolution (if the planned RCS water level is already below the RPV flange), warrants declaration of a UE due to the reduced RCS inventory that is available to keep the core covered.

The allowance of 15 minutes was chosen because it is reasonable to assume that level can be restored within this time frame using one or more of the redundant means of makeup that should be available. If level cannot be restored in this time frame then it may indicate a more serious condition exists.

Continued loss of RCS Inventory will result in escalation to the Alert emergency classification level via either CA6 or CA5.

Threshold #1 Basis:

This EAL involves a drop in RCS level below the top of the RPV flange that continues for 15 minutes due to an UNPLANNED event. This EAL is not applicable to level changes in flooded reactor cavity level, which is addressed by RU2, until such time as the level drop reaches the level of the vessel flange.

If RPV level continues to decrease and reaches the Bottom ID of the RCS Loop then escalation to CA6 would be appropriate.

Threshold #2 Basis:

This EAL addresses conditions in the refueling mode when normal means of core temperature indication and RCS level indication may not be available. Redundant means of RPV level indication will normally be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that RPV inventory loss was occurring by observing other indications such as sump and tank level changes, changes in makeup or observation of leakage. Sump and tank level changes must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

Escalation to the Alert emergency classification level would be via either CA6 or CA5.

Table TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION

CU7 (cont.)

Basis Reference(s):

1. Technical Specification 3.1.6. Leakage
3. OP-TM-220-251 RCS Leak Rate Determination Using PPC
4. OP-TM-220-252, Primary – To – Secondary Leakrate Determination (OTSG Leakage): Normal Operations
5. OP-TM-MAP-C0105 RCS Draindown LVL HI/LO
6. OP-TM-PRF1-0405 RB Sump Level HI
7. UFSAR 6.4.3, Bases of Leakage Estimate
8. 1103-11 RCS Water Level Control
9. OP-TM-EOP-030, Loss of Decay Heat Removal
10. NEI 99-01 Rev 5, CU2

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HG1

Initiating Condition

HOSTILE ACTION resulting in loss of physical control of the facility.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Value:

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1).

   OR

2. A HOSTILE ACTION has:

   - Caused failure of Spent Fuel Pool Cooling Systems

     AND

   - IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).

Table H1 – Safety Functions
• Reactivity Control (ability to shut down the reactor and keep it shutdown
• RCS Inventory (ability to cool the core)
• Secondary Heat Removal (ability to maintain heat sink)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HG1 (cont.)

Basis: (cont)

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

Threshold #1 Basis

This threshold encompasses conditions under which a HOSTILE ACTION has taken physical control of VITAL AREAS (containing vital equipment or controls of vital equipment) required to maintain safety functions. As a result, there is a loss of one or more of the Table H1 functions and equipment control cannot be transferred to and operated from another location.

If control of the plant equipment necessary to maintain safety functions can be transferred to another location, then the above EAL threshold is not met.

Threshold #2 Basis

This threshold addresses loss of physical control of spent fuel pool cooling systems if imminent fuel damage is likely because there is freshly off-loaded fuel in the pool. The condition “freshly off-loaded reactor fuel in pool” equates to fuel off-loaded within the last 120 days in NF-AA-309 Special Nuclear Material And Core Component Move Sheet Development.

Basis Reference(s):

1. OP-TM-EOP-020, Cooldown from Outside the Control Room
2. 1105-20 Remote Shutdown Systems
3. Security and Safeguards Contingency Plan Station Security Plan – Appendix C
4. NF-AA-309, Special Nuclear Material And Core Component Move Sheet Development
5. NEI 99-01, Rev. 5 HG1

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HS1

Initiating Condition

HOSTILE ACTION within the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

This condition represents an escalated threat to plant safety above that contained in the Alert in that a HOSTILE FORCE has progressed from the OWNER CONTROLLED AREA to the PROTECTED AREA.

This EAL addresses the contingency for a very rapid progression of events. It is not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack with minimal time available for further preparation or additional assistance to arrive requires Offsite Response Organizations (ORO) readiness and preparation for the implementation of protective measures.

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HS1 (cont.)

Basis: (cont)

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the PROTECTED AREA. Those events are adequately addressed by other EALs.

Escalation of this emergency classification level, if appropriate, would be based on actual plant status after impact or progression of attack.

Basis Reference(s):

1. SY-AA-101-132, Security Assessment and Response to Unusual Activities
2. Security And Safeguards Contingency Plan Station Security Plan – Appendix C
3. NEI 99-01 Rev 5, HS4

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA1

Initiating Condition

HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site.

   OR

2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

OWNER CONTROLLED AREA (OCA): is the property associated with the station owned by the company. Access is normally limited to persons entering for official business.

Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

The fact that the site is under serious attack or is an identified attack target with minimal time available for further preparation or additional assistance to arrive requires a heightened state of readiness and implementation of protective measures that can be effective (such as on-site evacuation, dispersal or sheltering).

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA1 (cont)

Basis: (cont)

Threshold #1 Basis

This EAL addresses the immediacy of an expected threat arrival or impact on the site within a relatively short time.

The intent of this EAL is to ensure that notifications for the airliner attack threat are made in a timely manner and that Offsite Response Organizations (ORO) and plant personnel are at a state of heightened awareness regarding the credible threat. Airliner is meant to be a large aircraft with the potential for causing significant damage to the plant.

This EAL is met when a plant receives information regarding an airliner attack threat from NRC and the airliner is within 30 minutes of the plant. Only the plant to which the specific threat is made need declare the Alert.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Threshold #2 Basis

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the OCA. Those events are adequately addressed by other EALs.

Note that this EAL is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA.

Basis Reference(s):

1. SY-AA-101-132, Security Assessment and Response to Unusual Activities
2. Station Security Plan – Appendix C
3. NEI 99-01 Rev 5, HA4

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HU1

Initiating Condition

Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities.

   OR

2. A validated notification from NRC providing information of an aircraft threat.

   OR

3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

Basis:

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HU1 (cont)

Basis Reference(s):

Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

Security events assessed as HOSTILE ACTIONS are classifiable under HA1, HS1 and HG1.

A higher initial classification could be made based upon the nature and timing of the security threat and potential consequences. The licensee shall consider upgrading the emergency response status and emergency classification level in accordance with the site's Safeguards Contingency Plan and Emergency Plan.

Threshold #1 Basis

This threshold is included to ensure that appropriate notifications for the security threat are made in a timely manner. This includes information of a credible threat. Only the plant to which the specific threat is made need declare the Notification of an Unusual Event.

The determination of "credible" is made through use of information found in the Station Security Plan or SY-AA-101-132, "Security Assessment and Response to Unusual Activities" procedure.

Threshold #2 Basis

The intent of this EAL is to ensure that notifications for the aircraft threat are made in a timely manner and that Offsite Response Organizations (ORO) and plant personnel are at a state of heightened awareness regarding the credible threat. It is not the intent of this EAL to replace existing non-hostile related EALs involving aircraft.

This EAL is met when a plant receives information regarding an aircraft threat from NRC. Validation is performed by calling the NRC. Only the plant to which the specific threat is made need declare the Unusual Event.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Escalation to Alert emergency classification level would be via HA1 would be appropriate if the threat involves an airliner within 30 minutes of the plant.

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HU1 (cont)

Basis Reference(s):

Threshold #3 Basis

Reference is made to security force because these individuals are the designated personnel on-site qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the plant Safeguards Contingency Plan.

This threshold is based on Station Security Plan – Appendix C. 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 in some cases under 10 CFR 50.72.

Basis Reference(s):

1. SY-AA-101-132, Security Assessment and Response to Unusual Activities
2. Security And Safeguards Contingency Plan Station Security Plan – Appendix C
3. NEI 99-01 Rev 5, HU4

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HS2

Initiating Condition

Control Room evacuation has been initiated and plant control cannot be established.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Control room evacuation has been initiated.

   AND

2. Control of the plant **cannot** be established per OP-TM-EOP-020 **< 15 minutes**.

Basis:

The time period to establish control of the plant starts when either:

a. Control of the plant is no longer maintained in the Main Control Room

   OR

b. The last Operator has left the Main Control Room.

The intent of this EAL is to capture those events where control of the plant cannot be reestablished in a timely manner. In this case, expeditious transfer of control of safety systems has not occurred (although fission product barrier damage may not yet be indicated).

The intent of the EAL is to establish control of important plant equipment and knowledge of important plant parameters in a timely manner. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions. Typically, these safety functions are reactivity control, RCS inventory, and secondary heat removal.

The determination of whether or not control is established at the remote shutdown panel is based on Emergency Director (ED) judgment. The Emergency Director is expected to make a reasonable, informed judgment within the specified time for transfer that the licensee has control of the plant from the remote shutdown panel.

Escalation of this emergency classification level, if appropriate, would be by Fission Product Barrier or Abnormal Rad Levels/Radiological Effluent EALs.

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HS2 (cont)

Basis Reference(s):

1. OP-TM-EOP-020, Cooldown from Outside the Control Room
2. 1105-20 Remote Shutdown Systems
3. NEI 99-01, Rev. 5 HS2

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA2

Initiating Condition

Control Room evacuation has been initiated.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Entry into OP-TM-EOP-020 and Control Room evacuation is required.

Basis:

With the control room evacuated, additional support, monitoring and direction through the Technical Support Center and/or other emergency response facilities may be necessary.

Inability to establish plant control from outside the control room will escalate this event to a Site Area Emergency.

Basis Reference(s):

1. OP-TM-EOP-020, Cooldown from Outside the Control Room
2. 1105-20 Remote Shutdown Systems
3. NEI 99-01, Rev. 5 HA5

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA3

Initiating Condition

FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

FIRE or EXPLOSION resulting in any of the following:

- VISIBLE DAMAGE to a Table H2 permanent structure.

  OR

- VISIBLE DAMAGE to safety system equipment contained within a Table H2 area.

  OR

- Control Room indication of degraded safety system equipment performance within a Table H2 area.

Table H2 – Vital Areas
• Reactor Building
• Intake Building
• Intermediate Building
• Control Tower
• Auxiliary & Fuel Handling Buildings
• 1A and 1B Diesel Generator Buildings
• BWST
• CST

Basis:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA3 (cont.)

Basis: (cont)

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

The areas listed in Table H2 specify specific structures or areas that contain safety system, or component and functions required for safe shutdown of the plant.

VISIBLE DAMAGE is used to identify the magnitude of the FIRE or EXPLOSION and to discriminate against minor FIRES and EXPLOSIONS.

The reference to structures containing safety systems or components is included to discriminate against FIRES or EXPLOSIONS in areas having a low probability of affecting safe operation. The significance here is not that a safety system was degraded but the fact that the FIRE or EXPLOSION was large enough to cause damage to these systems.

An EXPLOSION due to failure of pressurized equipment that does not cause damage to other permanent structures or equipment associated with plant operations does not meet the criteria for declaration under this EAL, but may result in other declaration criteria being met (e.g., when the line is an element of a Fission Product Barrier, or the results in inventory loss).

The use of VISIBLE DAMAGE should not be interpreted as mandating a lengthy damage assessment prior to classification. The declaration of an Alert and the activation of the Technical Support Center will provide the Emergency Director with the resources needed to perform detailed damage assessments.

The Emergency Director also needs to consider any security aspects of the EXPLOSION.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions, Fission Product Barrier or Abnormal Rad Levels / Radiological Effluent EALs.

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA3 (cont.)

Basis Reference(s):

1. FSAR Figure 2.1-3, Extended Plot Plan TMINS
2. FSAR Section 5.1, Class I Structures, Components, and Systems
3. NEI 99-01, Rev. 5 HA2
4. OP-TM-AOP-001, Fire
5. OP-TM-EOP-020, Cooldown Outside of Control Room

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HU3

Initiating Condition

FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm.

Table H2 –Vital Areas
▪ Reactor Building ▪ Intake Building ▪ Intermediate Building ▪ Control Tower ▪ Auxiliary & Fuel Handling Buildings ▪ 1A and 1B Diesel Generator Buildings ▪ BWST ▪ CST

OR

2. EXPLOSION within PROTECTED AREA affecting a Table H2 area.

Basis:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HU3 (cont.)

Bases: (cont)

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

PROTECTED AREA: An area which normally encompasses all controlled areas within the security protected area fence.

This EAL addresses the magnitude and extent of FIRES or EXPLOSIONS that may be potentially significant precursors of damage to safety systems. It addresses the FIRE / EXPLOSION, and not the degradation in performance of affected systems that may result.

As used here, notification is visual observation and report by plant personnel or sensor alarm indication.

For the purposes of declaring an emergency event, the term “extinguished” means no visible flames.

Thresholds #1:

The 15 minute time period begins with a credible notification that a FIRE is occurring, or indication of a fire detection system alarm/actuation. Verification of a fire detection system alarm/actuation includes actions that can be taken within the control room or other nearby site specific location to ensure that it is not spurious. An alarm is assumed to be an indication of a FIRE unless it is disproved within the 15 minute period by personnel dispatched to the scene. In other words, a personnel report from the scene may be used to disprove a sensor alarm if received within 15 minutes of the alarm, but shall not be required to verify the alarm.

The intent of this 15 minute duration is to size the FIRE and to discriminate against small FIRES that are readily extinguished (e.g., smoldering waste paper basket). Such fires are excluded from consideration in this threshold since they have no safety consequence.

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HU3 (cont.)

Bases: (cont)

Threshold #2 Basis:

This EAL addresses only those EXPLOSIONS of sufficient force to damage permanent structures or equipment associated with plant operations within the PROTECTED AREA.

An EXPLOSION due to failure of pressurized equipment that does not cause damage to other permanent structures or equipment associated with plant operations does not meet the criteria for declaration under this EAL, but may result in other declaration criteria being met (e.g., when the line is an element of a Fission Product Barrier, or the results in inventory loss).

No attempt is made to assess the actual magnitude of the damage. The occurrence of the EXPLOSION is sufficient for declaration.

The Emergency director also needs to consider any security aspects of the EXPLOSION, if applicable.

Escalation of this emergency classification level, if appropriate, would be based on HA3.

Basis Reference(s):

1. FSAR Figure 2.1-3, Extended Plot Plan TMINS
2. FSAR Section 5.1, Class I Structures, Components, and Systems
3. NEI 99-01, Rev. 5 HU2
4. OP-TM-AOP-001, Fire
5. OP-TM-EOP-020, Cooldown Outside of Control Room

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA4

Initiating Condition

Natural or destructive phenomena affecting VITAL AREAS.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

1. a. Seismic event **> Operating Basis Earthquake (OBE)** as indicated by seismic Alarm **PRF-1-3** Operating Basis Earthquake.

   AND

   b. Confirmed by **ANY** of the following:

   - Earthquake felt in plant.

     OR

   - National Earthquake Center.

     OR

   - Control Room indication of degraded performance of systems required for the safe shutdown of the plant.

   OR

2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area:

   - Tornado strike

     OR

   - High winds **> 80 mph**

     OR

   - Vehicle crash

     OR

   - Turbine failure-generated PROJECTILES

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA4 (cont.)

EAL Threshold Values: (cont)

OR

3. Flooding in Auxiliary or Intermediate Building that results in **EITHER**:

   - Degraded safety system performance as indicated in the Control Room.

     OR

   - Industrial safety hazards (e.g., electric shock) that preclude access to operate or monitor safety equipment.

   OR

4. Abnormal river water level at the Intake Pump and Screen House as indicated by **EITHER:**

   - **> 302 ft. el.** (high level)

     OR

   - **< 271 ft. el.** (low level)

Table H2 – Vital Areas
• Reactor Building
• Intake Building
• Intermediate Building
• Control Tower
• Auxiliary & Fuel Handling Buildings
• 1A and 1B Diesel Generator Buildings
• BWST
• CST

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA4 (cont.)

Basis:

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

These EALs escalate from HU4 in that the occurrence of the event has resulted in VISIBLE DAMAGE to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control room indications of degraded system response or performance. The occurrence of VISIBLE DAMAGE and/or degraded system response is intended to discriminate against lesser events. 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. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction ICs.

Threshold #1 Basis:

This threshold addresses events that may have resulted in a Table H2 area being subjected to forces beyond design limits and thus damage may be assumed to have occurred to plant safety systems.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA4 (cont.)

Bases: (cont)

Threshold #2 Basis:

This threshold addresses events within the PROTECTED AREA that results in VISIBLE DAMAGE to any Table H2 structure or Control Room indication of degraded performance of a safety system in any Table H2 area:

This threshold addresses the following events:

- Tornado strike.
- High winds.
- Vehicle crashes such as plane, helicopter, train, barge, car or truck crashes. The Emergency director also needs to consider any security aspects of the vehicle crash.
- Threat to safety-related equipment imposed by PROJECTILES generated by main turbine rotating component failures.

Threshold #3 Basis:

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. The actual component failure or equipment misalignment is addressed by Technical Specifications or plant procedures unless the resulting flooding causes degraded performance of safety systems, or has created industrial safety hazards (e.g., electrical shock) that preclude necessary access to operate or monitor safety equipment. The inability to access, operate or monitor safety equipment represents an actual or substantial potential degradation of the level of safety of the plant.

Flooding as used in this EAL describes a condition where water is entering the room faster than installed equipment is capable of removal, resulting in a rise of water level within the room. Classification of this EAL should not be delayed while corrective actions are being taken to isolate the water source.

Threshold #4 Basis:

The flood stage level of the Susquehanna River will be exceeded with river level greater than 302 ft el. at the Intake Pump and Screen House. Portions of the site would be flooded at this level and there is a potential for damage to vital equipment.

A low river water condition below 271 ft el. requires an immediate plant shutdown per OP-TM-AOP-005 and is a precursor to a more serious condition involving loss of decay heat removal.

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA4 (cont.)

Basis Reference(s):

1. OP 1105-17 Seismic Monitoring System
2. OP-TM-AOP-003, Earthquake
3. PRF 1-3 Operating Bases Earthquake
4. OP-TM-AOP-005 River Water System Failures
5. OP-TM-AOP-002, Flood
6. FSAR Section 2.8.1 Seismicity
7. FSAR Section 5.1.2.1.1 Class I Structure Design
8. FSAR Section 5.2.1.2.5 Wind, Snow, or Ice Load
9. UFSAR, Section 2.6.5 - “Design of Hydraulic Facilities”
10. Technical Specification 3.14
11. NEI 99-01, Rev. 5 HA1
12. OP-TM-AOP-004, Tornado / High Winds
13. OP-TM-AOP-051, Secondary Side High Energy Leak
14. OP-TM-EOP-003, Excessive Primary to Secondary Heat Transfer
15. PRF1-3-5, Internal Bldg Flooding

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HU4

Initiating Condition

Natural or destructive phenomena affecting the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

1. a. Seismic event as indicated by seismic Alarm **PRF-1-2**, Threshold Seismic Condition.

   AND

   b. Confirmed by **EITHER**:
   - Earthquake felt in plant.

     OR

   - National Earthquake Center.

   OR

2. **EITHER** of the following occurring within the PROTECTED AREA boundary:
   - Tornado strike

     OR

   - Sustained **(> 15 minutes)** high winds **> 80 mph**

   OR

3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

   OR

4. Flooding that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode in **EITHER:**
   - Auxiliary Building

     OR

   - Intermediate Building

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HU4

EAL Threshold Values:

OR

5. Abnormal river water level at the Intake Pump and Screen House as indicated by **EITHER:**

   - **> 300 ft. el.** (high level)

     OR

   - **< 274 ft. el.** (low level)

Bases:

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

These EALs are categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

Threshold #1 Basis:

Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

Threshold #2 Basis:

This EAL is based on a tornado striking (touching down) or high winds within the PROTECTED AREA.

Escalation of this emergency classification level, if appropriate, would be based on VISIBLE DAMAGE, or by other in plant conditions, via HA4.

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HU4 (cont.)

Bases: (cont)

Threshold #3 Basis:

This EAL addresses main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Generator seal damage observed after generator purge does not meet the intent of this EAL because it did not impact normal operation of the plant.

Of major concern is the potential for leakage of combustible fluids (lubricating oils) and gases (hydrogen cooling) to the plant environs. Actual FIRES and flammable gas build up are appropriately classified via HU3 and HU5.

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 this emergency classification level, if appropriate, would be to HA4 based on damage done by PROJECTILES generated by the failure or by the radiological releases. The latter events would be classified by the radiological EALs or Fission Product Barrier.

Threshold #4 Basis:

The assessment of the potential for flooding to affect safety related equipment is based on the rate of level rise in the area and the ability to terminate the input prior to submerging or spraying the electrical portion of safety related equipment.

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. Minor leaks, such as valve packing or instrument line breaks would not constitute “Flooding.” The Internal Flooding Areas of concern for the Unusual Event declaration are those Table H3 areas that have the potential to affect safety related equipment needed for the current operating mode.

Escalation of this emergency classification level, if appropriate, would be based VISIBLE DAMAGE via HA4, or by other plant conditions.

Threshold #5 Basis:

The level of the Susquehanna River is approaching flood stage; flood stage is defined as 302 ft el. at the Intake Pump and Screen House.

A low river water condition below 274 ft el. requires a Technical Specification 3.0.1 plant shutdown per OP-TM-AOP-005 and is a precursor to a more serious condition.

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HU4 (cont)

Basis Reference(s):

1. OP 1105-17 Seismic Monitoring System
2. OP-TM-AOP-003, Earthquake
3. PRF 1-3 Operating Bases Earthquake
4. OP-TM-AOP-005 River Water System Failures
5. OP-TM-AOP-002, Flood
6. FSAR Section 2.8.1 Seismicity
7. FSAR Section 5.1.2.1.1 Class I Structure Design
8. FSAR Section 5.2.1.2.5 Wind, Snow, or Ice Load
9. UFSAR, Section 2.6.5 - “Design of Hydraulic Facilities”
10. Technical Specification 3.14
11. NEI 99-01, Rev. 5 HU1
12. OP-TM-AOP-004, Tornado / High Winds
13. OP-TM-AOP-051, Secondary Side High Energy Leak
14. OP-TM-EOP-003, Excessive Primary to Secondary Heat Transfer

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA5

Initiating Condition

Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Note: If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.

Table H2 – Vital Areas
• Reactor Building • Intake Building • Intermediate Building • Control Tower • Auxiliary & Fuel Handling Buildings • 1A and 1B Diesel Generator Buildings • BWST • CST

Basis:

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA5 (cont.)

Bases: (cont)

Gases in a VITAL AREA can affect the ability to safely operate or safely shutdown the reactor.

The fact that SCBA may be worn does not eliminate the need to declare the event.

A precautionary area evacuation for the purpose of atmospheric testing does not warrant declaration until test results are obtained unless access is required for operation of operable equipment to maintain safe operations or safely shutdown the reactor. Declaration should not be delayed for confirmation from atmospheric testing if the atmosphere poses an immediate threat to life and health or an immediate threat of severe exposure to gases. This could be based upon documented analysis, indication of personal ill effects from exposure, or operating experience with the hazards such as an inadvertent actuation of installed Cardox fire suppression system.

Station evaluations have shown installed Halon systems by design do not create an IDLH atmosphere when discharged. Therefore, when an installed Halon Fire Suppression system discharge occurs, an IDLH atmosphere should not be assumed, and declaration of a toxic or asphyxiant atmosphere must be based on representative sampling of the affected area, unless there are indications of personal ill effects result from exposure.

Areas directly associated with a fire that may be considered to have a hazardous environment (due to smoke, design fire suppression system actuation or administrative controls awaiting ventilation and/or testing) do not warrant declaration of an Alert under this EAL but should be evaluated against the fire EALs.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of 19.5%, which can lead to breathing difficulties, unconsciousness or even death.

An uncontrolled release of flammable gasses 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. Flammable gasses, such as hydrogen and acetylene, are routinely used to maintain plant systems (hydrogen) or to repair equipment/components (acetylene - used in welding). This EAL assumes concentrations of flammable gasses which can ignite/support combustion.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions, Fission Product Barrier or Abnormal Rad Levels / Radioactive Effluent EALs.

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA5 (cont.)

Basis Reference(s):

1. FSAR Figure 2.1-3, Extended Plot Plan TMINS
2. FSAR Section 5.1, Class I Structures, Components, and Systems
3. NEI 99-01, Rev. 5 HA3
4. OP-TM-406-901, Hazardous Material Release
5. AR-660892, Station Halon and IDLH Evaluations
6. 29CFR1910.134(b) and 29CFR1910.134(d)(2)(iii)

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HU5

Initiating Condition

Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS.

   OR

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

Basis:

NORMAL PLANT OPERATIONS: Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

This EAL is based on the release of toxic, corrosive, asphyxiant or flammable gases of sufficient quantity to affect NORMAL PLANT OPERATIONS.

The fact that SCBA may be worn does not eliminate the need to declare the event.

This EAL is not intended to require significant assessment or quantification. It assumes an uncontrolled process that has the potential to affect plant operations. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation.

The release may have originated within the Protected Area boundary, or it may have originated offsite and subsequently drifted inside the Protected Area boundary. Offsite events (e.g., tanker truck accident releasing toxic gases, etc.) resulting in the plant being within the evacuation area should also be considered in this EAL because of the adverse affect on NORMAL PLANT OPERATIONS.

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HU5

Basis: (cont)

Areas directly associated with a fire that may be considered to have a hazardous environment (due to smoke, design fire suppression system actuation or administrative controls awaiting ventilation and/or testing) do not warrant declaration of an Unusual Event under this EAL but should be evaluated against the fire EALs.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of 19.5%, which can lead to breathing difficulties, unconsciousness or even death.

Escalation of this emergency classification level, if appropriate, would be based on HA5.

Basis Reference(s):

1. FSAR Figure 2.1-3, Extended Plot Plan TMINS
2. NEI 99-01, Rev. 5 HU3
3. OP-TM-406-901, Hazardous Material Release

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HG6

Initiating Condition

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the General Emergency class.

Basis Reference(s):

1. NEI 99-01, Rev 5 HG2

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HS6

Initiating Condition

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a Site Area Emergency.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency class description for Site Area Emergency.

Basis Reference(s):

1. NEI 99-01, Rev 5 HS3

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA6

Initiating Condition

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the Alert emergency class.

Basis Reference(s):

1. NEI 99-01, Rev 5 HA6

TABLE TMI 3-2: EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HU6

Initiating Condition

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Unusual Event.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Basis:

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

Basis Reference(s):

1. NEI 99-01, Rev 5 HU5

Section 4: Emergency Measures

4.1 Notification of the Emergency Organization

Notifications for the Three Mile Island Station are in accordance with Section E.3 of the Exelon Nuclear Radiological Emergency Plan. For initial notification/escalation of Unusual Event, Alert and Site Area and General Emergencies, TMI will notify the following offsite agencies within 15 minutes of event declaration:

- Pennsylvania Emergency Management Agency (PEMA)
- Dauphin County
- York County
- Lancaster County
- Lebanon County
- Cumberland County

Within one hour of event classification, but immediately following notification of PEMA and the risk counties, TMI will also notify the Nuclear Regulatory Commission.

Upon notification of an emergency at Three Mile Island Station, the Pennsylvania Bureau of Radiation Protection (BRP) will contact the appropriate station to verify that an emergency exists and to obtain technical information, and then makes recommendations to PEMA regarding protective actions for the public. The BRP 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".

In addition to the initial notification and verification, communication channels will be maintained between the facility and offsite emergency response organizations to allow for any further dissemination and update of information concerning the emergency.

The Commonwealth of Pennsylvania, in accordance with the State Radiological Emergency Response Plan, will coordinate offsite emergency support from Federal, State and local agencies

Exelon Nuclear will provide follow-up information to the BRP 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 personnel.

4.1.1 Offsite Agency Response

1. **Risk Counties (Within Plume Exposure Pathway)**

   - The dispatcher at the Risk Counties shall notify their County Emergency Management Coordinator or his designated alternate.
   - The County Office of Emergency Management shall notify county and municipal personnel, as appropriate.
   - Dauphin County - Act as central communications agency in the event of a PEMA/TMI communication breakdown.

2. **Pennsylvania Emergency Management Agency (PEMA)**

   Upon receiving notification of an emergency from the site, the PEMA Duty Officer Agency shall immediately notify the State Bureau of Radiation Protection (BRP).

   PEMA will also notify the following personnel, organizations, and agencies as appropriate in accordance with their standard operating procedures:

   a. Other affected County Emergency Management Agencies
   c. Other affected states
   d. Selected State agencies
   e. Selected Federal agencies

3. **Department of Environmental Protection / Bureau of Radiation Protection (DEP/BRP)**

   The Incident Manager, who receives the notification from PEMA, shall:

   - Contact the licensee to: (1) Verify actual origin of the emergency message; (2) Determine the classification of the emergency; and (3) Obtain and assess information and data pertaining to the emergency.
   - Initiate activation of the BRP emergency response organization, if appropriate.
   - Advise the PEMA Duty Officer or Operations Officer of the BRP initial assessment of the emergency.
   - Notify selected Federal agencies, as appropriate.

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 μCi/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 TMI UFSAR.

Portable monitoring instruments and sampling equipment consist of such items that are utilized and maintained on-site for normal day-to-day plant operations and are thus available for emergency use.

Refer to Section 5.2 of the REP Annex for TMI Station for a listing of assessment resources.

4.2.1 Radiological Assessment and Offsite Monitoring

For the emergency assessment of gaseous releases, refer to the description of the dose projection model contained in Part II, Section I.4 of the Standard Plan.

For liquid releases, the radionuclide concentration at any downstream location is determined by taking liquid effluent concentrations and applying the effluent flow rate and volumetric flow rate of the receiving water. Downstream users will be notified to curtail intake if the projected concentration is above the level specified in the procedures.

4.2.2 Source Term Determination

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 detailed core damage assessment methodology has been established under Section 6.0 of the TMI Technical Support Center Calculation Guides. The process used is based on measured physical and chemical parameters that occur in the plant when the core is damaged. Three (3) methods have been developed under Section 6.0 of the TMI Technical Support Center Calculation Guides (per TDR 431) to determine core damage estimates:

1. In-core thermocouple temperature correlations to fuel conditions;

2. Radiation monitor and hydrogen production correlations based on fuel and plant system conditions; and

3. Chemical measurement correlations based on radionuclide inventory released into reactor coolant during core damage.

Throughout each emergency situation, continuing assessment will occur. Assessment actions at Three Mile Island Station may include an evaluation of plant conditions; in-plant, onsite, and initial offsite radiological measurements; and initial estimates of offsite doses. Core damage information is used to refine dose assessments and confirm or extend initial protective action recommendations. Three Mile Island Station utilizes WCAP-14696-A, Revision 1, (1999) as the basis for this methodology of post-accident core damage assessment. This methodology utilizes real-time plant indications. In addition, Three Mile Island Station may use samples of plant fluids and atmospheres as inputs to the CDAM (Core Damage Assessment Methodology) program for core damage estimation.

4.3 Protective Actions for the Offsite Public

The responsibility for actions to protect persons in offsite areas rests with the State and is described in detail in the State Emergency Plan and implemented in conjunction with the county emergency plans.

DEP/BRP is the specific agency responsible for evaluating information from the TMI staff and all other sources and recommending to PEMA that protective actions be taken. The BRP has sheltering and evacuation as protective action options. The most appropriate protective action for a particular situation will depend on the magnitude of the release, duration of the release, wind speed, wind direction, time of day and transportation constraints. In the case of a General Emergency, circumstances may indicate the immediate need to initiate some precautionary protective action. This judgment is the responsibility of the BRP and should be based on an evaluation of the current plant conditions, dose projections relative to the PAG's and expected subsequent plant operations/evaluations.

Off-site it is the responsibility of the State Department of Agriculture, in conjunction with the Department of Environmental Protection, to issue guidance and coordinate actions to control contaminated agricultural products.

The means to warn or advise involved persons is a responsibility of the risk county. The risk county, in coordination with the State, is also responsible for the preparation and dissemination of information material for the general public on protective actions including necessary information (evacuation routes, maps, etc.) for the implementation of protective measures in the Plume Exposure Pathway.

The population within the 10-Mile Emergency Planning Zone (Plume Exposure Pathway) will be provided, on a periodic basis, information describing the methods by which they will be notified of an emergency and specific instructions that should be followed upon receipt of such notification.

4.3.1 Alert and Notification System (ANS) Sirens

ANS is comprised of sirens distributed throughout the 5 risk counties that fall within the TMI Plume Exposure EPZ. A complete description of the siren system to include siren ratings, siren coverage, and location is located with the Emergency Preparedness Department. The TMI Station ANS meets the guidelines of Appendix 3 to NUREG-0654-FEMA-Rep. 1 Rev-1 Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants as identified in each site specific siren acoustical evaluation.

After State authorities have been notified, the ANS (sirens) and Emergency Alert System (EAS) are the primary means of notifying the population within the Plume Exposure Pathway (10-Mile EPZ). The risk counties can activate the sirens located in their portion of the county that falls within the same Plume Exposure Pathway EPZ. The signal is a three to five minute steady tone that alerts the population to tune their radios or television to the local EAS station. PEMA and risk counties will then broadcast emergency information messages advising the population of what actions should be taken, if any.

4.3.2 Evacuation Time Estimates

The ETE study used population data from the 2010 census which includes parts of five Pennsylvania counties: Cumberland, Dauphin, Lancaster, Lebanon and York. The evacuation times are based on a detailed consideration of the EPZ roadway network and population distribution. The ETE Study, contained in EP-AA-1009 Addendum 2, Evacuation Time Estimates for the Three Mile Island Plume Exposure Pathway Emergency Planning Zone, presents evacuation times for daytime and nighttime scenarios under various weather conditions for the evacuation of various areas around the TMI 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.

Based on the criteria established under the Appendix E of the Commonwealth of Pennsylvania Operations Plan, the TMI Station will recommend to government officials that the general public be notified to take KI at a General Emergency classification in those areas were an evacuation or shelter 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 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, as defined by the Commonwealth of Pennsylvania and risk counties.

These public information publications (including telephone book emergency information, etc.) instruct the public to go indoors 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 TMI 4-1, "Plant-Based PAR Determination Flowchart", illustrates affected areas using the generic plant-based event logic as outlined in Section J.10.m. of the Exelon Nuclear Standardized Radiological Emergency Plan, with the exception of a 360 degree radius evacuation versus "keyhole" concept.

Further evaluation of PAR based on dose assessments shall be performed in accordance with Section II.J.10.m.2) of the Exelon Nuclear Standardized Radiological Emergency Plan.

4.4 Protective Actions for Onsite Personnel

During an emergency, personnel may be required to temporarily relocate to prevent or minimize exposure to radiation and radioactive materials. The following subsections discuss the policies applying to sheltering, evacuation and personnel accountability during emergencies at the TMI site.

At the time an emergency is declared, an announcement is made on the site public address system to all personnel within the Owner Controlled area. The announcement will include the classifications of the event, a brief description of the event, and actions taken by site personnel. Shift personnel will proceed to their emergency assignments.

The TMI-1 licensee retains complete authority to determine and maintain sufficient control of all activities including the authority to exclude or remove personnel and property for land areas within the exclusion area and contamination will, thereby, be controlled. In addition, there are no areas for producing agricultural products within the exclusion area. In-plant contamination control will be in accordance with approved Radiological Controls procedures.

The primary protective measures for onsite personnel during an emergency is prompt evacuation from areas, which are affected by significant radiation, contamination, airborne radioactivity or other personnel hazards. All persons onsite at the time an emergency is declared shall be notified by means of the plant page supplemented by designated personnel providing notification in areas that the page does not cover.

4.4.1 Emergency Personnel Exposure

Exposure to personnel remaining onsite as or in support of ERO activities will be monitored. This may be accomplished through continuous monitoring for habitability at designated emergency and support facilities. Dosimetry will be issued to personnel leaving or working outside a monitored facility, and will be available to ERO personnel located inside a site emergency facility, in the event of a radiological release or elevated plant radiation levels, as applicable, per approved procedures. Additional provisions have been made for dosimetry issue at the site entrance gates or other locations, if required. Dosimetry will be periodically read and recorded in accordance with approved RP procedures.

Emergency personnel, including those involved in the removal of injured persons, undertaking corrective actions, performing assessment or personnel decontamination, and providing first aid and support to ambulance services will have their radiation dose controlled in accordance with approved procedures and normal RP practices.

When offsite emergency personnel are called to respond to TMI, station RP support is provided to support these activities, which include the monitoring and control of radiation exposure and evaluation of radiological hazards.

4.4.2 Radiological Monitoring and Decontamination

Personnel and equipment decontamination will be initially accomplished at the Radiation Protection Access Control Point where specialized equipment and supplies are available. Procedures are written with specific details for decontamination. For personnel within the Protected Area, emergency situations, which require decontamination will be handled in accordance with these procedures.

All personnel leaving a Radiological Controlled Area (RCA) will be monitored for contamination. Any individual found to have contamination levels in excess of thresholds established in Radiation Protection (RP) procedures will be considered contaminated.

Personnel found to be contaminated will undergo decontamination by radiological controls personnel (or other designated personnel as specified in Radiation Protection Procedures). Measures will be taken to prevent the spread of contamination. Such measures may include isolating affected areas, placing contaminated personnel in "clean" protective clothing before moving, and decontaminating affected personnel, their clothing and equipment prior to release, in accordance with applicable station Radiation Protection Procedures.

In the event that a release of contaminants has occurred or is occurring, in-plant potable water systems will be secured to prevent possible contamination. If food and water supplies are brought in for emergency personnel who remain on-site these supplies will be packaged in sealed containers and will be monitored by Radiation Protection personnel (using standard Rad Con practices and procedures) prior to use or consumption and on a normal routine basis. Any food or water supplies discovered as contaminated will immediately be disposed of as waste and will not be used.

Upon receipt of information that the emergency has entered recovery phase, in-plant facilities and areas will be surveyed, sampled, and cleared for use, or controlled as necessary, in accordance with applicable Radiation Protection practices.

4.4.3 Personnel Accountability / Site Evacuation

Upon declaration of a Site Area Emergency, General Emergency and/or at the discretion of the Station Emergency Director, essential personnel within the Protected Area will be accounted for at the Control Room, TSC and OSC unless other factors (e.g., security events) advise against it.

Non-essential personnel will be directed to proceed to their vehicles directly and to evacuate to designated Remote Assembly Areas or dismissed to their homes. The Station Emergency Director based on the prevailing radiological conditions will determine evacuation routes. This evacuation will be accomplished using private vehicles.

In support of these operations, a sweep of buildings, trailers, and other areas of the Owner Controlled area will commence to ensure that all persons have assembled and/or evacuated the site.

Refer to Section J of the Standard Plan for specific requirements for the initiation and completion of personnel accountability and the evacuation of non-essential personnel from the site. Search and rescue operations will be implemented to locate any missing persons.

4.4.4 Monitoring of Evacuees

At the Remote Assembly Areas (Figures TMI 4-2 and TMI 4-3), personnel and vehicles from the TMI site will be monitored for radioactive contamination, if necessary. Individuals found to be contaminated will be decontaminated in accordance with applicable Radiation Protection Procedures. Vehicles found to be contaminated will be impounded until they can be decontaminated. Inclement weather will not affect the direction of the traffic flow, but may increase evacuation times.

If anyone is found to be contaminated, showers, sinks and decontaminating supplies are available in close proximity to the plant. Equipment for decontamination personnel will be stored in Emergency Supply Lockers. Portable survey instruments are available and routinely calibrated for use in decontamination operations. All skin contamination problems will be treated using accepted Radiation Protection practices.

For contaminated personnel inside the Protected Area, the preferred decontamination facility will be those onsite at the TMI Site Laboratory, if accessible; otherwise offsite facilities will be used.

The registering and monitoring of the general public evacuating from the Plume Exposure Pathway EPZ, as described in Section II.J.12 of the Exelon Nuclear Standardized Radiological Emergency Plan, will occur at designated facilities per the respective State and County Radiological Emergency Response Plans.

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 Procedures (SAMPs) provide sound technical strategies for maximizing the effectiveness of equipment and personnel in preventing, mitigating and terminating severe accidents.

Implementation of SAMPs 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 personnel are also trained to assist in evaluating plant conditions using the SAM Technical Support Guidelines (TSG).

FIGURE TMI 4-1: Plant-Based PAR Determination Flowchart

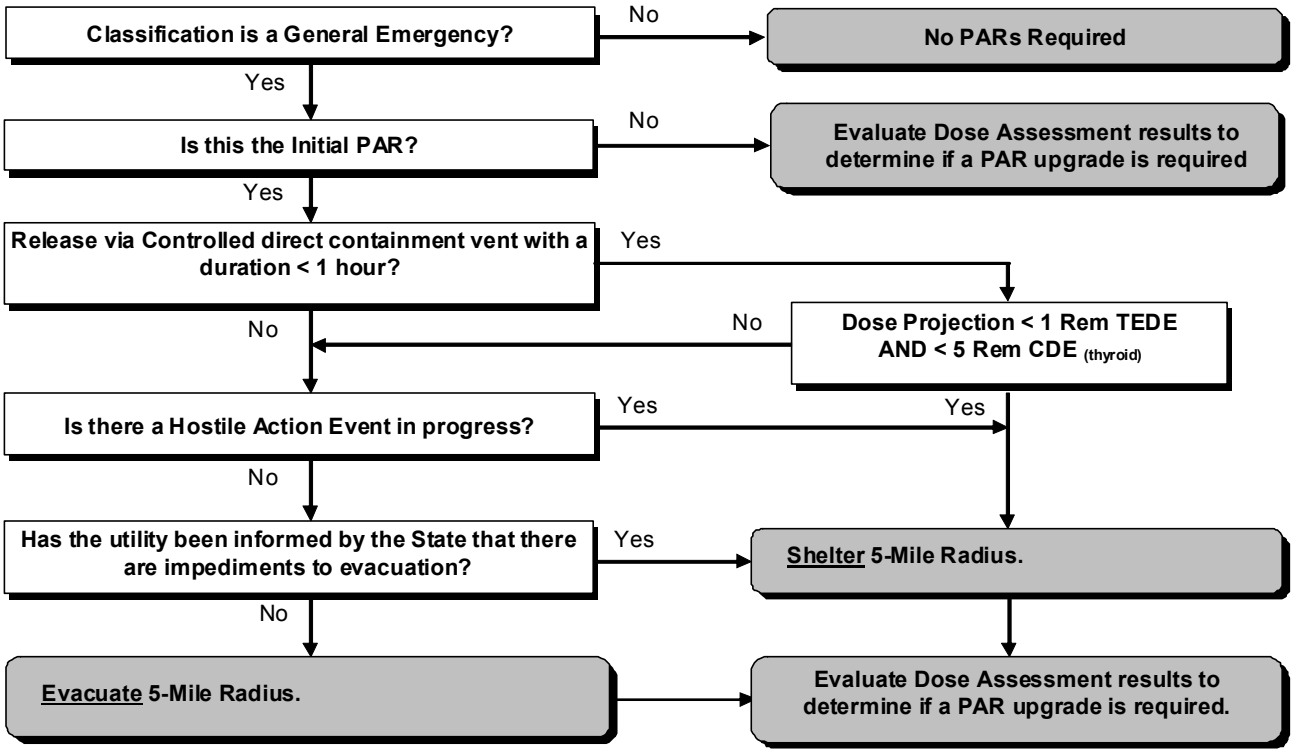
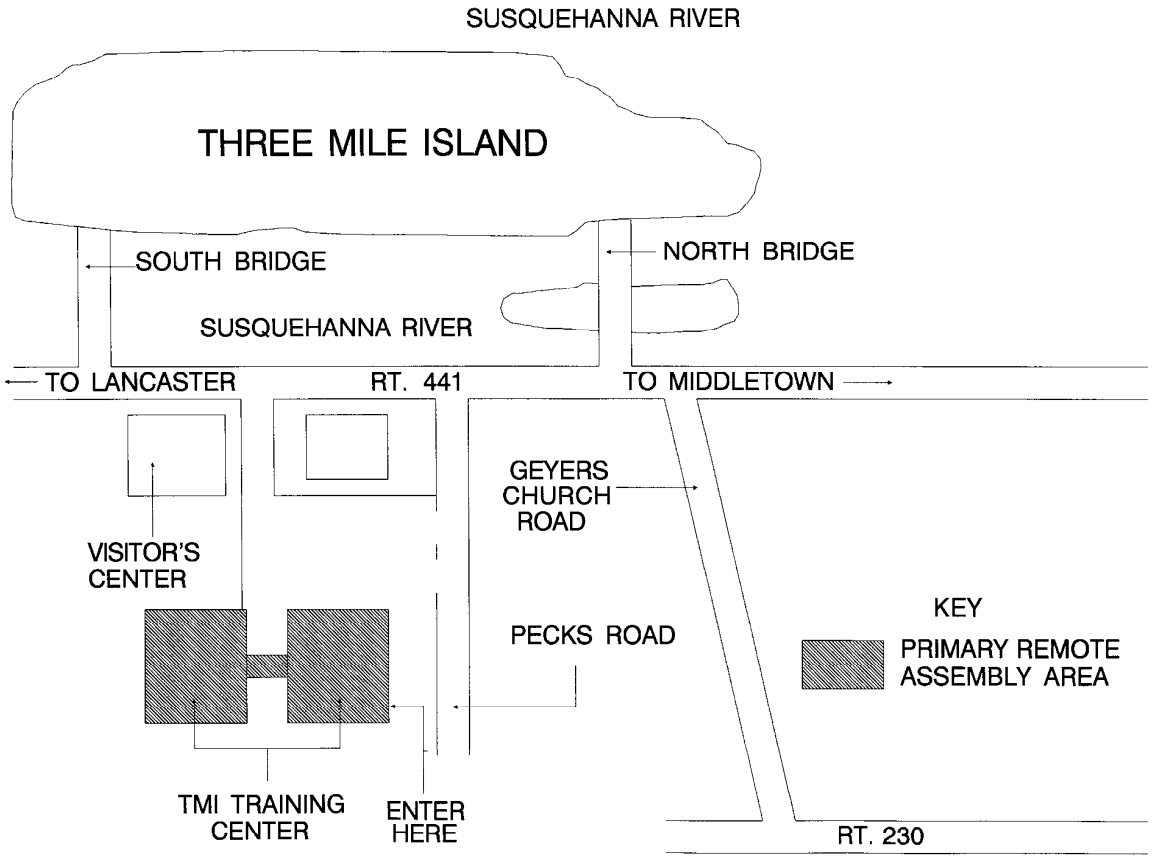
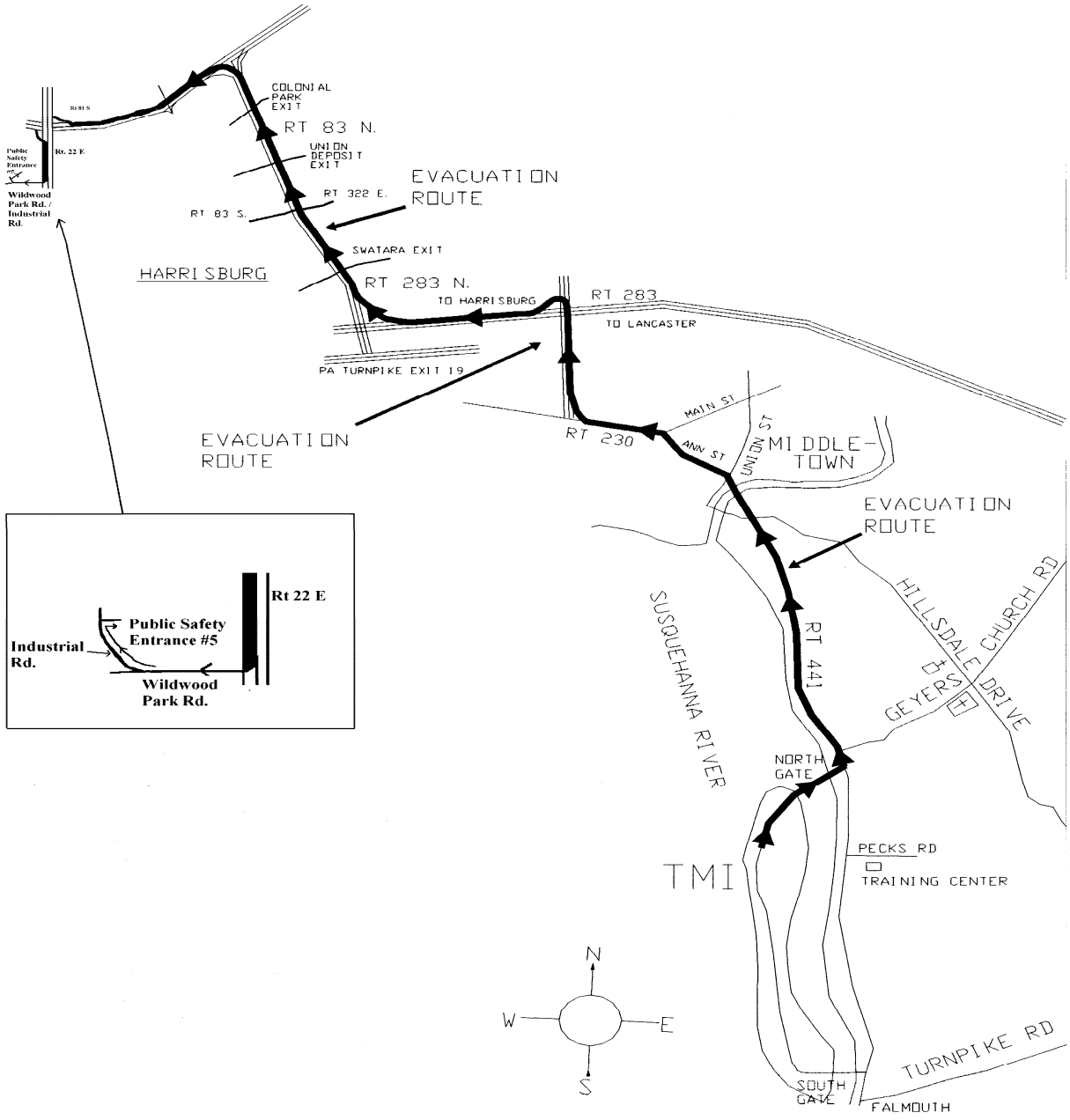


FIGURE TMI 4-2: Remote Assembly Area – TMI Training Center



DRAWING NOT TO SCALE

FIGURE TMI 4-3: Remote Assembly Area – Harrisburg Area Community College



Section 5: Emergency Facilities and Equipment

5.1 Emergency Response Facilities

5.1.1 Station Control Room

The Control Room and Shift Manager's Office are designed to be habitable under accident conditions. These areas are located in seismically-rated structures and have adequate shielding to permit safe occupation for extended periods of time. The TMI-1 Control Room ventilation system has redundant fans and chillers and is provided with radiation and smoke detectors with appropriate alarms and interlocks. Provisions have been made for air from the control rooms to be recirculated through high efficiency particulate air (HEPA) and activated charcoal filters. Fresh air is drawn through underground ventilation tunnels which have been provided with protection against combustible vapors, incipient explosions or fires. The tunnels are Seismic Class I rated and also designed for a hypothetical aircraft incident.

Emergency lighting, power, ventilation system, and shielding walls enable operators to remain in the Control Room to ensure that the reactor will be maintained in a safe condition. In addition, the operators will be able to evaluate plant conditions and relay pertinent information to appropriate onsite and offsite personnel, organizations, and agencies during emergencies. To ensure the operations shift and other personnel assembled at the location can remain self-sufficient, emergency equipment and supplies will be stored in or near the Control Room. The location, type and quantity of emergency equipment and supplies available is specified in the Emergency Plan Administrative Procedures.

5.1.2 Technical Support Center (TSC)

The TSC is located on the 1st floor of the Operations Support Facility (OSF), which is outside but adjacent to the Protected Area. The TSC meets the requirements of NUREG-0696 for size and habitability, including a filtered HVAC system that can be isolated in the event of a radiological accident.

A backup electrical power source is designated in the event of a loss of the normal power supply. UPS capability is provided to designated electrical outlets to ensure that a transient loss of power does not occur to significant communications, dose projection, and data acquisition and display systems.

A room is provided for use by NRC response team members and the Resident Inspector during a declared emergency event. This conference room provides a workspace and telephone communications for a minimum of five (5) people.

Records and drawings, which describe conditions and layout of structures, systems, and components, are contained in filing cabinets inside the TSC.

5.1.3 Operational Support Center (OSC)

The OSC is located on the 305' Elevation of the Service Building. The OSC conforms to the requirements of Section H.1.c of the Exelon Nuclear Standardized Radiological Emergency Plan.

The OSC serves as a muster area for shift personnel and as a location to organize and dispatch emergency response teams (i.e., onsite radiological monitoring, fire brigade, rescue operations, damage control, and maintenance). Emergency equipment and supplies, including portable radios, portable lighting, protective clothing, and respirators, are maintained in emergency lockers located or adjacent to in the OSC. Additional emergency equipment, such as gamma and air monitoring equipment can be made promptly available to the OSC if needed.

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, approximately 50 miles from the TMI Site. The EOF supports Peach Bottom and Limerick Generating Station, in addition to TMI Station, under the Standard Plan.

Primary staffing of the Coatesville facility will be from the Exelon Nuclear Mid-Atlantic Region Office located in Kennett Square, PA, which is approximately 18 miles drive (11 miles straight line distance) from the Coatesville facility.

Plant Process Computer (PPC) subsets of screens were developed for EOF use. These screens provide for the display of basic Safety Parameter Display System (SPDS) points and designated EP data screens. The Coatesville EOF is equipment with multiple projectors in the Main Room for the display of these data screens. The designated EP screens, feed off a database from the TMI Station PPC, are available via an Ethernet LAN connection. A backup LAN has also been established via a Token Ring LAN from the TMI Site through the PECO Main Office Building in Philadelphia, PA. to ensure continued access to plant operational, radiological and meteorological data.

The Coatesville facility has a designated diesel generator and uninterruptible power supply (UPS) as a backup power source in the event of a loss of normal power.

The EOF equipment includes:

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

Separate offices are provided for Exelon Nuclear, NRC, State representatives and other emergency personnel.

5.1.5 Joint Information Center (JIC)

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

5.1.6 Processing Center

The Processing Center will be continuously manned by Site Security personnel, unless otherwise directed based on the Nuclear Station Security Plan. Emergency equipment and supplies will be maintained in this facility to support such tasks as reentry efforts, performing onsite and offsite radiation surveys or collecting airborne samples. The exact location and the type and quantity of emergency equipment and supplies are specified under the applicable Emergency Plan Administrative Procedures.

5.1.7 Alternative Facility

The Alternative Facility maintains the capability for staging the TSC/OSC emergency response organization personnel in the event of a hostile action. This alternative facility has the capability for communications with the emergency operations facility, control room, and plant security. The Alternative Facility is located at the Londonderry Fire Hall 2655 Foxianna Road, Middletown, Pennsylvania.

5.2 Assessment Resources

5.2.1 Radiation Monitoring System

The onsite Radiation Monitoring System contributes to personnel protection, equipment monitoring, data gathering, and accident assessment by measuring and recording radiation levels and concentrations of radioactive material at selected locations within the plant. The Radiation Monitoring System alarms and initiates required emergency actions when radiation levels or radionuclide concentrations exceed predetermined levels. Area, liquid, and atmospheric monitoring subsystems are required to perform these functions. Specific details regarding radiation monitoring and effluent monitoring systems can be found in system design descriptions (SDDs), site Final Safety Analysis Reports, and the TMI Radiation Monitoring Setpoint Procedures.

The data from these subsystems are displayed by readout in the Control Room. Selected channels are recorded by recorders and/or the plant process computer, which are also located in the Control Room.

In general the radiation monitoring equipment is designed in accordance with the following:

- Each monitoring station has adjustable alarm, alert, and power supply failure alarms.
- Solid-state circuitry is used except for primary detectors.
- Most AC operated radiation monitoring equipment, except for the pump assemblies, is provided with power from the battery-backed, inverter-fed vital power supply bus.
- Each radiation monitor is capable of being checked periodically with solenoid actuated check sources.
- A pulse generator or solid sources are used for electrically checking each monitor or subsystem.
- The modules are designed so that an alarm and/or indication is initiated when failure occurs anywhere in the channel.

1. **Area Radiation Monitoring**

   The TMI-1 area radiation monitoring subsystem is comprised of channels, which utilize an ion chamber detector housed in a weatherproof container.

2. **Containment Radiation Monitors**

   Post accident radiation levels in containment are monitored by two channels of fully qualified high range area monitors. These monitors are ion chamber detectors and are designed to withstand a LOCA. Readout modules are located for these detectors on the radiation monitoring panel in the control room.

   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.

3. **Atmospheric Radiation Monitoring**

   Each installed atmospheric monitor (except the condenser off-gas, ESF ventilation exhaust and waste gas monitor) is comprised of a particulate measuring channel, iodine measuring channel, and a gaseous measuring channel. The atmospheric radiation monitor subsystem is comprised of monitors with fixed and movable particulate filters, and fixed radioiodine filters. Representative samples are obtained by means of a sampling head placed in a ventilation duct.

   Movable airborne monitors are typically used in the spent fuel handling area during refueling operations and in the radiochemical laboratory during laboratory sample preparation operations. These monitors are supplemented with various other portable radiation monitors. Each monitor contains three channels for particulate, iodine, and gaseous monitoring, respectively.

4. **Liquid Radiation Monitoring**

   The liquid radiation monitoring subsystem is comprised of monitors, each of which has a sampler, detector, and Control Room ratemeter module (exceptions are the IWTS/IWFS discharge monitor, waste treatment system discharge monitor and the turbine building sump pump). The monitors provide visual indications in the Control Room. The TMI-1 Primary Coolant Letdown monitor also contains a high range channel.

5. **Post Accident Sampling System (PASS)**

   Liquid Reactor Coolant System Post Accident Sample System (PASS) samples may be taken from the pressurizer and decay heat and reactor coolant letdown systems. Liquid samples may be analyzed for isotopic concentration, boron concentration, chloride concentration and dissolved gases.

   The Containment Atmosphere Post Accident Sampling System (CATPASS) is used to sampling isotopic concentration in the containment atmosphere. MAP-5 microprocessor stations sample iodine and particulates in condenser off-gas and auxiliary and reactor building exhausts.

5.2.2 Fire Protection Devices

TMI has implemented and maintains a Fire Protection Program as described in the updated FSAR for TMI-1. The Fire Protection Program is controlled under TMI-1 license conditions.

5.2.3 Seismic Monitoring

Strong motion recording systems at TMI measures ground motion and structural vibrating response caused by an earthquake occurring in the vicinity of the site. Cassette magnetic tape recorders located in the TMI-1 Control Room receive information supplied by triaxial sensor units which are firmly mounted on the Reactor Building. One triaxial sensor unit is attached immediately outside of the containment wall at the base of the Reactor Building. A second triaxial sensor is situated along the same Reactor Building axis, but is attached to the Reactor Building ring girder. The triaxial sensor units begin to supply seismic data to the magnetic tape recorder after a signal is sent to the sensors by a remote starter unit. A remote starter unit attached to the base of the Reactor Building provides a signal for its systems sensor units when the starter unit detects a ground acceleration greater than a present threshold level. The remote starter also actuates an annunciator in the TMI-1 control room labeled "Threshold Seismic Condition". If the ground acceleration exceeds the horizontal or vertical setpoints, a seismic trigger, also mounted on the base of the Reactor Building, will cause a TMI-1 annunciator labeled "Operating Basis Earthquake" to actuate.

The time history of a ground motion and resulting vibrating response can be displayed by using magnetic tape cassettes containing the recorded data, and the magnetic tape playback system in the control rooms. The magnetic tape playback system produces visual playouts of selected magnetically recorded data. This is accomplished with a strip chart recorder built into the playback system. A visual playout allows quick analysis of the earthquake. The magnetic tapes are available also for detailed analysis.

Peak reading accelerographs are anchored to Class 1 selected items. These accelerographs will produce a permanent record of the peak amplitude of the low frequency accelerations caused by seismic disturbances.

This record is in the form of magnetic erasure clips which must be developed using the magnetic developer kit. After developing, these clips can be examined to verify seismic response which had been determined analytically.

5.2.4 Onsite Meteorological Monitors

At TMI, basic meteorological information is obtained from a weather tower maintained at the north end of the Island. Real time information can be obtained from the plant process computer.

The meteorological measurement system is deployed on a 150 ft. tower. It measures wind speed and wind direction at 100 ft. and 150 ft. above grade. There are redundant speed and direction sensors at the 100 ft. level. Temperature is measured at both 33 ft. and 150 ft. from two sets of platinum sensors. Temperature difference (ΔT) is also derived and recorded. A recorder located inside the meteorological building adjacent to the weather tower records all of the above information. The Control Room also has a recorder with wind speed, direction, temperature, and differential temperature which is an indication of atmospheric stability.

Meteorological data can be remotely interrogated by telephone by NRC and Commonwealth of Pennsylvania.

Protective Measures personnel are capable of making real-time offsite estimates of atmospheric effluent transport and diffusion following an accidental airborne radioactive release from the plant. Real time meteorological information is obtained from the plant process computer. The recorder at the meteorological building located at the north end of TMI has a storage capacity of several months of data. Beyond that time period the meteorological data is permanently stored in a history file. Back-up meteorological information is available from the National Weather Service directly and indirectly from other sources that collect National Weather Service information.

5.2.5 Process Monitors

Process monitors measure appropriate parameters that are indicative of the status of various plant systems and the reactors. These parameters are displayed and recorded in the Control Room, or at local panels in the plant

5.2.6 Laboratory Facilities

The TMI laboratory facility is equipped to provide the water chemistry and radiochemical analysis support required during normal plant operations and emergencies.

5.3 Protective Facilities and Equipment

Personnel protective action is a function of the nature of the hazard (e.g., preparing for a hurricane is somewhat different from preparing for radiological hazards). Preplanned responses to basic hazards, high wind, flooding, earthquakes, and radiation exposure, are an integral part of the Emergency Plan. A fundamental concept in personnel protection is the evacuation of all individuals not essential to the operation, safety, security, and damage control of the plant. Obviously some hazards can occur before significant protective action can be applied (e.g., earthquake). When the situation permits positive action, the appropriate alarms are sounded and all personnel on the site either assume assigned emergency responsibilities or prepare for evacuation.

Provision has been made for adequate supplies and protective equipment for all personnel who may be required to perform emergency activities. Specific quantities of each type are detailed in station procedures and include equipment for personnel monitoring, determining the magnitude and continuously assessing the impact of the release of radioactive material, decontaminating personnel and providing emergency first aid. Additionally, a current prescription and adequate supplies of potassium iodide are maintained for issue to personnel exposed or suspected of exposure to radioactive iodine.

Onsite locations have been designated as emergency assembly points or areas where emergency teams will be assembled in accordance with the Emergency Plan Implementing Procedures or as directed by the Station Emergency Director. Major locations for onsite protective equipment and supplies are the Control Room, access control point, and processing center. Additional information regarding protective facilities can be obtained by consulting the UFSAR.

5.3.1 First Aid and Medical Equipment

A first aid facility is designed to support a wide range of immediate care requirements ranging from simple first aid to procedures requiring a physician.

Small kits placed throughout the plant provide the most readily available first aid. These kits contain items typically needed to care for minor injuries. Typical contents can be referenced in Table TMI 5-1. The next level of first aid equipment is found at first aid stations. The medical staff can also provide Advanced Life Support and routine trauma care.

5.3.2 Damage Control Equipment

The TMI plant site is extensively equipped to conduct preventive maintenance and repairs on mechanical, structural, electrical, and instrumentation and controls equipment found in the plant. Operational policy requires that a minimum maintenance crew be assigned to the onsite shift organization at all times. Each individual assigned to the maintenance crew is qualified and certified to perform the tasks associated with his craft in the working environment of a nuclear plant.

In addition to the equipment and materials required for normal maintenance, other items are available to handle extraordinary maintenance jobs that might arise in damage control. Selection of damage control equipment inventory is based upon (a) mitigating the consequences of flooding, (b) personnel rescue, (c) checking the uncontrolled flow of fluids from process systems, and (d) elimination of electrical hazards. Typical equipment available for damage control can be found in Table TMI 5-1.

5.3.3 Radiation Protection Equipment

The TMI plant site maintains an inventory of protective clothing, respiratory equipment, survey instruments and supplies to provide adequate contamination control for all personnel expected to be onsite who might be affected in the event of an emergency.

The supplies are maintained, updated, inventoried and calibrated, as appropriate, on a regular basis in accordance with applicable procedures. Storage locations of emergency supplies can be found in the site implementing documents. Typical equipment available can be found in Table TMI 5-1.

5.3.4 Emergency Equipment Readiness

Designated emergency equipment and supplies and their storage locations will be listed in the Emergency Plan Implementing Documents. Such equipment and supplies will be maintained, inventoried, inspected and calibrated in accordance with approved site procedures. Equipment, supplies, and parts having shelf-lives will be checked and replaced as necessary.

To insure that the necessary emergency equipment is maintained and available for use during emergency situations, readiness checklists have been developed and incorporated in Administrative Procedures. These checklists facilitate detailed inventory and calibration/functional checks of equipment contained in the emergency kits/lockers. The inventory checklists will be performed on a quarterly basis and to insure interim readiness, all kits/lockers are sealed or locked as appropriate.

Any deficiencies found during the inventory and inspection will be either cleared immediately or documented for corrective action. A report of each inventory and inspection, including documented deficiencies, will be prepared and submitted to the Emergency Preparedness Manager. He will ensure that cognizant department heads assign personnel to correct deficiencies and shall ensure that identified deficiencies are corrected in a reasonable period of time.

5.4 First Aid and Medical Facilities

5.4.1 Decontamination and Medical Response

Emergency first aid and medical treatment will be given to injured personnel who may or may not be contaminated. Shift personnel, trained in first aid, will be available onsite on a 24-hour per day basis and will assist contaminated personnel at the scene of the accident. Provisions have been made, through agreements, to ensure contaminated and injured personnel will receive specialized medical treatment, if necessary. Local hospitals in the vicinity of the TMI site have agreed to accept contaminated patients for emergency medical and surgical treatment and/or observation.

A comprehensive program of radiological control for injured/contaminated personnel has been developed and will be instituted when necessary during an emergency. The primary emphasis will be to initially address traumatic or life-threatening injuries since radiation injuries may not be immediately life threatening.

Detailed instructions for treatment and transportation of contaminated and injured individuals are specified in appropriate procedures.

5.4.2 Medical Transportation

Agreements have been made with local medical support organizations to provide ambulance services to the site. Ambulance personnel will be certified in accordance with State regulations. TMI will offer training to the squad members in the treatment and transportation of contaminated injured individuals. TMI will provide radiological control technicians if available to assist the squads enroute to the hospital. TMI or local first aid squads provide ambulance service for the facility.

When affected personnel must be transported, measures will be taken to prevent the spread of contamination. Such measures will include placing affected personnel in "clean" protective clothing or wrapping in blankets. The Emergency Director will insure that these organizations, which provide the transportation and treatment, are alerted.

Detailed instructions for treatment and transportation of contaminated and injured individuals are specified in appropriate procedures.

5.4.3 Medical Treatment

Arrangements for hospital and medical services for injured or contaminated / overexposed personnel are provided for by letters of agreement.

The first level of treatment can be given on-site by personnel trained in first aid. If the severity of the injury requires more extensive or prolonged treatment, the patient will be transported for the second level of assistance. For conventional injuries (that is, non-radiation injuries), the patient will be transported to any of the local hospitals.

Arrangements for hospital and medical services for injured and/or contaminated/overexposed personnel are provided by Harrisburg Hospital and Hershey Medical Center. These hospitals have agreed to accept contaminated patients for emergency medical and surgical treatment or observation. Detailed plans and procedures are in place for decontamination and treatment of contaminated patients.

5.5 Communications

5.5.1 Station to State / Local Communications Circuits

In addition to the Nuclear Accident Reporting System (NARS), the Bureau of Radiation Protection (BRP) Line is available for communications from the TMI Station with designated State / Local agencies: The BRP line is dedicated for use by the TSC to communicate plant status and radiological information to the BRP. Internal plant radiological assessment and discussions leading to the development of protective action recommendations should not occur over this circuit.

5.5.2 Station Telephone System

An EP Private Branch Exchange (PBX), separate from the Site PBX System, is available to support emergency communications. The EP PBX is powered from the OSF (TSC) UPS battery. The EP PBX provides 3-digit dialing and telephone stations can be grouped. The EP PBX has been set-up to support various intra-facility communications links as described in Section F.1 to the Standard Plan.

Intra-facility and off-site communications are also supported by the existing Site PBX (948) phones.

The Site PBX System will be used to support various point-to-point communications serving the following functions:

- Environmental Assessment (TSC / EOF)
- In-Plant Radiological Controls (TSC/OSC)
- NRC Site Team (CR / TSC / OSC / EOF)

A separate drop off the Site PBX, referred to as the Off-Premise Exchange (OPX), is provided for EP communication purposes. The Site PBX is a DC-powered system with batteries receiving power through chargers fed from a normal AC source. Estimated battery life is 8 hours. The OPX supports the following offsite communications links:

- Nuclear Accident Reporting System (NARS)
- Bureau of Radiation Protection (BRP) Line

Both the EP PBX and OPX (Site PBX) are routed via a common mix, originating in the Service Building, to the local telephone exchange. From the central mix located in the Service Building, the EP PBX (copper lines) and Site PBX (fiber optics) are routed along the same path to the local telephone central office (CO). No physical separation is in place nor required to reduce the probability of a common off-site failure (e.g., excavation, etc.).

The availability of the satellite telephone provides reasonable backup to bypass this localized point of failure.

U.S. NRC telephones are on the Corporate PBX system from the Station, which is powered locally at the local office.

The Maintenance and Instrumentation telephone system also provides maintenance personnel with a direct communications circuit to the Control Room from strategic locations throughout the plant. The Maintenance and Instrumentation Phone System consists of three essentially independent circuits: the Nuclear Subsystem, the Turbine Subsystem, and the Fuel Handling Subsystem.

These circuits are designed for use between two or more locations during operations when direct communications between operators and/or maintenance personnel is required. Handsets and headsets are provided. The system is operable when headsets and/or handsets are plugged into the various stations of the three subsystems.

5.5.3 Coatesville EOF Telephone System

A dedicated Private Branch Exchange (PBX) is installed at the Coatesville facility to support emergency communications. This switch will control telephone communications in and between the facility, other Exelon locations, and non-Exelon locations.

Two separate T-1 leased lines are used from the TMI Site PBX to the Coatesville facility PBX to support intra-facility communications and offsite notifications. Separate carriers are used for each T-1 line to provide redundancy, with an auto “fail over” (transfer) feature incorporate to ensure continued communications over the various EP intra-facility circuits

The Coatesville facility PBX is designed with a 4-hour to provide a backup power source to the phone switch in the event of a simultaneous loss of normal power and the designated emergency diesel generator.

In the event of a PBX failure, outside dial capability is available through trunk lines from the Coatesville Service Building via the Corporate Sonic Link to the PECO Main Office Facility in Philadelphia, PA. These lines are designed to bypass the local central office (CO) to another site for commercial dial tone, if required.

In addition, designated power failure phone jacks that bypass the Coatesville PBX, are located at key workstations in the EOF to support continued communications in the event of a complete loss of electrical power to the Coatesville facility.

5.5.4 Radio Communications

Radio communication equipment used during normal plant operations will be used in an emergency to communicate with mobile units and to provide backup to the telephone system.

At TMI, radio capabilities include the following frequencies from Control Room, OSC, TSC, CAS/SAS and mobile vehicle / potable units, as applicable:

- TMI Operations Frequencies
- TMI Security Frequency
- Environmental and Radiological System Frequency
- Maintenance and Rad Con Frequency

Dedicated channels on the redundant T-1 lines to the TMI radio bay station in the TSC Radiological Assessment Room will allow access from the existing Coatesville multi-channel, fixed base radio system used under the common Emergency Plan for LGS & PBAPS. At the TSC bay station, the T-1 lines will tie into the Station Radio System, thus allowing the use of the existing Environmental and Radiological Frequency for communications with field survey team within the TMI 10-mile Emergency Planning Zone (EPZ).

The fixed base radio repeaters, antenna system and radio consoles for the Coatesville EOF are powered from a variety of emergency AC sources (diesel backup and alternate battery supplies).

5.5.5 Station Warning System

1. **Alarms**

Audible alarms are a quick and effective means of communicating emergency warnings on the site. Alarms currently installed at TMI include:

- Station Emergency Alarm
- Fire Alarm
- Reactor Building Evacuation Alarm

Each alarm provides a distinctive sound that all site personnel and contractors are trained to recognize and respond to. The Station Emergency Alarm will be followed by an announcement that provides emergency information such as class of emergency declared, accountability directions, radiological precautions, etc. At TMI-1, the Reactor Building evacuation alarm is supplemented with flashing lights at specific locations in the Reactor Building to provide both audible and visual warnings.

The Control Room alarm systems consist of overhead annunciators, panel annunciators and computer alarms. The overhead and panel annunciators consist of flashing translucent tiles and audible indicators (i.e., buzzer or horn). The computer alarms use annunciators and also provide specific data using the alarm printer. At TMI-1, alarm data is also provided by CRTs.

2. **Plant Paging System**

The Plant Paging System provides plant-wide paging from the Control Room and all remote stations plus private communications during normal operating conditions.

The plant paging system provides immediate warning and instructions to onsite personnel in the event of an emergency. Phone stations and speakers of this subsystem are located in vital plant areas.

TABLE TMI 5-1: Inventory of Emergency Kits By General Category

I. RADIATION MONITORING

A. Typical Contents

1. Full Face Respirators with Canisters
2. Survey Instruments - Radiation Survey Meters, Countrate Meters
3. Dosimetry Equipment - Dosimeters/Chargers
4. Protective Clothing
5. Air Sampler and Cartridges
6. Support Materials - Paper, Pencils, Envelopes, Maps, Procedures, Etc.

II. FIRST AID

A. Minor Injury

1. Contain items typically needed for minor injuries.
2. Placed throughout Plant

B. Employee Kits

1. Contain sufficient quantities to serve expected needs of approximately 100 employees.

   NOTE: Locations as determined by Medical Department.

   a. Stretchers

   b. Employee size first aid kits

C. First Aid and Medical Facility

1. Equipment inventory to support professional medical treatment.
2. Contains equipment necessary for examination of patients.

III. DAMAGE CONTROL

A. Typical Equipment Available

1. Hand tools
2. Cutting/Welding equipment
3. Patching materials
4. Portable blowers
5. Submersible pumps
6. Electrical equipment

APPENDIX 1: NUREG-0654 CROSS-REFERENCE

Annex Section	NUREG-0654
1.0	Part I, Section A
1.1	Part I, Section B
1.2	Part I, Section D
1.3	Part I, Section D
Figure TMI 1-1	Part I, Section D
Figure TMI 1-2	Part II, Section J.10
Figure TMI 1-3	Part II, Section J.10
Figure TMI 1-4	Part II, Section J.10 & 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 B.1 & 2
Table TMI 2-1	Part II, Section B (Table B-1)
Figure TMI 2-1	Part II, Section B.1
Figure TMI 2-2	Part II, Section B.6
Figure TMI 2-3	Part II, Section B.5 & 7
Figure TMI 2-4	Part II, Section B.5 & 7
3.0	Part II, Section D
3.1	Part II, Section D.1 & 2
3.2	Part II, Section D.1 & 2
3.3	Part II, Section D.1 & 2
3.4	Not Applicable
3.5	Part II, Section D.3
Table TMI 3-1	Part II, Section D.1 & 2
Table TMI 3-2	Part II, Section D.1 & 2
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
4.3.4.a	Part II, Section G.1 & 2
4.3.4.b	Part II, Section G.5
4.3.5	Part II, Section J.7
4.4.1	Part II, Section K.5 & 7
4.4.2	Part II, Section J.5
4.4.3	Part II, Section J.3
4.5	Not Applicable
Figure TMI 4-1	Part II, Section I.2 & 3
Figure TMI 4-3	Part II, Section I. J.4
Figure TMI 4-4	Part II, Section I. J.4
5.1.1	Part II, Section B.1
5.1.2	Part II, Section H.1

APPENDIX 1: NUREG-0654 CROSS-REFERENCE

Annex Section	NUREG-0654
5.1.3	Part II, Section H.1
5.1.4	Part II, Section H.2 & G.3.b
5.1.5	Part II, Section G.3.a
5.2.1	Part II, Section H.5.b, H.6.c &I.2
5.2.2	Part II, Section H.5.d
5.2.3	Part II, Section H.5.a
5.2.4	Part II, Section H.5.a & 8
5.2.5	Part II, Section H.5.c
5.2.6	Part II, Section H.6.c
5.2.7	Not Applicable
5.2.8	Part II, Section H.6.b & 7, I.9-10
5.3	Part II, Section H.9-10
5.4	Part II, Section L.1 & 2
5.5	Part II, Section F.1
Table TMI 5-1	Part II, Section H.11
Appendix 1	Part II, Section P.8
Appendix 2	Part II, Section P.4

APPENDIX 2: SITE-SPECIFIC LETTERS OF AGREEMENT

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

Local County Response Agencies

- Pennsylvania Emergency Management Agency Memorandum of Understanding (MOU) (letter on file)

NOTE: Documentation of agreement for Cumberland, Dauphin, Lancaster, Lebanon, and York counties are contained as part of the agreement with PEMA.

Medical Support Organizations and Personnel

- Londonderry Volunteer Fire Company (ambulance service)
- South Central Emergency Medical Services Inc.
- Northwest Emergency Medical Services
- Hershey Medical Center
- Harrisburg Hospital

Firefighting Organizations

NOTE: These are supplemented by Mutual Aid agreements with other firefighting as organizations.

- Bainbridge Volunteer Fire Company (Lancaster Co.)
- Middletown Volunteer Fire Department
- Londonderry Volunteer Fire Company
- Elizabethtown Fire Department
- Lower Swatara Volunteer Fire Department
- Susquehanna Area Regional Airport Authority (SARAA)
- Petroleum Products Corporation

Other Agencies

- Norfolk Southern Railway Company
- AREVA *
- Harrisburg Area Community College
- Londonderry Volunteer Fire Department (staging area)

Law Enforcement Agencies

- Pennsylvania State Police#

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

* Agreement is a Services and Materials Agreement maintained by Exelon BSC, Corporate Supply.

ATTACHMENT 12

EP-AA-1010, Revision 7

Exelon Nuclear Radiological Emergency Plan Annex for Oyster Creek Station

Exelon Generation®

EXELON NUCLEAR

RADIOLOGICAL EMERGENCY PLAN ANNEX
FOR
OYSTER CREEK STATION

Section 1: Introduction

Section 2: Organizational Control of Emergencies

Section 3: Classification of Emergencies

Section 4: Emergency Measures

Section 5: Emergency Facilities and Equipment

APPENDICES

ADDENDUMS

REVISION HISTORY

EP-OC-1010

REVISION	EFFECTIVE DATE	REVISION	EFFECTIVE DATE
0	Not issued	6	May 15, 2006
1	April 26, 2004	7	May 15, 2006
2	July, 31 2004	8	January 22, 2007
3	April 4, 2005	9	April 16, 2007
4	May 27, 2005	10	September, 12, 2007
5	January 13, 2006		

EP-AA-1010

REVISION	EFFECTIVE DATE	REVISION	EFFECTIVE DATE
0	November, 2007		
1	September, 2008		
2	March, 2010		
3	March, 2011		
4	March 2012		
5	November 2012		
6	December 2012		
7	June 2013		

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 Oyster Creek 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

General Information and Site Description

OCGS is operated by Exelon Nuclear and is a General Electric 1930 Mw Thermal Boiling Water Reactor steam supply system. Control rods and recirculation flow are used for reactivity control. Steam generated within the reactor housing is utilized to drive a turbine coupled to the main generator. The arrangement of the major OCGS facilities is shown in Figure OCGS 1-1: OCGS Site Arrangement.

The OCGS site is located near the Atlantic Ocean within the State of New Jersey. The Plant site, approximately 152 acres, is in Lacey and Ocean Townships, Ocean County. OCGS is about two miles inland from the shore of Barnegat Bay and seven miles west-northwest of Barnegat Light on the Atlantic shorefront. The site is approximately nine miles south of Toms River, New Jersey, about fifty miles east of Philadelphia, Pennsylvania, and sixty miles south of Newark, New Jersey.

The major transportation routes include the Garden State Parkway and U.S. Highway 9, running north and south; U.S. Highway 72, State Highways 37 and 70, New Jersey Routes 532, 530, 554 and Lacey Road running east and west, which serve primarily as feeder routes to the Garden State Parkway and U.S. Route 9. U.S. Highway 9 provides the eastern most site boundary. Exelon owns approximately 708 acres of property to the east of Route 9 extending to the Barnegat Bay. U.S. Highway 9 provides the only access routes to the site by land. Water access to the site is provided by the Intercostals Waterway, which runs through Barnegat Bay. A general area map showing the relative location of the OCGS site is shown as Figure OCGS 1-2: OCGS Site Relative Location.

For more specific site location information, refer to the Updated Final Safety Analysis Report (UFSAR) for Oyster Creek Generating Station.

Owner Controlled Area, Exclusion Area and Low Population Zone

The Owner Controlled Area (OCA) for the OCGS includes all areas within the site perimeter security fence. At Oyster Creek, the minimum distance from the centerline of the OCGS Reactor Building to the eastern OCA fence is approximately 800 feet.

The Exclusion Area for the OCGS is a 1358 ft. radius as measured from the centerline of the Reactor Building. The licensee retains complete authority to determine and maintain sufficient control of all activities including the authority to exclude or remove personnel and property from land areas within the exclusion area.

The OCGS low population zone is shown in Figure OCGS 1-3: OCGS Site Exclusion Area and LPZ.

Population and Population Distribution

The nearest population center is Toms River in Dover Township, 9.5 miles north of the site. Specific information regarding population densities within the Plume Exposure Pathway EPZ (e.g., residential areas, typical school enrollment and typical hospital capacities) can be found in the Oyster Creek Evacuation Time Estimate Study.

An appreciable variance in population density occurs during June, July and August due to seasonal transient vacationers. The Oyster Creek area, particularly the bay and seashores, is a summer vacation area for the mid Atlantic states. This seasonal population fluctuation occurs primarily in the eastern sectors.

Local Industry and Military Facilities

Typical industries within 10 miles of the OCGS site are found in the Oyster Creek UFSAR.

The area within 40 miles of the site is comprised primarily of forest, vacant land, or farmland. Only about 25 percent of the land is developed. No major industry exists within a 10-mile radius of the site, although several small industrial concerns exist in the Toms River area.

The nearest military installations are Fort Dix, New Jersey (approximately 35 miles northwest), McGuire Air Force Base (on the Fort Dix Military Reserve), and Lakehurst Naval Air Station (14 miles north). There is also a military reserve approximately 12 miles west along U.S. Route 72, utilized as a practice bombing range.

There is one general aviation airport within the 10-mile radius, Robert J. Miller Airpark County Airport, approximately 9 miles northwest.

1.2 Emergency Planning Zones

OCGS has taken into consideration the information and data presented above, guidance provided by the Environmental Protection Agency, Nuclear Regulatory Commission, and the New Jersey Office of Emergency Management, as well as other important factors such as organizational capabilities, availability of emergency facilities and equipment, and the methods for implementing the OCGS Emergency Plan in defining the Emergency Planning Zones (EPZs) for the Oyster Creek site. As a result, an EPZ having an approximate radial distance of 10 miles from the sites has been defined as the Plume Exposure Pathway EPZ. An EPZ having a radial distance of 50 miles from the sites has been defined as the Ingestion Exposure Pathway EPZ. Figure OCGS 1-4: 10-Mile Plume Exposure Pathway and Figure OCGS 1-5: 50-Mile Ingestion Pathway illustrate the respective boundaries of these EPZs.

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 E-Plan recognizes the State of New Jersey, in cooperation with the local EPZ communities, as the overall authority responsible for protective action directives in order to protect the health and safety of the general public.

The development of the State of New Jersey Emergency Plan and the OCGS Emergency Plan were closely coordinated. In addition, specific State requirements for reporting of emergencies, providing information and data, and recommending protective actions, have been integrated directly into the Emergency Plan Implementing Procedures.

In considering the Plume Exposure Pathway EPZ, there are also county plans that have been considered in the development of the OCGS Emergency Plan. The State Plan designates the New Jersey State Police, Office of Emergency Management (OEM) as the lead state agency for radiological emergency response planning and the state agency through which the Governor will exercise coordination and control during an emergency. The State Plan is an integrated document setting forth the resources and responsibilities of all relevant state agencies. Significant plans from the State Departments of Agriculture, Environmental Resources, NJ and Health and Bureau of Nuclear Engineering, are included in the State Plans.

The organization having prime responsibility in matters of radiation hazards are the Bureau of Nuclear Engineering (BNE). County and local governments are responsible for the protection of public health and safety within their jurisdiction.

Figure OCGS 1-1: OCGS Site Arrangement

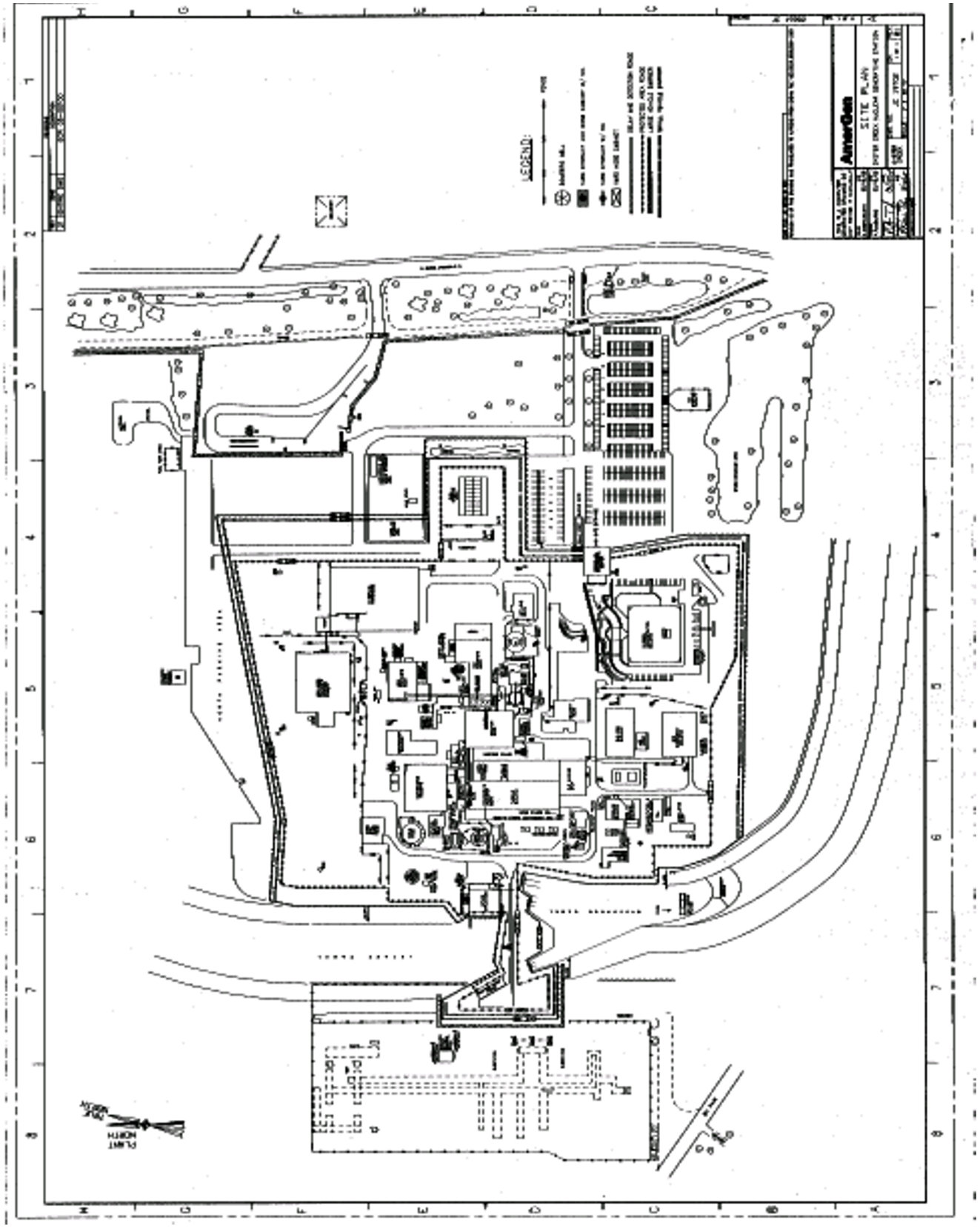


Figure OCGS 1-2: OCGS Site Relative Location

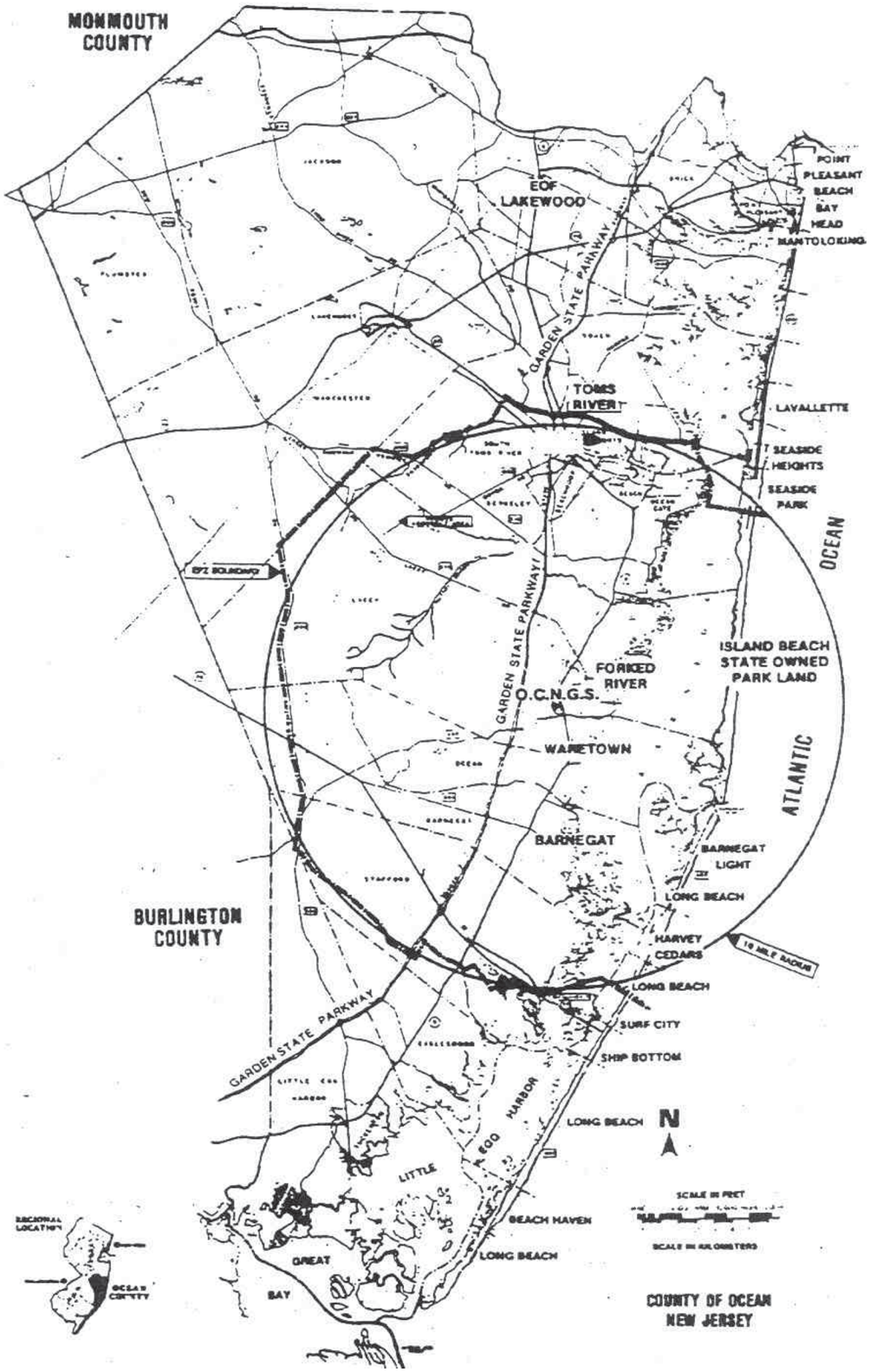


Figure OCGS 1-3: OCGS Site Exclusion Area and LPZ

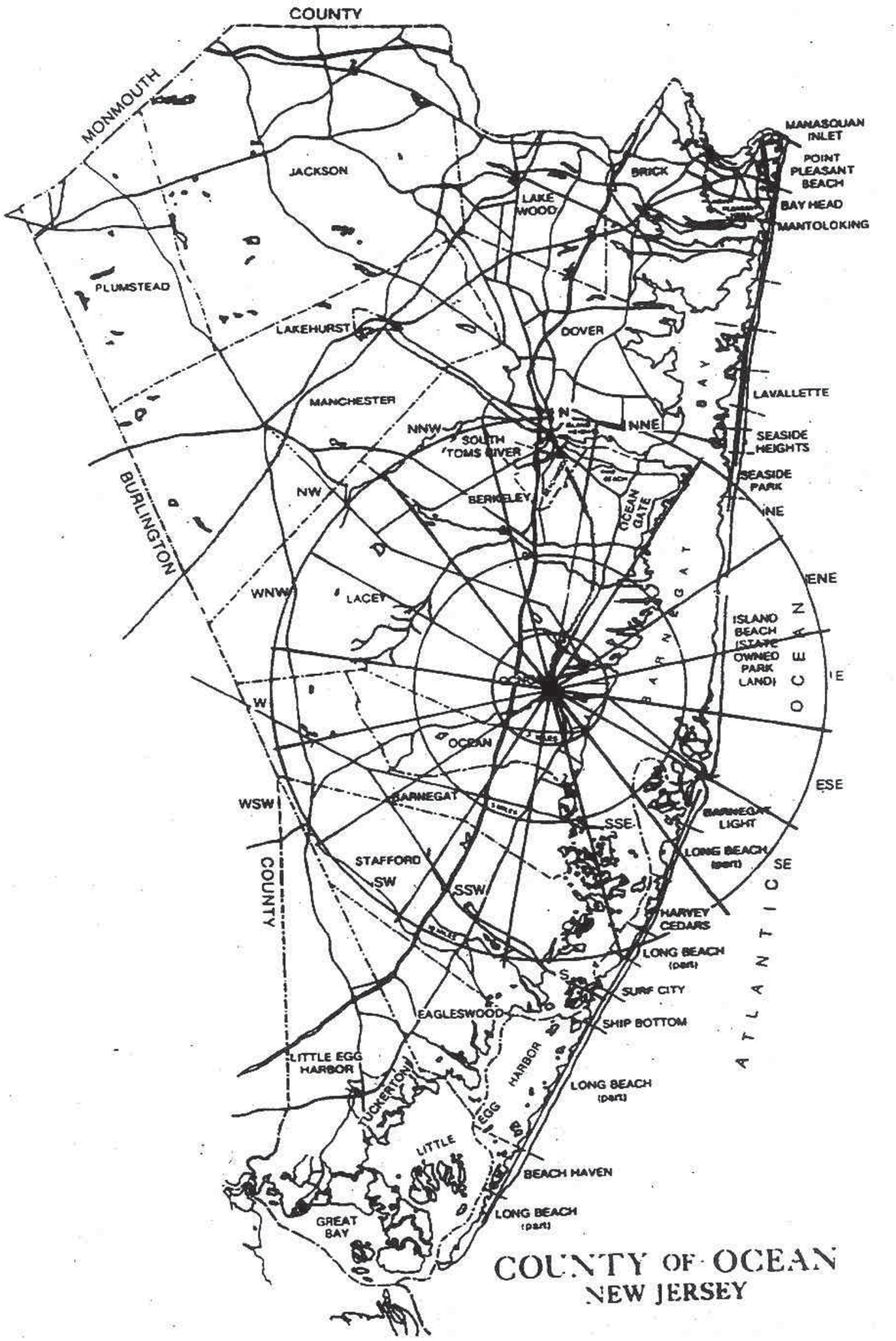


Figure OCGS 1-4: 10-Mile Plume Exposure Pathway

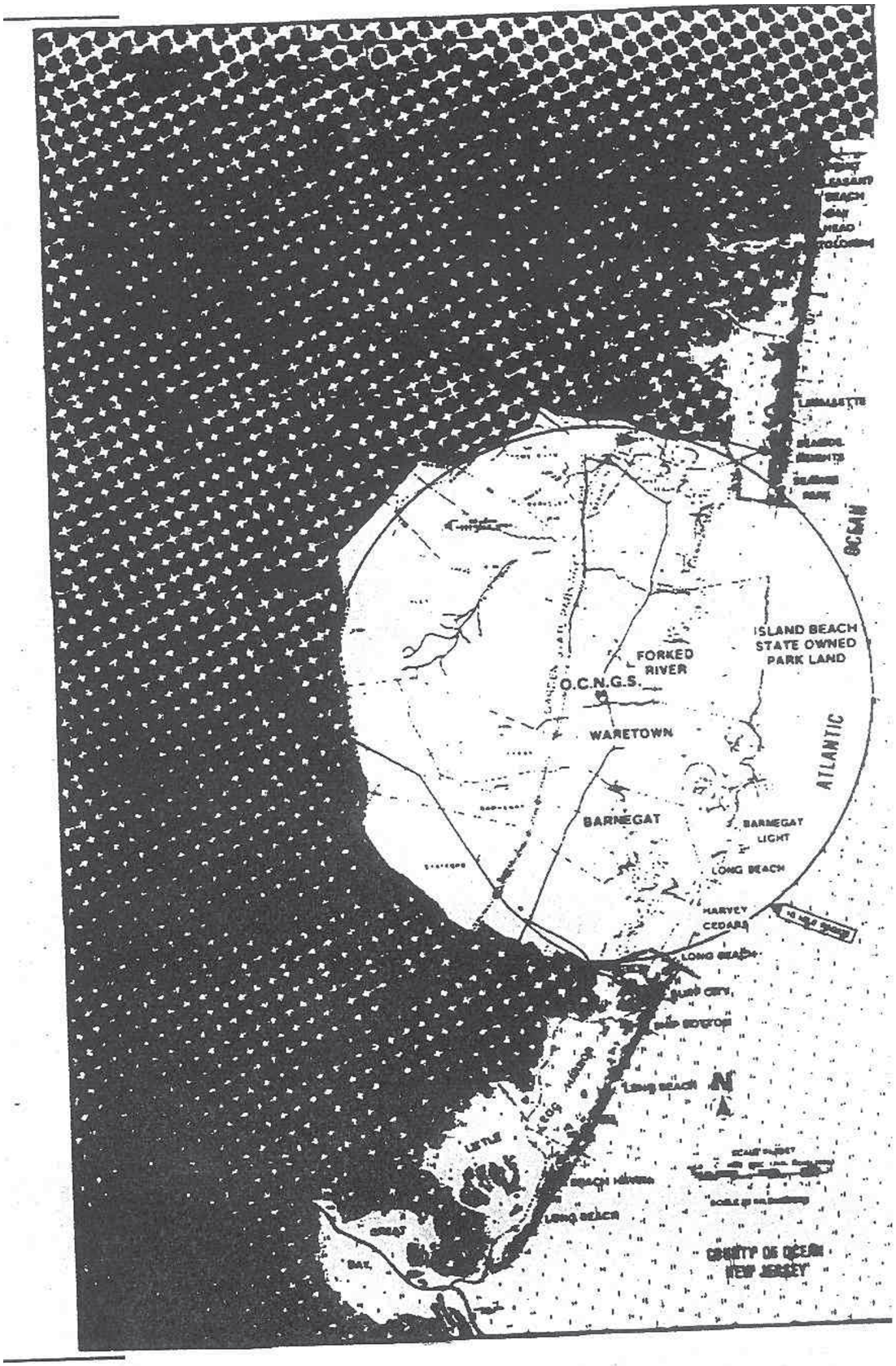
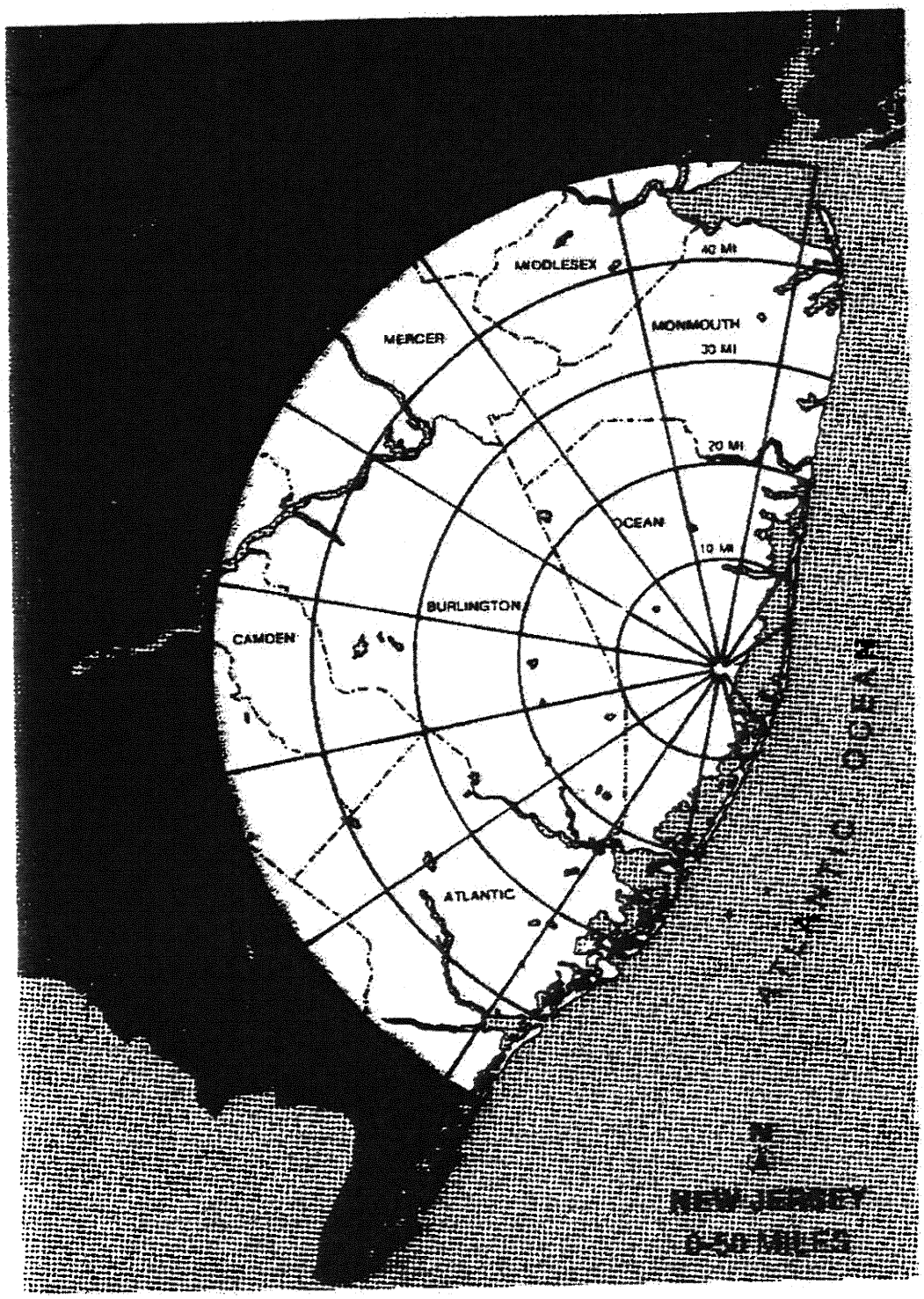


Figure OCGS 1-5: 50-Mile Ingestion Pathway



Section 2: Organizational Control of Emergencies

This section describes the Emergency Response Organization (ERO) and its key positions. It outlines the staffing requirements which provide initial emergency response actions and provisions for timely augmentation of on-shift personnel when required. It also describes interfaces among Exelon Nuclear emergency response personnel and specifies the offsite support available to respond to the nuclear generating stations.

At OGCS a goal of 60 minutes for minimum staffing, following notification of the declaration of an Alert or higher emergency classification, has been established for the ERO personnel responding to the station emergency facilities and the EOF.

The overall Emergency Plan staffing by positions and responsibilities is addressed in the Exelon Nuclear Standardized Radiological Emergency Plan. The list below includes position and responsibility differences between OCGS and the Standard Plan.

2.1 Shift Organization Staffing

Initial response to any emergency is by the normal plant organization present at the site. This organization includes positions that are onsite 24 hours per day and is described in Section B.1 of the Exelon Nuclear Standardized Radiological Emergency Plan. The Normal Shift Organization will be augmented, in an emergency, with designated/additional Emergency Response Organization (ERO) personnel within 60 minutes of notification as specified under Table OCGS 2-1. ERO activation is described in Section H.4 of the Exelon Nuclear Standardized Radiological Emergency Plan.

Table OCGS 2-1 outlines ERO positions required to meet minimum staffing and full augmentation of the on-shift complement at an Alert or higher classification, and the major tasks assigned to each position. Responsibilities for each position are described in Section B.5 of the Exelon Nuclear Standardized Radiological Emergency Plan.

2.1.1 Shift Technical Advisor (STA)

Each on duty shift shall include a Shift Technical Advisor as required per the OCGS Technical Specifications, Section 6.3.3. Any STA qualified individual may perform the position. The Shift Technical Advisor position may be filled by an on-shift Senior Reactor Operator (dual-role SRO/STA) provided the individual meets the requirements of the OCGS Technical Specifications.

2.1.2 Incident Assessor

Oyster Creek Generating Station has the option of using an Incident Assessor in these cases where the STA qualification is held by others such as the Shift Manager. Upon declaration of an emergency, the Incident Assessor fulfills the role of the on-shift technical advisor and reports to the Shift Emergency Director (Shift Manager). The Incident Assessor shall function as an advisor to the Shift Manager on matters of safety and act as an on-shift technical advisor. The Incident Assessor is an ERO position that

can be filled by an individual who is qualified as the Shift Technical Advisor or Incident Assessor.

2.2 Emergency Response Organization (ERO) Staffing

Refer to Table OCGS 2-1 of the OCGS 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 OCGS 2-1)

Radiation Controls Coordinator (RCC) TSC

- Following EOF Protective Measures Group staffing:

  Transfer responsibility for dose assessment activities and control of the Field Monitoring Teams to the EOF Dose Assessment Coordinator when appropriate. Standard Plan transfers control of Field Monitoring Teams to the Environmental Coord.

Technical Support Staff TSC

The Electrical or Mechanical Engineer, as directed by the Technical Manager, will perform the duties of the State / Local Communicator until relieved by the EOF.

Dose Assessment Coordinator EOF

The Dose Assessment Coordinator is responsible for the tasks listed in the Standard Plan in addition to the Standard Plan responsibilities for the EOF Environmental Coordinator.

HPN Communicator EOF

The HPN Communicator reports to the Dose Assessment Coordinator.

State Environs Communicator EOF

The responsibilities of the State Environs Communicator as listed in the Standard Plan are accomplished by the Dose Assessment Coordinator in the OCGS Emergency Organization.

Computer Specialist TSC

The Computer Specialist reports to the Logistics Coordinator in the TSC, not the EOF.

Security Coordinator EOF

The responsibilities of the Security Coordinator as listed in the Standard Plan are accomplished by the Logistics Manager in the OCGS Emergency Organization.

EOC Communicator EOF

The responsibilities of the EOC Communicator as listed in the Standard Plan are addressed by direct interaction with the State Representatives present in the EOF for the OCGS Emergency Organization.

County Liaisons – dispatched to County EOCs EOF

County Liaisons as listed in the Standard Plan are not required for support of the OCGS Emergency Organization.

State EOC Liaisons – dispatched to State EOCs EOF

State EOC Liaisons as listed in the Standard Plan are not required for support of the OCGS Emergency Organization.

Radiation Protection Spokesperson JIC

The responsibilities of the Radiation Protection Spokesperson as listed in the Standard Plan are addressed by direct interaction with the Bureau of Nuclear Engineering (BNE) present in the EOF for the OCGS Emergency Organization.

Public Information Director (PID) JIC

The Public Information Director does not have media monitoring staff. The responsibilities are performed by the New Jersey Office of Emergency Management.

News Writer JIC

In the OCGS Emergency Organization, the News Writer obtains assistance from the Bureau of Nuclear Engineering (BNE) rather than from the Radiation Protection Spokesperson as listed in the Standard Plan.

Media Monitoring Staff JIC

There is no Media Monitoring Staff in the OCGS Emergency Organization. The media monitoring responsibilities are performed by the New Jersey Office of Emergency Management.

Rumor Control Staff JIC

There is no Rumor Control Staff in the OCGS Emergency Organization. The rumor control responsibilities are performed by the New Jersey Office of Emergency Management.

The Corporate Spokesperson is not a minimum staffing position in the OCGS Emergency Plan.

2.2.2 Emergency Offsite Organization (Figure OCGS 2-2)

Based on existing interface and staffing agreements, representatives from the State of New Jersey 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 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 OCGS 2-3)

Based on the co-location of the EOF with the Joint Information Center (JIC) 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 JIC positions.

These differences in staffing are:

- Media Monitoring and Rumor Control is not required because these functions are the responsibility of State of NJ Office of Emergency Management.
- Radiation Protection Spokesperson position was incorporated into the Technical Spokesperson
- Facilities Support Staff is not performed by designated individuals in the OCGS Emergency Plan

The logistical and administrative configuration of the OCGS EOF/JIC facilitates association between the ENC (Emergency News Center) and the JIC (Joint Information Center), where the Standard Plan associates the ENC with the EOF. The differences in facility position assignments are shown below:

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 + 3 months (25% grace period).

OCGS JIC/ENC staff will receive training on a periodic basis on their roles in responding to an emergency at the station per Section II.O.5.

2.4 Non-Exelon Nuclear Support Groups

Agreements exist on file with or are verified current annually by the MA Region Corporate Emergency Preparedness Group for the support agencies listed in Appendix 2 of the Exelon Nuclear Radiological Emergency Plan Annex for OCGS.

Additionally, Exelon Nuclear has contractual agreements common within Exelon Nuclear with several companies whose services would be available in the event of a radiological emergency. These agencies are also listed in Appendix 3 of the Exelon Nuclear Standardized Radiological Emergency Plan.

Emergency response coordination with governmental agencies and other support organizations is discussed in Section A of the Exelon Nuclear Standardized Radiological Emergency 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

General Electric 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 OCGS 2-1: Minimum Staffing Requirements

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

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

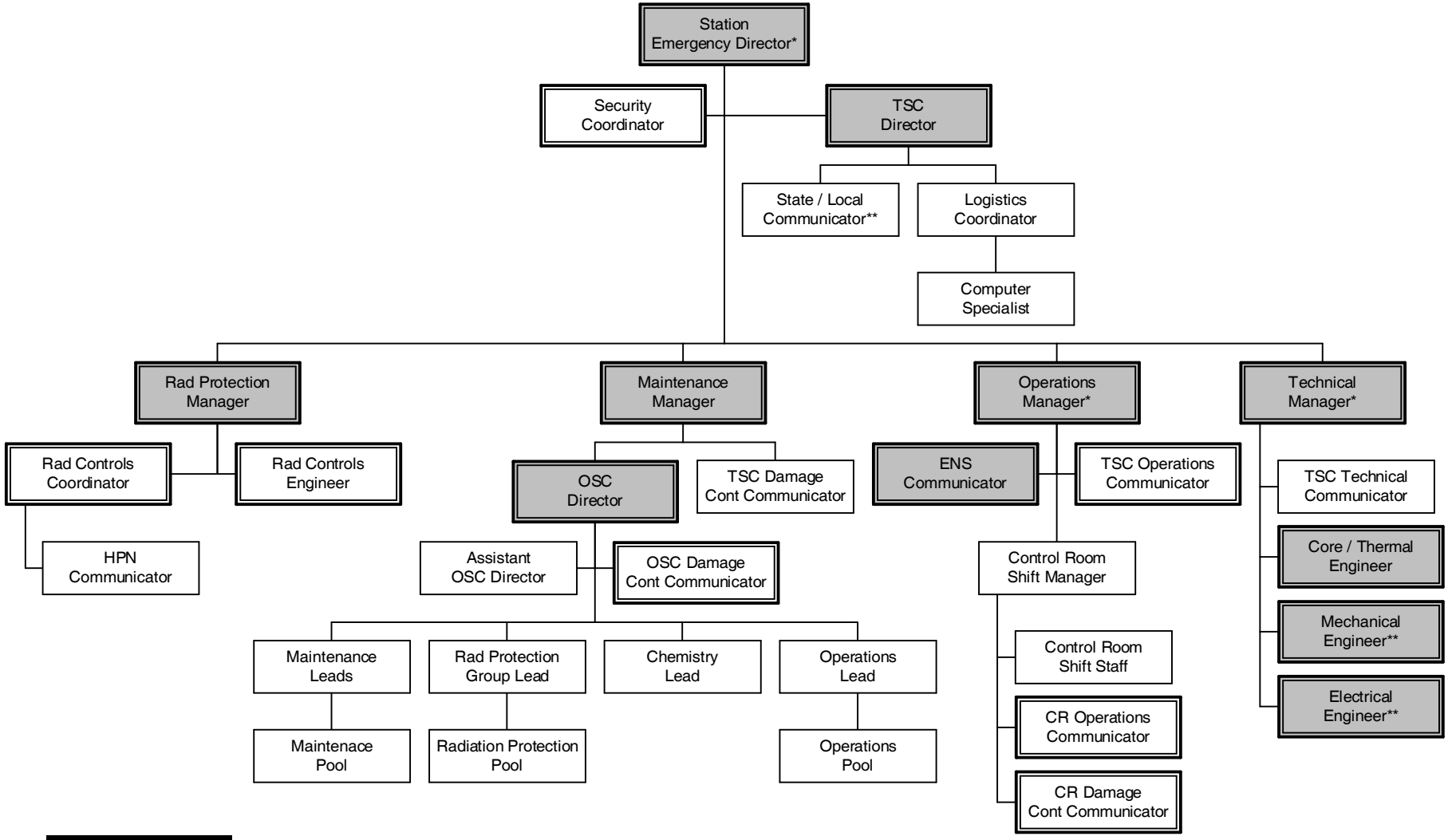
Functional Area	Major Tasks	Emergency Positions	Minimum Shift Size	[a]60 Minute Augmentation	Full Augmentation
5. Plant System Engineering, Repair and Corrective Actions	Technical Support	STA / Incident Assessor [i] (CR)	1		
		Technical Manager (TSC)		1	
		Core/Thermal Hydraulics Engineer (TSC)		1	
		Mechanical Engineer [j] (TSC)		1	
		Electrical Engineer [j] (TSC)		1	
		SAMG Decision Maker (TSC)		1[c]	
		SAMG Evaluator (TSC)		2[c]	
		Operations Manager (TSC)		1	
		Radiation Controls Engineer (TSC)		1	
	Repair and Corrective Actions	Maintenance Personnel[l] (OSC)	2[c]		(d)
		Maintenance Manager (TSC)		1	
		OSC Director[k] (OSC)	1[c]	1	
		OSC Assistant Director (OSC)			1
	Accident Analysis	Technical Support Manager (EOF)		1	
		Operations Advisor (EOF)			1
		Technical Advisor (EOF)			1
6. In-Plant Protective Actions	Radiation Protection	RP Personnel	3[c]		(d)
7. Fire Fighting	--	Fire Brigade[f]	5		
8. First Aid and Rescue Operations	--	Plant Personnel	2[c]		(d)
9. Site Access Control and Personnel Accountability	Security & Accountability	Security Team Personnel	(g)	(g)	
		Security Coordinator (TSC)		1	
	JIC Security	Access Control (JIC)			1
10. Resource Allocation and Administration	Logistics / Administration	Logistics Manager (EOF)		1	
		Logistics Coordinator (TSC)			1
		Clerical Staff (TSC/OSC/EOF)			(d)
		Events Recorder (EOF/JIC)			2
		Administrative Coordinator (EOF)			1
		Computer Specialist (TSC)			1

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

Functional Area	Major Tasks	Emergency Positions	Minimum Shift Size	[(a)]60 Minute Augmentation	Full Augmentation
11. Public Information	Media Interface	Corporate Spokesperson (JIC)			1
		Technical Advisor / Spokesperson (JIC)			1
	Information Development	Public Information Director (JIC)			1
		News Writer (JIC)		1	
	Media Monitoring and Rumor Control	NJ OEM Conducts Rumor Control (JIC)			
	Facility Operation and Control	JIC Director (JIC)		1	
		JIC Coordinator (JIC)			1
		Administrative Coordinator (JIC)			1
		Clerical Support (JIC)			(d)
			Minimum Shift Size	**Total Minimum Staff**	**Total Full Augmentation**
		TOTAL:	**16**	**34**	**20+**

(a) Response time is based on optimum travel conditions.
(b) Position assumed by the Shift Dose Assessor when relieved by the Radiological Controls Coordinator.
(c) May be provided by personnel assigned other functions. Personnel can fulfill multiple functions.
(d) Personnel numbers depend on the type and extent of the emergency.
(e) 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.
(f) Fire Brigade per UFSAR / TRM, as applicable.
(g) Function performed by on-shift security personnel.
(h) Each Field Survey Team consists of a Lead and Driver.
(i) Refer to Section 2.1.1 and 2.1.2 for description of on-shift STA and Incident Assessor staffing requirements.
(j) State / Local communicator function in TSC assigned as collateral duty to either mechanical or electrical engineer (60-minute staff personnel)
(k) On-shift OSC Director assumes role of OSC Operations Group Lead when relieved by ERO OSC Director
(l) One position is filled by a Senior Maintenance Technician, the other position maybe filled by an equipment operator.

Figure OCGS 2-1: Emergency Onsite Organization



Shaded Boxes indicate minimum staffing positions.

Bolded Boxes indicate 60 minute responder positions.

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

** Refer to Table OCGS 2-1: Minimum Staffing Requirements for required staffing levels

Figure OCGS 2-2: Emergency Offsite Organization

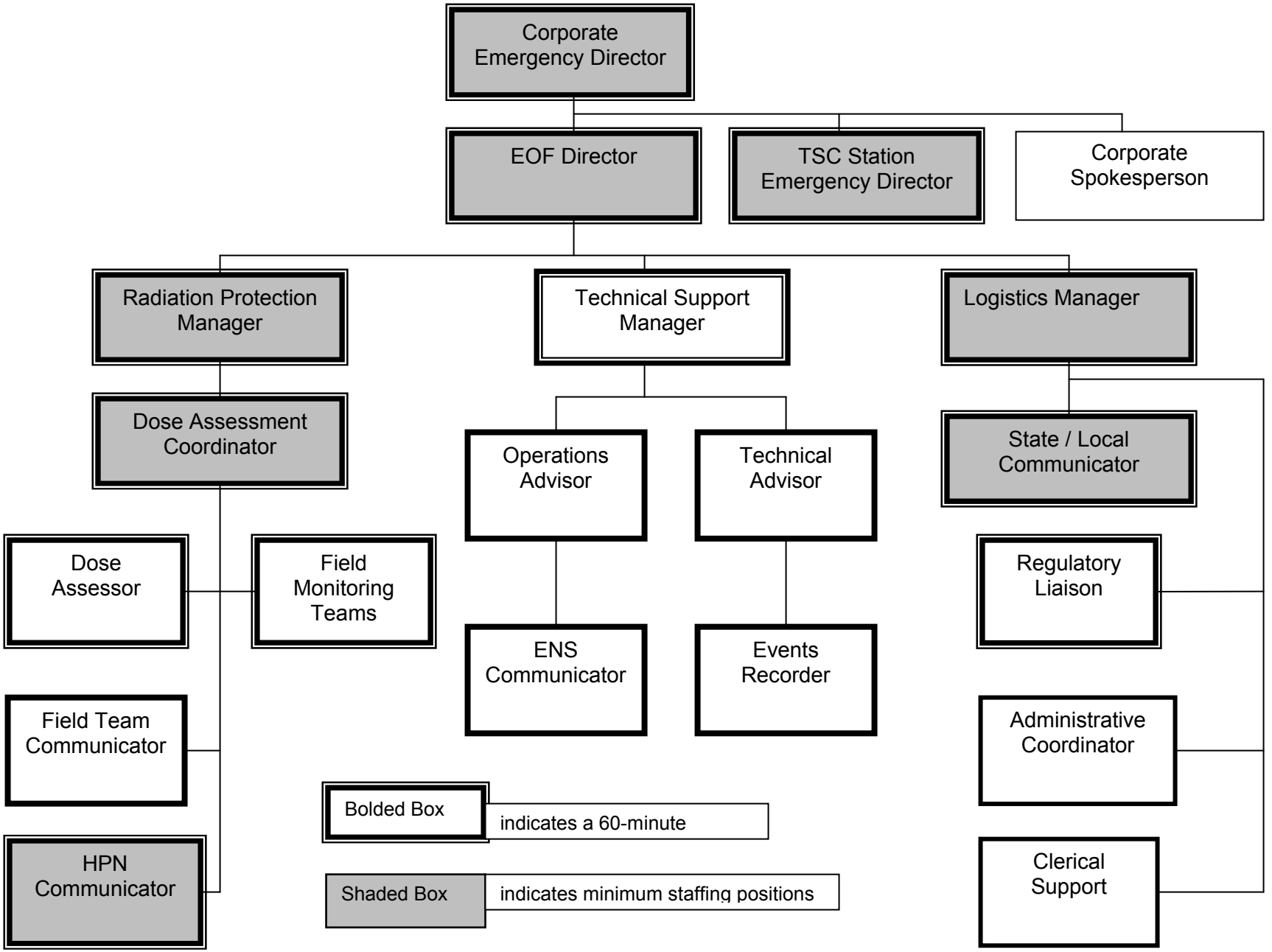
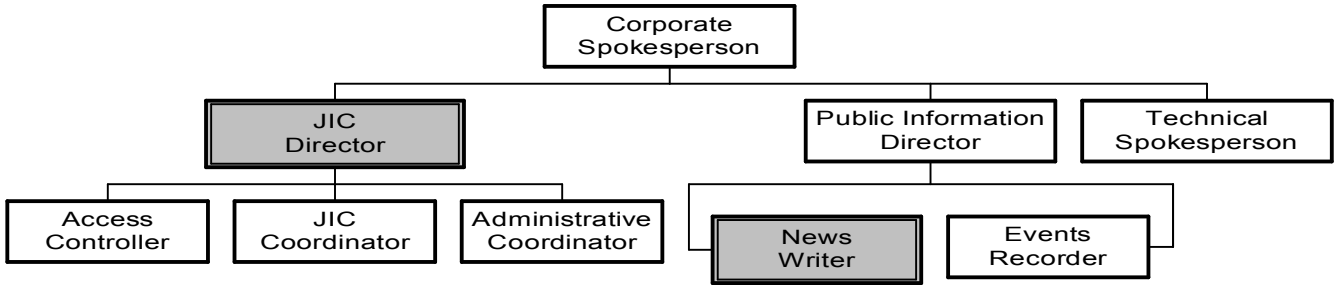


Figure OCGS 2-3: Emergency Public Information Organization



Shaded Box indicates minimum staffing positions

Bolded Box indicates a 60-minute responder

Section 3: Classification of Emergencies

3.1 General

Section D of the Exelon Nuclear Standardized Emergency Plan divides the types of emergencies into four Emergency Classification Levels (ECLs). They are the UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY, and GENERAL EMERGENCY. These ECLs are entered by meeting the Emergency Action Level (EAL) Threshold Values provided in this section of the Annex. The ECLs are escalated from least severe to most severe according to relative threat to the health and safety of the public and emergency workers. Depending on the severity of an event, prior to returning to a standard day-to-day organization, a state or phase called RECOVERY may be entered to provide dedicated resources and organization in support of restoration and communication activities following the termination of the emergency.

UNUSUAL EVENT: Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

ALERT: Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

SITE AREA EMERGENCY: Events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

GENERAL EMERGENCY: Events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

RECOVERY: Recovery can be considered as a phase of the emergency and is entered by meeting emergency termination criteria provided in EP-AA-111 Emergency Classification and Protective Action Recommendations.

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 4 are based on Reactor Mode Switch Position and average reactor coolant temperature. "Defueled" Mode was established for classification purposes under NEI 99-01 to reflect conditions where all fuel has been removed from the Reactor Pressure Vessel.

MODE	TITLE	CONDITION
1	Power Operation	Technical Specification definition
2	Hot Shutdown	**Shutdown condition** or **Refuel Mode** as defined by Technical Specifications and Reactor Coolant Temperature not below 212 degrees F or not vented.
3	Cold Shutdown	Technical Specification Definition
4	Refueling	Technical Specification definition of **Refuel Mode** and Reactor coolant temperature below 212 degrees F and vented.
D	Defueled	No fuel in the Reactor Vessel

Hot Matrix - applies in modes (1), and (2)

Cold Matrix - applies in modes (3), (4), and (D)

Individuals responsible for the classification of events will refer to the Initiating Condition and Threshold Values on the matrix of the appropriate station Standardized Emergency Plan Annex (this document). This matrix will contain Initiating Conditions, EAL Threshold Values, Mode Applicability Designators, appropriate EAL numbering system, and additional guidance necessary to classify events. It may be provided as a user aid.

The matrix is set up in six Recognition Categories. The first is designated as "R" and relates to Abnormal Radiological Conditions / Abnormal Radiological Effluent Releases. The second is designated as "F" and relates to Fission Product Barrier Degradation. The third is designated as "M" and relates to hot condition System Malfunctions. The fourth is designated as "C" and relates to Cold Shutdown / Refueling System Malfunctions. The fifth is designated as "H" and relates to Hazards and Other Conditions. The sixth is designated "E-H" and relates to ISFSI Malfunctions.

The 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.

The Initiating Conditions are coded with a two letter and one number code. The first letter is the Recognition Category designator, the second letter is the Classification Level, "U" for (NOTIFICATION OF) UNUSUAL EVENT, "A" for ALERT, "S" for SITE AREA EMERGENCY and "G" for GENERAL EMERGENCY. The EAL number is a sequential number for that Recognition Category series. All Initiating Conditions that are describing the severity of a common condition (series) will have the same number.

The EAL number may then be used to reference a corresponding page(s), which provides the basis information pertaining to the Initiating Condition:

- Threshold Value
- Mode Applicability
- Basis

Emergency Action Levels are the measurable, observable detailed conditions that must be met in order to classify the event. Classification is not to be made without referencing, comparing and satisfying the Threshold Values specified in the Emergency Action Levels.

A list of definitions is provided as part of this document for terms having specific meaning to the Emergency Action Levels. Site specific definitions are provided for terms with the intent to be used for a particular Initiating Condition/Threshold Value and may not be applicable to other uses of that term at other sites, the Emergency Plan or procedures.

References are also included to documents that were used to develop the EAL Threshold Values.

References to the Emergency Director means the person in Command and Control as defined in the Emergency Plan. Classification of emergencies is a non-delegable responsibility of Command and Control for the onsite facilities with responsibility assigned to the Shift Emergency Director (Control Room Shift Manager) or the Station Emergency Director (TSC). Classification of emergencies remains the responsibility of the applicable onsite facility even after Command and Control is transferred to the Corporate Emergency Director (EOF).

3.2 Classification, Instrumentation and Transient Events

Although the majority of the EALs provide very specific thresholds, the Emergency Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL is IMMINENT. If, in the judgment of the Emergency Director, an IMMINENT situation is at hand, the classification should be made as if the threshold has been exceeded. While this is particularly prudent at the higher emergency classification levels (as the early classification may provide for more effective implementation of protective measures), it is nonetheless applicable to all emergency classification levels.

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 indications, or (3) by direct observation by plant personnel, such that doubt related to the indication's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

Indications used for monitoring and evaluation of plant conditions include the normally used instrumentation, backup or redundant instrumentation, and the use of other parameters that provide information that supports determination if an EAL threshold value has been reached. When an EAL refers to a specific instrument or indication that is determined to be inaccurate or unavailable, then alternate indications shall be used to monitor the specified condition.

During an event that results in changing parameters trending towards an EAL classification, and instrumentation that was available to monitor this parameter becomes unavailable or the parameter goes off scale, the parameter should be assumed to have been exceeded and the classification made if there are no other direct or indirect means available to determine if the threshold has not been exceeded.

Planned evolutions involve preplanning to address the limitations imposed by the condition, the performance of required surveillance testing, and the implementation of specific controls prior to knowingly entering the condition in accordance with the specific requirements of the site's Technical Specifications. Activities which cause the site to operate beyond that allowed by the site's Technical Specifications, planned or unplanned, may result in an EAL threshold being met or exceeded. Planned evolutions to test, manipulate, repair, perform maintenance or modifications to systems and equipment that result in an EAL value being met or exceeded are not subject to classification and activation requirements as long as the evolution proceeds as planned and is within the operational limitations imposed by the specific operating license. However, these conditions may be subject to the reporting requirements of 10 CFR 50.72.

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.

Concerning Classification Downgrading, Exelon Nuclear policy is that emergency classifications shall <u>not</u> be downgraded to a lower classification. Once declared, the event shall remain in effect until no Classification is warranted or until such time as conditions warrant classification to Recovery.

There may be cases in which a plant condition that exceeded an EAL was not recognized at the time of occurrence but is identified well after the condition has occurred (e.g., as a result of routine log or record review), and the condition no longer exists. In these cases, an emergency should not be declared. Reporting requirements of 10 CFR 50.72 are applicable, the guidance of NUREG-1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73 and the Reportability Reference Manual, should be applied.

3.3 Mode Applicability

The plant-operating mode that existed at the time that the event occurred, prior to any protective system or operator action initiated in response to the condition, is compared to the mode applicability of the EALs. If an event occurs, and a lower or higher plant-operating mode is reached before the emergency classification can be made, the declaration shall be based on the mode that existed at the time the event occurred.

For events that occur in Cold Shutdown or Refueling, escalation is via EALs that have Cold Shutdown or Refueling for mode applicability, even if Hot Shutdown (or a higher mode) is entered during any subsequent heat-up. In particular, the Fission Product Barrier Matrix EALs are applicable only to events that initiate in Hot Shutdown or higher.

If there is a change in Mode following the initial event declaration, any subsequent events will be evaluated on the existing Mode of the plant at the time the conditions occur.

3.4 Emergency Director Judgment

Emergency Director Judgment EALs are provided in the Hazards and Other Condition Affecting Plant Safety section and on the Fission Product Barrier Matrix. Both of the Emergency Director Judgment EALs have specific criteria for when they should be applied.

The Hazards Section Emergency Director Judgment EALs are intended to address unanticipated conditions which are not addressed explicitly by other EALs but warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under specific emergency classifications (UE, Alert, SAE or GE).

The FPB Matrix ED Judgment EALs are intended to include unanticipated conditions, which are not addressed explicitly by any of the other FPB threshold values, but warrant determination because conditions exist that fall under the broader definition for a significant Loss or Potential Loss of the barrier (equal to or greater than the defined FPB threshold values).

3.5 Fission Product Barrier Restoration

Fission Product Barrier (FPB) thresholds are not treated the same as EAL threshold values. Conditions warranting declaration of the loss or potential loss of a Fission Product Barrier may occur resulting in a specific classification. The condition that caused the loss or potential loss declaration could be rectified as the result of Operator action, automatic actions, or designed plant response. Barriers will be considered re-established when there are direct verifiable indications (containment penetration or open valve has been isolated, coolant sample results, etc) that the barrier has been restored and is capable of mitigating future events.

The reestablishment of a fission product barrier does not alter or lower the existing classification. Entry into Termination/Recovery phase is still required for exiting the present classification. However the reestablishment of the barrier should be considered in determining future classifications should plant conditions or events change.

3.6 Definitions

AFFECTING SAFE SHUTDOWN: Event in progress has adversely affected functions that are necessary to bring the plant to and maintain it in the applicable HOT or COLD SHUTDOWN condition. Plant condition applicability is determined by Technical Specification LCOs in effect.

Example 1: Event causes damage that results in entry into an LCO that requires the plant to be placed in HOT SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is not "AFFECTING SAFE SHUTDOWN."

Example 2: Event causes damage that results in entry into an LCO that requires the plant to be placed in COLD SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is "AFFECTING SAFE SHUTDOWN."

BOMB: An explosive device suspected of having sufficient force to damage plant systems or structures.

CIVIL DISTURBANCE: A group of persons violently protesting station operations or activities at the site.

CONFINEMENT BOUNDARY: The barrier(s) between areas containing radioactive substances and the environment.

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized / energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

EXTORTION: An attempt to cause an action at the station by threat of force.

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fire. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTILE FORCE: One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

INTRUSION: A person(s) present in a specified area without authorization. Discovery of a BOMB in a specified area is indication of INTRUSION into that area by a HOSTILE FORCE.

NORMAL LEVELS: Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI): A complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage.

NORMAL PLANT OPERATIONS: Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

OWNER CONTROLLED AREA (OCA): The property associated with the station and owned by the company. Access is normally limited to persons entering for official business.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

SABOTAGE: A deliberate damage, mis-alignment, or mis-operation of plant equipment with the intent to render the equipment inoperable. Equipment found tampered with or damaged due to malicious mischief may NOT meet the definition of SABOTAGE until this determination is made by security supervision.

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

SIGNIFICANT TRANSIENT: is an UNPLANNED event involving one or more of the following: (1) Turbine Trip, (2) Reactor scram, (3) ECCS actuation, (4) >25% power change, or (5) thermal power oscillations >10%.

STRIKE ACTION: A work stoppage within the PROTECTED AREA by a body of workers to enforce compliance with demands made on management. The STRIKE ACTION must threaten to interrupt NORMAL PLANT OPERATIONS.

UNISOLABLE: A breach or leak that cannot be promptly isolated.

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

Table OCGS 3-1: Emergency Action Level (EAL) Matrix

Abnormal Rad Levels / Radiological Effluent

Radiological Effluents

GENERAL EMERGENCY

RG1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**:

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:

   a. **> 1000 mRem TEDE**

   OR

   b. **> 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**.

   OR

   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

SITE AREA EMERGENCY

RS1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**:

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:

   a. **> 100 mRem TEDE**

   OR

   b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.

   OR

   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

ALERT

RA1 Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer. 1 2 3 4 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **200 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 15 minutes**.
   - Radwaste Overboard Discharge effluent monitor

     OR

   - Discharge Permit specified monitor

   OR

2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**.

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.

UNUSUAL EVENT

RU1 Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer. 1 2 3 4 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **2 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 60 minutes**.
   - Radwaste Overboard Discharge effluent monitor

     OR

   - Discharge Permit specified monitor

   OR

2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 60 minutes**.

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Modes: 1 – Power Operation, 2 – Hot Shutdown, 3 – Cold Shutdown, 4 – Refueling, D – Defueled

Table R1 -- Effluent Monitor Thresholds

	General Emergency	Site Area Emergency	Alert	Unusual Event
Main Stack RAGEMS	4.0 E+01 μCi/cc HRM **OR** 1.6 E-08 amps HRM	4.0 E+00 μCi/cc HRM **OR** 1.6 E-09 amps HRM	1.93 E+00 μCi/cc HRM **OR** 7.8 E-10 amps HRM	7.92 E+03 cps LRM
Turbine Bldg RAGEMS	5.0 E-01 μCi/cc HRM	2.51 E+05 cpm LRM	8.11 E+04 cpm LRM	8.11 E+02 cpm LRM

Table OCGS 3-1: Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Abnormal Rad Levels / Radiological Effluent				
Abnormal Rad Levels		**Table R2 - Refuel Floor ARMs** • C-5, Crit Mon • C-10, North Wall • C-9, North Wall • B-9, Open Floor	**RA2** Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel. 1 2 3 4 D **EAL Threshold Values:** 1. VALID reading **> 1000 mR/hr** on any Table R2 Radiation Monitor due to **EITHER**: • Damaged irradiated fuel. **OR** • Water level drop. **OR** 2. Water level drop in the Reactor Refueling Cavity or Spent Fuel Pool that will result in irradiated fuel becoming uncovered.	**RU2** UNPLANNED rise in plant radiation levels. 1 2 3 4 D **EAL Threshold Values:** 1. a. UNPLANNED water level drop in the Reactor Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by: • Reactor Cavity water level **< 583 inches** (GEMAC Wide Range, floodup calibration). **OR** • Report of visual observation of a drop in water level in the Reactor Cavity or Spent Fuel Pool. **AND** b. VALID Area Radiation Monitor reading rise on one or more radiation monitor in Table R2. **OR** 2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.
		Table R3 **Areas Requiring Continuous Occupancy** • Main Control Room • Central Alarm Station - (by survey)	**RA3** Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. 1 2 3 4 D **EAL Threshold Values:** Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R3) to maintain plant safety functions.	**RU3** Fuel Clad Degradation. 1 2 **EAL Threshold Values:** Fuel clad degradation resulting in **EITHER**: • Offgas system radiation monitor **HI-HI** alarm. **OR** • Coolant activity **> 4.0 µCi/gm** Dose Equivalent I-131.

Modes: 1 – Power Operation, 2 – Hot Shutdown, 3 – Cold Shutdown, 4 – Refueling, D – Defueled

Table OCGS 3-1: Emergency Action Level (EAL) Matrix

Modes: 1 - Power Ops **2 -** Hot Shutdown

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
FG1 Loss of ANY two barriers AND Loss or Potential Loss of third barrier. 1 2	**FS1** Loss or Potential Loss of. ANY two barriers. 1 2	**FA1** ANY Loss or ANY Potential Loss of either Fuel Clad or RCS. 1 2	**FU1** ANY Loss or ANY Potential Loss of Containment. 1 2

Sub-Category	FC - Fuel Clad		RC – Reactor Coolant System		CT - Containment	
	Loss	**Potential Loss**	**Loss**	**Potential Loss**	**Loss**	**Potential Loss**
1. Pri Coolant Activity	Coolant activity **> 300 uCi/gm** Dose Equivalent I-131	None	None	None	None	None
2. RPV Water Level	1. RPV level **cannot** be restored and maintained **> - 20 inches TAF.**	2. RPV level **cannot** be restored and maintained **> 0 inches TAF.** **OR** 3. RPV level **cannot** be determined.	1. RPV level **cannot** be restored and maintained **> 0 inches TAF.** **OR** 2. RPV level **cannot** be determined.	None	None	Plant conditions indicate that Primary Containment Flooding is required.
3. Primary Cont Conditions	None	None	1. Drywell pressure **> 3.0 psig.** **AND** 2. Drywell pressure rise due to RCS leakage.	None	1. Rapid unexplained drop in Drywell Pressure following initial pressure rise. **OR** 2. Drywell pressure response **not** consistent with LOCA conditions.	3. Drywell pressure **> 44 psig** and rising. **OR** 4. a. Drywell or Torus Hydrogen concentration **≥ 6%.** **AND** b. Drywell or Torus Oxygen concentration **≥ 5%.** **OR** 5. Heat Capacity Temperature Limit (EMG-3200.02 Fig. F) exceeded.
4. RCS Leak Rate	None	None	1. UNISOLABLE Main Steam Line (MSL), Isolation Condenser, Feedwater, or RWCU line break. **OR** 2. Emergency RPV Depressurization is required.	3. RCS leakage **> 50 gpm** inside the drywell. **OR** 4. UNISOLABLE primary system leakage outside drywell resulting in **EITHER:** • Secondary Containment area temperatures **> EMG-3200.11 Max Normal** (Table 11) operating level. **OR** • Secondary Containment area radiation levels **> EMG-3200.11 Max Normal** (Table 12) operating level.	None	None
5. Pri Cont Rad Monitoring	Containment Hi Range Radiation Monitoring System (CHRRMS) reading **> 530 R/hr**.	None	Containment Hi Range Radiation Monitoring System (CHRRMS) reading **> 100 R/hr.**	None	None	Containment Hi Range Radiation Monitor System (CHRRMS) reading **> 1210 R/hr**.
6. Primary Cont Isolation Failure or Bypass	None	None	None	None	1. a. Failure of isolation valves in any one line to close. **AND** b. Direct downstream pathway to the environment exists after a primary containment isolation signal. **OR** 2. Intentional venting/purging of Primary Containment per EOPs or SAMGs due to accident conditions. **OR** 3. UNISOLABLE primary system leakage outside drywell resulting in **EITHER:** • Secondary Containment area temperatures **> EMG-3200.11 Max Safe** (Table 11) operating level. **OR** • Secondary Containment area radiation levels **> EMG-3200.11 Max Safe** (Table 12) operating level.	None
7. ED Judgment	1. Any condition in the opinion of the Emergency Director that indicates Loss of the Fuel Clad Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Fuel Clad Barrier.	1. Any condition in the opinion of the Emergency Director that indicates Loss of the RCS Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the RCS Barrier.	1. Any condition in the opinion of the Emergency Director that indicates Loss of the Containment Barrier.	2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment Barrier.

Table OCGS 3-1: Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
Loss of AC Power	**MG1** Prolonged loss of all Off-Site and all On-Site AC power to emergency busses. [1] [2] **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to 4160V Buses 1C and 1D. **AND** 2. Failure of EDG-1 and EDG-2 Emergency Diesel Generators to supply power to 4160V Buses 1C and 1D. **AND** 3. a. Restoration of at least one 4160V Bus (1C or 1D) in **< 1 hour** is **not** likely. **OR** b. RPV level **cannot** be determined to be **> 0 inches TAF**.	**MS1** Loss of all Off-Site and all On-Site AC power to emergency busses for 15 minutes or longer. [1] [2] **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to 4160V Buses 1C and 1D. **AND** 2. Failure of EDG-1 and EDG-2 Emergency Diesel Generators to supply power to 4160V Buses 1C and 1D. **AND** 3. Failure to restore power to at least one 4160V Bus (1C or 1D) in **< 15 minutes** from the time of loss of both offsite and onsite AC power.	**MA1** AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout. [1] [2] **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. AC power capability to 4160V Buses 1C and 1D reduced to only one of the following power sources for **≥ 15 minutes.** • Startup Transformer SA • Startup Transformer SB • EDG-1 Emergency Diesel Generator • EDG-2 Emergency Diesel Generator **AND** 2. Any additional single power source failure will result in a station blackout.	**MU1** Loss of all Off-Site AC power to Emergency busses for 15 minutes or longer. [1] [2] **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of all off-site AC power to 4160V Buses 1C and 1D for **≥ 15 minutes**.
RPS Failure /Inadvertent Criticality	**MG2** Automatic Scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists. [1] **EAL Threshold Values:** 1. Automatic scram was **not** successful as indicated by Reactor Power **> 2%.** **AND** 2. Manual scram/ARI actions were **not** successful as indicated by Reactor Power **> 2%.** **AND** 3. **EITHER** of the following exists: • RPV level **cannot** be restored and maintained **> - 20 inches TAF**. **OR** • Heat Capacity Temperature Limit (EMG-3200.02 Fig. F) exceeded.	**MS2** Automatic Scram fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor. [1] **EAL Threshold Values:** 1. Automatic scram was **not** successful as indicated by Reactor Power **> 2%.** **AND** 2. Manual scram/ARI actions were **not** successful from the Reactor Console as indicated by Reactor Power **> 2%.**	**MA2** Automatic Scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor. [1] **EAL Threshold Values:** 1. Automatic scram was **not** successful as indicated by Reactor Power **> 2%.** **AND** 2. Manual scram/ARI actions were successful from Reactor Console as indicated by Reactor Power **≤ 2%.**	**MU2** Inadvertent criticality. [2] **EAL Threshold Values:** UNPLANNED sustained positive period observed on nuclear instrumentation.

Modes: 1 – Power Operation, 2 –Hot Shutdown, 3 – Cold Shutdown, 4 – Refueling, D – Defueled

Table OCGS 3-1: Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
DC Power		**MS3** Loss of all vital DC power for 15 minutes or longer. 1 2 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of all vital DC power based on **< 115 VDC** on 125 VDC battery busses B and C for **≥ 15 minutes**.		
Annunciators		**MS4** Inability to monitor a SIGNIFICANT TRANSIENT in progress. 1 2 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1) **AND** 2. SIGNIFICANT TRANSIENT in progress (Table M2). **AND** 3. Compensatory indications (computer points) are unavailable.	**MA4** UNPLANNED Loss of safety system annunciation or indication in the control room with EITHER (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable. 1 2 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1) **AND** 2. a. SIGNIFICANT TRANSIENT in progress (Table M2). **OR** b. Compensatory indications (computer points) are unavailable.	**MU4** UNPLANNED loss of safety system annunciation or indication in the control room for 15 minutes or longer. 1 2 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:** • Safety System annunciators (Table M1) **OR** • Safety System indications (Table M1)
		Table M1 - Safety Systems • ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring	**Table M2 - Significant Transients** • Turbine trip • Reactor scram • ECCS actuation • Thermal power change > 25% • Thermal power oscillations > 10 % Reactor Power change	

Modes: 1 – Power Operation, 2 – Hot Shutdown, 3 – Cold Shutdown, 4 – Refueling, D – Defueled

Table OCGS 3-1: Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
RCS Leak				**MU5** RCS Leakage. 1 2 **EAL Threshold Values:** 1. Unidentified or pressure boundary leakage into the Drywell **> 10 gpm**. **OR** 2. Identified leakage into the Drywell **> 25 gpm**.
Communications		**Table M3- Communications Capability** System / Onsite / Offsite Plant Paging System: X / Station Radio: X / Conventional telephone lines: X / X Cell Phones: X / X Emergency Notification System (ENS): / X Health Physics Network (HPN): / X		**MU6** Loss of all On-site or Off-site communications capabilities. 1 2 **EAL Threshold Values:** 1. Loss of all Table M3 **Onsite** communications capability affecting the ability to perform routine operations. **OR** 2. Loss of all Table M3 **Offsite** communications capability affecting the ability to perform offsite notifications.
T. S. Time				**MU7** Inability to reach required shutdown within Technical Specification limits. 1 2 **EAL Threshold Values:** Plant is **not** brought to required operating mode within Technical Specifications LCO Action Statement Time.

Modes: 1 – Power Operation, 2 – Hot Shutdown, 3 – Cold Shutdown, 4 – Refueling, D – Defueled

Table OCGS 3-1: Emergency Action Level (EAL) Matrix

Hazards and Other Conditions Affecting Plant Safety

Security

GENERAL EMERGENCY

HG1 HOSTILE ACTION resulting in loss of physical control of the facility. 1 2 3 4 D

EAL Threshold Values:

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1).

   OR

2. A HOSTILE ACTION has:
   - Caused failure of Spent Fuel Pool Cooling Systems

     AND

   - IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).

SITE AREA EMERGENCY

HS1 HOSTILE ACTION within the PROTECTED AREA. 1 2 3 4 D

EAL Threshold Values:

A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.

ALERT

HA1 HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. 1 2 3 4 D

EAL Threshold Values:

1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site.

   OR

2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.

UNUSUAL EVENT

HU1 Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant. 1 2 3 4 D

EAL Threshold Values:

1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities.

   OR

2. A validated notification from NRC providing information of an aircraft threat.

   OR

3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

C. R. Evacuation

Table H1 - Safety Functions

- Reactivity Control (ability to shut down the reactor and keep it shutdown)
- RCS Inventory (ability to cool the core)
- Decay Heat Removal (ability to maintain heat sink)

SITE AREA EMERGENCY

HS2 Control Room evacuation has been initiated and plant control cannot be established. 1 2 3 4 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Control Room evacuation has been initiated.

   AND

2. Control of the plant **cannot** be established per ABN-30 in **< 15 minutes**.

ALERT

HA2 Control Room evacuation has been initiated. 1 2 3 4 D

EAL Threshold Values:

Entry into ABN-30 for Control Room evacuation.

Fire / Explosion

Table H2 – Vital Areas

- Reactor Bldg
- 4160V Switchgear Rooms (1C & 1D)
- Control Room Complex (MOB, Upper and Lower Cable Spreading Rooms)
- Main Transformer/Condensate Transfer Pad
- Intake Structure
- #1 EDG Vault
- #2 EDG Vault
- EDG Fuel Oil Storage Tank

ALERT

HA3 FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown. 1 2 3 4 D

EAL Threshold Values:

FIRE or EXPLOSION resulting in any of the following:

- VISIBLE DAMAGE to a Table H2 permanent structure.

  OR

- VISIBLE DAMAGE to safety system equipment contained within a Table H2 area.

  OR

- Control Room indication of degraded safety system equipment performance contained within a Table H2 area.

UNUSUAL EVENT

HU3 FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA. 1 2 3 4 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm.

   OR

2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

Modes: 1 – Power Operation, 2 – Hot Shutdown, 3 – Cold Shutdown, 4 – Refueling, D – Defueled

Table OCGS 3-1: Emergency Action Level (EAL) Matrix

Natural / Destructive Phenomena

Hazards and Other Conditions Affecting Plant Safety

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Table H2 - Vital Areas • Reactor Bldg • 4160V Switchgear Rooms (1C & 1D) • Control Room Complex (MOB, Upper and Lower Cable Spreading Rooms) • Main Transformer/Condensate Transfer Pad • Intake Structure • #1 EDG Vault • #2 EDG Vault • EDG Fuel Oil Storage Tank **Table H3 – Internal Flooding Areas** • Reactor Building NE Corner Room • Reactor Building SE Corner Room • Reactor Building SW Corner Room (RBEDT Rm) ▪ Reactor Building NW Corner Room (CRD Pp Rm)		**HA4** Natural or destructive phenomena affecting VITAL AREAS. 1 2 3 4 D **EAL Threshold Values:** 1. A confirmed Seismic event that affects safety systems or systems required for safe shutdown requiring reactor scram. **OR** 2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area: • Tornado strike **OR** • High winds **> 99 mph** **OR** • Vehicle crash **OR** • Turbine failure-generated PROJECTILES **OR** 3. Flooding in any Table H3 area that results in **ANY** of the following: • Degraded safety system performance area as indicated in the Control Room. **OR** • Industrial safety hazards (e.g., electric shock) that preclude access necessary to operate or monitor safety equipment. **OR** • Water level **> EMG 3200.11 Max Safe** (Table 13). **OR** 4. Abnormal Intake Structure level, as indicated by **EITHER**: • **> 6.0 ft. MSL** (> 4.90 psig on PI-533-1172 and PI-533-1173 or > 6.0 ft MSL on CR-423-11 pt 24 and pt 23). **OR** • **≤ -4.0 ft. MSL** (≤ 0.50 psig on PI-533-1172 and PI-533-1173 or ≤ -4.0 ft MSL on CR-423-11 pt 24 and pt 23). **MSL** = Mean Sea Level	**HU4** Natural or destructive phenomena affecting the PROTECTED AREA. 1 2 3 4 D **EAL Threshold Values:** 1. Seismic event as indicated by any **TWO** of the following: • Seismic event confirmed by station seismic monitor procedure. **OR** • Earthquake felt in plant. **OR** • National Earthquake Center. **OR** 2. **EITHER** of the following occurring within the PROTECTED AREA boundary: • Tornado strike **OR** • Sustained **(> 15 minutes)** high winds **> 99 mph** **OR** 3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals. **OR** 4. Flooding in any Table H3 area that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode. **OR** 5. Abnormal Intake Structure level, as indicated by **EITHER**: • **> 4.5 ft. MSL** (> 4.25 psig on PI-533-1172 and PI-533-1173 or > 4.5 ft MSL on CR-423-11 pt 24 and pt 23). **OR** • **≤ -3.0 ft. MSL** (≤ 0.95 psig on PI-533-1172 and PI-533-1173 or ≤ -3.0 ft MSL on CR-423-11 pt 24 and pt 23). **MSL** = Mean Sea Level

Modes: 1 – Power Operation, 2 – Hot Shutdown, 3 – Cold Shutdown, 4 – Refueling, D – Defueled

Table OCGS 3-1: Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Toxic / Flammable Gas	**Table H2 - Vital Areas** • Reactor Bldg • 4160V Switchgear Rooms (1C & 1D) • Control Room Complex (MOB, Upper and Lower Cable Spreading Rooms) • Main Transformer/Condensate Transfer Pad • Intake Structure • #1 EDG Vault • #2 EDG Vault • EDG Fuel Oil Storage Tank		**HA5** Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor. 1 2 3 4 D **EAL Threshold Values:** **Note:** If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event. Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.	**HU5** Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS. 1 2 3 4 D **EAL Threshold Values:** 1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS. **OR** 2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.
Judgment	**HG6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY. 1 2 3 4 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**HS6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY. 1 2 3 4 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	**HA6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an ALERT. 1 2 3 4 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**HU6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT. 1 2 3 4 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Modes: 1 – Power Operation, 2 – Hot Shutdown, 3 – Cold Shutdown, 4 – Refueling, D – Defueled

Table OCGS 3-1: Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
ISFSI MALFUNCTION				
ISFSI				**E-HU1** Damage to a loaded cask CONFINEMENT BOUNDARY 1 2 3 4 D **EAL Threshold Values:** Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**.

Modes: 1 – Power Operation, 2 – Hot Shutdown, 3 – Cold Shutdown, 4 – Refueling, D – Defueled

Table OCGS 3-1: Emergency Action Level (EAL) Matrix

Abnormal Rad Levels / Radiological Effluent

Radiological Effluents

GENERAL EMERGENCY

RG1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**:

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:

   a. **> 1000 mRem TEDE**

   OR

   b. **> 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**.

   OR

   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

SITE AREA EMERGENCY

RS1 Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology. 1 2 3 4 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**:

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:

   a. **> 100 mRem TEDE**

   OR

   b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.

   OR

   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

ALERT

RA1 Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer. 1 2 3 4 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **200 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 15 minutes**.
   - Radwaste Overboard Discharge effluent monitor

     OR

   - Discharge Permit specified monitor

   OR

2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**.

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.

UNUSUAL EVENT

RU1 Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer. 1 2 3 4 D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors > **2 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 60 minutes**.
   - Radwaste Overboard Discharge effluent monitor

     OR

   - Discharge Permit specified monitor

   OR

2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 60 minutes**.

   OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Modes: 1 – Power Operation, 2 – Hot Shutdown, 3 – Cold Shutdown, 4 – Refueling, D – Defueled

Table R1 -- Effluent Monitor Thresholds

	General Emergency	Site Area Emergency	Alert	Unusual Event
Main Stack RAGEMS	4.0 E+01 μCi/cc HRM **OR** 1.6 E-08 amps HRM	4.0 E+00 μCi/cc HRM **OR** 1.6 E-09 amps HRM	1.93 E+00 μCi/cc HRM **OR** 7.8 E-10 amps HRM	7.92 E+03 cps LRM
Turbine Bldg RAGEMS	5.0 E-01 μCi/cc HRM	2.51 E+05 cpm LRM	8.11 E+04 cpm LRM	8.11 E+02 cpm LRM

Table OCGS 3-1: Emergency Action Level (EAL) Matrix

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Abnormal Rad Levels / Radiological Effluent			
Abnormal Rad Levels	**Table R2 - Refuel Floor ARMs** • C-5, Crit Mon • C-10, North Wall • C-9, North Wall • B-9, Open Floor	**RA2** Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel. 1 2 3 4 D **EAL Threshold Values:** 1. VALID reading **> 1000 mR/hr** on any Table R2 Radiation Monitor due to **EITHER**: • Damaged irradiated fuel. **OR** • Water level drop. **OR** 2. Water level drop in the Reactor Refueling Cavity or Spent Fuel Pool that will result in irradiated fuel becoming uncovered.	**RU2** UNPLANNED rise in plant radiation levels. 1 2 3 4 D **EAL Threshold Values:** 1. a. UNPLANNED water level drop in the Reactor Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by: • Reactor Cavity water level **< 583 inches** (GEMAC Wide Range, floodup calibration). **OR** • Report of visual observation of a drop in water level in the Reactor Cavity or Spent Fuel Pool. **AND** b. VALID Area Radiation Monitor reading rise on one or more radiation monitor in Table R2. **OR** 2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.
	Table R3 **Areas Requiring Continuous Occupancy** • Main Control Room • Central Alarm Station - (by survey)	**RA3** Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. 1 2 3 4 D **EAL Threshold Values:** Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R3) to maintain plant safety functions.	

Modes: 1 – Power Operation, 2 – Hot Shutdown, 3 – Cold Shutdown, 4 – Refueling, D – Defueled

Table OCGS 3-1: Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Cold Shutdown / Refueling System Malfunctions				
Loss of AC Power			**CA1** Loss of all Off-Site and all On-Site AC power to emergency busses for 15 minutes or longer. 3 4 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Loss of all off-site AC power to 4160V Buses 1C and 1D. **AND** 2. Failure of EDG-1 and EDG-2 Emergency Diesel Generators to supply power to 4160V Buses 1C and 1D. **AND** 3. Failure to restore power to at least one 4160V Bus (1C or 1D) in **< 15 minutes** from the time of loss of both offsite and onsite AC power.	**CU1** AC power capibilty to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout. 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. AC power capability to 4160V Buses 1C and 1D reduced to only one of the following power sources for **≥ 15 minutes.** • Startup Transformer SA • Startup Transformer SB • EDG-1 Emergency Diesel Generator • EDG-2 Emergency Diesel Generator **AND** 2. Any additional single power source failure will result in a station blackout.
Inadvertent Criticality				**CU2** Inadvertent criticality. 3 4 **EAL Threshold Values:** UNPLANNED sustained positive period observed on nuclear instrumentation.
DC Power				**CU3** Loss of required DC power for 15 minutes or longer. 3 4 **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of required DC power based on **< 115 VDC** on 125 VDC battery buses B and C for **≥ 15 minutes**.

Modes: 1 – Power Operation, 2 – Hot Shutdown, 3 – Cold Shutdown, 4 – Refueling, D – Defueled

Table OCGS 3-1: Emergency Action Level (EAL) Matrix

Cold Shutdown / Refueling System Malfunctions

Communications

GENERAL EMERGENCY

SITE AREA EMERGENCY

ALERT

Table C1 - Communications Capability

System	Onsite	Offsite
Plant Paging System	X	
Station Radio	X	
Conventional telephone lines	X	X
Cell Phones	X	X
Emergency Notification System (ENS)		X
Health Physics Network (HPN)		X

UNUSUAL EVENT

CU4 Loss of all On-site or Off-site communications capabilities. 3 4 D

EAL Threshold Values:

1. Loss of all Table C1 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table C1 **Offsite** communications capability affecting the ability to perform offsite notifications.

Heat Sink

GENERAL EMERGENCY

SITE AREA EMERGENCY

Table C2 – RCS Reheat Duration Thresholds

RCS	Containment Closure	Duration
Intact	N/A	60 minutes*
Not Intact	Established	20 minutes*
	Not Established	0 minutes

*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then EAL Threshold #1 is **not** applicable.

ALERT

CA5 Inability to maintain plant in cold shutdown. 3 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 212°F** for **> Table C2 duration**.

   OR

2. UNPLANNED RPV pressure rise **> 10 psig** as a result of temperature rise due to loss of decay heat removal.

UNUSUAL EVENT

CU5 UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV. 3 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 212°F**.

   OR

2. Loss of the following for **≥ 15 minutes:**
   - All RCS temperature indications

     AND
   - All RPV level indications

Modes: 1 – Power Operation, 2 – Hot Shutdown, 3 – Cold Shutdown, 4 – Refueling, D – Defueled

Table OCGS 3-1: Emergency Action Level (EAL) Matrix

Cold Shutdown / Refueling System Malfunctions

RCS Leakage / Inventory

GENERAL EMERGENCY

CG6 Loss of RPV inventory affecting fuel clad integrity with containment challenged. [3] [4]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. RPV level **< 0 inches TAF** for **≥ 30 minutes**.

   AND

   b. Any Containment Challenge Indication (Table C4).

   OR

2. a. RPV level unknown for **≥ 30 minutes.**

   AND

   b. Loss of RPV inventory as indicated by any of the following:

   - Table C3 indication.

     OR

   - Erratic Source Range Monitor indication.

     OR

   - Refuel Floor Area Radiation Monitor C-10, North Wall, reading **> 3 R/hr**.

   AND

   c. Any Containment Challenge Indication (Table C4)

SITE AREA EMERGENCY

CS6 Loss of RPV inventory affecting core decay heat removal capability. [3] [4]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. With CONTAINMENT CLOSURE **not** established, RPV level **< 84 inches TAF**.

   OR

2. With CONTAINMENT CLOSURE established, RPV level **< 0 inches TAF.**

   OR

3. a. RPV level unknown for **≥ 30 minutes.**

   AND

   b. Loss of RPV inventory as indicated by any of the following:

   - Table C3 indications.

     OR

   - Erratic Source Range Monitor indication.

     OR

   - Refuel Floor Area Radiation Monitor C-10, North Wall, reading **> 3 R/hr**.

ALERT

CA6 Loss of RPV inventory. [3] [4]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. RPV level **< 90 inches TAF**.

   OR

2. a. RPV level unknown for **≥ 15 minutes**.

   AND

   b. Loss of RPV inventory per Table C3 indications.

UNUSUAL EVENT

CU6 RCS leakage. [3] [4]

EAL Threshold Values:

NOTE: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

This EAL is applicable when all vessel head bolts are fully tensioned.

RCS leakage results in the inability to restore and maintain RPV level **> 139 inches TAF** for **≥ 15 minutes**.

RPS

Table C4 – Containment Challenge Indications

- Primary Containment Hydrogen concentration **≥ 6%** and Oxygen **≥ 5%**.
- UNPLANNED rise in containment pressure
- CONTAINMENT CLOSURE **not** established.
- Any Secondary Containment radiation monitors reading **> EMG-3200.11 Maximum Safe** (Table 12).

Table C3 – Indications of RCS Leakage

- UNPLANNED floor or equipment sump level rise
- UNPLANNED Torus level rise
- UNPLANNED vessel make-up rise
- Observation of leakage or Inventory loss

CU7 UNPLANNED loss of RPV inventory. [3] [4]

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

This EAL is applicable when one or more vessel head bolts are less than fully tensioned.

1. UNPLANNED Reactor Cavity or Vessel level drop that meets **EITHER**:

   - When controlling level above the RPV flange, Reactor Cavity level drop below the RPV flange for **≥ 15 minutes**.

     OR

   - When controlling level below the RPV flange, vessel level drop below the procedurally established limit for **≥ 15 minutes**.

   OR

2. a. RPV level unknown.

   AND

   b. Loss of RPV inventory per Table C3 indications.

Modes: 1 – Power Operation, 2 – Hot Shutdown, 3 – Cold Shutdown, 4 – Refueling, D – Defueled

Table OCGS 3-1: Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Security	**HG1** HOSTILE ACTION resulting in loss of physical control of the facility. 1 2 3 4 D **EAL Threshold Values:** 1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1). **OR** 2. A HOSTILE ACTION has: • Caused failure of Spent Fuel Pool Cooling Systems **AND** • IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).	**HS1** HOSTILE ACTION within the PROTECTED AREA. 1 2 3 4 D **EAL Threshold Values:** A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.	**HA1** HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. 1 2 3 4 D **EAL Threshold Values:** 1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site. **OR** 2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.	**HU1** Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant. 1 2 3 4 D **EAL Threshold Values:** 1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities. **OR** 2. A validated notification from NRC providing information of an aircraft threat. **OR** 3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.
C. R. Evacuation	**Table H1 - Safety Functions** • Reactivity Control (ability to shut down the reactor and keep it shutdown) • RCS Inventory (ability to cool the core) • Decay Heat Removal (ability to maintain heat sink)	**HS2** Control Room evacuation has been initiated and plant control cannot be established. 1 2 3 4 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. Control Room evacuation has been initiated. **AND** 2. Control of the plant **cannot** be established per ABN-30 in **< 15 minutes**.	**HA2** Control Room evacuation has been initiated. 1 2 3 4 D **EAL Threshold Values:** Entry into ABN-30 for Control Room evacuation.	
Fire / Explosion		**Table H2 – Vital Areas** • Reactor Bldg • 4160V Switchgear Rooms (1C & 1D) • Control Room Complex (MOB, Upper and Lower Cable Spreading Rooms) • Main Transformer/Condensate Transfer Pad • Intake Structure • #1 EDG Vault • #2 EDG Vault • EDG Fuel Oil Storage Tank	**HA3** FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown. 1 2 3 4 D **EAL Threshold Values:** FIRE or EXPLOSION resulting in any of the following: • VISIBLE DAMAGE to a Table H2 permanent structure. **OR** • VISIBLE DAMAGE to safety system equipment contained within a Table H2 area. **OR** • Control Room indication of degraded safety system equipment performance contained within a Table H2 area.	**HU3** FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA. 1 2 3 4 D **EAL Threshold Values:** **Note:** The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. 1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm. **OR** 2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

Modes: 1 – Power Operation, 2 – Hot Shutdown, 3 – Cold Shutdown, 4 – Refueling, D – Defueled

Table OCGS 3-1: Emergency Action Level (EAL) Matrix

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety			

Natural / Destructive Phenomena

Table H2 - Vital Areas

- Reactor Bldg
- 4160V Switchgear Rooms (1C & 1D)
- Control Room Complex (MOB, Upper and Lower Cable Spreading Rooms)
- Main Transformer/Condensate Transfer Pad
- Intake Structure
- #1 EDG Vault
- #2 EDG Vault
- EDG Fuel Oil Storage Tank

Table H3 – Internal Flooding Areas

- Reactor Building NE Corner Room
- Reactor Building SE Corner Room
- Reactor Building SW Corner Room (RBEDT Rm)
- Reactor Building NW Corner Room (CRD Pp Rm)

HA4 Natural or destructive phenomena affecting VITAL AREAS. 1 2 3 4 D

EAL Threshold Values:

1. A confirmed Seismic event that affects safety systems or systems required for safe shutdown requiring reactor scram.

   OR

2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area:
   - Tornado strike

     OR
   - High winds **> 99 mph**

     OR
   - Vehicle crash

     OR
   - Turbine failure-generated PROJECTILES

   OR

3. Flooding in any Table H3 area that results in **ANY** of the following:
   - Degraded safety system performance area as indicated in the Control Room.

     OR
   - Industrial safety hazards (e.g., electric shock) that preclude access necessary to operate or monitor safety equipment.

     OR
   - Water level **> EMG 3200.11 Max Safe** (Table 13).

   OR

4. Abnormal Intake Structure level, as indicated by **EITHER**:
   - **> 6.0 ft. MSL** (> 4.90 psig on PI-533-1172 and PI-533-1173 or > 6.0 ft MSL on CR-423-11 pt 24 and pt 23).

     OR
   - **≤ -4.0 ft. MSL** (≤ 0.50 psig on PI-533-1172 and PI-533-1173 or ≤ -4.0 ft MSL on CR-423-11 pt 24 and pt 23).

     MSL = Mean Sea Level

HU4 Natural or destructive phenomena affecting the PROTECTED AREA. 1 2 3 4 D

EAL Threshold Values:

1. Seismic event as indicated by any **TWO** of the following:
   - Seismic event confirmed by station seismic monitor procedure.

     OR
   - Earthquake felt in plant.

     OR
   - National Earthquake Center.

   OR

2. **EITHER** of the following occurring within the PROTECTED AREA boundary:
   - Tornado strike

     OR
   - Sustained **(> 15 minutes)** high winds **> 99 mph**

   OR

3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

   OR

4. Flooding in any Table H3 area that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

   OR

5. Abnormal Intake Structure level, as indicated by **EITHER**:
   - **> 4.5 ft. MSL** (> 4.25 psig on PI-533-1172 and PI-533-1173 or > 4.5 ft MSL on CR-423-11 pt 24 and pt 23).

     OR
   - **≤ -3.0 ft. MSL** (≤ 0.95 psig on PI-533-1172 and PI-533-1173 or ≤ -3.0 ft MSL on CR-423-11 pt 24 and pt 23).

     MSL = Mean Sea Level

Modes: 1 – Power Operation, 2 – Hot Shutdown, 3 – Cold Shutdown, 4 – Refueling, D – Defueled

Table OCGS 3-1: Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Plant Safety				
Toxic / Flammable Gas	**Table H2 - Vital Areas** • Reactor Bldg • 4160V Switchgear Rooms (1C & 1D) • Control Room Complex (MOB, Upper and Lower Cable Spreading Rooms) • Main Transformer/Condensate Transfer Pad • Intake Structure • #1 EDG Vault • #2 EDG Vault • EDG Fuel Oil Storage Tank		**HA5** Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor. 1 2 3 4 D **EAL Threshold Values:** **Note:** If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event. Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.	**HU5** Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS. 1 2 3 4 D **EAL Threshold Values:** 1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS. **OR** 2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.
Judgment	**HG6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY. 1 2 3 4 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**HS6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY. 1 2 3 4 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	**HA6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an ALERT. 1 2 3 4 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**HU6** Other conditions existing which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT. 1 2 3 4 D **EAL Threshold Values:** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Modes: 1 – Power Operation, 2 – Hot Shutdown, 3 – Cold Shutdown, 4 – Refueling, D – Defueled

Table OCGS 3-1: Emergency Action Level (EAL) Matrix

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
ISFSI MALFUNCTION				
ISFSI				**E-HU1** Damage to a loaded cask CONFINEMENT BOUNDARY 1 2 3 4 D **EAL Threshold Values:** Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**.

Modes: 1 – Power Operation, 2 – Hot Shutdown, 3 – Cold Shutdown, 4 – Refueling, D – Defueled

Table OCGS 3-2 OCGS EAL Technical Basis

Emergency Action Level Technical Basis Page Index

General		Site Area		Alert		Unusual Event	
EAL	Pg.	EAL	Pg.	EAL	Pg.	EAL	Pg.
RG1	3-29	RS1	3-32	RA1	3-35	RU1	3-38
				RA2	3-41	RU2	3-44
				RA3	3-47	RU3	3-48
FG1	3-50	FS1	3-51	FA1	3-52	FU1	3-53

Fuel Clad		RCS		Containment	
FC1	3-54				
FC2	3-55	RC2	3-59	CT2	3-66
		RC3	3-60	CT3	3-67
		RC4	3-61		
FC5	3-57	RC5	3-64	CT5	3-69
				CT6	3-70
FC7	3-58	RC7	3-65	CT7	3-73

MG1	3-74	MS1	3-76	MA1	3-78	MU1	3-80
MG2	3-81	MS2	3-83	MA2	3-84	MU2	3-85
		MS3	3-86				
		MS4	3-87	MA4	3-90	MU4	3-92
						MU5	3-94
						MU6	3-95
						MU7	3-97
				CA1	3-98	CU1	3-99
						CU2	3-101
						CU3	3-102
						CU4	3-103
				CA5	3-105	CU5	3-108
CG6	3-110	CS6	3-113	CA6	3-116	CU6	3-118
						CU7	3-119
HG1	3-122	HS1	3-124	HA1	3-126	HU1	3-128
		HS2	3-131	HA2	3-133		
				HA3	3-134	HU3	3-137
				HA4	3-140	HU4	3-145
				HA5	3-149	HU5	3-151
HG6	3-153	HS6	3-154	HA6	3-155	HU6	3-156
						E-HU1	3-157

Table OCGS 3-2 OCGS EAL Technical Basis
RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RG1

Initiating Condition

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Values

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**:

Table R1 – Effluent Monitor Thresholds	
	General Emergency
Main Stack RAGEMS	4.0 E+01 μCi/cc HRM **OR** 1.6 E-08 amps HRM
Turbine Building RAGEMS	5.0 E-01 μCi/cc HRM

HRM = High Range Monitor

OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:

   a. **> 1000 mRem TEDE**

   OR

   b. **> 5000 mRem CDE Thyroid**

Table OCGS 3-2 OCGS EAL Technical Basis
RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RG1 (cont)

EAL Threshold Values: (cont)

OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **> 1000 mR/hr** are expected to continue for **≥ 60 minutes**.

   OR

   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed the EPA Protective Action Guides (PAGs). Public protective actions will be necessary. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public and likely involve fuel damage.

While these failures are addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

Table OCGS 3-2 OCGS EAL Technical Basis
RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RG1 (cont)

Basis (cont):

Threshold #1 Basis:

Amp readings for the Main Stack RAGEMS HRM instrument are read on Panel 1R (MCR).

The site-specific monitors listed include effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading threshold is not, the results from dose assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency-implementing procedures call for the timely performance of dose assessments using actual meteorology and release information. If the results of dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading threshold.

Threshold #2 Basis:

The “site boundary” is the nearest distance from potential release points at which protective actions would be required for members of the public.

Threshold #3 Basis:

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. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption on sample media followed by field analysis are used for determining the iodine (CDE) thyroid value.

Basis: (References)

1. EP-AA-110-200, Dose Assessment
2. EP-AA-110-201, On Shift Dose Assessment
3. NEI 99-01, Rev. 5 AG1
4. EP-EAL-0610, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values, Oyster Creek Generating Station
5. BNE Correspondence dated February 1, 2007

Table OCGS 3-2 OCGS EAL Technical Basis
RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RS1

Initiating Condition

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Values

NOTE: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**:

Table R1 – Effluent Monitor Thresholds	
	Site Area Emergency
Main Stack RAGEMS	4.0 E+00 μCi/cc HRM **OR** 1.6 E-09 amps HRM
Turbine Building RAGEMS	2.51 E+05 cpm LRM

HRM = High Range Monitor LRM = Low Range Monitor

OR

2. Dose assessment using actual meteorology indicates doses at or beyond the Site Boundary of **EITHER**:

   a. **> 100 mRem TEDE**

   OR

   b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond Site Boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **> 100 mR/hr** are expected to continue for **≥ 60 minutes**.

   OR

   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

Table OCGS 3-2 OCGS EAL Technical Basis
RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RS1 (cont)

Basis

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed 10% of the EPA Protective Action Guides (PAGs). Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

While these failures are addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

Threshold #1 Basis:

Amp readings for the Main Stack RAGEMS HRM instrument are read on Panel 1R (MCR).

The site specific monitors listed include effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading threshold is not, the results from dose assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency-implementing procedures call for the timely performance of dose assessments using actual meteorology and release information. If the results of dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading threshold.

Threshold #2 Basis:

The "site boundary" is the nearest distance from potential release points at which Protective Actions would be required for members of the public.

Table OCGS 3-2 OCGS EAL Technical Basis
RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RS1 (cont)

Basis

Threshold #3 Basis:

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. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption on sample media followed by field analysis are used for determining the iodine (CDE) thyroid value.

Basis: (References)

1. EP-MA-110-200, Dose Assessment
2. EP-MA-110-201, On Shift Dose Assessment
3. NEI 99-01, Rev. 5 AS1
4. EP-EAL-0610, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values, Oyster Creek Generating Station
5. BNE Correspondence dated February 1, 2007

Table OCGS 3-2 OCGS EAL Technical Basis
RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA1

Initiating Condition

Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Values

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors **> 200 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 15 minutes**:

   - Radwaste Overboard Discharge effluent monitor

   OR

   - Discharge Permit specified monitor

   OR

2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**.

Table R1 – Effluent Monitor Thresholds	
	Alert
Main Stack RAGEMS	1.93 E+00 μCi/cc HRM **OR** 7.8 E-10 amps HRM
Turbine Building RAGEMS	8.11E+04 cpm LRM

HRM = High Range Monitor LRM = Low Range Monitor

OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 200 times ODCM Limit** with a release duration of **≥ 15 minutes**.

Table OCGS 3-2 OCGS EAL Technical Basis
RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA1 (cont)

Basis

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses an actual or substantial potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in RU1 and RA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases are not to be prorated or averaged. For example, a release exceeding 600 times ODCM for 5 minutes does not meet the threshold

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

Threshold #1 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

The effluent monitors listed are those normally used for planned discharges. If a discharge is performed using a different flowpath or effluent monitor other than those listed (e.g., a portable or temporary effluent monitor), then the declaration criteria will be based on the monitor specified in the Discharge Permit.

Table OCGS 3-2 OCGS EAL Technical Basis
RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA1 (cont)

Basis (cont):

Threshold #2 Basis:

Amp readings for the Main Stack RAGEMS HRM instrument are read on Panel 1R (MCR).

This threshold is intended for effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

Threshold #3 Basis:

This threshold addresses uncontrolled releases that are detected by sample analyses, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

Basis: (References)

1. CY-OC-170-301, Offsite Dose Calculation Manual for Oyster Creek
2. EP-EAL-0610, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values, Oyster Creek Generating Station
3. NEI 99-01, Rev. 5 AA1
4. ABN-27, Inadvertent Overboard Radioactive Release or Cross Contamination

Table OCGS 3-2 OCGS EAL Technical Basis
RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU1

Initiating Condition

Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Value

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the following effluent monitors **> 2 times alarm setpoint** established by a current radioactivity discharge permit for **≥ 60 minutes**:

   - Radwaste Overboard Discharge effluent monitor

   OR

   - Discharge Permit specified monitor

OR

2. VALID reading on any Table R1 Effluent Monitor **> Table R1 value** for **≥ 60 minutes**.

Table R1 – Effluent Monitor Thresholds	
	Unusual Event
Main Stack RAGEMS	7.92 E+03 cps LRM
Turbine Building RAGEMS	8.11E+02 cpm LRM

LRM = Low Range Monitor

OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Table OCGS 3-2 OCGS EAL Technical Basis
RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU1 (cont)

Basis

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses a potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in RU1 and RA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases are not to be prorated or averaged. For example, a release exceeding 4 times ODCM for 30 minutes does not meet the threshold.

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

Threshold #1 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

The effluent monitors listed are those normally used for planned discharges. If a discharge is performed using a different flowpath or effluent monitor other than those listed (e.g., a portable or temporary effluent monitor), then the declaration criteria will be based on the monitor specified in the Discharge Permit.

Table OCGS 3-2 OCGS EAL Technical Basis
RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU1 (cont)

Basis (cont):

Threshold #2 Basis:

This threshold addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL.

This threshold is intended for effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

Threshold #3 Basis:

This threshold addresses uncontrolled releases that are detected by sample analyses, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

Basis: (References)

1. CY-OC-170-301, Offsite Dose Calculation Manual for Oyster Creek
2. EP-EAL-0610, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values, Oyster Creek Generating Station
3. NEI 99-01, Rev. 5 AU1
4. ABN-27, Inadvertent Overboard Radioactive Release or Cross Contamination

Table OCGS 3-2 OCGS EAL Technical Basis
RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA2

Initiating Condition

Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Values

1. VALID reading **> 1000 mR/hr** on any Table R2 Radiation Monitor due to **EITHER**:

   - Damaged irradiated fuel.

     OR

   - Water level drop.

Table R2 – Refuel Floor ARMs
• C-5, Crit Mon
• C-10, North Wall
• C-9, North Wall
• B-9, Open Floor

   OR

2. Water level drop in the Reactor Cavity or Spent Fuel Pool that will result in irradiated fuel becoming uncovered.

Basis

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

This EAL addresses increases in radiation dose rates within plant buildings, and may be a precursor to a radioactivity release to the environment. These events represent a loss of control over radioactive material and represent an actual or substantial potential degradation in the level of safety of the plant.

Table OCGS 3-2 OCGS EAL Technical Basis
RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA2 (cont)

Basis (cont)

These events escalate from RU2 in that fuel activity has been released, or is anticipated due to fuel heatup. This EAL applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage.

Threshold #1 Basis:

This EAL addresses radiation monitor indications of fuel uncovery and/or fuel damage.

Uncovering spent fuel represents a substantial degradation of the level of safety of the plant and warrants an Alert classification. Visual observation of spent fuel uncovery represents a major ALARA concern in that radiation levels could exceed 10,000 R/hr on the refuel bridge when fuel uncovery begins. The value of 1000 mR/hr was conservatively chosen for classification purposes.

Radiation monitor readings are used to provide indication of fuel uncovery and/or fuel damage. High monitor readings associated with the transfer or relocation of a source, stored in or near the pool or readings responding to a planned evolution such as removal of the reactor head or equipment relocation are not classified under this threshold since the reading would not be indicative of fuel uncovery and/or fuel damage.

Dropping heavy loads onto the spent fuel can cause significant damage to the spent fuel and an Alert is also warranted under these conditions provided that the above radiation monitor threshold readings are reached.

Escalation of this emergency classification level, if appropriate, would be based on RS1 or RG1.

Threshold #2 Basis:

Once Spent Fuel Pool water level drops below the low level alarm setpoint, further drops can be monitored only by visual observation unless the Spent Fuel Pool is in communication with the Refueling Cavity.

If available, video cameras may allow remote observation. Depending on available level instrumentation, the declaration threshold may need to be based on indications of water makeup rate.

Table OCGS 3-2 OCGS EAL Technical Basis
RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA2 (cont)

Basis Reference(s):

1. RAP G-7-a, SKM SRG TNK LVL LO-LO
2. NEI 99-01, Rev. 5 AA2
3. RAP-10F-1-m, Crit Mon C5 Hi
4. RAP-10F-3-m, North Wall C9 Hi Vent Trip
5. RAP-10F-2-m, North Wall C10 Hi
6. RAP-10F-4-m, North Wall B9 Hi Vent Trip

Table OCGS 3-2 OCGS EAL Technical Basis
RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU2

Initiating Condition

UNPLANNED rise in plant radiation levels.

Operating Mode Applicability

1, 2, 3, 4, D

EAL Threshold Value

1. a. UNPLANNED water level drop in the Reactor Cavity, Spent Fuel Pool or Fuel Transfer Canal as indicated by:
   - Reactor Cavity water level **< 583 inches** (GEMAC Wide Range, floodup calibration).

     OR

   - Report of visual observation of a drop in water level in the Reactor Cavity or Spent Fuel Pool.

   AND

   b. VALID Area Radiation Monitor reading rise on one or more radiation monitor in Table R2.

Table R2 – Refuel Floor ARMs
• C-5, Crit Mon
• C-10, North Wall
• C-9, North Wall
• B-9, Open Floor

   OR

2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate rise by a factor of **1000** over NORMAL LEVELS.

Basis

VALID: An indication, report, or condition, is considered to be VALID when it is 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.

Table OCGS 3-2 OCGS EAL Technical Basis
RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU2 (cont)

Basis (cont)

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

NORMAL LEVELS: Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

This EAL addresses increased radiation levels as a result of water level decreases above irradiated fuel or events that have resulted, or may result, in UNPLANNED increases in radiation dose rates within plant buildings. These radiation increases represent a loss of control over radioactive material and represent a potential degradation in the level of safety of the plant.

Threshold #1 Basis:

Level indications may include installed or temporary water level instrumentation. If available, video cameras may allow remote observation for determining water level changes.

This EAL addresses unplanned lowering of level in the refueling pathway and a corresponding rise in refuel floor radiation readings. For events in Refuel mode where the water level drops with no corresponding rise in refuel floor radiation readings classification would be via CU7. This event escalates to an Alert per RA2 if irradiated fuel outside the reactor vessel is uncovered.

Threshold #2 Basis:

This EAL addresses increases in plant radiation levels that represent a loss of control of radioactive material resulting in a potential degradation in the level of safety of the plant.

This EAL excludes radiation level increases that result from planned activities such as use of radiographic sources and movement of radioactive waste materials. A specific list of ARMs is not required, as it would restrict the applicability of the threshold. The intent is to identify loss of control of radioactive material in any monitored area. Survey results are not required for confirmation of area radiation monitor readings but are applicable to areas where area radiation monitors do not have sufficient range to indicate a rise by a factor of 1000 over NORMAL LEVELS.

Table OCGS 3-2 OCGS EAL Technical Basis
RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU2 (cont)

Basis (References)

1. RP-AA-203 Exposure Control and Authorization
2. RAP-G-7-a, SKM SRG TNK LVL LO-LO
3. 205.94.0 RPV Floodup Using Core Spray
4. 205.95.0 Reactor Flood-up / Drain-down
5. FSAR Figure 7.6-3
6. NEI 99-01, Rev. 5 AU2

Table OCGS 3-2 OCGS EAL Technical Basis
RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RA3

Initiating Condition

Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Values

Dose rate **> 15 mR/hr** in **ANY** area requiring continuous occupancy (Table R3) to maintain plant safety functions.

Table R3 - Areas Requiring Continuous Occupancy
• Main Control Room • Central Alarm Station (by survey)

Basis

This EAL addresses increased radiation levels that impact continued operation in areas requiring continuous occupancy to maintain safe operation or to perform a safe shutdown.

The cause and/or magnitude of the increase in radiation levels is not a concern of this EAL. The Emergency Director must consider the source or cause of the increased radiation levels and determine if any other EAL may be involved.

Areas requiring continuous occupancy include Main Control Room and the Central Alarm Station (CAS).

Basis (References):

1. ABN-29, Plant Fires
2. EMG-3200.11, Secondary Containment Control
3. NEI 99-01, Rev. 5 AA3

Table OCGS 3-2 OCGS EAL Technical Basis
RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU3

Initiating Condition

Fuel Clad Degradation.

Operating Mode Applicability:

1, 2

EAL Threshold Values

Fuel clad degradation resulting in **EITHER**:

- Offgas system radiation monitor **HI-HI** alarm.

  OR

- Coolant activity **> 4.0 µCi/gm** Dose Equivalent I-131.

Basis:

This EAL is included because it is a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant.

Escalation of this EAL to the Alert level is via the Fission Product Barriers.

Threshold #1 Basis:

Conditions that cause the monitor to alarm that are not related to fuel clad degradation should not result in the declaration of an Unusual Event.

This threshold addresses site-specific radiation monitor readings that provide indication of a degradation of fuel clad integrity.

Threshold #2 Basis:

An Unusual Event is only warranted when actual fuel clad damage is the cause of the elevated coolant sample (as determined by laboratory confirmation). Fuel clad damage should be assumed to be the cause of elevated Reactor Coolant activity unless another cause is known.

This threshold addresses coolant samples exceeding coolant technical specifications for transient iodine spiking limits.

Table OCGS 3-2 OCGS EAL Technical Basis
RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

RU3 (cont)

Basis (References)

1. ABN-26, High Main Steam Line or Off Gas Activity
2. RAP10F-1-c, Offgas HI-HI
3. Technical Specifications 3.6.A
4. NEI 99-01, Rev. 5 SU4

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FG1

Initiating Condition

Loss of ANY two barriers AND Loss or Potential Loss of third barrier.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss Threshold Values to determine barrier status.

Basis:

Fuel Cladding, RCS and Primary Containment comprise the fission product barriers.

At the General Emergency classification level each barrier is weighted equally.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FS1

Initiating Condition

Loss or Potential Loss of ANY two barriers.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss Threshold Values to determine barrier status.

Basis

Fuel Cladding, RCS and Primary Containment comprise the fission product barriers.

At the Site Area Emergency classification level, each barrier is weighted equally.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FA1

Initiating Condition

ANY Loss or ANY Potential Loss of EITHER Fuel Clad OR RCS.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss Threshold Values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the Alert classification level, Fuel Cladding and RCS barriers are weighted more heavily than the Containment barrier. Unlike the Containment barrier, loss or potential loss of either the Fuel Cladding or RCS barrier may result in the relocation of radioactive materials or degradation of core cooling capability. Note that the loss or potential loss of Containment barrier in combination with loss or potential loss of either Fuel Cladding or RCS barrier results in declaration of a Site Area Emergency under EAL FS1.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FU1

Initiating Condition

ANY Loss or ANY Potential Loss of Containment.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

Refer to Fission Product Barrier Loss and Potential Loss Threshold Values to determine barrier status.

Basis:

The Primary Containment Barrier includes the drywell, respective interconnecting paths, and other connections up to and including the outermost containment isolation valves. Containment Barrier thresholds are used primarily as discriminators for escalation from an Alert to a Site Area Emergency or a General Emergency.

The Containment Barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (i.e., Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment Barrier status is addressed by Technical Specifications.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FC1

Initiating Condition

Primary Coolant Activity Level

Operating Mode Applicability:

1, 2

EAL Threshold Value

LOSS:

Coolant Activity **> 300 µCi/gm** Dose Equivalent I-131.

Basis:

300 uCi/gm Dose Equivalent I-131 is well above that expected for iodine spikes and corresponds to less than 5% fuel clad damage. This amount of radioactivity indicates significant clad damage and thus the Fuel Clad Barrier is considered lost.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FC2

Initiating Condition

Reactor Vessel Water Level

Operating Mode Applicability:

1, 2

EAL Threshold Value

LOSS:

1. RPV level **cannot** be restored and maintained **> - 20 inches TAF**

POTENTIAL LOSS:

2. RPV level **cannot** be restored and maintained **> 0 inches TAF.**

   OR

3. RPV level **cannot** be determined.

Basis:

Determination of "restore and maintained" is based on the actions driven by Emergency Operating Procedures to restore level. The inability to reverse the RPV level lowering trend after lining up injection sources and injecting, including the use of low pressure systems following an Emergency Depressurization would warrant classification.

Loss Threshold #1 Basis:

This corresponds to the level used in EOPs to indicate challenge of core cooling.

Potential Loss Thresholds #2 and #3 Basis:

This threshold is the same as the RCS barrier Loss threshold and corresponds to the water level at the top of the active fuel. Thus, this threshold indicates a Potential Loss of the Fuel Clad barrier and a Loss of RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

Since the loss of ability to determine if adequate core cooling is being provided presents a significant challenge to the fuel clad barrier, a potential loss of the fuel clad barrier is specified.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FC2 (cont)

Basis Reference(s):

1. EMG-3200.01A, RPV Control – No ATWS
2. EMG-3200.01B, RPV Control – With ATWS
3. EMG-3200.08A, RPV Flooding – No ATWS
4. EMG-3200.08B, RPV Flooding – With ATWS
5. EMG-3200.02, Primary Containment Control
6. NEI 99-01, Rev. 5 Table 5-F-2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FC5

Initiating Condition

Primary Containment Radiation Monitoring

Operating Mode Applicability:

1, 2

EAL Threshold value

LOSS:

Containment Hi Range Radiation Monitoring System (CHRRMS) reading **> 530 R/hr**.

Basis:

The Containment Hi Range Radiation monitor reading is a value, which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the drywell.

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 Loss threshold. Thus, this threshold indicates a loss of both Fuel Clad barrier and RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. Core Damage Assessment Methodology (CDAM)
2. NEI 99-01, Rev. 5 Table 5-F-2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

FC7

Initiating Condition

Emergency Director Judgment

Operating Mode Applicability:

1, 2

EAL Threshold Value

LOSS:

1. Any condition in the opinion of the Emergency Director that indicates a Loss of the Fuel Clad Barrier.

POTENTIAL LOSS:

2. Any condition in the opinion of the Emergency Director that indicates a Potential Loss of the Fuel Clad Barrier.

Basis:

These thresholds address 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 threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC2

Initiating Condition

Reactor Vessel Water Level

Operating Mode Applicability

1, 2

EAL Threshold Value

LOSS:

1. RPV level **cannot** be restored and maintained **> 0 inches TAF.**

   OR

2. RPV level **cannot** be determined.

Basis:

Determination of "restore and maintained" is based on the actions driven by Emergency Operating Procedures to restore level. The inability to reverse the RPV level lowering trend after lining up injection sources and injecting, including the use of low pressure systems following an Emergency Depressurization would warrant classification.

This threshold is the same as Fuel Clad Barrier Potential Loss threshold and corresponds to a challenge to core cooling. Thus, this threshold indicates a Loss of RCS barrier and Potential Loss of Fuel Clad barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. 2000-GLN-3200.01, Plant Specific Technical Guideline
2. 2000-BAS-3200.02, EOP Users Guide
3. NEI 99-01, Rev. 5 Table 5-F-2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC3

Initiating Condition

Primary Containment Conditions

Operating Mode Applicability

1, 2

EAL Threshold Value

LOSS:

1. Drywell pressure **> 3.0 psig.**

   AND

2. Drywell pressure rise due to RCS leakage.

Basis:

The primary containment pressure is based on the drywell high pressure set point which indicates a LOCA by automatically initiating ECCS.

The second threshold focuses the fission product barrier loss threshold on a failure of the RCS instead of the non-LOCA malfunctions that may adversely affect primary containment pressure. Pressures of this magnitude can be caused by non-LOCA events such as a loss of drywell cooling or inability to control primary containment vent/purge.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. EMG-3200.01A, RPV Control – No ATWS
2. EMG-3200.02, Primary Containment Control
3. 2000-BAS-3200.02, EOP User's Guide
4. NEI 99-01, Rev. 5 Table 5-F-2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC4

Initiating Condition

RCS Leak Rate

Operating Mode Applicability

1, 2

EAL Threshold Value

LOSS:

1. UNISOLABLE Main Steam Line (MSL), Isolation Condenser, Feedwater, or RWCU line break.

   OR

2. Emergency RPV Depressurization is required.

POTENTIAL LOSS:

3. RCS leakage **> 50 gpm** inside the Drywell.

   OR

4. UNISOLABLE primary system leakage outside drywell resulting in **EITHER:**

   - Secondary Containment area temperatures **> EMG-3200.11 Max Normal** (Table 11) operating level.

     OR

   - Secondary Containment area radiation levels **> EMG-3200.11 Max Normal** (Table 12) operating level.

Basis:

UNISOLABLE – is a breach or leak that cannot be promptly isolated.

Promptly allows for actions to be taken to isolate the leak. Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC4 (cont)

Basis (cont)

Classification of a system break over system leakage is based on information available to the Control Room from the event. Indications that should be considered are:

- Reports describing magnitude of steam or water release.
- Use of system high flow alarms / indications, if available,
- Significant changes in makeup requirements,
- Abnormal reactor water level changes in response to the event.

The use of the above indications provides the Control Room the bases to determine that the on going event is more significant than the indications that would be expected from system leakage and therefore should be considered a system break.

Loss Thresholds #1 Basis:

An UNISOLABLE MSL break is a breach of the RCS barrier. Thus, this threshold is included for consistency with the Alert emergency classification level.

Other large high-energy line breaks such as Isolation Condenser, Feedwater, or RWCU, that are UNISOLABLE also represent a significant loss of the RCS barrier and should be considered for purposes of classification.

Loss Thresholds #2 Basis:

Plant symptoms requiring Emergency RPV Depressurization per the EOPs are indicative of a loss of the RCS barrier. If Emergency RPV depressurization is required, the plant operators are directed to open electromatic relief valves (EMRVs) and keep them open. Even though the RCS is being vented into the torus, a loss of the RCS should be considered to exist due to the diminished effectiveness of the RCS pressure barrier to a release of fission products beyond its boundary.

Potential Loss Threshold #3 Basis:

This threshold is based on leakage 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 uncovery is not a significant concern for a 50 gpm leak, however, break propagation leading to significantly larger loss of inventory is possible.

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

If primary system leak rate information is unavailable, other indicators of RCS leakage should be used.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC4 (cont)

Basis (cont)

Potential Loss Threshold #4 Basis:

Potential loss of RCS based on primary system leakage outside the primary containment is determined from site specific temperature or area radiation Maximum Normal setpoints in the areas of the trunnion room, isolation condensers, main turbine generator, etc., which indicate a direct path from the RCS to areas outside primary containment.

The indicators reaching the threshold values and confirmed to be caused by unisolable RCS leakage warrant an Alert classification. An unisolable leak which is indicated by a Maximum Safe setpoint escalates to a Site Area Emergency when combined with Containment Barrier Loss threshold (after a containment isolation) and a General Emergency when the Fuel Clad Barrier criteria is also exceeded.

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.

Basis Reference(s):

1. EMG-3200.11, Secondary Containment Control
2. 2000-GLN-3200.01, Plant Specific Technical Guideline
3. NEI 99-01, Rev. 5 Table 5-F-2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC5

Initiating Condition

Primary Containment Radiation Monitoring

Operating Mode Applicability

1, 2

EAL Threshold Value

LOSS:

Containment Hi Range Radiation Monitoring System (CHRRMS) reading **> 100 R/hr.**

Basis:

The Drywell Radiation monitor reading is a value, which indicates the release of reactor coolant to the primary containment.

This reading is less than that specified for Fuel Clad barrier Loss. Thus, this threshold would be indicative of a RCS leak only. If the radiation monitor reading increased to that value specified by Fuel Clad Barrier threshold, fuel damage would also be indicated.

There is no Potential Loss threshold associated with this item.

Basis Reference(s):

1. EP-EAL-0611, Criteria for Choosing Containment Radiation Monitor Reading Indicative of Loss of RCS Barrier
2. NEI 99-01, Rev. 5 Table 5-F-2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

RC7

Initiating Condition

Emergency Director Judgment

Operating Mode Applicability

1, 2

EAL Threshold Value

LOSS:

1. Any condition in the opinion of the Emergency Director that indicates a Loss of the Reactor Coolant System Barrier.

POTENTIAL LOSS:

2. Any condition in the opinion of the Emergency Director that indicates a Potential Loss of the Reactor Coolant System Barrier.

Basis:

These thresholds address 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 threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

Basis Reference(s):

1. NEI 99-01, Rev. 5 Table 5-F-2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT2

Initiating Condition

Reactor Vessel Water Level

Operating Mode Applicability

1, 2

EAL Threshold Value

POTENTIAL LOSS:

Plant conditions indicate that Primary Containment flooding is required.

Basis:

There is no Loss threshold associated with this item.

The potential loss requirement for Primary Containment Flooding indicates adequate core cooling cannot be established and maintained and that core melt is possible. Entry into Severe Accident Management Guidelines is a logical escalation in response to the inability to maintain adequate core cooling.

The condition in this potential loss threshold represents a potential core melt sequence which, if not corrected, could lead to vessel failure and increased potential for containment failure. In conjunction with Reactor Vessel water level “Loss” thresholds in the Fuel Clad and RCS barrier columns, this threshold will result in the declaration of a General Emergency -- loss of two barriers and the potential loss of a third.

Basis Reference(s):

1. EMG-3200.01A, RPV Control – No ATWS
2. EMG-3200.01B, RPV Control – With ATWS
3. EMG-3200.08A, RPV Flooding – No ATWS
4. EMG-3200.08B, RPV Flooding – With ATWS
5. EMG-3200.02, Primary Containment Control
6. NEI 99-01, Rev. 5 Table 5-F-2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT3

Initiating Condition

Primary Containment Conditions

Operating Mode Applicability

1, 2

EAL Threshold Value

LOSS:

1. Rapid unexplained drop in Drywell pressure following an initial pressure rise.

   OR

2. Drywell pressure response **not** consistent with LOCA conditions.

POTENTIAL LOSS:

3. Drywell pressure **> 44 psig** and rising.

   OR

4. a. Drywell or Torus Hydrogen concentration **≥ 6%.**

      AND

   b. Drywell or Torus Oxygen concentration **≥ 5%.**

   OR

5. Heat Capacity Temperature Limit (EMG-3200.02 Fig. F) exceeded.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT3 (cont)

Basis: (cont)

Loss Threshold #1 and #2 Basis

Rapid unexplained drop in pressure (i.e., not attributable to drywell spray or condensation effects) following an initial pressure rise from a high energy line break indicates a loss of containment integrity. Primary containment pressure should rise as a result of mass and energy release into containment from a LOCA. Thus, primary containment pressure not rising under these conditions indicates a loss of containment integrity.

This indicator relies on operator recognition of an unexpected response for the condition and therefore does not have a specific value associated with it. The unexpected response is important because it is the indicator for a containment breach condition.

Potential Loss Threshold #3 Basis:

Drywell pressure is based on the primary containment design pressure.

Potential Loss Threshold #4 Basis:

Explosive mixtures in the primary containment are assumed to be elevated concentrations of hydrogen and oxygen.

Potential Loss Threshold #5 Basis:

The Heat Capacity Temperature Limit HCTL is a function of RPV pressure, torus temperature and water level. It is utilized to preclude failure of the containment and equipment in the containment necessary for the safe shutdown of the plant and therefore, the inability to maintain plant parameters below the limit constitutes a potential loss of containment.

Basis Reference(s):

1. EMG-3200.02 Primary Containment Control
2. FSAR Update 6.2.1.1.3
3. Technical Specifications 5.2 Basis
4. NEI 99-01, Rev. 5 Table 5-F-2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT5

Initiating Condition

Primary Containment Radiation Monitoring

Operating Mode Applicability

1, 2

EAL Threshold Value

POTENTIAL LOSS:

Containment Hi Range Radiation Monitor System (CHRRMS) reading **> 1210 R/hr**.

Basis

The Containment Hi Range Radiation monitor reading is a value that indicates significant fuel damage well in excess of that required for loss of RCS and Fuel Clad.

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.

There is no Loss threshold associated with this item.

Basis Reference(s):

1. Core Damage Assessment Methodology
2. NEI 99-01, Rev. 5 Table 5-F-2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT6

Initiating Condition

Primary Containment Isolation Failure or Bypass

Operating Mode Applicability

1, 2

EAL Threshold Value

LOSS:

1. a. Failure of isolation valves in any one line to close.

   AND

   b. Direct downstream pathway to the environment exists after a primary containment isolation signal.

   OR

2. Intentional venting/purging of Primary Containment per EOPs or SAMGs due to accident conditions.

   OR

3. UNISOLABLE primary system leakage outside of drywell resulting in **EITHER:**

   - Secondary Containment area temperatures **> EMG-3200.11 Max Safe** (Table 11) operating level.

     OR

   - Secondary Containment area radiation levels **> EMG-3200.11 Max Safe** (Table 12) operating level.

Basis:

UNISOLABLE – is a breach or leak that cannot be promptly isolated.

Promptly allows for actions to be taken to isolate the leak. Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

These thresholds address incomplete containment isolation that allows direct release to the environment.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT6 (cont)

Basis: (cont)

Loss Threshold #1 Basis

This threshold addresses failure of open isolation devices, which should close upon receipt of a manual or automatic containment isolation signal resulting in a significant radiological release pathway to the environment. The concern is the unisolable open pathway to the environment. A failure of the ability to isolate any one line indicates a breach of primary containment integrity.

Failure of containment isolation valves to isolate with a downstream pathway to the environment following an automatic or manual isolation signal is only a concern during an event requiring mitigation by the Primary Containment barrier. If this condition exists during normal Power Operation, a Technical Specification Action Statement will address it. However, during events requiring Primary Containment integrity, this will represent a breach of Primary Containment.

The use of the modifier “direct” in defining the release path discriminates against release paths through interfacing liquid systems. The existence of an in–line charcoal filter does not make a release path indirect since the filter is not effective at removing fission product noble gases. Typical filters have an efficiency of 95-99% removal of iodine. Given the magnitude of the core inventory of iodine, significant releases could still occur. In addition, since the fission product release would be driven by boiling in the reactor vessel, the high humidity in the release stream can be expected to render the filters ineffective in a short period.

Leakage into a closed system is to be considered only if the closed system is breached and thereby creates a significant pathway to the environment. Examples include unisolable Main Steamline, Isolation Condenser line breaks, unisolable RWCU system breaks, and unisloable containment atmosphere vent paths. Minor release paths such as instrument and sample lines are not considered under this threshold.

Examples of “downstream pathway to the Environment” could be through Turbine/Condenser, or direct release to the Turbine or Reactor Building.

Loss Threshold #2 Basis:

EOPs may direct containment isolation valve logic(s) to be intentionally bypassed, regardless of radioactivity release rates. Under these conditions with a valid containment isolation signal, the containment should also be considered lost if containment venting is actually performed.

Intentional venting of primary containment for primary containment pressure or combustible gas control per EOPs to the secondary containment and/or the environment is considered a loss of containment. Containment venting for pressure control when not in an accident situation should not be considered.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT6 (cont)

Basis: (cont)

Loss Threshold #3 Basis:

The presence of area radiation or temperature above Maximum Safe Operating setpoints indicating unisolable primary system leakage outside the primary containment are addressed after a containment isolation. The indicators should be confirmed to be caused by RCS 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.

There is no Potential Loss threshold associated with this item.

Basis References:

1. EMG-3200.11, Secondary Containment Control
2. 2000-GLN-3200.01, Plant Specific Technical Guideline
3. EMG-3200.02, Primary Containment Control
4. Support Procedures -32, -34, -41, -44
5. 2000-GLN-3200.03, OCNGS Plant Specific Technical Guidelines for Severe Accident Guidelines
6. NEI 99-01, Rev. 5 Table 5-F-2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER

CT7

Initiating Condition

Emergency Director Judgment

Operating Mode Applicability

1, 2

EAL Threshold Value

LOSS:

1. Any condition in the opinion of the Emergency Director that indicates a Loss of the Primary Containment Barrier.

POTENTIAL LOSS:

2. Any condition in the opinion of the Emergency Director that indicates a Potential Loss of the Primary Containment Barrier.

Basis:

These thresholds address any other factors that are to be used by the Emergency Director in determining whether the Containment barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this threshold as a factor in Emergency Director Judgment that the barrier may be considered lost or potentially lost.

The Containment barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment barrier status is addressed by Technical Specifications.

Basis References:

1. NEI 99-01, Rev. 5 Table 5-F-2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG1

Initiating Condition

Prolonged loss of all Off-Site and all On-Site AC power to emergency busses.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to 4160V Buses 1C and 1D.

   AND

2. Failure of EDG-1 and EDG-2 Emergency Diesel Generators to supply power to 4160V Buses 1C and 1D.

   AND

3. a. Restoration of at least one 4160V Bus (1C or 1D) in **< 1 hour** is **not** likely.

      OR

   b. RPV level **cannot** be determined to be **> 0 inches TAF**.

Basis:

Loss of all AC power to emergency busses compromises all plant safety systems requiring electric power including ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all AC power to emergency busses will lead to loss of fuel clad, RCS, and containment, thus warranting declaration of a General Emergency.

This EAL is specified to assure that in the unlikely event of a prolonged station blackout, timely recognition of the seriousness of the event occurs and that declaration of a General Emergency occurs as early as is appropriate, based on a reasonable assessment of the event.

The likelihood of restoring at least one emergency bus should be based on a realistic appraisal of the situation since a delay in an event classification escalation decision based on only a chance of mitigating the event could result in a loss of valuable time in preparing and implementing public protective actions.

In addition, under these conditions, fission product barrier monitoring capability may be degraded.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG1 (cont)

Basis References:

1. OCNGS Drawing BR 3000
2. ABN-36, Loss of Off-Site Power
3. ABN-37, Station Blackout
4. ABN-60, Grid Emergency
5. Regulatory Guide 1.155, Station Blackout
6. TDR-1099, "Station Blackout Evaluation Report"
7. 2000-BAS-3200.02, EOP User's Guide
8. 2000-GLN-3200.01, Plant Specific Technical Guideline
9. NEI 99-01, Rev. 5 SG1

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS1

Initiating Condition

Loss of all Off-Site and all On-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to 4160V Buses 1C and 1D.

   AND

2. Failure of EDG-1 and EDG-2 Emergency Diesel Generators to supply power to 4160V Buses 1C and 1D.

   AND

3. Failure to restore power to at least one 4160V Bus (1C or 1D) in **< 15 minutes** from the time of loss of both offsite and onsite AC power.

Basis:

Loss of all AC power to emergency busses compromises all plant safety systems requiring electric power including ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all AC power to emergency busses will lead to loss of Fuel Clad, RCS, and Containment, thus this event can escalate to a General Emergency.

Fifteen minutes was selected as a threshold to exclude momentary losses of off-site power.

Escalation to General Emergency is via Fission Product Barrier Degradation or MG1, "Prolonged Loss of All Off-site Power and Prolonged Loss of All On-site AC Power."

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS1 (cont)

Basis References)

1. OCNGS Drawing BR 3000
2. ABN-36, Loss of Off-Site Power
3. ABN-37, Station Blackout
4. ABN-60, Grid Emergency
5. NEI 99-01, Rev. 5 SS1

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA1

Initiating Condition

AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. AC power capability to 4160V Buses 1C and 1D reduced to only one of the following power sources for **≥ 15 minutes.**

   - Startup Transformer SA
   - Startup Transformer SB
   - EDG-1 Emergency Diesel Generator
   - EDG-2 Emergency Diesel Generator

   AND

2. Any additional single power source failure will result in a station blackout.

Basis:

Capability: (pertaining to electrical power supplies) is equipment that is available to provide and maintain AC power at the required voltage and frequency for the required load.

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. Another related condition could be the loss of all off-site power and loss of on-site emergency generators with only one train of emergency busses being backfed from the unit main generator, or the loss of on-site emergency generators with only one train of emergency busses being backfed from off-site power. The subsequent loss of this single power source would escalate the event to a Site Area Emergency in accordance with MS1.

Fifteen minutes was selected as a threshold to exclude momentary losses of power.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA1 (cont)

Basis References:

1. OCNGS Drawing BR 3000
2. ABN-36, Loss of Off-Site Power
3. ABN-37, Station Blackout
4. ABN-60, Grid Emergency
5. NEI 99-01, Rev. 5 SA5

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU1

Initiating Condition

Loss of all Off-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of all off-site AC power to 4160V Buses 1C and 1D for **≥ 15 minutes**.

Basis:

Prolonged loss of off-site 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 to emergency busses.

Fifteen minutes was selected as a threshold to exclude momentary losses of off-site power.

Basis Reference(s):

1. OCNGS Drawing BR 3000
2. ABN-36, Loss of Off-Site Power
3. ABN-60, Grid Emergency
4. NEI 99-01, Rev. 5 SU1

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG2

Initiating Condition

Automatic Scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists.

Operating Mode Applicability:

1

EAL Threshold Values:

1. Automatic scram was **not** successful as indicated by Reactor Power **> 2%.**

   AND

2. Manual scram/ARI actions were **not** successful as indicated by Reactor Power **> 2%.**

   AND

3. **EITHER** of the following exists:

   - RPV level **cannot** be restored and maintained **> - 20 inches TAF**.

     OR

   - Heat Capacity Temperature Limit (EMG-3200.02 Fig. F) exceeded.

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful.

The third condition of this EAL indicates an extreme challenge to the ability to cool the core as indicated when RPV level cannot be restored and maintained above the Minimum Steam Cooling RPV Water Level or a challenge to Containment for energy transfer from the RPV as indicated by exceeding the Heat Capacity Temperature Limit. RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the SAMG program.

In the event either of these challenges exists at a time that the reactor has not been brought below the power associated with the safety system design a core melt sequence exists. In this situation, core degradation can occur rapidly. For this reason, the General Emergency declaration is intended to be anticipatory of the fission product barrier table declaration to permit maximum off-site intervention time.

Determination of “restore and maintained” is based on the actions driven by Emergency Operating Procedures to restore level. The inability to reverse the RPV level lowering trend after lining up injection sources and injecting, including the use of low pressure systems following an Emergency Depressurization would warrant classification.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG2 (cont)

Basis Reference(s):

1. EMG-3200.01A, RPV Control – no ATWS
2. EMG-3200.01B, RPV Control – with ATWS
3. EMG-3200.02, Primary Containment Control
4. 2000-BAS-3200.02, EOP User's Guide
5. 2000-GLN-3200.01, Plant Specific Technical Guideline
6. NEI 99-01, Rev. 5 SG2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS2

Initiating Condition

Automatic Scram fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor.

Operating Mode Applicability:

1

EAL Threshold Values:

1. Automatic scram was **not** successful as indicated by Reactor Power **> 2%.**

   AND

2. Manual scram/ARI actions were **not** successful from the Reactor Console as indicated by Reactor Power **> 2%.**

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful. A Site Area Emergency is warranted because conditions exist that lead to IMMINENT loss or potential loss of both fuel clad and RCS.

Manual actions taken at the reactor control console are any set of actions by the reactor operator(s) at which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

Manual actions are not considered successful if action away from the reactor control console is required to scram the reactor. This EAL is still applicable even if actions taken away from the reactor control console are successful in shutting the reactor down because the design limits of the fuel may have been exceeded or because of the gross failure of the Reactor Protection System to shutdown the plant.

Escalation of this event to a General Emergency would be due to a prolonged condition leading to an extreme challenge to either core-cooling or heat removal.

Basis Reference(s):

1. EMG-3200.01A, RPV Control – no ATWS
2. EMG-3200.01B, RPV Control – with ATWS
3. 2000-BAS-3200.02, EOP User's Guide
4. 2000-GLN-3200.01, Plant Specific Technical Guideline
5. NEI 99-01, Rev. 5 SS2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA2

Initiating Condition

Automatic Scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor.

Operating Mode Applicability:

1

EAL Threshold Values:

1. Automatic scram was **not** successful as indicated by Reactor Power **> 2%.**

   AND

2. Manual scram/ARI actions were successful from Reactor Console as indicated by Reactor Power **≤ 2%.**

Basis:

Manual actions taken at the reactor control console are any set of actions by the reactor operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

This condition indicates failure of the automatic protection system to scram the reactor in response to exceeding reactor protective system setpoints during a plant transient. Associated RPS instrument failures during non-transient plant conditions would be addressed by Technical Specifications. This condition is more than a potential degradation of a safety system in that a front line automatic protection system did not function in response to a plant transient. Thus the plant safety has been compromised because design limits of the fuel may have been exceeded. An Alert is indicated because conditions may exist that lead to potential loss of fuel clad or RCS and because of the failure of the Reactor Protection System to automatically shutdown the plant.

If manual actions taken at the reactor control console fail to shutdown the reactor, the event would escalate to a Site Area Emergency.

Basis Reference(s):

1. EMG-3200.01A, RPV Control – no ATWS
2. EMG-3200.01B, RPV Control – with ATWS
3. 2000-BAS-3200.02, EOP User's Guide
4. 2000-GLN-3200.01, Plant Specific Technical Guideline
5. NEI 99-01, Rev. 5 SA2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU2

Initiating Condition

Inadvertent Criticality.

Operating Mode Applicability:

2

EAL Threshold Values:

UNPLANNED sustained positive period observed on nuclear instrumentation.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL addresses inadvertent criticality events. This EAL excludes inadvertent criticalities that occur during planned reactivity changes associated with reactor startups (e.g., criticality earlier than estimated). This condition can be identified using period monitors. The term “sustained“ is used in order to allow exclusion of expected short term positive periods from planned control rod movements. Escalation would be by the Fission Product Barrier.

This EAL indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU8

2. ABN-7, Unexplained Reactivity Change

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS3

Initiating Condition

Loss of all vital DC power for 15 minutes or longer.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of all vital DC power based on **< 115 VDC** on 125 VDC battery busses B and C for **≥ 15 minutes**.

Basis:

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power will cause core uncovering and loss of containment integrity when there is significant decay heat and sensible heat in the reactor system.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Escalation to a General Emergency would occur by Abnormal Rad Levels/Radiological Effluent, Fission Product Barrier Degradation.

Basis Reference(s):

1. OCNGS Drawing BR 3000
2. ABN-54, Loss of DC Distribution Center B
3. ABN-55, Loss of DC Distribution Center C
4. NEI 99-01, Rev. 5 SS3

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS4

Initiating Condition

Inability to monitor a SIGNIFICANT TRANSIENT in progress.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**
   - Safety System annunciators (Table M1)

     OR

   - Safety System indications (Table M1)

   AND

2. SIGNIFICANT TRANSIENT in progress (Table M2).

   AND

3. Compensatory indications (computer points) are unavailable.

Table M1 – Safety System
• ECCS • Containment Isolation • Reactor Scram • Process/Area Radiation Monitoring

Table M2 – Significant Transients
• Turbine trip • Reactor scram • ECCS actuation • Thermal power change > 25% • Thermal power oscillations > 10 % Reactor Power change

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS4 (cont)

Basis:

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) Turbine Trip (2) Reactor Scram (3) ECCS Actuation, (4) thermal power change >25%, or (5) thermal power oscillations > 10% Reactor Power change.

This EAL is intended to recognize the threat to plant safety associated with the complete loss of capability of the control room staff to monitor plant response to a SIGNIFICANT TRANSIENT.

"Planned" and “UNPLANNED” actions are not differentiated since the loss of instrumentation of this magnitude is of such significance during a transient that the cause of the loss is not a factor.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

A Site Area Emergency is considered to exist if the control room staff cannot monitor safety systems needed for protection of the public while a significant transient is in progress.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS4 (cont)

Basis (cont):

Indications needed to monitor safety systems necessary for protection of the public must include control room indications; computer generated indications and dedicated annunciation capability. The specific parameters are those used to determine such functions as the ability to shut down the reactor, maintain the core cooled and in a coolable geometry, remove heat from the core, and maintain the reactor coolant system and primary containment.

"Compensatory indications" in this context includes computer based information. This includes all computer systems available for this use.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Basis References

1. EMG-3200.01A, RPV Control – No ATWS
2. EMG-3200.02, Primary Containment Control
3. 2000-BAS-3200.02 EOP User's Guide
4. NEI 99-01, Rev. 5 SS6

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA4

Initiating Condition

UNPLANNED Loss of safety system annunciation or indication in the control room with EITHER (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**

   - Safety System annunciators (Table M1)

   OR

   - Safety System indications (Table M1)

Table M1 – Safety System
• ECCS
• Containment Isolation
• Reactor Scram
• Process/Area Radiation Monitoring

AND

2. a. SIGNIFICANT TRANSIENT in progress (Table M2).

Table M2 - Significant Transients
• Turbine trip
• Reactor scram
• ECCS actuation
• Thermal power change > 25%
• Thermal power oscillations > 10 % Reactor Power change

OR

b. Compensatory indications (computer points) are unavailable.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA4 (cont)

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) Turbine Trip (2) Reactor Scram (3) ECCS Actuation, (4) Thermal power change > 25%, or (5) thermal power oscillations > 10% Reactor Power change

This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a SIGNIFICANT TRANSIENT.

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

"Compensatory indications" in this context includes computer based information. If both a major portion of the annunciation system and all computer monitoring are unavailable, the Alert is required.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

This Alert will be escalated to a Site Area Emergency if the operating crew cannot monitor the transient in progress due to a concurrent loss of compensatory indications with a SIGNIFICANT TRANSIENT in progress during the loss of annunciation or indication.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SA4

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU4

Initiating Condition

UNPLANNED loss of safety system annunciation or indication in the control room for 15 minutes or longer.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

UNPLANNED loss of **greater than approximately 75%** of the following for **≥ 15 minutes:**

- Safety System annunciators (Table M1)

OR

- Safety System indications (Table M1)

Table M1 – Safety System
• ECCS
• Containment Isolation
• Reactor Scram
• Process/Area Radiation Monitoring

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment.

Recognition of the availability of computer based indication equipment is considered.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU4 (cont)

Basis (cont)

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on MU7 "Inability to Reach Required Shutdown Within Technical Specification Limits."

Fifteen minutes was selected as a threshold to exclude momentary power losses.

This Unusual Event will be escalated to an Alert based on a concurrent loss of compensatory indications or if a SIGNIFICANT TRANSIENT is in progress during the loss of annunciation or indication.

Basis Reference(s):

1. NEI 99-01, Rev. 5 SU3

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU5

Initiating Condition

RCS Leakage.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Unidentified or pressure boundary leakage into the Drywell **> 10 gpm**.

   OR

2. Identified leakage into the Drywell **> 25 gpm**.

Basis:

This EAL is included as an Unusual Event because it may be a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified or pressure boundary leakage was selected as it is observable with normal control room indications. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances).

Relief valve operation should be excluded from this EAL.

The EAL for identified leakage is set at a higher value due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage. In either case, escalation of this EAL to the Alert level is via Fission Product Barrier.

Basis Reference(s):

1. Technical Specifications Section 3.3.D
2. FSAR Updated Section 5.2, Leak Detection System
3. NEI 99-01, Rev. 5 SU5

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU6

Initiating Condition

Loss of all On-site or Off-site communications capabilities.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

1. Loss of all Table M3 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table M3 **Offsite** communications capability affecting the ability to perform offsite notifications.

Table M3- Communications Capability		
System	**Onsite**	**Offsite**
Plant Paging System	X	
Station Radio	X	
Conventional telephone lines	X	X
Cell Phones	X	X
Emergency Notification System (ENS)		X
Health Physics Network (HPN)		X

Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU6 (cont)

Basis Reference(s):

1. EP-AA-1010, E-Plan Annex for Oyster Creek Station
2. EP-MA-124-1001, Facilities Inventories and Equipment Tests
3. NEI 99-01, Rev. 5 SU6

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU7

Initiating Condition

Inability to reach required shutdown within Technical Specification limits.

Operating Mode Applicability:

1, 2

EAL Threshold Values:

Plant is **not** brought to required operating mode within Technical Specifications LCO Action Statement Time.

Basis:

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 Unusual Event is required when the plant is not brought 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.

Basis Reference(s):

1. Oyster Creek Technical Specifications
2. NEI 99-01, Rev. 5 SU2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA1

Initiating Condition

Loss of all Off-Site and all On-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

3, 4, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all off-site AC power to 4160V Buses 1C and 1D.

   AND

2. Failure of EDG-1 and EDG-2 Emergency Diesel Generators to supply power to 4160V Buses 1C and 1D.

   AND

3. Failure to restore power to at least one 4160V Bus (1C or 1D) in **< 15 minutes** from the time of loss of both offsite and onsite AC power.

Basis:

Loss of all AC power compromises all plant safety systems requiring electric power including ECCS, Containment Heat Removal, Spent Fuel Heat Removal and the Ultimate Heat Sink.

The event can be classified as an Alert when in cold shutdown, refueling, or defueled mode because of the significantly reduced decay heat and lower temperature and pressure, increasing the time to restore one of the emergency busses, relative to that specified for the Site Area Emergency EAL.

Escalating to Site Area Emergency, if appropriate, is by Abnormal Rad Levels / Radiological Effluent EALs.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Basis Reference(s):

1. OCNGS Drawing BR 3000
2. ABN-36, Loss of Off-Site Power
3. ABN-37, Station Blackout
4. ABN-60, Grid Emergency
5. NEI 99-01, Rev. 5 CA3

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU1

Initiating Condition

AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.

Operating Mode Applicability:

3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. AC power capability to 4160V Buses 1C and 1D reduced to only one of the following power sources for **≥ 15 minutes.**

   - Startup Transformer SA
   - Startup Transformer SB
   - EDG-1 Emergency Diesel Generator
   - EDG-2 Emergency Diesel Generator

   AND

2. Any additional single power source failure will result in a station blackout.

Basis:

Capability: (pertaining to electrical power supplies) is equipment that is available to provide and maintain AC power at the required voltage and frequency for the required load.

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. The subsequent loss of this single power source would escalate the event to an Alert in accordance with CA1.

Fifteen minutes was selected as a threshold to exclude momentary losses of power.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU1 (cont)

Basis References:

1. OCNGS Drawing BR 3000
2. ABN-36, Loss of Off-Site Power
3. ABN-37, Station Blackout
4. ABN-60, Grid Emergency
5. NEI 99-01, Rev. 5 CU3

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU2

Initiating Condition

Inadvertent Criticality.

Operating Mode Applicability:

3, 4

EAL Threshold Values:

UNPLANNED sustained positive period observed on nuclear instrumentation.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL also addresses criticality events that occur in Cold Shutdown or Refueling modes such as fuel mis-loading events. This condition can be identified using period monitors. The term “sustained” is used in order to allow exclusion of expected short term positive periods from planned fuel bundle or control rod movements during core alteration.

This EAL indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU8

2. ABN-7, Unexplained Reactivity Change

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU3

Initiating Condition

Loss of required DC power for 15 minutes or longer.

Operating Mode Applicability:

3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Loss of required DC power based on **< 115 VDC** on 125 VDC battery buses B and C for **≥ 15 minutes**.

Basis:

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.

The required busses are the minimum allowed by Technical Specifications for the mode of operation. It is intended that the loss of the operating (operable) train is to be considered. If this loss results in the inability to maintain cold shutdown, the escalation to an Alert will be per CA5.

Fifteen minutes was selected as a threshold to exclude momentary power losses.

Basis Reference(s):

1. OCNGS Drawing BR 3000
2. ABN-54, DC Bus B and Panel/MCC Failures
3. ABN-55, DC Bus C and Panel/MCC Failures
4. NEI 99-01, Rev. 5 CU7

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU4

Initiating Condition

Loss of all On-site or Off-site communications capabilities.

Operating Mode Applicability:

3, 4, D

EAL Threshold Values:

1. Loss of all Table C1 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of all Table C1 **Offsite** communications capability affecting the ability to perform offsite notifications.

Table C1 - Communications Capability		
System	**Onsite**	**Offsite**
Plant Paging System	X	
Station Radio	X	
Conventional telephone lines	X	X
Cell Phones	X	X
Emergency Notification System (ENS)		X
Health Physics Network (HPN)		X

Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU4 (cont)

Basis Reference(s):

1. EP-AA-1010, E-Plan Annex for Oyster Creek Station
2. EP-MA-124-1001, Facilities Inventories and Equipment Tests
3. NEI 99-01, Rev. 5 CU6

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5

Initiating Condition

Inability to maintain plant in cold shutdown.

Operating Mode Applicability:

3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 212°F** for **> Table C2 duration**.

Table C2 – RCS Reheat Duration Thresholds		
RCS	**Containment Closure**	**Duration**
Intact	N/A	60 minutes*
Not Intact	Established	20 minutes*
	Not Established	0 minutes
*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then EAL Threshold #1 is **not** applicable.		

OR

2. UNPLANNED RPV pressure rise **> 10 psig** as a result of temperature rise due to loss of decay heat removal.

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

RCS is intact when the RCS pressure boundary is in its normal condition for the Cold Shutdown mode of operation (e.g., no freeze seals or main steam line nozzle plugs, etc.).

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5 (cont)

BASIS (cont)

Threshold #1 Basis:

The RCS Reheat Duration Threshold table addresses complete loss of functions required for core cooling for greater than 60 minutes during refueling and cold shutdown modes when RCS integrity is established. The status of CONTAINMENT CLOSURE in this condition is immaterial given that the RCS is providing a high pressure barrier to fission product release to the environment. The 60 minute time frame should allow sufficient time to restore cooling without there being a substantial degradation in plant safety.

The RCS Reheat Duration Threshold table also addresses the complete loss of functions required for core cooling for greater than 20 minutes during refueling and cold shutdown modes when CONTAINMENT CLOSURE is established but RCS integrity is not established. The allowed 20 minute time frame was included to allow operator action to restore the heat removal function, if possible.

Finally, complete loss of functions required for core cooling during refueling and cold shutdown modes when neither CONTAINMENT CLOSURE nor RCS integrity are established. No delay time is allowed because the evaporated reactor coolant that may be released into the Containment during this heatup condition could also be directly released to the environment.]

The note (*) indicates that this EAL is not applicable if actions are successful in restoring an RCS heat removal system to operation and RCS temperature is being reduced within the specified time frame.

Threshold #2 Basis:

The 10 psig pressure rise due to loss of decay heat removal infers an intact RCS with uncontrolled RPV temperature rise in excess of the Technical Specification cold shutdown limit (212° F) for which CA5 Threshold #1 would permit up to sixty minutes to restore RCS cooling before declaration of an Alert. This EAL therefore covers situations of high decay heat loads, in which the event should be declared without delay.

Escalation to Site Area Emergency would be via CS6 should boiling result in significant RPV level loss leading to core uncovery.

A loss of Technical Specification components alone is not intended to constitute an Alert. The same is true of a momentary UNPLANNED excursion above the Technical Specification cold shutdown temperature limit when the heat removal function is available.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5 (cont)

Basis reference(s):

1. Technical Specifications 1.7
2. OU-AA-103, Shutdown Safety Management Program
3. NEI 99-01, Rev. 5 CA4

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU5

Initiating Condition

UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV.

Operating Mode Applicability:

3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. UNPLANNED loss of decay heat removal capability results in RCS temperature **> 212°F**.

   OR

2. Loss of the following for **≥ 15 minutes:**

   - All RCS temperature indications

     AND

   - All RPV level indications

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL is be a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant.

In cold shutdown the ability to remove decay heat relies primarily on forced cooling flow. Operation of the systems that provide this forced cooling may be jeopardized due to the unlikely loss of electrical power or RCS inventory. Since the RCS usually remains intact in the cold shutdown mode a large inventory of water is available to keep the core covered.

During refueling the level in the RPV will normally be maintained above the RPV flange. Refueling evolutions that decrease water level below the RPV flange are carefully planned and procedurally controlled. Loss of forced decay heat removal at reduced inventory may result in more rapid increases in RCS/RPV temperatures depending on the time since shutdown.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU5 (cont)

Basis (cont)

Normal means of core temperature indication and RCS level indication may not be available in the refueling mode. Redundant means of RPV level indication are therefore procedurally installed to assure that the ability to monitor level will not be interrupted. However, if all level and temperature indication were to be lost in either the cold shutdown of refueling modes, Threshold #2 would result in declaration of an Unusual Event if both temperature and level indication cannot be restored within 15 minutes from the loss of both means of indication. Escalation to Alert would be via MA8 based on an inventory loss or MA5 based on exceeding its temperature criteria.

Basis Reference(s):

1. Technical Specifications 1.7
2. 2000-GLN-3200.01, Plant Specific Technical Guideline
3. 205.94.0, RPV Floodup Using Core Spray
4. 205.95.0, Reactor Flood-up / Drain-down
5. NEI 99-01, Rev. 5 CU4

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6

Initiating Condition

Loss of RPV inventory affecting fuel clad integrity with containment challenged.

Operating Mode Applicability:

3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. RPV level **< 0 inches TAF** for **≥ 30 minutes**.

   AND

   b. Any Containment Challenge Indication (Table C4).

   OR

2. a. RPV level unknown for **≥ 30 minutes.**

   AND

   b. Loss of RPV inventory as indicated by any of the following:

   - Table C3 indication.

     OR

   - Erratic Source Range Monitor indication.

     OR

   - Refuel Floor Area Radiation Monitor C-10, North Wall, reading **> 3 R/hr**.

   AND

   c. Any Containment Challenge Indication (Table C4)

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6 (cont.)

EAL Threshold Values: (cont)

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise • UNPLANNED Torus level rise • UNPLANNED vessel make-up rise • Observation of leakage or Inventory loss

Table C4 – Containment Challenge Indications
• Primary Containment Hydrogen concentration **≥ 6%** and Oxygen **≥ 5%**. • UNPLANNED rise in containment pressure • CONTAINMENT CLOSURE **not** established. • Any Secondary Containment radiation monitors reading **> EMG-3200.11 Maximum Safe** (Table 12).

Basis:

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL represents the inability to restore and maintain RPV level to above the top of active fuel with containment challenged. Fuel damage is probable if RPV level cannot be restored, as available decay heat will cause boiling, further reducing the RPV level. With the CONTAINMENT breached or challenged then the potential for unmonitored fission product release to the environment is high. This represents a direct path for radioactive inventory to be released to the environment. This is consistent with the definition of a General Emergency. The General Emergency is declared on the occurrence of the loss or IMMINENT loss of function of all three barriers.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6 (cont.)

Basis: (cont)

A number of variables can have a significant impact on heat removal capability challenging the fuel clad barrier. Examples include initial vessel level and shutdown heat removal system design.

Analysis indicates that core damage may occur within an hour following continued core uncovery therefore, 30 minutes was conservatively chosen.

If CONTAINMENT CLOSURE is re-established prior to exceeding the 30 minute core uncovery time limit then escalation to a General Emergency would not occur.

When RPV level indication is unavailable, the inventory loss must be detected by erratic Source Range Monitor indication, elevated drywell radiation or unexplained rise in drywell floor or equipment drain sump pumpout rate. Post-TMI studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and that Source Range Monitors can be used as a tool for making such determinations.

As water level in the RPV lowers, the dose rate above the core will rise. Indication of > 3000 mR/hr is indicative of core uncovery (i.e. level at TAF).

Basis Reference(s):

1. EMG-3200.01A, RPV Control – No ATWS
2. Technical Specifications 5.2 Basis
3. 2000-GLN-3200.03, Plant Specific Technical Guidelines for Severe Accident Guidelines
4. EMG-3200.11, Secondary Containment Control
5. FSAR Update 6.2.1.1.3
6. EMG-3200.02, Primary Containment Control
7. EP-AEL-0501, Estimation of Radiation Monitor Readings Indicating Core Uncovery
8. NEI 99-01, Rev. 5 CG1

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6

Initiating Condition

Loss of RPV inventory affecting core decay heat removal capability.

Operating Mode Applicability:

3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. With CONTAINMENT CLOSURE **not** established, RPV level **< 84 inches TAF**.

   OR

2. With CONTAINMENT CLOSURE established, RPV level **< 0 inches TAF.**

   OR

3. a. RPV level unknown for **≥ 30 minutes.**

      AND

   b. Loss of RPV inventory as indicated by any of the following:

      - Table C3 indications.

        OR

      - Erratic Source Range Monitor indication.

        OR

      - Refuel Floor Area Radiation Monitor C-10, North Wall, reading **> 3 R/hr**.

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise
• UNPLANNED Torus level rise
• UNPLANNED vessel make-up rise
• Observation of leakage or Inventory loss

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6 (cont)

Basis:

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment (primary or secondary) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

RPV values are actual levels, not indicated levels. Therefore, they may need level compensation depending on conditions. Compensated values may be used in accordance with the SAMG program.

Under the conditions specified, a continued drop in RCS/RPV level is indicative of a loss of inventory control. Inventory loss may be due to an RCS breach, pressure boundary leakage, or continued boiling in the RPV. Thus, declaration of a Site Area Emergency is warranted.

Escalation to a General Emergency is via CG6 or RG1.

Threshold #1 and #2 Basis:

If a low-pressure boundary to fission product release does not exist (i.e., without CONTAINMENT CLOSURE established), the RPV level associated with this threshold is six inches below the low-low ECCS actuation setpoint. If CONTAINMENT CLOSURE is established, a low-pressure boundary to fission product release exists and RPV level can drop to the top of active fuel before a Site Area Emergency declaration is required. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further RPV level drop and potential core uncovery.

Threshold #3 Basis:

When RPV level indication is unavailable, the inventory loss must be detected by erratic Source Range Monitor indication, elevated drywell radiation or unexplained rise in drywell floor or equipment drain sump pumpout rate. Post-TMI studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and that Source Range Monitors can be used as a tool for making such determinations.

The 30-minute duration allows sufficient time for actions to be performed to recover inventory control equipment.

As water level in the RPV lowers, the dose rate above the core will rise. Indication of > 3000 mR/hr. is indicative of core uncovery (i.e. level at TAF).

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6 (cont)

Basis Reference(s):

1. EMG-3200.01A, RPV Control – No ATWS
2. 2000-GLN-3200.03, Plant Specific Technical Guidelines for EOPs
3. NEI 99-01, Rev. 5 CS1
4. EP-AEL-0501,, Estimation of Radiation Monitor Readings Indicating Core Uncovery

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA6

Initiating Condition

Loss of RPV inventory.

Operating Mode Applicability:

3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. RPV level **< 90 inches TAF**.

   OR

2. a. RPV level unknown for **≥ 15 minutes**.

      AND

   b. Loss of RPV inventory per Table C3 indications.

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise • UNPLANNED Torus level rise • UNPLANNED vessel make-up rise • Observation of leakage or Inventory loss

Basis:

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

This EAL serves as precursors to a loss of ability to adequately cool the fuel. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further RPV level decrease and potential core uncovery. This condition will result in a minimum emergency classification level of an Alert.

If RPV level continues to lower then escalation to Site Area Emergency will be via CS6.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA6 (cont)

Basis (cont)

Threshold #1 Basis:

The inability to restore and maintain level after reaching this setpoint would be indicative of a failure of the RCS barrier.

Threshold #2 Basis:

When RPV level indication is unavailable, the inventory loss must be detected by other means including rise in sump pumpout rates, changes in makeup or observation of leakage.

The 15-minute interval for the loss of level indication was chosen because it is half of the Site Area Emergency duration.

Basis Reference(s):

1. 2000-BAS-3200.02 EOP User's Guide
2. 2000-GLN-3200.01 Plant Specific Technical Guideline
3. 205.94.0 RPV Floodup Using Core Spray
4. 205.95.0 Reactor Flood-up / Drain-down
5. FSAR Figure 7.6-3
6. NEI 99-01, Rev. 5 CA1

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU6

Initiating Condition

RCS Leakage.

Operating Mode Applicability:

3, 4

EAL Threshold Values:

NOTE: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

This EAL is applicable when all vessel head bolts are fully tensioned.

RCS leakage results in the inability to restore and maintain RPV level **> 139 inches TAF** for **≥ 15 minutes**.

Basis:

This EAL is considered to be a potential degradation of the level of safety of the plant. The inability to maintain or restore level is indicative of loss of RCS inventory.

Prolonged loss of RCS Inventory may result in escalation to the Alert emergency classification level via either CA6 or CA5.

Basis Reference(s):

1. NEI 99-01, Rev. 5 CU1

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU7

Initiating Condition

UNPLANNED loss of RPV inventory.

Operating Mode Applicability:

3, 4

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

This EAL is applicable when one or more vessel head bolts are less than fully tensioned.

1. UNPLANNED Reactor Cavity or Vessel level drop that meets **EITHER**:

   - When controlling level above the RPV flange, Reactor Cavity level drop below the RPV flange for **≥ 15 minutes**.

     OR

   - When controlling level below the RPV flange, vessel level drop below the procedurally established limit for **≥ 15 minutes**.

   OR

2. a. RPV level unknown.

   AND

   b. Loss of RPV inventory per Table C3 indications.

Table C3 – Indications of RCS Leakage
• UNPLANNED floor or equipment sump level rise
• UNPLANNED Torus level rise
• UNPLANNED vessel make-up rise
• Observation of leakage or Inventory loss

Basis:

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU7 (cont)

Basis (cont)

This EAL is a precursor of more serious conditions and considered to be a potential degradation of the level of safety of the plant.

Refueling evolutions that lowers RCS water level below the RPV flange are carefully planned and procedurally controlled. An UNPLANNED event that results in water level dropping below the RPV flange, or below the planned RCS water level for the given evolution (if the planned RCS water level is already below the RPV flange), warrants declaration of a UE due to the reduced RCS inventory that is available to keep the core covered.

The allowance of 15 minutes was chosen because it is reasonable to assume that level can be restored within this time frame using one or more of the redundant means of makeup that should be available. If level cannot be restored in this time frame then it may indicate a more serious condition exists.

Continued loss of RCS Inventory will result in escalation to the Alert emergency classification level via either CA6 or CA5.

Threshold #1 Basis:

This EAL involves a drop in RCS level below the top of the RPV flange that continues for 15 minutes due to an UNPLANNED event. This EAL is not applicable to level changes in flooded reactor cavity level, which is addressed by RU2, until such time as the level drop reaches the level of the vessel flange.

If RPV level continues to lower and reaches the Low-Low ECCS Actuation Setpoint then escalation to CA6 would be appropriate.

Threshold #2 Basis:

This EAL addresses conditions in the refueling mode when normal means of core temperature indication and RCS level indication may not be available. Redundant means of RPV level indication will normally be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that RPV inventory loss was occurring by observing other indications such as sump level changes, changes in makeup or observation of leakage. Sump level changes must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

Escalation to the Alert emergency classification level would be via either CA6 or CA5.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU7 (cont)

Basis Reference(s):

1. Technical Specifications Section 3.3.D
2. 205.94.0, RPV Floodup Using Core Spray
3. 205.95.0, Reactor Flood-up / Drain-down
4. FSAR Figure 7.6-3
5. NEI 99-01, Rev. 5 CU2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1

Initiating Condition

HOSTILE ACTION resulting in loss of physical control of the facility.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Value:

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain **ANY** safety function (Table H1).

   OR

2. A HOSTILE ACTION has:

   - Caused failure of Spent Fuel Pool Cooling Systems

     AND

   - IMMINENT fuel damage is likely for freshly offloaded reactor fuel in the pool (e.g., within 120 days).

Table H1 – Safety Functions
• Reactivity Control (ability to shut down the reactor and keep it shutdown)
• RCS Inventory (ability to cool the core)
• Decay Heat Removal (ability to maintain heat sink)

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1 (cont)

Basis: (cont)

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

Threshold #1 Basis

This threshold encompasses conditions under which a HOSTILE ACTION has taken physical control of VITAL AREAS (containing vital equipment or controls of vital equipment) required to maintain any safety function. As a result, there is a loss of one or more of the Table H1 functions and equipment control cannot be transferred to and operated from another location.

If control of the plant equipment necessary to maintain all safety functions can be operated from the Control Room or transferred to another location, then the above EAL threshold is not met.

Threshold #2 Basis

This threshold addresses loss of physical control of spent fuel pool cooling systems if imminent fuel damage is likely because there is freshly off-loaded fuel in the pool. The condition “freshly off-loaded reactor fuel in pool” equates to fuel offloaded within the last 120 days in NF-AA-309 Special Nuclear Material And Core Component Move Sheet Development.

Basis Reference(s):

1. ABN-30, Control Room Evacuation
2. SY-AA-101-132, Security Assessment and Response to Unusual Activities
3. Station Security Plan – Appendix C
4. NF-AA-309, Special Nuclear Material And Core Component Move Sheet Development
5. NEI 99-01, Rev. 5 HG1
6. ABN-41, Security Event

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS1

Initiating Condition

HOSTILE ACTION within the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Values:

A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA..

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

This condition represents an escalated threat to plant safety above that contained in the Alert in that a HOSTILE FORCE has progressed from the OWNER CONTROLLED AREA to the PROTECTED AREA.

This EAL addresses the contingency for a very rapid progression of events. It is not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack with minimal time available for further preparation or additional assistance to arrive requires Offsite Response Organizations (ORO) readiness and preparation for the implementation of protective measures.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS1 (cont)

Basis: (cont)

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the PROTECTED AREA. Those events are adequately addressed by other EALs.

Escalation of this emergency classification level, if appropriate, would be based on actual plant status after impact or progression of attack.

Basis Reference(s):

1. ABN-30, Control Room Evacuation
2. SY-AA-101-132, Security Assessment and Response to Unusual Activities
3. Station Security Plan – Appendix C
4. NEI 99-01 Rev 5, HS4
5. ABN-41, Security Event

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1

Initiating Condition

HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Values:

1. A validated notification from NRC of an airliner attack threat **< 30 minutes** from the site.

   OR

2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

OWNER CONTROLLED AREA (OCA): is the property associated with the station owned by the company. Access is normally limited to persons entering for official business.

Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

The fact that the site is under serious attack or is an identified attack target with minimal time available for further preparation or additional assistance to arrive requires a heightened state of readiness and implementation of protective measures that can be effective (such as on-site evacuation, dispersal or sheltering).

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1 (cont)

Basis: (cont)

Threshold #1 Basis

This EAL addresses the immediacy of an expected threat arrival or impact on the site within a relatively short time.

The intent of this EAL is to ensure that notifications for the airliner attack threat are made in a timely manner and that Offsite Response Organizations (ORO) and plant personnel are at a state of heightened awareness regarding the credible threat. Airliner is meant to be a large aircraft with the potential for causing significant damage to the plant.

This EAL is met when a plant receives information regarding an airliner attack threat from NRC and the airliner is within 30 minutes of the plant. Only the plant to which the specific threat is made need declare the Alert.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Threshold #2 Basis

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the OCA. Those events are adequately addressed by other EALs.

Note that this EAL is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA.

Basis Reference(s):

1. SY-AA-101-132, Security Assessment and Response to Unusual Activities
2. Station Security Plan – Appendix C
3. NEI 99-01 Rev 5, HA4

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1

Initiating Condition

Confirmed SECURITY CONDITION or threat, which indicates a potential degradation in the level of safety of the plant.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Values:

1. A credible site-specific security threat notification as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities.

   OR

2. A validated notification from NRC providing information of an aircraft threat.

   OR

3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

Basis:

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1 (cont)

Basis Reference(s):

Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

Security events assessed as HOSTILE ACTIONS are classifiable under HA1, HS1 and HG1.

A higher initial classification could be made based upon the nature and timing of the security threat and potential consequences. The licensee shall consider upgrading the emergency response status and emergency classification level in accordance with the site's Safeguards Contingency Plan and Emergency Plan.

Threshold #1 Basis

This threshold is included to ensure that appropriate notifications for the security threat are made in a timely manner. This includes information of a credible threat. Only the plant to which the specific threat is made need declare the Notification of an Unusual Event.

The determination of "credible" is made through use of information found in the Station Security Plan or SY-AA-101-132, "Security Assessment and Response to Unusual Activities" procedure.

Threshold #2 Basis

The intent of this EAL is to ensure that notifications for the aircraft threat are made in a timely manner and that Offsite Response Organizations (ORO) and plant personnel are at a state of heightened awareness regarding the credible threat. It is not the intent of this EAL to replace existing non-hostile related EALs involving aircraft.

This EAL is met when a plant receives information regarding an aircraft threat from NRC. Validation is performed by calling the NRC. Only the plant to which the specific threat is made need declare the Unusual Event.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Escalation to Alert emergency classification level would be via HA1 would be appropriate if the threat involves an airliner within 30 minutes of the plant.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1 (cont)

Basis Reference(s):

Threshold #3 Basis

Reference is made to security force because these individuals are the designated personnel on-site qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the plant Safeguards Contingency Plan.

This threshold is based on Station Security Plan – Appendix C. 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 in some cases under 10 CFR 50.72.

Basis Reference(s):

1. Station Security Plan – Appendix C
2. NEI 99-01 Rev 5, HU4
3. SY-AA-101-132, Security Assessment and Response to Unusual Activities

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS2

Initiating Condition

Control Room evacuation has been initiated and plant control cannot be established.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Control Room evacuation has been initiated.

   AND

2. Control of the plant **cannot** be established per ABN-30 in **< 15 minutes**.

Basis:

The time period to establish control of the plant starts when either:

a. Control of the plant is no longer maintained in the Main Control Room

   OR

b. The last Operator has left the Main Control Room.

The intent of this EAL is to capture those events where control of the plant cannot be reestablished in a timely manner. In this case, expeditious transfer of control of safety systems has not occurred (although fission product barrier damage may not yet be indicated).

The intent of the EAL is to establish control of important plant equipment and knowledge of important plant parameters in a timely manner. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions. Typically, these safety functions are reactivity control (ability to shutdown the reactor and maintain it shutdown), reactor water level (ability to cool the core), and decay heat removal (ability to maintain a heat sink).

The determination of whether or not control is established at the remote shutdown panel is based on Emergency Director (ED) judgment. The Emergency Director is expected to make a reasonable, informed judgment within the specified time for transfer that the licensee has control of the plant from the remote shutdown panel.

Escalation of this emergency classification level, if appropriate, would be by Fission Product Barrier or Abnormal Rad Levels/Radiological Effluent EALs.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS2 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 5 HS2

2. ABN-30 Control Room Evacuation

3. Procedure 346 Operation of the Remote and Local Shutdown Panels Shutdown from the Alternative Shutdown Panels – Bases

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA2

Initiating Condition

Control Room Evacuation Has Been Initiated.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Values:

Entry into ABN-30 for Control Room evacuation.

Basis:

With the control room evacuated, additional support, monitoring and direction through the Technical Support Center and/or other emergency response facilities may be necessary.

Inability to establish plant control from outside the control room will escalate this event to a Site Area Emergency.

Basis Reference(s):

1. ABN-30 Control Room Evacuation
2. NEI 99-01, Rev. 5 HA5

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3

Initiating Condition

FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Values:

FIRE or EXPLOSION resulting in any of the following:

- VISIBLE DAMAGE to a Table H2 permanent structure.

  OR

- VISIBLE DAMAGE to safety system equipment contained within a Table H2 area.

  OR

- Control Room indication of degraded safety system equipment performance contained within a Table H2 area.

Table H2 – Vital Areas
• Reactor Bldg
• 4160V Switchgear Rooms (1C & 1D)
• Control Room Complex (MOB, Upper and Lower Cable Spreading Rooms)
• Main Transformer/Condensate Transfer Pad
• Intake Structure
• #1 EDG Vault
• #2 EDG Vault
• EDG Fuel Oil Storage Tank

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3 (cont.)

Bases:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized / energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

The areas listed in Table H2 specify specific structures or areas that contain safety system, or component and functions required for safe shutdown of the plant.

VISIBLE DAMAGE is used to identify the magnitude of the FIRE or EXPLOSION and to discriminate against minor FIRES and EXPLOSIONS.

The reference to structures containing safety systems or components is included to discriminate against FIRES or EXPLOSIONS in areas having a low probability of affecting safe operation. The significance here is not that a safety system was degraded but the fact that the FIRE or EXPLOSION was large enough to cause damage to these systems.

An EXPLOSION due to failure of pressurized equipment that does not cause damage to other permanent structures or equipment associated with plant operations does not meet the criteria for declaration under this EAL, but may result in other declaration criteria being met (e.g., when the line is an element of a Fission Product Barrier, or the results in inventory loss).

The use of VISIBLE DAMAGE should not be interpreted as mandating a lengthy damage assessment prior to classification. The declaration of an Alert and the activation of the Technical Support Center will provide the Emergency Director with the resources needed to perform detailed damage assessments.

The Emergency Director also needs to consider any security aspects of the EXPLOSION.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions, Fission Product Barrier or Abnormal Rad Levels / Radiological Effluent EALs.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3 (cont.)

Basis Reference(s):

1. ABN-29, Plant Fires
2. ABN-25, Offgas Deflagration
3. NEI 99-01, Rev. 5 HA2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3

Initiating Condition

FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Values:

Note: The Emergency Director should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. FIRE in any Table H2 area **not** extinguished in **< 15 minutes** of Control Room notification or verification of a Control Room FIRE alarm.

Table H2 – Vital Areas
• Reactor Bldg
• 4160V Switchgear Rooms (1C & 1D)
• Control Room Complex (MOB, Upper and Lower Cable Spreading Rooms)
• Main Transformer/Condensate Transfer Pad
• Intake Structure
• #1 EDG Vault
• #2 EDG Vault
• EDG Fuel Oil Storage Tank

OR

2. EXPLOSION within PROTECTED AREA boundary affecting a Table H2 area.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3 (cont)

Basis:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized / energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

PROTECTED AREA: An area which normally encompasses all controlled areas within the security protected area fence.

This EAL addresses the magnitude and extent of FIRES or EXPLOSIONS that may be potentially significant precursors of damage to safety systems. It addresses the FIRE / EXPLOSION, and not the degradation in performance of affected systems that may result.

As used here, notification is visual observation and report by plant personnel or sensor alarm indication.

For the purposes of declaring an emergency event, the term “extinguished” means no visible flames.

Thresholds #1:

The 15 minute time period begins with a credible notification that a FIRE is occurring, or indication of a fire detection system alarm/actuation. Verification of a fire detection system alarm/actuation includes actions that can be taken within the control room or other nearby site specific location to ensure that it is not spurious. An alarm is assumed to be an indication of a FIRE unless it is disproved within the 15 minute period by personnel dispatched to the scene. In other words, a personnel report from the scene may be used to disprove a sensor alarm if received within 15 minutes of the alarm, but shall not be required to verify the alarm.

The intent of this 15 minute duration is to size the FIRE and to discriminate against small FIRES that are readily extinguished (e.g., smoldering waste paper basket). Such fires are excluded from consideration in this threshold since they have no safety consequence.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3 (cont)

Basis: (cont)

Threshold #2 Basis:

This EAL addresses only those EXPLOSIONS of sufficient force to damage permanent structures or equipment associated with plant operations within the PROTECTED AREA.

An EXPLOSION due to failure of pressurized equipment that does not cause damage to other permanent structures or equipment associated with plant operations does not meet the criteria for declaration under this EAL, but may result in other declaration criteria being met (e.g., when the line is an element of a Fission Product Barrier, or the results in inventory loss).

No attempt is made to assess the actual magnitude of the damage. The occurrence of the EXPLOSION is sufficient for declaration.

The Emergency director also needs to consider any security aspects of the EXPLOSION, if applicable.

Escalation of this emergency classification level, if appropriate, would be based on HA3.

Basis Reference(s):

1. ABN-29, Plant Fires
2. Station Security Plan – Appendix C
3. NEI 99-01, Rev. 5 HU2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4

Initiating Condition

Natural or destructive phenomena affecting VITAL AREAS.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Values:

1. A confirmed Seismic event that affects safety systems or systems required for safe shutdown requiring reactor scram.

   OR

2. **ANY** of the following resulting in VISIBLE DAMAGE to any Table H2 structure **OR** Control Room indication of degraded performance of a safety system in any Table H2 area:

   - Tornado strike

     OR

   - High winds **> 99 mph**

     OR

   - Vehicle crash

     OR

   - Turbine failure-generated PROJECTILES

Table H2 – Vital Areas
• Reactor Bldg
• 4160V Switchgear Rooms (1C & 1D)
• Control Room Complex (MOB, Upper and Lower Cable Spreading Rooms)
• Main Transformer/Condensate Transfer Pad
• Intake Structure
• #1 EDG Vault
• #2 EDG Vault
• EDG Fuel Oil Storage Tank

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

EAL Threshold Value (cont)

OR

3. Flooding in any Table H3 area that results in **ANY** of the following:

   - Degraded safety system performance area as indicated in the Control Room.

     OR

   - Industrial safety hazards (e.g., electric shock) that preclude access necessary to operate or monitor safety equipment.

     OR

   - Water level **> EMG 3200.11 Max Safe** (Table 13).

Table H3 – Internal Flooding Areas
• Reactor Building NE Corner Room
• Reactor Building SE Corner Room
• Reactor Building SW Corner Room (RBEDT Rm)
• Reactor Building NW Corner Room (CRD Pp Rm)

OR

4. Abnormal Intake Structure level, as indicated by **EITHER**:

   - **> 6.0 ft. MSL** (> 4.90 psig on PI-533-1172 and PI-533-1173 or > 6.0 ft MSL on CR-423-11 pt 24 and pt 23).

     OR

   - **≤ -4.0 ft. MSL** (≤ 0.50 psig on PI-533-1172 and PI-533-1173 or ≤ -4.0 ft MSL on CR-423-11 pt 24 and pt 23).

     MSL = Mean Sea Level

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

Basis

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

These EALs escalate from HU4 in that the occurrence of the event has resulted in VISIBLE DAMAGE to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control room indications of degraded system response or performance. The occurrence of VISIBLE DAMAGE and/or degraded system response is intended to discriminate against lesser events. 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. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction EALs.

Threshold #1 Basis:

This threshold addresses events that may have resulted in a Table H2 area being subjected to forces beyond design limits and thus damage may be assumed to have occurred to plant safety systems.

A reactor scram is required by procedure ABN-38, Station Seismic Event, if:

- The seismic event affects safe plant operation by jeopardizing the availability of safety systems, systems required to complete safe shutdown, or causing spurious actuation of equipment, or

- The Shift Manager determines it necessary to scram the Reactor to protect public safety.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

Basis (cont)

Threshold #2 Basis:

This threshold addresses events within the PROTECTED AREA that results in VISIBLE DAMAGE to any Table H2 structure or Control Room indication of degraded performance of a safety system in any Table H2 area:

This threshold addresses the following events:

- Tornado strike.
- High winds.
- Vehicle crashes such as plane, helicopter, train, barge, car or truck crashes. The Emergency director also needs to consider any security aspects of the vehicle crash.
- Threat to safety-related equipment imposed by PROJECTILES generated by main turbine rotating component failures.

Threshold #3 Basis:

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. The actual component failure or equipment misalignment is addressed by Technical Specifications or plant procedures unless the resulting flooding causes degraded performance of safety systems, or has created industrial safety hazards (e.g., electrical shock) that preclude necessary access to operate or monitor safety equipment. The inability to access, operate or monitor safety equipment represents an actual or substantial potential degradation of the level of safety of the plant.

Flooding as used in this EAL describes a condition where water is entering the room faster than installed equipment is capable of removal, resulting in a rise of water level within the room. Classification of this EAL should not be delayed while corrective actions are being taken to isolate the water source.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (cont)

Basis (cont)

Threshold #4 Basis:

This threshold covers high and low water level conditions as well as internal flooding events that may have resulted in a plant Vital Area being subjected to levels beyond design limits, and thus damage may be assumed to have occurred to plant safety systems.

High Intake Structure level is capable of causing flooding that can affect Vital Areas. At levels > 6.5 ft. above MSL, Circulating Water Pumps may become flooded. At levels > 8.0 ft. above MSL, Service Water pumps may become flooded.

Low Intake Structure level indicates the possible loss of Emergency Service Water pumps.

Basis Reference(s):

1. ABN-38, Station Seismic Event
2. FSAR Update Section 3. 7 (Seismic)
3. FSAR Update Section 3.3.1 (High winds)
4. ABN-31, High Winds
5. ABN-32, Abnormal Intake Level
6. ABN-29, Plant Fires
7. LES Calculation No. 72-01-01, Turbine Missile Analysis for New Monoblock Rotor and Blades," October 1996, Revision 3
8. NEI 99-01, Rev. 5 HA1

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4

Initiating Condition

Natural or destructive phenomena affecting the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Values:

1. Seismic event as indicated by any **TWO** of the following:
   - Seismic event confirmed by station seismic monitor procedure.

     OR
   - Earthquake felt in plant.

     OR
   - National Earthquake Center.

   OR

2. **EITHER** of the following occurring within the PROTECTED AREA boundary:
   - Tornado strike

     OR
   - Sustained **(> 15 minutes)** high winds **> 99 mph**

   OR

3. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

   OR

4. Flooding in any Table H3 area that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

Table H3 Internal Flooding Areas
• Reactor Building NE Corner Room
• Reactor Building SE Corner Room
• Reactor Building SW Corner Room (RBEDT Rm)
• Reactor Building NW Corner Room (CRD Pp Rm)

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont.)

EAL Threshold Value (cont)

OR

5. Abnormal Intake Structure level, as indicated by **EITHER**:

   - **> 4.5 ft. MSL** (> 4.25 psig on PI-533-1172 and PI-533-1173 or > 4.5 ft MSL on CR-423-11 pt 24 and pt 23).

     OR

   - **≤ -3.0 ft. MSL** (≤ 0.95 psig on PI-533-1172 and PI-533-1173 or ≤ -3.0 ft MSL on CR-423-11 pt 24 and pt 23).

MSL = Mean Sea Level

Basis:

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

These EALs are categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

Threshold #1 Basis:

Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

Threshold #2 Basis:

This EAL is based on a tornado striking (touching down) or high winds within the PROTECTED AREA.

Escalation of this emergency classification level, if appropriate, would be based on VISIBLE DAMAGE, or by other in plant conditions, via HA4.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont)

Basis: (cont)

Threshold #3 Basis:

This EAL addresses main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Generator seal damage observed after generator purge does not meet the intent of this EAL because it did not impact normal operation of the plant.

Of major concern is the potential for leakage of combustible fluids (lubricating oils) and gases (hydrogen cooling) to the plant environs. Actual FIRES and flammable gas build up are appropriately classified via HU3 and HU5.

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 this emergency classification level, if appropriate, would be to HA4 based on damage done by PROJECTILES generated by the failure or by the radiological releases. The latter events would be classified by the radiological EALs or Fission Product Barrier.

Threshold #4 Basis:

The assessment of the potential for flooding to affect safety related equipment is based on the rate of level rise in the area and the ability to terminate the input prior to submerging or spraying the electrical portion of safety related equipment.

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. Minor leaks, such as valve packing or instrument line breaks would not constitute “Flooding.” The Internal Flooding Areas of concern for the Unusual Event declaration are those Table H3 areas that have the potential to affect safety related equipment needed for the current operating mode.

Escalation of this emergency classification level, if appropriate, would be based VISIBLE DAMAGE via HA4, or by other plant conditions.

Threshold #5 Basis:

High Intake Structure level, is sufficiently high to require plant shutdown per ABN-32, Abnormal Intake Level.

Low Intake Structure level indicates the possible loss of Radwaste Service Water pumps and is approaching levels, which may result in a loss of vital cooling equipment.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4 (cont)

Basis Reference(s):

1. ABN-38, Station Seismic Event
2. FSAR Update 3. 7 (Seismic)
3. FSAR Update 3.3.1 (High winds)
4. ABN-31, High Winds
5. ABN-32, Abnormal Intake Level
6. ABN-29, Plant Fire
7. NEI 99-01, Rev. 5 HU1

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5

Initiating Condition

Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Values:

Note: If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

Access to a Table H2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases, which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.

Table H2 – Vital Areas
• Reactor Bldg
• 4160V Switchgear Rooms (1C & 1D)
• Control Room Complex (MOB, Upper and Lower Cable Spreading Rooms)
• Main Transformer/Condensate Transfer Pad
• Intake Structure
• #1 EDG Vault
• #2 EDG Vault
• EDG Fuel Oil Storage Tank

Basis:

VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5 (cont.)

Bases: (cont)

Gases in a VITAL AREA can affect the ability to safely operate or safely shutdown the reactor.

The fact that SCBA may be worn does not eliminate the need to declare the event.

A precautionary area evacuation for the purpose of atmospheric testing does not warrant declaration until test results are obtained unless access is required for operation of operable equipment to maintain safe operations or safely shutdown the reactor. Declaration should not be delayed for confirmation from atmospheric testing if the atmosphere poses an immediate threat to life and health or an immediate threat of severe exposure to gases. This could be based upon documented analysis, indication of personal ill effects from exposure, or operating experience with the hazards such as an inadvertent actuation of installed Cardox fire suppression system.

Station evaluations have shown that installed Halon systems by design do not create an IDLH atmosphere when discharged. Therefore, when an installed Halon Fire Suppression system discharge occurs, an IDLH atmosphere should not be assumed, and declaration of a toxic or asphyxiant IDLH atmosphere must be based on representative sampling of the affected area, unless there are indications of personal ill effects resulting from exposure.

Areas directly associated with a fire that may be considered to have a hazardous environment (due to smoke, design fire suppression system actuation or administrative controls awaiting ventilation and/or testing) do not warrant declaration of an Alert under this EAL but should be evaluated against the fire EALs.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of 19.5%, which can lead to breathing difficulties, unconsciousness or even death.

An uncontrolled release of flammable gasses 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. Flammable gasses, such as hydrogen and acetylene, are routinely used to maintain plant systems (hydrogen) or to repair equipment/components (acetylene - used in welding). This EAL assumes concentrations of flammable gasses which can ignite/support combustion.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions, Fission Product Barrier or Abnormal Rad Levels / Radioactive Effluent EALs.

Basis Reference(s):

1. ABN-33, Toxic or Flammable Gas Release
2. NEI 99-01, Rev. 5 HA3
3. AR 660892, Station Halon and IDLH Evaluations
4. 29CFR1910.134(b) and 29CFR1910.134(d)(2)(iii)

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU5

Initiating Condition

Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Values:

1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS.

   OR

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

Basis:

NORMAL PLANT OPERATIONS: Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

This EAL is based on the release of toxic, corrosive, asphyxiant or flammable gases of sufficient quantity to affect NORMAL PLANT OPERATIONS.

The fact that SCBA may be worn does not eliminate the need to declare the event.

This EAL is not intended to require significant assessment or quantification. It assumes an uncontrolled process that has the potential to affect plant operations. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation.

The release may have originated within the Protected Area boundary, or it may have originated offsite and subsequently drifted inside the Protected Area boundary. Offsite events (e.g., tanker truck accident releasing toxic gases, etc.) resulting in the plant being within the evacuation area should also be considered in this EAL because of the adverse affect on NORMAL PLANT OPERATIONS.

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU5 (cont)

Basis: (cont)

Areas directly associated with a fire that may be considered to have a hazardous environment (due to smoke, design fire suppression system actuation or administrative controls awaiting ventilation and/or testing) do not warrant declaration of an Unusual Event under this EAL but should be evaluated against the fire EALs.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of 19.5%, which can lead to breathing difficulties, unconsciousness or even death.

Escalation of this emergency classification level, if appropriate, would be based on HA5.

Basis Reference(s):

1. ABN-33, Toxic or Flammable Gas Release

2. NEI 99-01, Rev. 5 HU3

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG6

Initiating Condition

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Basis:

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the General Emergency class.

Basis Reference(s):

1. NEI 99-01, Rev 5 HG2

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS6

Initiating Condition

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a Site Area Emergency.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels, which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency class description for Site Area Emergency.

Basis Reference(s):

1. NEI 99-01, Rev 5 HS3

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA6

Initiating Condition

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Basis:

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

This EAL addresses unanticipated conditions not addressed elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the Alert emergency class.

Basis Reference(s):

1. NEI 99-01, Rev 5 HA6

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU6

Initiating Condition

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Unusual Event.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Values:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Basis:

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

Basis Reference(s):

1. NEI 99-01, Rev 5 HU5

Table OCGS 3-2 OCGS EAL Technical Basis

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

E-HU1

Initiating Condition

Damage to a loaded cask CONFINEMENT BOUNDARY.

Operating Mode Applicability:

1, 2, 3, 4, D

EAL Threshold Values:

Damage to a loaded cask CONFINEMENT BOUNDARY resulting in radiation readings **> 10 times normal.**

Basis:

CONFINEMENT BOUNDARY – is the barrier(s) between areas containing radioactive substances and the environment.

An Unusual Event in this EAL is categorized on the basis of the occurrence of an event of sufficient magnitude that a loaded cask CONFINEMENT BOUNDARY is damaged or violated. This includes classification based on a loaded fuel storage cask CONFINEMENT BOUNDARY loss leading to the degradation of the fuel during storage or posing an operational safety problem with respect to its removal from storage.

Basis Reference(s):

1. OCNGS ISFSI Certificate of Compliance
2. ISFSI Safety Evaluation Report
3. OCNGS Modified and Amended Physical Security Plan
4. NEI 99-01, Rev 5 E-HU1

Section 4: Emergency Measures

The planning for, and response to a radiological emergency at the OCGS is the joint responsibility of Exelon and the state/county/local governmental agencies. OCGS is responsible for onsite emergency response. In order to fulfill this responsibility, OCGS relies on various offsite agencies, both governmental and private, to provide assistance beyond that available onsite.

4.1 Notification of the Emergency Organization

Figure OCGS 4-1: OCGS Notification Network provides a visual representation of the notification process. A notification shall be made within fifteen (15) minutes of the following to the NJ-Office of Emergency Management (NJ-OEM):

- The initial emergency classification.
- Classification escalation.
- The issuance of or change to a Protective Action Recommendation (PAR) for the general public at the General Emergency classification, if the NJ EOC is not activated.
- Changes in radiological release status, occurring outside of an event classification or PAR notification, based on an agreement with the state(s).

The NJ-OEM will provide verification of an initial notification from OCGS.

A notification shall be made within fifteen (15) minutes of the classification of a General Emergency to **Ocean County, Ocean Township and Lacey Township**.

A notification of the OCGS protective action recommendation (PAR) for the general public, as described in Section II.J.10.m, shall be made to the **designated NJ Senior State Official**. The initial PAR notification shall occur within 15 minutes of GE declaration. Subsequent or update PAR notifications shall occur within fifteen (15) minutes of PAR decision.

If the PAR is provided prior to State Emergency Operations Center (EOC) activation, the State Police Dispatcher (NJ-OEM) will be considered the “Senior State Official”.

The designate State and local points of contact are notified using dedicated circuits or a commercial telephone line as backup, per Section II.F.

The emergency warning points are simultaneously notified using the Nuclear Accident Reporting System (NARS), or a commercial telephone line as backup.

1) This NARS process consists of:

   a) New Jersey State Police Notification and Verification Line -- The New Jersey State Police Notification and Verification Lines are two separate circuits that connect the Control Room, the Technical Support Center (TSC) and the Emergency Operations Facility (EOF) with the State Police Communicator at the Division Headquarters Communications Center, West Trenton, N.J. The purpose of these lines is to provide a reliable means of prompt notification and verification of an emergency at OCGS.

   b) Ocean County Notification and Verification Line -- The Ocean County Notification and Verification Line is separate and dedicated automatic ring circuits that directly connect the Control Room, the TSC and the EOF with the Sheriff's representatives in the Ocean County Communications Center, Toms River, N.J. The purpose of this line is to provide a reliable means of prompt notification and verification.

2) State Emergency Director's Hot Line: The State Emergency Director's Hot Line provides automatic communication between the Emergency Director position in the Control Room or EOF to the State Emergency Director at the state EOC.

3) Emergency Response Facility Communications System: The phone system used by the OCGS Emergency Response Organization includes a dedicated system with the normal site phone system as a back up. The dedicated system allows communications between the ERFs and is not normally connected with outside circuits. The system has its own uninterruptible power supply (rated at 8 hours) that is powered by one of the Station’s Emergency Diesel Generator backed busses.

A notification will also be initiated to cognizant State/Local government agencies as soon as possible but within one hour of the termination of an event classification, or entry into Recovery Phase.

A separate form will be used to notify the designated NJ Senior State Official of Licensee protective action recommendations (PARs) for the general public in potentially affected Sectors (when a General Emergency is declared). These Licensee PARs include:

- Evacuation and shelter
- Prophylactic use of potassium iodide (KI)

The Disaster Field Office (DFO) will be established by FEMA at a location identified in conjunction with the State that serves as a focal point for Federal response team interactions with the State. The DFO will more than likely be established at Miller Airpark in Berkeley Township, N.J

During a radiation emergency at OCGS which could involve exposure to offsite personnel, the U.S. Coast Guard and NJ Marine Law Enforcement Bureau will provide assistance by notifying mariners, maintaining water traffic control, and implementing protective and parallel actions as directed. The N.J. State OEM will coordinate the emergency response activities of these agencies in support of OCGS.

In addition to the initial notification and verification, communication channels will be maintained between the facility and offsite emergency response organizations to allow for any further dissemination and update of information concerning the emergency. The communications network has been established at OCGS for notification requirements, information reporting, and decision-making.

Communicators have been assigned in each facility per Section II.B.5, identifying responsibility for establishing and maintaining an open communications link with the NRC Duty Officer and Incident Response Center, as requested.

USNRC telephones are on the Corporate PBX System, which is powered locally and at the local central office.

To ensure that proper offsite authorities are kept fully informed of the emergency status and actions in progress, the Emergency Director will ensure that follow-up messages containing the following information, if it is known and appropriate, are transmitted in a timely manner:

- Location of incident and name and telephone number (or communications channel identification) of caller
- Date/time of incident
- Class of emergency, nature of emergency, and plant status
- Type of actual or projected release and identification of potentially affected areas
- Estimate of quantity of radioactive material released or being released and height of release
- Isotopic and physical form of released material, including estimates of the relative quantities and concentration of noble gases, iodines and particulates
- Prevailing weather conditions (e.g., wind velocity, direction, temperature, atmospheric stability data)
- Actual or projected dose rates and integrated dose at exclusion area boundary and at about 2, 5 and 10 mile radius, including sectors affected
- Surface radioactive contamination levels

- Emergency response actions underway
- Recommended actions, including protective measures
- Request for on-site support from off-site organizations

Prognosis for future course of event based on current plant information

Upon notification of an event classification, the response by off-site agencies is as follows:

- Ocean County

The dispatcher at Ocean County shall notify the County Emergency Management Coordinator or his designated alternate. The County Office of Emergency Management shall then notify county and municipal personnel, as appropriate.

- State Emergency Management Agency (NJ State Police OEM)

Upon receiving notification of an emergency from the site, the Duty Officer at the Office of Emergency Management shall immediately notify the State Bureau of Nuclear Engineering.

The Office of Emergency Management Agency shall then notify the following personnel, organizations, and agencies as appropriate in accordance with their standard operating procedures:

- Ocean County
- Other affected County Emergency Management Agencies
- Selected State agencies
- Selected Federal agencies
- Bureau of Nuclear Engineering

The person at the Bureau of Nuclear Engineering (i.e., Incident Manager) who receives the notification from the State Emergency Management Agency shall:

a. Call the site Control Room to:
   - Verify actual origin of the emergency message.
   - Determine the classification of the emergency.
   - Obtain and assess information and data pertaining to the emergency.

b. Initiate activation of the BNE emergency response organization, if appropriate.

c. Advise the State EMA Duty Officer or Operations Officer of the BNE initial assessment of the emergency.

d. Notify selected Federal agencies, as appropriate.

4.2 Assessment Actions

Radiation 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 OCGS 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.

Emergency personnel, including those involved in removal of injured persons, undertaking corrective actions, performing assessment actions, providing first aid, performing personnel decontamination, providing ambulance service, and providing medical treatment services, will have their dose minimized. This is accomplished through normal Radiation Protection Practices onsite.

When offsite emergency personnel are called to respond to Oyster Creek, qualified Radiation Protection Technicians (RPT) are provided to support these teams.

Risks are determined and decisions are made to expedite lifesaving activities based upon advance radiation surveys done at the affected areas to determine stay times, shielding requirements, or the possibility of dispatching a "scouting" team to assess actual conditions.

4.2.1 Core Damage Assessment Methodology

Core damage information is used to refine dose assessments and confirm or extend initial protective action recommendations. Oyster Creek Generating Station utilizes NEDC-33045P, “Methods of Estimating Core Damage in BWRs” (Revision 0, July 2001), as the basis for the methodology for post-accident core damage assessment. This methodology utilizes real-time plant indications. In addition, Oyster Creek Generating Station may use samples of plant fluids and atmospheres as inputs to the CDAM (Core Damage Assessment Methodology) program for core damage estimation.

4.3 Protective Actions for the Offsite Public

The Ocean County Office of Emergency Management (OEM) is the established emergency response organization that will serve each affected municipal OEM in a coordination and support capacity. It will assume the coordination of all inter-municipality communications and emergency operations. Upon receipt of notification of a radiological emergency at OCGS, which requires a County response, the Ocean County Emergency Operations Center (EOC) will be activated. The Ocean County EOC is located at the Miller Air Park in Berkeley Township, NJ.

The Ocean County EOC will serve as the focal point for County emergency operations and protective actions for the duration of the emergency. Personnel and resources of the County agencies employed in local emergency operations will be under the operational control of the Director of the Ocean County Board of Chosen Freeholders and will be coordinated by the Ocean County Emergency Management Coordinator in accordance with direction received from the State Office of Emergency Management.

Dose calculations and projections performed by the OCGS ERO are relayed to the BNE in NJ. In addition, the BNE liaison in the EOF makes independent assessments and maintains contact with BRP/BNE headquarters.

The NJ Dept. of Environmental Protection, BNE, is responsible for responding to radiological incidents within their respective state boundaries. The BNE maintains personnel, facilities and equipment to assist in assessing the hazard and provide technical guidance and recommendations regarding the implementation of protective actions for the general public. The BNE perform both routine and emergency environmental monitoring.

The Emergency Director in Command and Control approves PARs. Recommendations are developed when it is apparent that a release is possible or underway and dose projections indicate protective actions may be required for the public and within approximately 15 minutes of the declaration of a General Emergency.

OCGS ERO personnel normally do not have the necessary information to determine whether off site conditions would require sheltering instead of evacuation. When prior knowledge of offsite impediments to evacuate exist (such as severe weather or other travel restrictions), then sheltering shall be considered over evacuation recommendations.

The responsibility for actions to protect persons in offsite areas rests with the State and is described in detail in the State Emergency Plan and implemented in conjunction with the county emergency plans.

The State Bureau of Nuclear Engineering (BNE) is the specific agency responsible for evaluating information from the OCGS staff and all other sources and recommending to NJ-OEM that protective actions be taken. The BNE has sheltering and evacuation as protective action options. The most appropriate protective action for a particular situation will depend on the magnitude of the release, duration of the

release, wind speed, wind direction, time of day and transportation constraints.

In the case of a General Emergency, circumstances may indicate the immediate need to initiate some precautionary protective action. This judgment is the responsibility of the BNE and should be based on an evaluation of the current plant conditions, dose projections relative to the PAG's and expected subsequent plant operations/evaluations.

Off-site it is the responsibility of the State Department of Agriculture, in conjunction with the Departments of Environmental Resources/Protection and Health, to issue guidance and coordinate actions to control contaminated agricultural products.

The means to warn or advise involved persons is a responsibility of the risk county. The risk county, in coordination with the State, is also responsible for the preparation and dissemination of information material for the general public on protective actions including necessary information (evacuation routes, maps, etc.) for the implementation of protective measures in the Plume Exposure Pathway.

The principal off-site local coordinating agency for providing response to radiological emergencies in the vicinity of OCGS is the Ocean County Office of Emergency Management. The population and land area within the Plume Exposure Pathway EPZ is wholly within Ocean County. Upon notification of a situation that may require protective actions by the offsite population, the Ocean County Emergency Management Coordinator will initiate appropriate actions in accordance with the Ocean County Radiological Emergency Response Plan and in coordination with the NJ-OEM.

The Ocean County Office of Emergency Management and NJ-OEM have prepared detailed plans for implementing protective actions including:

- Prompt notification of the population within a 10-mile radius of OCGS.
- Transmitting specific instructions to potentially affected populations.
- Providing assistance for evacuation of all specific segments of the population within the 10-mile Emergency Planning Zone.
- Providing reception and mass care centers for evacuated individuals.

The population within the 10-mile Emergency Planning Zone will be provided, on a periodic basis, information describing the methods by which they will be notified of an emergency and specific instructions that should be followed upon receipt of such notification.

4.3.1 Alert and Notification System (ANS) Sirens

Prompt notification and instructions to the population at risk are accomplished by the NJ- OEM and the affected county emergency management organizations. The ANS is the vital first link in this process. Sirens are used for prompt notification throughout the Plume Exposure Pathway EPZ.

After state authorities have been notified, the ANS and EAS are the primary means of notifying the population within the Plume Exposure Pathway EPZ. Ocean County can activate the sirens located in the Plume Exposure Pathway EPZ. This siren signal is a three to five minute steady tone that alerts the population to tune their radio or television to the local EAS station.

The NJ-OEM and the Ocean County has the capability to broadcast emergency information messages advising the population of what actions should be taken, if any. These EAS messages will be repeated at frequent intervals to ensure proper dissemination. In addition to the Alert Notification System and the EAS message, state and/or municipal police and fire departments will act to supplement emergency notification through the use of route alerting procedures, as necessary.

The Oyster Creek Alert Notification System (ANS) meets the guidelines of Appendix 3 to NUREG-0654-FEMA-REP-1, “Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants as identified in each site specific siren acoustical evaluation” (Revision 1).

The OCGS ANS is comprised of 42 sirens throughout portions of Ocean County that fall within the OCGS Plume Exposure Pathway EPZ.

A complete description of the siren system to include siren ratings, siren coverage, and location is located with the Emergency Preparedness Department.

The ANS will be activated by the Ocean County Sheriff's department upon receipt of notification of an emergency situation that would require the dissemination of pertinent information to the public. The emergency situation that could require the sounding of the warning systems may be a natural catastrophe, industrial accident, or fixed nuclear facility emergency which may require protective action. The siren sounding is intended as an alerting mechanism to have the public monitor a designated Emergency Alert System radio station for emergency information. If an incident at the plant warrants the activation of the ANS, the initial notification will be made to NJ-OEM. NJ-OEM will in turn notify the BNE and Ocean County.

Ocean County will activate the sirens via radio signal, which is received and translated by the individual sirens, causing the siren to sound. The preventive maintenance program for the system insures a high degree of reliability. The sirens are inspected and tested in accordance with NUREG-0654 guidance on a continuous schedule.

Sirens are sounded annually for three minutes by Ocean County. Exelon retains system ownership and maintenance responsibilities.

The Siren Communications Testing occurs weekly with a Silent Test which includes a Quiet/Growl (Equipment) Test monthly. The Quiet/Growl Test is also performed during preventive or corrective maintenance. The Quiet/Growl testing is more frequent than the quarterly requirement stated in the Standard Plan.

4.3.2 Evacuation Time Estimates

The ETE study used population data from the 2010 census which includes Ocean County, New Jersey. The evacuation times are based on a detailed consideration of the EPZ roadway network and population distribution. The ETE Study, contained in EP-AA-1010 Addendum 2, Evacuation Time Estimates for the Oyster Creek Plume Exposure Pathway Emergency Planning Zone, presents evacuation times for daytime and nighttime scenarios under various weather conditions for the evacuation of various areas around the Oyster Creek Station, once a decision has been made to evacuate.

4.3.3 Potassium Iodide (KI)

OCGS ERO personnel will recommend to offsite officials the issuance of KI for the general public within the EPZ.

4.3.4 Public Information

a. Publications

Annually in conjunction with NJ-OEM and Ocean County, emergency-related information containing educational information on radiation, contact points for additional information and protective measures is disseminated to all residents, business establishments, hotels, motels and parks within the Plume Exposure Pathway EPZ. In addition, a means is provided for individuals requiring special assistance to be identified and accommodated.

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 OCGS 4-2: Plant-Based PAR Determination Flowchart, illustrates affected downwind sectors based on wind direction, using the generic plant-based event logic as outlined in Section II.J.10.m.1 of the Exelon Nuclear Standardized Radiological Emergency Plan. Further evaluation of PAR based on dose assessments shall be performed in accordance with Section II.J.10.m.2 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. 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 location. 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 are accounted for at the security exit point. Emergency response personnel are accounted for by badging into their assembly areas.

4.4.3 Monitoring of Evacuees

Evacuees from the Oyster Creek Site are checked for contamination.

Necessary personnel and vehicle decontamination efforts are initiated at the decontamination centers. 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.

The registering and monitoring of the general public evacuating from the Plume Exposure Pathway EPZ, as described in Section II.J.12 of the Exelon Nuclear Standardized Radiological Emergency Plan, will occur at designated facilities per the respective State and County Radiological Emergency Response Plans.

Personnel and equipment decontamination will be initially accomplished at the Radiological Controls Access Control Point where specialized equipment and supplies are available using Radiation Protection procedures. For personnel within the Protected Area, emergency situations that require decontamination will be handled in accordance with these procedures and the Emergency Plan implementing procedures.

All personnel leaving a Radiologically Controlled Area will be monitored for contamination. Any individual found to have contamination levels in excess of RP Practices at the site will be considered contaminated. Personnel found to be contaminated will undergo decontamination by Radiation Protection personnel (or other designated personnel as specified in Emergency Plan implementing procedures). Measures will be taken to prevent the spread of contamination that include isolating affected areas, placing contaminated personnel in "clean" protective clothing before moving, and decontaminating in accordance with Radiation Protection Procedures.

In the event that a release of contaminants has occurred or is occurring, in-plant potable water systems will be secured to prevent possible contamination. If food and water supplies are brought in for emergency personnel who remain on-site these supplies will be packaged in sealed containers and will be monitored by Radiation Protection personnel (using standard RP practices and procedures) prior to use or consumption and on a normal routine basis. Any food or water supplies discovered to be contaminated will immediately be disposed of as waste and will not be used.

Upon receipt of information that the emergency has entered recovery phase, in-plant facilities and areas will be surveyed, sampled, and cleared for use, or controlled as necessary, in accordance with applicable Radiation Protection practices.

Equipment for decontamination personnel will be stored in Emergency Supply Lockers. Portable survey instruments are available and routinely calibrated for use in decontamination operations. All skin contamination problems will be treated using accepted Radiation Protection practices.

For contaminated personnel inside the Protected Area, the preferred

decontamination facility will be the onsite Monitor and Control Station if accessible; otherwise offsite facilities will be used.

4.5 Severe Accident Management

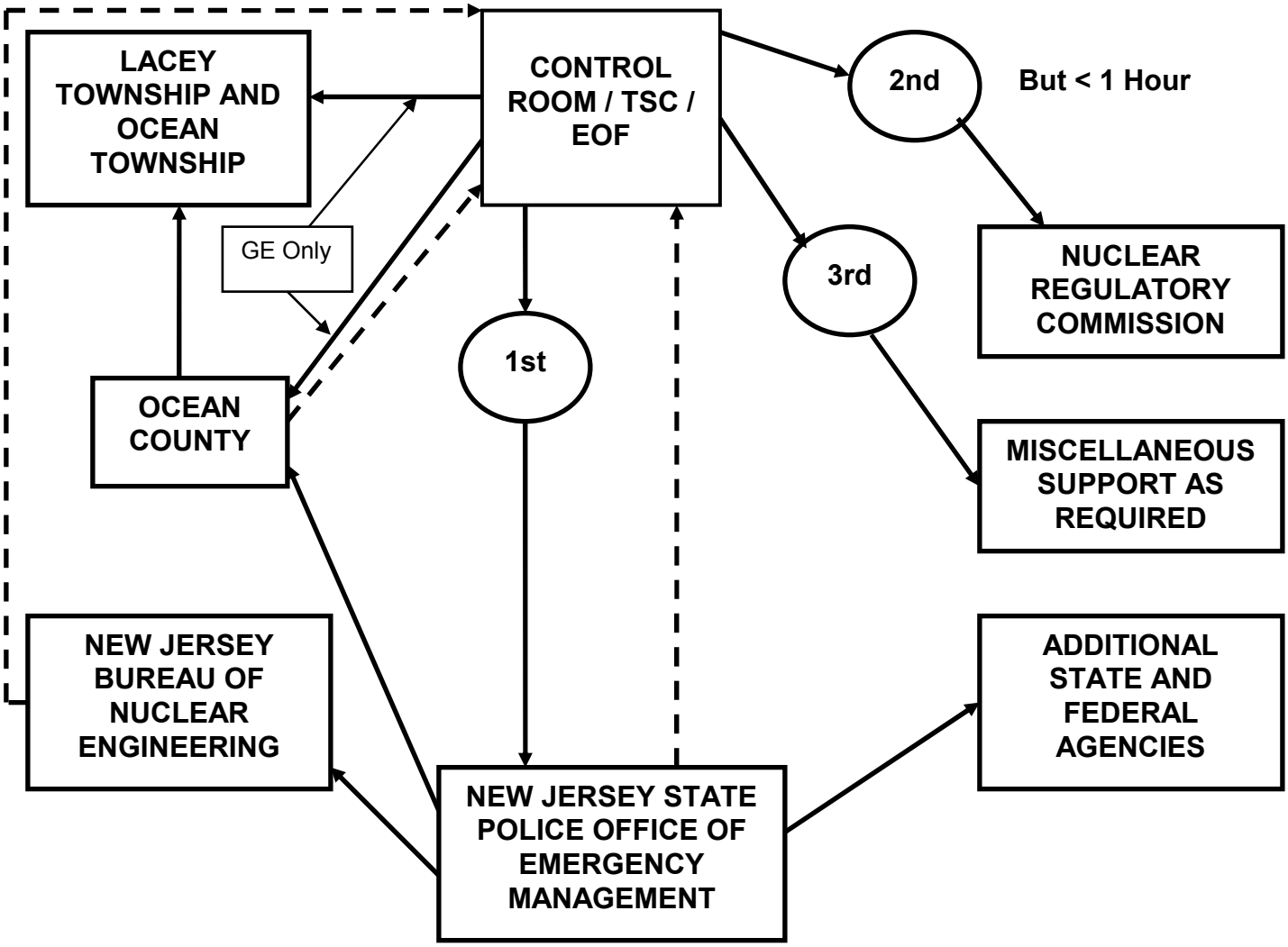
Accident management consists of those actions taken during the course of an accident, by the Emergency response Organization (ERO), specifically: plant operations, technical support, and plant management staff in order to:

- 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 Guidelines (SAMGs) provide sound technical strategies for maximizing the effectiveness of equipment and personnel in preventing, mitigating and terminating severe accidents.

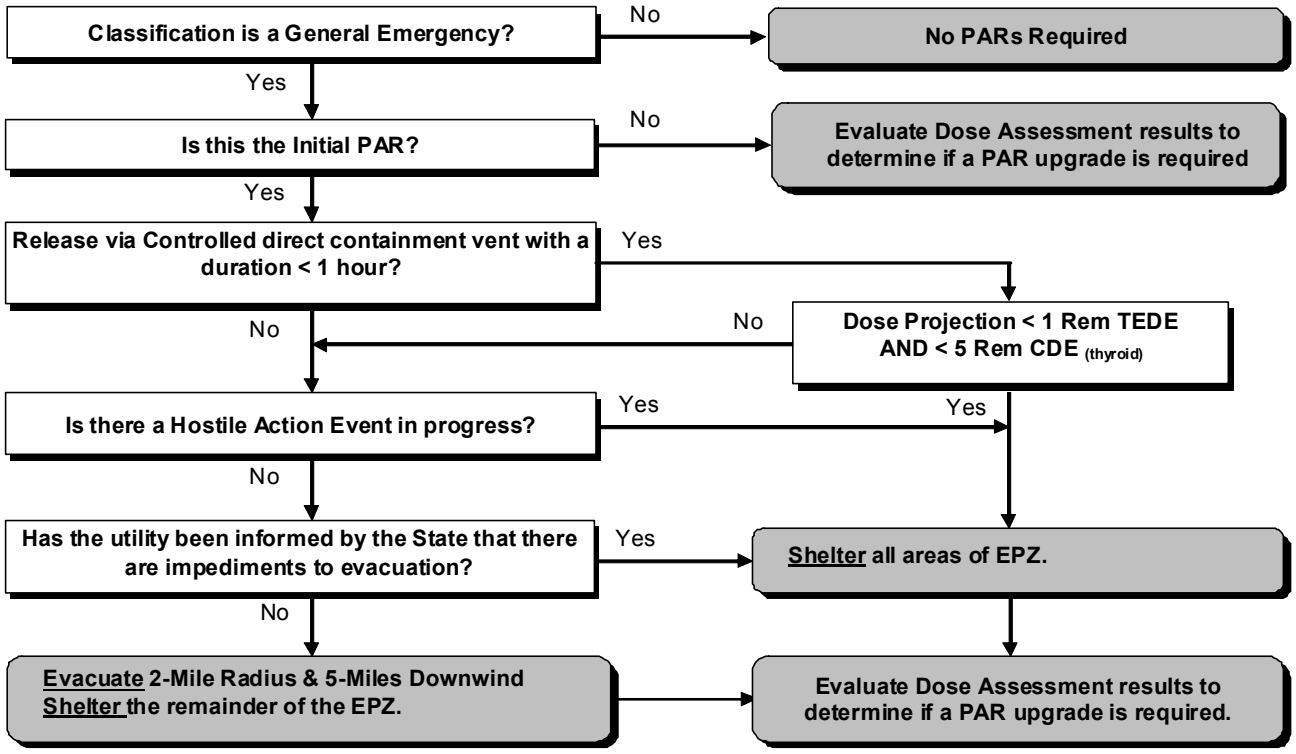
Implementation of SAMG procedures is a collaborative effort between the Shift Manager and the Station Emergency Director in the TSC (once activated). The Station Emergency Director maintains ultimate responsibility for direction of mitigating strategies. Designated TSC Technical and Operations Support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

Figure OCGS 4-1: OCGS Notification Network



Notifications are sequenced as shown, with the order of notifications designated by 1st, 2nd, and 3rd. **If** the event is a General Emergency, **then** the NJ-OEM, Ocean County, Ocean Township and Lacey Township must be notified within 15 minutes. The NRC is notified after State and Local notifications are complete but within 1 hour.

Figure OCGS 4-2: Plant-Based PAR Determination Flowchart



WIND DIRECTION FROM		AFFECTED DOWNWIND SECTORS	WIND DIRECTION FROM		AFFECTED DOWNWIND SECTORS
N	350 to 011	SSE / **S** / SSW	S	170 to 191	NNW / **N** / NNE
NNE	012 to 034	S / **SSW** / SW	SSW	192 to 214	N / **NNE** / NE
NE	035 to 056	SSW / **SW** / WSW	SW	215 to 237	NNE / **NE** / ENE
ENE	057 to 079	SW / **WSW** / W	WSW	238 to 259	NE / **ENE** / E
E	080 to 101	WSW / **W** / WNW	W	260 to 281	ENE / **E** / ESE
ESE	102 to 124	W / **WNW** / NW	WNW	282 to 304	E / **ESE** / SE
SE	125 to 146	WNW / **NW** / NNW	NW	305 to 326	ESE / **SE** / SSE
SSE	147 to 169	NW / **NNW** / N	NNW	327 to 349	SE / **SSE** / S

Section 5: Emergency Facilities and Equipment

5.1 Emergency Response Facilities

5.1.1 Station Control Room

The Control Room is the centralized onsite area, located on the 46' elevation of the Turbine Building, from which the reactor and major plant systems are operated. The Control Room is equipped with instrumentation to supply detailed information on the reactor and major plant systems, and meteorological, radiological and plant system parameter readouts integrated with assessment aids for all critical plants systems and provide access to all station communication systems. The Control Room is continuously staffed with qualified licensed operators.

The Control Room, which includes the Shift Manager's office areas for EP purposes, is the first onsite facility to become involved with the response to emergency events. Control Room personnel must evaluate and effect control over the emergency and initiate activities necessary for coping with the emergency until such time that support centers can be activated. These activities shall include:

- Reactor and plant control.
- Initial direction of all plant related operations.
- Accident recognition, classification, mitigation and initial corrective actions.
- Alerting of onsite personnel.
- Notification of appropriate individuals and activation of the Emergency Response Data System (ERDS).
- Activation of emergency response facilities and ERO notification.
- Notification of offsite agencies.
- Continuous evaluation of the magnitude and potential consequences of an incident.
- Initial dose projections.
- Recommendations for immediate protective actions for the public.

As other ERFs become activated, they will supply support to the Control Room, although overall Command and Control of the emergency will transfer to the SED (TSC) or the CED (EOF). Throughout all emergencies, the Control Room maintains its emergency activation status until its normal operational status may be resumed.

The Control Room, including the Shift Manager's Office, is designed to be habitable under accident conditions and will serve as the primary onsite Emergency Response Facility. These areas are located in seismically rated structures and have adequate shielding to permit safe occupation for extended periods of time.

The OCGS control room ventilation system can be operated in an emergency mode with 100 percent outside air to prevent recirculation of smoke in the control room and to clear the areas of smoke and fumes. This system has been modified to prevent smoke from other areas from entering the control room.

Emergency lighting, power, ventilation system, and shielding walls enable operators to remain in the Control Room to ensure that the reactor will be maintained in a safe condition. In addition, the operators will be able to evaluate plant conditions and relay pertinent information to appropriate onsite and offsite personnel, organizations, and agencies during emergencies. To ensure the operations shift and other personnel assembled at the location can remain self-sufficient, emergency equipment and supplies will be stored in or near the Control Room.

5.1.2 Technical Support Center (TSC)

The OCGS has established a TSC in the Site Emergency Building for use during emergency situations by station management, technical, and engineering support personnel. The TSC is activated for all emergencies classified as Alert or higher. Activation for other events is optional. When activated the TSC functions include:

- Support for the Control Room's emergency response efforts.
- Performance of the non-delegable functions when in Command & Control.
- Continued evaluation of event classification.
- Assessment of the plant status and potential offsite impact.
- Coordination of emergency response actions.
- Notification of appropriate corporate and station management.

- Notification and update of the NRC via Emergency Notification System (ENS) including verifying activation of ERDS by the Control Room.

The TSC is the onsite location utilized to support the Control Room for assessment of plant status and potential offsite impact, and for implementation of emergency actions. The TSC provides technical data and information to the EOF.

Figure OCGS 2-1: Emergency Onsite Organization illustrates the staffing and organization of the TSC.

The TSC provides reliable voice communications to the Control Room, the OSC, the EOF, the NRC, and state and local Emergency Operations Centers. In addition, they provide facsimile transmissions capability (see Section F.1).

A HEPA and charcoal-filtered ventilation system, continuous air monitors and an area radiation monitor shall protect personnel in the TSC from radiological hazards. In addition, protective breathing apparatus and KI are available for use as required.

Records and drawings, which describe conditions and layout of structures, systems, and components, are contained in filing cabinets inside the TSC.

5.1.3 Operational Support Center (OSC)

OCGS has established an Operations Support Center (OSC) in the Drywell Processing Center. The OSC is the onsite location to where station support personnel report during an emergency and from which they will be dispatched for assignments or duties in support of emergency operations. The OSC shall be activated whenever the TSC is activated, but need not remain activated at the Alert level if the Station Emergency Director judges its use unnecessary. At the Site Area and General Emergency levels, the OSC or an alternate OSC shall be activated at all times. Activation for other events is optional. Station disciplines reporting to the OSC include, but are not limited to:

- Operating personnel not assigned to the Control Room,
- Radiation Protection Personnel,
- Chemistry Personnel,
- Maintenance Personnel (mechanical, electrical and I&C).

Figure OCGS 2-1: Emergency Onsite Organization illustrates the staffing and organization for the OSC.

5.1.4 Emergency Operations Facility (EOF)

The OCGS EOF is co-located with the JIC in Toms River, New Jersey and is approximately 12 miles from the OCGS site. The facility is equipped with data transmission links with the plant, status boards and dedicated communication links with the CR, TSC, OSC, NRC, State Bureau of Nuclear Engineering (BNE), and the JIC. Drawings that describe the as-built conditions and layout of the structures, systems, and components and applicable operating procedures are available at the OCGS.

Space and telephone provisions have been made for BNE and NRC liaison representatives.

5.1.5 Joint Information Center (JIC)

OCGS has a designated JIC/ENC, located in Toms River NJ, which is co-located with the EOF.

Rumor Control at Oyster Creek is handled by the NJ Office of Emergency Management.

5.1.6 Evacuation Locations

If a Site Evacuation is required, nonessential personnel are directed to immediately evacuate the site. Personnel will be directed to either proceed to their homes or to reassemble at the designated offsite Remote Assembly Area as designated by the Station Emergency Director in accordance with station procedures. Visitors to the station will assemble with and follow the instructions of their escorts. Nonessential personnel within the Protected Area will normally exit through the Main Processing Center. Personal transportation (if available) will normally be used and established evacuation routes will be followed. Personnel without transportation will be identified and provided transportation as necessary.

5.1.7 Alternative Facility

The Alternative Facility maintains the capability for staging the TSC/OSC emergency response organization personnel in the event of a hostile action. This alternative facility has the capability for communications with the emergency operations facility, control room, and plant security. The Alternative Facility is co-located with the EOF at 1268 Rt. 37 West Toms River, NJ.

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 OCGS UFSAR.

Meteorological data have been collected onsite since February of 1966. The current meteorological tower is 400 ft. high and located 2529 feet (0.48 miles) west-northwest of the OCGS stack. The tower is instrumented with complete redundant sensors at all three levels, 33 feet, 150 feet, and 380 feet. A back-up electrical power supply is available, if necessary.

The instrumentation and meteorological variables measured at each level are as follows:

Approximate Height Above Tower Base (ft.)	Parameter
380 ft.	wind speed, wind direction, temperature, DT 380 33
150 ft.	wind speed, wind direction, temperature, DT 150-33
33 ft.	wind speed, wind direction, and temperature
Ground Level	rainfall

The variables are measured every 10 seconds and are averaged for 15 minute periods before being archived using a computer.

There are redundant wind speed, wind direction, and temperature sensors at the 33 feet, 150 feet, and 380 feet levels to insure efficient data recovery and to comply with U.S. Nuclear Regulatory Commission Regulatory Guide 1.23 requirements. In addition, a processor calculates vertical temperature differentials between the 150 and 33 ft. and the 380 and 33 ft. levels.

The meteorological tower sensors, chart recorders, and processors are calibrated at least semi-annually as per Regulatory Guide 1.23. Periodic tower inspections are made to insure maximum data integrity. A full description of the Onsite Meteorological Measurement Program is included in the UFSAR.

Meteorological data can be remotely interrogated by telephone by the NRC and New Jersey State agencies.

b. Offsite Meteorological Monitoring Program

The National Weather Service (NWS) can provide backup meteorological information (e.g., wind speed, temperature, and wind direction) from several locations in the vicinity of the Oyster Creek site. The information for various locations is available through the Mt. Holly, NJ office.

Air stability determinations are also provided, with information received from weather stations in Pittsburgh; Washington, D.C.; Binghamton, NY; and Mt. Holly, NJ.

Back-up meteorological information from the National Weather Service is also available indirectly from other sources that collect National Weather Service data.

c. Seismic Monitoring

Although OCGS currently does not have seismic or hydrologic instrumentation installed onsite, offsite hydrologic information can be obtained from the Hydrologic Division of the United States Geological Survey and offsite seismic information can be obtained from the Lamont Doherty Geological Observatory, the New Jersey State Geological Survey or the United States Geological Survey.

5.2.2 Radiation Monitoring Equipment

The onsite Radiation Monitoring System contributes to personnel protection, equipment monitoring, data gathering, and accident assessment by measuring and recording radiation levels and concentrations of radioactive material at selected locations within the plant. The Radiation Monitoring System alarms and initiates required emergency actions when radiation levels or radionuclide concentrations exceed predetermined levels. Area, liquid, and atmospheric monitoring subsystems are required to perform these functions.

Specific details regarding radiation monitoring and effluent monitoring systems can be found in system design descriptions (SDDs) and Updated Final Safety Analysis Report.

The data from these subsystems are displayed by readout in the Control Room. Recorders and/or the plant process computer located in the Control Room record selected channels.

In general the radiation monitoring equipment is designed in accordance with the following:

- Each monitoring station has adjustable alarm, alert, and power supply failure alarms.
- Solid-state circuitry is used except for primary detectors.
- Most AC operated radiation monitoring equipment, except for the pump assemblies, is provided with power from the battery-backed, inverter-fed vital power supply bus.
- Each radiation monitor is capable of being checked periodically with solenoid actuated check sources.
- A pulse generator or solid sources are used for electrically checking each monitor or subsystem.
- The modules are designed so that an alarm and/or indication are initiated when failure occurs anywhere in the channel.

a) **Area Radiation Monitors (ARMs)** -- Plant areas are provided with area radiation monitors in the Augmented Off-Gas (AOG), Turbine, Reactor, old Radwaste and new Radwaste buildings.

In-plant ARMs (turbine, reactor and old radwaste buildings) are the Geiger-Mueller type. The AOG building and the new Radwaste building utilize ionization chambers.

Each in-plant monitor has a remote indicator, an alarm and is recorded on one of two multi-channel recorders in the Control Room.

The monitors are provided with an upscale alarm which is set using past plant operating experience and warns of an abnormally high radiation level and each monitor is provided with a downscale alarm which warns of instrument channel failure. The individual detectors and associated instrumentation for the AOG and the new Radwaste buildings are provided with local indication and alarm, range indication on the respective AOG and new Radwaste control panels, high and high-high alarm for concerned level and limit level respectively.

b) **Atmospheric Radiation Monitoring** -- Atmospheric Radiation Monitoring is provided by Main Stack RAGEMS, Turbine Building RAGEMS, Air Ejector Off-Gas Monitoring, Reactor Building Ventilation Monitoring, and AOG Building monitoring.

RAGEMS (Radioactive Gas Effluent Monitoring System) has been installed to comply with NUREG-0737. These systems will provide for a continuous monitoring of noble gas releases, continuous particulate and iodine samplers are included in the RAGEMS. The systems are designed to detect noble gas.

Iodine and particulate samples from both systems must be manually analyzed to provide isotopic concentrations of halogens and particulates. RAGEMS data is accessible from recorders in the control room and/or by accessing the RAGEMS system computers, or the plant computer system.

The Air Ejector Off-Gas Monitoring Subsystem draws a sample of the condenser off-gas downstream of the steam jet air ejectors. A 2-minute delay line is provided to allow for the decay of N-16 and 0-19 before passing through the sample chamber.

The sample chamber is provided with two detectors. Output is recorded on a recorder located in the Control Room. The count-rate meters have adjustable downscale trip and upscale trips. The upscale trips are set in accordance with Station procedures not to exceed Technical Specification requirements while the downscale trip is set to indicate instrument failure. Any combination of either two "Hi-Hi" upscale trips or one "Hi-Hi" upscale and one downscale trip will initiate a 15 minute timed closure of the off-gas exhaust valve at the stack or isolate the augmented Off-Gas system if in operation. The recorders have an adjustable upscale "Hi" alarm set at a value equivalent to the maximum allowable stack gas release rate.

The Reactor Building Ventilation Monitoring Subsystem provides continuous monitoring of the gaseous discharges from the Reactor Building ventilation systems through the use of two Geiger-Mueller detectors located upstream of the ventilation outlet isolation valves. The downscale alarm indicates instrument failure, while the upscale trip is set at an acceptable radiation concentration. The activation of the upscale trip will close the Reactor Building ventilation inlet and outlet isolation valves, trip the ventilation fans and energize the standby gas treatment system.

However its usefulness is limited due to its sensitivity to other external radiation sources.

c) The **Main Steam Line Radiation Monitoring System** utilizes detectors mounted next to each of the primary steam lines. This subsystem provides continuous monitoring of the primary steam lines, which gives an immediate indication of a gross release of fission products from the fuel to the reactor coolant and subsequently to the turbine.

The detectors located immediately upstream of the outer isolation valves at the drywell penetration provide an output to a meter and a recorder located in the Control Room.

Each monitor has a downscale alarm and an adjustable upscale alarm set at less than or equal to five times normal. If the indicated value on two or more monitors reaches ten times normal, station procedures direct the scramming of the reactor and the closure of all four main steam isolation valves.

d) The **Augmented Off-Gas (AOG) Building Ventilation Exhaust Monitoring System** is designed to monitor and sample the effluent for iodine, gas, and particulates. The data from these subsystems are displayed by local readouts on the AOG control panel and are recorded by strip chart recorders displayed locally.

e) The **Containment High-Range Radiation Monitors (CHRRMS)** have been installed at OCGS to monitor containment radiation levels.

f) The **Process Liquid Monitoring Subsystem** provides the continuous monitoring of three process liquid streams: the radwaste discharge, the reactor building closed cooling-water system and the reactor service-water discharge. The radwaste monitor is located in the radwaste discharge line external to the radwaste building, downstream of the flow control valves. The reactor building closed cooling-water probe is located at the discharge header of the cooling water pumps. The reactor service-water monitor is located in the service water discharge of the closed cooling-water heat exchanger.

For liquid releases, the radionuclide concentration at any downstream location is determined by taking liquid effluent concentrations and applying the effluent flow rate and volumetric flow rate of the receiving water. Downstream users will be notified to curtail intake if the projected concentration is above the level specified in the procedures.

g) The **Post-Accident Sampling System (PASS)** was designed to sample five separate post-accident media from eight separate sampling points.

Liquid samples may be taken of the reactor water from "A" recirc loop, the liquid poison system or the shutdown cooling system and of torus water from the core spray system.

Gaseous samples may be taken of the drywell atmosphere from the hydrogen monitoring system and from the ring header. Gaseous samples may be taken of torus atmosphere and secondary containment from the TIP room.

h) **Continuous Radiological Environmental Surveillance Telemetry System (CREST)**

The NJDEP Bureau of Nuclear Engineering operates the CREST system, comprised of Reuter Stokes radiation monitors located in all sixteen compass sectors. The monitors transmit ambient gamma radiation levels and meteorological data back to the central processor via leased telephone lines every minute. The central processor creates hourly and daily reports and automatically sends them to designated printers. Two types of monitors are used, ranging from 0 to 100mR/hr and 10R/hr. Alarm thresholds can be determined, triggering reports when radiation levels are elevated and set points are exceeded.

If the instrumentation used for radiological assessment is off-scale or inoperative, in-plant sample data may be utilized from the affected ventilation pathway and utilize contingency calculations utilized based on plant conditions. Concurrently, radiological/environmental survey teams are sent to these locations of interest to take actual field measurements in order to verify the projections and to correlate projected versus actual results.

5.2.3 Data Acquisition Methods

Plant Process Computer System (PPC)

The OCGS 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. PPC 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.

PPC 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.

PPC 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.

PPC 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.

5.2.4 Onsite Fire Detection Instrumentation

The Fire Service Water System, the Halogenated Fire Suppression Systems, the CO_2 Fire Extinguishing System, and the Fire Detection/Alarm System provide fire Protection at OCGS.

The Fire Service Water System is a full-loop, piped system that supplies water for sprinklers, deluge water spray, fire hydrants and hose connections that are located to provide fire protection for all major areas of the plant. A man-made pond containing approximately 7 million gallons of water supplies a water source for this system. This system is maintained in a pressurized condition by an electric drive pond pump.

In the event a fire occurs, and either an automatic or manual system is initiated, the Fire Service Water System piping pressure will decrease which will sequentially start two diesel fire pumps to meet system flow requirements. The backup supply of Fire Service water consists of a 350,000-gallon tank and electric pump, which may manually be initiated to supply the loop should the primary source of water be inoperable.

Automated Halogenated Fire Suppression Systems are provided in the Control Room panels, the station battery A and B room and the 480-volt switchgear room to quickly suppress any fires that may occur.

The CO_2 Fire Extinguishing System provides fire protection for the 4160 Switchgear Vault. When a manual pushbutton is depressed, the CO_2 is discharged into the 4160 Switchgear Vault after a time delay.

5.2.5 Facilities and Equipment for Offsite Monitoring

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

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 there transport to an offsite laboratory for analysis.

The Oyster Creek laboratory facility is equipped to provide the water chemistry and radiochemical analysis support required during normal plant operations and emergencies.

Personnel in the EOF will designate the location to be used for the receipt and analysis of radiological field monitoring samples. Typically, this is a location on the Oyster Creek site. Arrangements will then be made for the transportation of collected samples to the on-site lab or contracted facility. Sampling and analysis equipment is available on-site for activity determination of these samples.

The Shift Dose Assessor, if required, may dispatch off-site Field Monitoring Teams. If not required as part of initial event response, responsibility for the mobilization of Field Monitoring Teams will by assumed by the TSC, upon facility activation.

These teams will consist of one to two persons per team, trained in the use of portable radiation monitoring equipment. When dispatched, the teams will pick up portable radios, and emergency kits containing portable monitoring equipment.

After an operational check of the equipment, including a radio operability check, they will proceed in an emergency vehicle to their first monitoring location. They will be controlled by the TSC Radiation Controls Coordinator and will report directly to him/her. The site has the capability to dispatch up to two field-monitoring teams within one-half hour of the emergency declaration, if necessary.

Procedures are in place that enables monitoring teams to detect airborne radioiodine and particulates under field conditions in the presence of noble gases and background radiation.

Based on dose projections and meteorological conditions, the Field Monitoring Teams can be directed to the location of interest to take readings and confirm the projection. Field Monitoring Team data lend credence to the dose projection process; better quantify ground receptor dose rates and alert plant personnel of any unmonitored release pathways or potential problems in the dose projection process.

When the Emergency Operations Facility (EOF) is ready (typically within one hour of the declaration of an Alert or higher classification), the responsibility for offsite radiological and environmental monitoring will be transferred to the Dose Assessment Coordinator. (NOTE: The Radiation Controls Coordinator will maintain control of the onsite survey team(s) and onsite radiological controls assessment.)

Two (2) Field Monitoring Teams can be dispatched during an emergency situation. This can be backed-up with two additional teams, should it become necessary. Communications with the field teams is generally performed using two-way radios.

The EOF Dose Assessment Coordinator, and his/her staff, can obtain additional monitoring teams from the OCGS and other Exelon sites.

Typical environmental/radiological monitoring equipment includes:

- Air Samplers -- Analysis for airborne radioiodine and particulates
- Environmental Sampling Equipment -- environmental media sampling
- Pressurized Ionization Chamber (PIC) -- gamma radiation
- Dosimeter of Legal Record (DLR) -- beta, gamma radiation
- Geiger Mueller Detectors -- beta, gamma radiation

Vendor/contractor support can be used to perform collection and analysis. Oyster Creek Generating Station will ship collected environmental samples offsite for analysis.

5.2.6 Site Hydrological Characteristics

Although OCGS currently does not have seismic or hydrologic instrumentation installed onsite, offsite hydrologic information can be obtained from the Hydrologic Division of the United States Geological Survey and offsite seismic information can be obtained from the Lamont Doherty Geological Observatory, the New Jersey State Geological Survey or the United States Geological Survey.

5.3 Protective Facilities and Equipment

5.3.1 Emergency Supplies

The site is extensively equipped to conduct preventive maintenance and repairs on mechanical, structural, electrical, and instrumentation and controls equipment found in the plant. Operational policy requires that a minimum maintenance crew be assigned to the onsite shift organization at all times. Each individual assigned to the maintenance crew is qualified and certified to perform the tasks associated with his craft in the working environment of a nuclear plant.

In addition to the equipment and materials required for normal maintenance, other items are available to handle extraordinary maintenance jobs that might arise in damage control. Selection of damage control equipment inventory is based upon (a) mitigating the consequences of flooding, (b) personnel rescue, (c) checking the uncontrolled flow of fluids from process systems, and (d) elimination of electrical hazards.

The site also maintains an inventory of protective clothing, respiratory equipment, survey instruments and supplies to provide adequate contamination control for all personnel expected to be onsite who might be affected in the event of an emergency. The supplies are maintained, updated, inventoried and calibrated, as appropriate, on a regular basis in accordance with applicable procedures. Storage locations of emergency supplies can be found in the site implementing documents.

5.4 First Aid and Medical Facilities

Emergency first aid and medical treatment will be given to injured personnel who may or may not be contaminated. Shift personnel, trained in first aid, will be available onsite on a 24-hour per day basis and will assist contaminated personnel at the scene of the accident. Provisions have been made, through agreements, to ensure contaminated and injured personnel will receive specialized medical treatment, if necessary. Local hospitals in the vicinity of the Oyster Creek site have agreed to accept contaminated patients for emergency medical and surgical treatment and/or observation.

A comprehensive program of radiological control for injured/contaminated personnel has been developed and will be instituted when necessary during an emergency. The primary emphasis will be to initially address traumatic or life-threatening injuries since radiation injuries may not be immediately life threatening. Detailed instructions for treatment and transportation of contaminated and injured individuals are specified in appropriate procedures.

First aid facilities are designed to support a wide range of immediate care requirements ranging from simple first aid to procedures requiring a physician. Small kits placed throughout the plant provide the most readily available first aid. These kits contain items typically needed to care for minor injuries. The next level of first aid equipment is found at first aid stations. Trained personnel can also provide Advanced Life Support and routine trauma care.

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

Additionally, the site Medical Department maintains a current prescription and adequate supplies of potassium iodide for issue to personnel exposed or suspected of exposure to radioactive iodine.

5.4.1 Decontamination and Medical Response

Arrangements for hospital and medical services for injured or contaminated/overexposed personnel are provided for by letters of agreement.

The first level of treatment can be given on-site. Qualified site personnel will render on-site emergency medical services. If the severity of the injury requires more extensive or prolonged treatment, the patient will be transported for the second level of assistance. For conventional injuries (that is, non-radiation injuries), the patient will be transported to any of the local hospitals.

Arrangements for hospital and medical services for injured and/or contaminated/overexposed personnel are provided by Community Medical Center, and Southern Ocean County Hospital, NJ. These hospitals have agreed to accept contaminated patients for emergency medical and surgical treatment or observation. Detailed plans and procedures are in place for decontamination and treatment of contaminated patients.

5.4.2 Medical Transportation

Transportation of injured personnel, who may or may not be radioactively contaminated, to medical treatment facilities is provided by local ambulance services.

Agreements have been made with local medical support organizations to provide ambulance services to the OCGS site. Ambulance personnel will be certified in accordance with State regulations. OCGS will offer training to the squad members in the treatment and transportation of contaminated injured individuals. OCGS will provide radiological control technicians if available to assist the squads enroute to the hospital. Local first aid squads provide ambulance service for the facility.

When affected personnel must be transported, measures will be taken to prevent the spread of contamination. Such measures will include placing affected personnel in "clean" protective clothing or wrapping in blankets. The Shift Manager will insure that the organizations that will provide the transportation and treatment are alerted.

Detailed instructions for treatment and transportation of contaminated and injured individuals are specified in appropriate procedures.

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.

1) Telephone Systems: The OCGS site is served by the Private Phone System (PBX) and direct commercial lines. These systems are expected to function during emergencies as they do during normal plant operations. Site telephone communications to other Exelon sites are provided via dedicated T-1 lines provided by commercial carrier. Access to this system is through the plant telephone system that bypasses potentially congested public-use circuits. Backup to these routes are commercial business lines.

   Automatic dialing equipment also provides automatic dialing of pre-selected telephone numbers, reducing callout/notification time and dialing errors.

   OCGS has direct offsite Commercial Phone system lines in each ERF and are supplied by phone company backup power. PBX power supplies support in-plant lines in each ERF as follows: 12.5KV offsite power, 19.9KV backup offsite power and backup battery power for 8 hours. In plant emergency circuits are also on the PBX and have an additional 8-hour battery backup. Offsite emergency circuits are carried by both dedicated T-1 lines and commercial business phone systems. The Commercial Phone system circuits have the same backup power as other such circuits.

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

2) Radio Communications: Radio communication equipment used during normal plant operations will be used in an emergency to communicate with mobile units and to provide backup to the telephone system.

OCGS, base stations are located in the Control Room and the Emergency Operations Facility. The EOF has the capability of transmitting and receiving on the State Emergency Radio (EMRAD) Network that provides a communication path with the N.J State and Ocean County Emergency Management Centers.

3) Station Warning System

In addition, station communication links exist to ensure appropriate information transfer capabilities during an emergency. The station may also utilize its Station Warning System, station radios and pagers to augment its emergency communications. The Station Warning System consists of the following:

a) Alarms: Audible alarms are a quick and effective means of communicating emergency warnings on the site. Alarms currently installed at Oyster Creek include:

- Station Emergency Alarm
- Fire Alarm
- Reactor Building Evacuation Alarm

Each alarm provides a distinctive sound that all site personnel and contractors are trained to recognize and respond to. The Station Emergency Alarm will be followed by an announcement that provides emergency information such as class of emergency declared, accountability directions, radiological precautions, etc. The Reactor Building evacuation alarm is supplemented with flashing lights at specific locations in the Reactor Building to provide both audible and visual warnings.

The Control Room alarm systems consist of overhead annunciators, panel annunciators and computer alarms. The overhead and panel annunciators consist of flashing translucent tiles and audible indicators (i.e., buzzer or horn). The computer alarms use annunciators and also provide specific data using the alarm printer.

b) Plant Paging System: The Plant Paging System provides plant-wide paging from the Control Room and all remote stations plus private communications during normal operating conditions.

The plant paging system provides immediate warning and instructions to onsite personnel in the event of an emergency. Phone stations and speakers of this subsystem are located in vital plant areas.

APPENDIX 1: NUREG-0654 CROSS-REFERENCE

Annex Section	NUREG-0654
1.0	Part I, Section A
1.1	Part I, Section B
Figure OCGS 1-1	Part I, Section B
Figure OCGS 1-2	Part I, Section B
1.2	Part I, Section D
Figure OCGS 1-3	Part I, Section D
1.3	Part I, Section F
Figure OCGS 1-4	Part II, Section J.10
Figure OCGS 1-5	Part II, Section J.11
2.0	Part II, Section B.1
Table OCGS 2-1	Part II, Section B.1
2.1	Part II, Section B.5
2.2	Part II, Section B.5
Figure OCGS 2-1	Part II, Section B.5
Figure OCGS 2-2	Part II, Section B.5
Figure OCGS 2-3	Part II, Section B.5
2.3	Part II, Section O.5
2.4	Part II, Section A.3
2.5	Part II, Section A.3
2.6	Part II, Section A.3
3.0	Part II, Section D
4.1	Part II, Section E.1 & J.7
Figure OCGS 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.10.f
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, Sections J.1 & 2
4.4.2	Part II, Section J.5
4.4.3	Part II, Section J.3
Figure OCGS 4-2	Part II, Section I. J.7
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.b & I.2
5.2.3	Part II, Section H.5
5.2.4	Part II, Section H.5.d
5.2.5	Part II, Section H.6.c & 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
Appendix 1	Part II, Section P.8
Appendix 2	Part II, Section A.3

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 Oyster Creek Generating 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.

NOTE: While this list reflects letters of agreement currently in effect, it is possible that the list may change for a number of reasons. The EP Department will consider the impact that a loss of an agency will have on the emergency response process.

1. Medical Support Organizations and Personnel

   - Community Medical Center
   - Southern Ocean County Hospital
   - Lacey Township First Aid Squad
   - Lanoka Harbor First Aid Squad
   - Waretown First Aid Squad

2. Firefighting Organizations

   NOTE: These are supplemented by Mutual Aid agreements with other firefighting as organizations.

   - Lanoka Harbor Fire Department
   - Forked River Volunteer Fire Company
   - Bayville Fire Department

3. Law Enforcement Agencies

   - New Jersey State Police/Office of Emergency Management
   - Lacey Township Police Department #

Agreement with local law enforcement agency maintained by Station Security under the Nuclear Station Security Plan.