EXELON NUCLEAR

RADIOLOGICAL EMERGENCY PLAN ANNEX FOR DRESDEN STATION

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APPENDIXES

REVISION HISTORY

Revision 0; July 1980	Revision 6j; June 1996	Revision 17; August 27, 2003
Revision 1; April 1981	Revision 6k; January 1997	Revision 18, December 2004
Revision 2; June 1982	Revision 6l; February 1997	
Revision 3; September 1984	Revision 6m; May 1997	
Revision 4; March 1986	Revision 6n; January 5, 1998	
Revision 5; February 1987	Revision 6p; August 14, 1998	
Revision 6; January 1991	Revision 7; May 13, 1999	
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Revision 6c; November 1992	Revision 10; January 8, 2001	
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Revision 6h; December 1995	Revision 15; September 12, 2002	
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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.

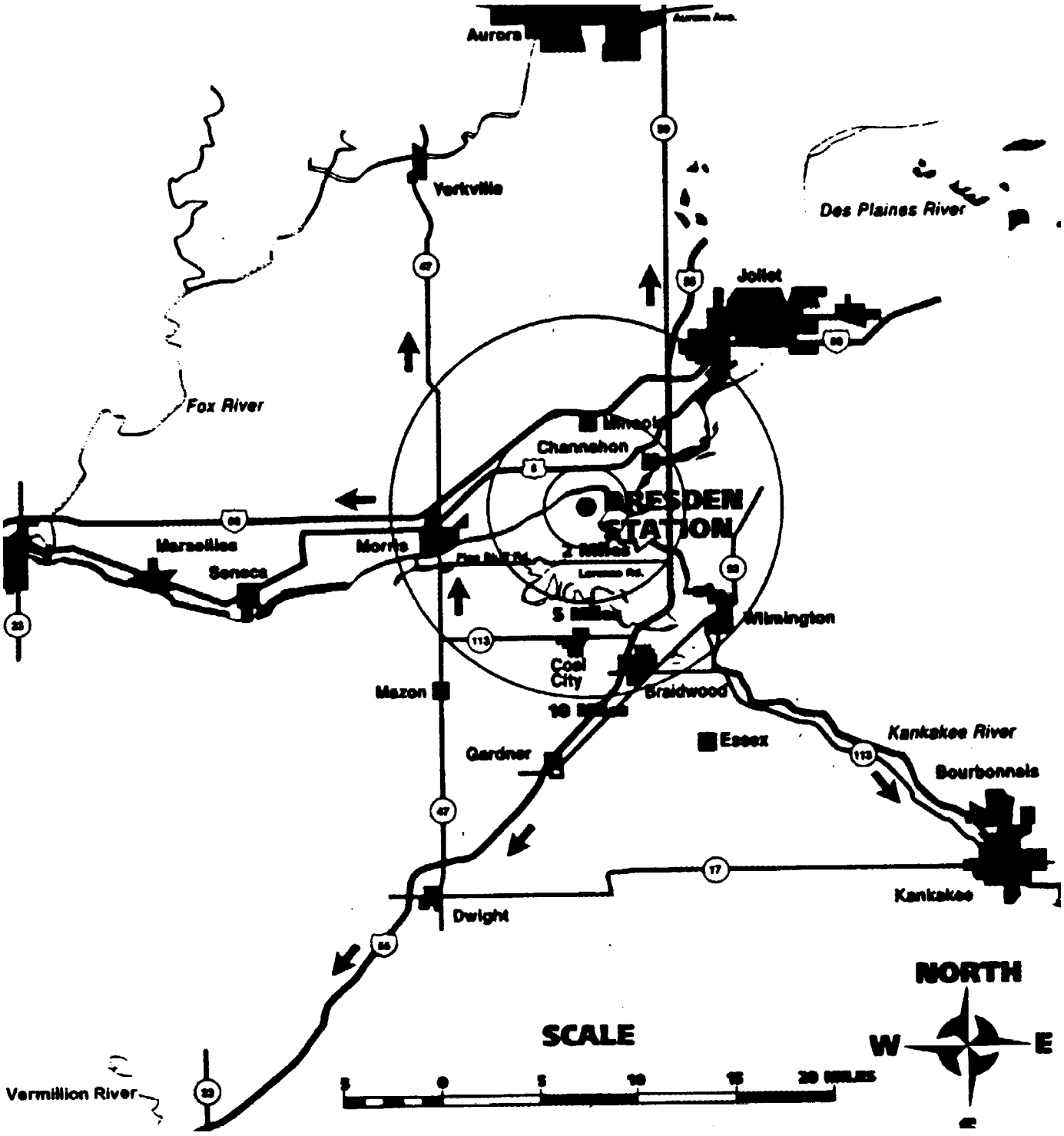
For more specific site location information, refer to the Station UFSAR.

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

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 Emergency Plan.

Once an emergency is declared, the Emergency Response Organization is activated according to Section B.4 of the Emergency Plan and Implementing Procedures.

2.1 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.

Section 3: Classification of Emergencies

Section D of the Emergency Plan describes the classification of emergencies into five levels. The first four are the Unusual Event, Alert, Site Area Emergency and General Emergency. These classification levels are entered by meeting the criteria of Emergency Action Levels (EALs) provided in this section of the Annex. These classification levels are escalated from least severe to most severe according to relative threat to the health and safety of the public and emergency workers. The fifth level is Recovery. 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.

The Initiating Conditions and the Emergency Action Level Threshold Values are provided in a matrix. 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 refer to the Initiating Condition and Threshold Values on the matrix of the appropriate station 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 four 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 "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 Unusual Event, “A” for Alert, “S” for Site Area Emergency and “G” for General Emergency. The number is a sequential number for that Recognition Category series. All Initiating Conditions that are describing the severity of a common condition (series) will have the same number.

The code may then be used to reference a corresponding Threshold Value page(s), which provides additional 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.

Mode Applicability provides the unit conditions when the Emergency Action Levels represent a threat. The Basis provides explanations and justification for including the Initiating Condition and Emergency Action Level.

Definitions are provided for terms having specific meaning as they relate to this procedure. Site specific definitions are provided for terms with the intent to be used for that 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 (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).

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.

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.

Key Definitions of Terms used in Threshold Values

ADEQUATE CORE COOLING - Core submergence. steam cooling or spray cooling as defined in the Emergency Operating Procedures (EOPs).

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

CONFIRMED – Indication or report is verified to be valid by source outside the Control Room.

- Calls to the National Earthquake Center or reports from university monitoring stations are the primary confirmation source for seismic event.
- Security or the NRC are the confirmation sources for security events.

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

ENVIRONMENT – Outside the Containment boundary.

EXPLOSION - A rapid, violent, unconfined combustion, or a catastrophic failure of pressurized equipment, that potentially imparts significant energy to nearby structures or equipment. This includes any High Energy Line Break.

EXTORTION – An attempt to cause an action at the station by threat of force.

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. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

IDENTIFIED - Identified leakage is leakage that is pumped from the drywell equipment sump. This number is determined by the total flow appearing on the drywell equipment drain recorder when the equipment drain sump is pumped.

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

MANUAL SCRAM - Any set of actions by the Control Room Operators at the Reactor Control Panels which causes control rods to be rapidly inserted into the core and brings the reactor to a condition where it will remain shutdown under all conditions without the use of Boron injection. A manual SCRAM may be accomplished by any of the following: (1) placing mode switch in shutdown; (2) using manual SCRAM pushbuttons, or (3) manual ARI initiation using pushbuttons. If the ARI system successfully inserts rods prior to operators using pushbuttons that is considered a successful Manual SCRAM.

MOST - 75% of safety system annunciators or indications are lost OR a significant risk that a degraded plant condition could go undetected exists.

Key Definitions of Terms used in Threshold Values (cont.)

NORMAL 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 OPERATIONS.

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

PPDS – Plant Process Data System, a system that displays plant information on personal computers. The system contains pre-selected computer points organized to allow easy access to critical data.

SIGNIFICANT TRANSIENT - Evolutions such as a SCRAM, a 25% thermal power change, ECCS actuation, or thermal power oscillation ≥ 10%.

SITE BOUNDARY - For classification and dose projection purposes, the boundary is a 800-meter (1/2 mile) radius around the plant. This is the nearest distance from potential release points at which Protective Actions would be required for members of the public.

SITE AREA EMERGENCY – Events are in progress or have occurred which involve actual or likely failure of plant functions needed for protection of the public. Any releases are not expected to result in exposure levels that exceed EPA Protective Action Guideline exposure levels except near the site boundary.

SUSTAINED - ≥ 15 minutes in duration.

TOXIC - Exposure to the worker in excess of the limits specified in 29 CFR 1910.1000. In practice, this should be considered for concentrations that are capable of incapacitating the worker.

UNIDENTIFIED - Unidentified leakage is leakage that is pumped from the drywell floor drain sump. This number is determined by the total flow appearing on the drywell floor drain recorder when the floor drain sump is pumped.

UNISOLABLE – A breach or leak that cannot be isolated from the Control Room or within 15 minutes by operators in the field.

UNPLANNED - Not the result of an intended evolution and requiring corrective or mitigating actions.

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

Emergency Action Level Technical Basis Page Index

General		Site Area		Alert		Unusual Event	
EAL	**Pg.**	**EAL**	**Pg.**	**EAL**	**Pg.**	**EAL**	**Pg**
RG1	3-14	RS1	3-16				
				RA2	3-18	RU2	3-20
				RA3	3-22	RU3	3-24
FG1	3-25	FS1	3-26	FA1	3-27	FU1	3-28
MG1	3-53	MS1	3-55	MA1	3-56	MU1	3-57
				MA2	3-58		
MG3	3-59	MS3	3-61	MA3	3-62		
		MS4	3-63			MU4	3-64
		MS5	3-65				
		MS6	3-66	MA6	3-67	MU6	3-68
		MS7	3-69	MA7	3-71	MU7	3-72
						MU8	3-73
						MU9	3-74
						MU10	3-75
				MA11	3-76	MU11	3-77
				MA12	3-78	MU12	3-79
HG1	3-80	HS1	3-81	HA1	3-82	HU1	3-83
HG2	3-85	HS2	3-86	HA2	3-87	HU2	3-88
		HS3	3-89	HA3	3-90		
				HA4	3-91	HU4	3-93
				HA5	3-95	HU5	3-97
				HA6	3-98	HU6	3-99
						HU7	3-100
						E-RU1	3-101
						E-HU1	3-102
						E-HU2	3-103

Containment	1.a	3-29	**Fuel Clad**	2.a	3-40	**RCS**	3.a.1	3-45
	1.b	3-30		2.b	3-41		3.a.2	3-46
	1.c.1	3-31		2.c	3-42		3.b	3-48
	1.c.2	3-32		2.d	3-44		3.c	3-49
	1.c.3	3-33					3.d	3-51
	1.c.4	3-34					3.e	3-52
	1.d	3-36						
	1.e	3-38						
	1.f	3-39						

ABNORMAL RAD LEVELS / EFFLUENTS

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Radiological Effluents	**RG1** Actual or projected Site Boundary dose: 1 2 3 4 5 D **≥ 1 Rem** TEDE. **OR** **≥ 5 Rem** CDE Thyroid EAL Threshold Value: 1. Radiological release in excess of **Table R1** "General Emergency" threshold **UNLESS** release can be determined to be below available **Table R2** "General Emergency" thresholds within **15 mins.** **OR** 2. Radiological release exceeds **ANY Table R2** column "General Emergency" threshold.	**RS1** Actual or projected Site Boundary dose: 1 2 3 4 5 D **≥ 100 mRem** TEDE. **OR** **≥ 500 mRem** CDE Thyroid. EAL Threshold Value: 1. Radiological release in excess of **Table R1** "Site Area Emergency" threshold **UNLESS** release can be determined to be below available **Table R2** "Site Area Emergency " thresholds within **15 mins.** **OR** 2. Radiological release exceeds **ANY Table R2** column "Site Area Emergency" threshold.	**Table R3** **Areas Req. Continuous Occupancy** • Main Control Room • Central Alarm Station • Secondary Alarm Station • Radwaste Control Room • Gatehouse	**Table R4** **Areas Requiring Infrequent Access** • HPCI Cubicle • East and West LPCI Pump Areas • East and West CRD Module Areas • Vessel Instrument Rack Area • RWCU Area • Isolation Condenser Area
			RA2 Release 1 2 3 4 5 D **≥ 10 X** ODCM limit for ≥ 15 mins. EAL Threshold Value: 1. Unplanned radiological release in excess of **Table R1** "Alert" threshold for **≥ 15 mins**. **UNLESS** release can be determined to be below available **Table R2** "Alert" thresholds within this period. **OR** 2. Unplanned Gaseous or Liquid radiological release exceeds **ANY Table R2** column "Alert" threshold for **≥ 15 mins**.	**RU2** Release 1 2 3 4 5 D **≥ 2 X** ODCM limit for ≥ 60 mins. EAL Threshold Value: 1. Unplanned radiological release in excess of **Table R1** "Unusual Event" threshold for **≥ 60 mins. UNLESS** release can be determined to be below available **Table R2** "Unusual Event" thresholds within this period. **OR** 2. Unplanned Gaseous **OR** Liquid radiological release exceeds **ANY Table R2** column "Unusual Event" threshold for **≥ 60 mins.**
Abnormal Rad Levels			**RA3** In plant radiation levels impede plant operations. 1 2 3 4 5 D EAL Threshold Value: 1. Radiation readings **≥ 15 mR/hr.** in **ANY** area requiring continuous occupancy, **Table R3**. **OR** 2. Radiation readings **≥ 2500 mR/hr.** in **ANY** area requiring infrequent access for safe plant operations, **Table R4.**	**RU3** Increase in plant radiation levels by a factor of 1000. 1 2 3 4 5 D EAL Threshold Value: Area Radiation Monitor readings **OR** survey results indicate an unplanned increase in plant radiation levels by a factor of **1000**.

Table R1 -- Effluent Monitor Thresholds

Low, mid or high Range As determined by DOP 1700-10 or PPDS	General Emergency	Site Area Emergency	Alert	Unusual Event
Total Station Release: **Units 2 / 3 Rx Bldg SPING** **Plus** **Units 2 / 3 Chimney SPING**	**≥ 1.5 E+07 µCi/sec**	**≥ 1.5 E+06 µCi/sec**	**≥ 8.5 E+05 µCi/sec** for **≥ 15 mins.**	**≥ 1.7 E+05 µCi/sec** for **≥ 60 mins.**

Table R2 Dose Assessment Thresholds

Method	General Emergency	Site Area Emergency	Alert	Unusual Event
Sample/ Release Package	N/A	N/A	**≥ 10** X ODCM limit for **≥ 15 mins**.	**≥ 2** X ODCM limit for **≥ 60 mins.**
Field Team Monitoring (At or beyond Site Boundary)	**≥ 1 R/hr.** for **≥ 1 hr.** **OR** **≥ 5 Rem** CDE Thyroid	**≥ 100 mR/hr.** for **≥ 1 hr.** **OR** **≥ 500 mRem** CDE Thyroid	**≥ 10 mR/hr.** for **≥ 15 mins.**	N/A
Dose Projection (At or beyond Site Boundary)	**≥ 1 Rem** TEDE **OR** **≥ 5 Rem** CDE Thyroid	**≥ 100 mRem** TEDE **OR** **≥ 500 mRem** CDE Thyroid	N/A	N/A

Plant Modes (white boxes indicate applicable modes)

1 **Power Operations** 2 **Startup** 3 **Hot Shutdown** 4 **Cold Shutdown** 5 **Refueling** D **Defueled**

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FISSION PRODUCT BARRIER DEGRADATION

FPB Loss / Potential Loss

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
FG1 Loss of 2 Fission Product Barriers with Loss or Potential loss of third barrier. 1 2 3 EAL Threshold Value: Review of Fission Product Barrier Matrix indicates: • Loss of 2 Fission Product Barriers. **AND** • Loss **OR** Potential Loss of the **THIRD** barrier.	**FS1** Loss or Potential Loss of 2 Fission Product Barriers 1 2 3 EAL Threshold Value: Review of Fission Product Barrier Matrix indicates **ANY 2** of the following: • Loss **OR** Potential Loss of **Fuel Clad.** • Loss **OR** Potential Loss of **RCS.** • Loss **OR** Potential Loss of **Containment.**	**FA1** Loss or Potential Loss of Fuel Clad or RCS Barrier. 1 2 3 EAL Threshold Value: Review of Fission Product Barrier Matrix indicates **EITHER**: • Loss **OR** Potential Loss of **Fuel Clad.** **OR** • Loss **OR** Potential Loss of **RCS.**	**FU1** Loss or Potential Loss of Containment barrier. 1 2 3 EAL Threshold Value: Review of Fission Product Barrier Matrix indicates: • Loss **OR** Potential Loss of **Containment.**

Fission Product Barrier Matrix

1. CONTAINMENT	LOSS	POTENTIAL LOSS
a. Drywell or Torus Pressure.	Rapid pressure decrease in containment after increase without containment spray. **OR** Drywell **OR** Torus pressure response **NOT** consistent with LOCA conditions during LOCA.	Containment pressure **≥ 62 psig.**
b. Drywell or Torus Hydrogen Concentration.	None	Drywell **OR** Torus Hydrogen concentration **≥ 6 %.** **AND** Drywell **OR** Torus Oxygen concentration **≥ 5 %.**
c Containment Breached / Bypassed.	See 1.c. Containment Breached / Bypassed Table	
d. Drywell Radiation Monitors.	None	Drywell radiation monitors in the **Containment Potential Loss** range of **Graph 1.d.**
e. Reactor Vessel Water Level.	None	Entry into Primary Containment Flooding SAMG-1.
f. Drywell Temperature	None	Drywell temperature **≥ 281ºF.**

2. FUEL CLAD	LOSS	POTENTIAL LOSS
a. Primary Coolant Activity.	Coolant Activity **≥ 300 uCi/gm I-131** dose equivalent.	None
b. Reactor Vessel Water level.	1. **BOTH** of the following: • Reactor water level **≤ -164"** (Minimum Steam Cooling) **AND** • **NEITHER** core spray loop flows **≥ 4750 gpm** **OR** 2. Reactor water level **≤ -191"** (2/3 Core Height).	Reactor Water level **≤ -143"** (TAF).
c. Drywell Radiation Monitors	Drywell Radiation in the **Fuel Cladding Lost** range of **Graph 2.c.**	None
d. Steamline Radiation.	MSL radiation levels ≥ 2 X the **High Radiation Alarm** setpoint.	None

RCS	LOSS	POTENTIAL LOSS
a.1. RCS Leak Rate.	Unisolable Main Steam Line break.	Unisolable RCS Leakage **≥ 50 gpm.**
a.2. RCS Leak Rate.	None	Unisolable primary system leakage outside primary containment into specified area **AND EITHER:** ▪ Area Temperatures **Table F1 ≥ Max. Normal Value.** **OR** ▪ Area Radiation, **Table F2 ≥ Max. Normal Value.**
b. Drywell Pressure.	Drywell pressure ≥ ECCS setpoint. **AND** Pressure increase due to reactor coolant leakage.	None
c. Drywell Radiation Monitor	Drywell Radiation monitor reading in the **RCS Lost** range of **Graph 3.c.**	None
d. Reactor Vessel Water Level.	Reactor Vessel level **≤ -143"** (TAF)	None
e. Primary System Relief Valves.	Primary system relief valve stuck open. **AND** Torus temperature **≥ 110ºF.**	None

1.c. CONTAINMENT BREACHED / BYPASSED

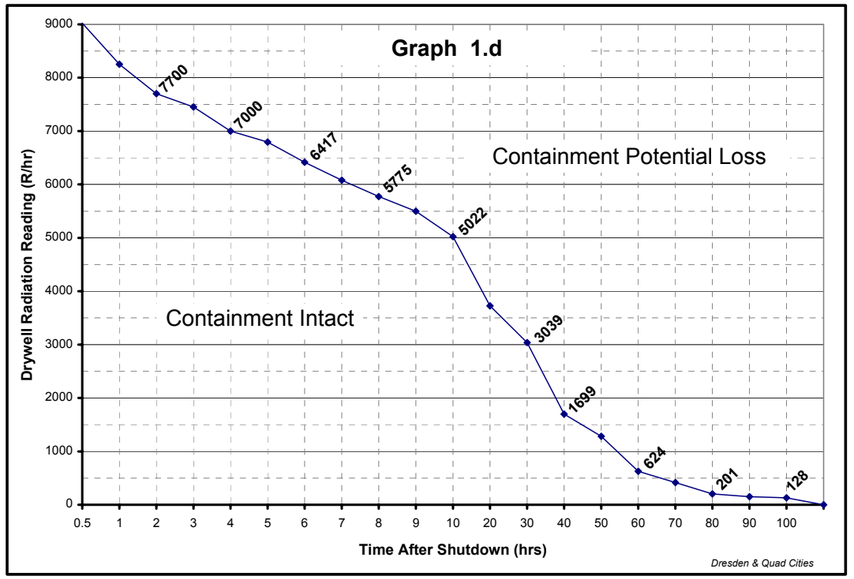
	LOSS	POTENTIAL LOSS
c.1. Containment Breached / Bypassed.	Failure of **ALL** automatic containment isolation valves in **ANY ONE** line penetrating the primary containment to isolate on isolation actuation signal.	None
c.2. Containment Breached / Bypassed.	Breach of primary containment, **NOT** part of Primary Containment Isolation, that is unisolable from the Main Control Room.	None
c.3. Containment Breached / Bypassed.	Intentional venting of primary containment per DEOPs or SAMG-1 **AFTER** containment isolation.	None
c.4. Containment Breached / Bypassed.	Unisolable primary system leakage outside containment as indicated by **EITHER**: 1. Area Temperatures, **Table F1 ≥ Max. Safe Value.** **OR** 2. Area Radiation levels, **Table F2 ≥ Max. Safe Value.**	None

Plant Modes (white boxes indicate applicable modes)

1 Power Operations 2 **Startup** 3 **Hot Shutdown**
4 **Cold Shutdown** 5 **Refueling** D **Defueled**

Fission Product Barrier Matrix - Support Tables and Graphs

Note: From time after shutdown to 0.5 hrs., use the 0.5 hrs. value.



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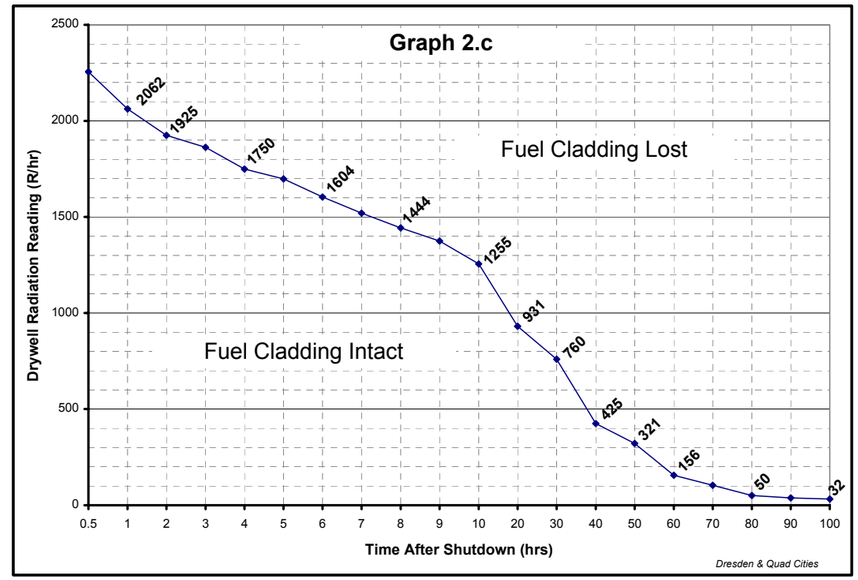


Note: From time after shutdown to 0.5 hrs., use the 0.5 hrs. value.

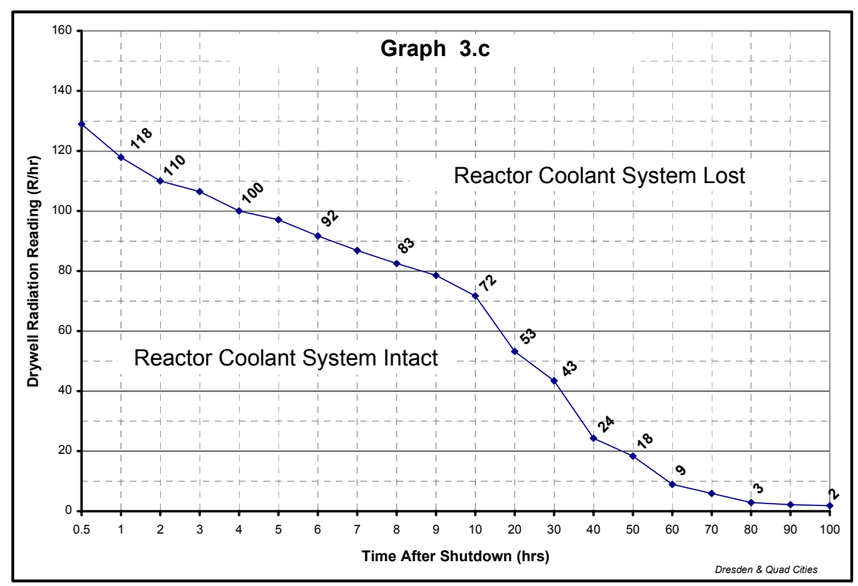


Table F1 -- Area Temperatures

	Max. Normal	Max. Safe
▪ HPCI Area	150 ºF	210 ºF
▪ Shutdown Cooling Pump Room	150 ºF	180 ºF
▪ Shutdown Cooling Heat Exchanger Room	150 ºF	180 ºF
▪ RWCU Demin Rooms	150 ºF	210 ºF
▪ RWCU Pump and Heat Exchanger Area	150 ºF	210 ºF
▪ Isolation Condenser Area	150 ºF	180 ºF

Table F2 -- Area Radiation

	Max. Normal mR/hr	Max. Safe mR/hr
▪ HPCI Cubicle Unit 2 (3)	150 (100)	2500
▪ East LPCI Pump Area	12	2500*
▪ West LPCI Pump Area	9	2500*
▪ East CRD Module Area	30	2500*
▪ West CRD Module Area	50	2500*
▪ Vessel Instrument Rack Area	30	2500*
▪ RWCU Area	30	2500*
▪ Isolation Condenser Area	10	2500

* Measured by Local Survey

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
SYSTEM MALFUNCTIONS				
Loss of AC Power	**MG1** Prolonged loss (>4 hrs) of all ECCS AC power. 1 2 3 EAL Threshold Value: 1. Loss of all AC power to ECCS bus 23-1 (33-1). **AND** 2. Loss of all AC power to ECCS bus 24-1(34-1). **AND** 3. Any of the following: • Restoration of power to **EITHER** bus 23-1 (33-1) or 24-1(34-1) within **4 hours** is NOT likely **OR** • Conditions are imminent that a Loss of two fission product barriers **AND** Loss or Potential Loss of the third (FG1) will occur prior to restoration of AC power to the Unit.	**MS1** Loss of all ECCS bus AC power for ≥ 15 minutes. 1 2 3 EAL Threshold Value: 1. Loss of all AC power to ECCS bus 23-1 (33-1). **AND** 2. Loss of all AC power to ECCS bus 24-1(34-1). **AND** 3. Failure to restore power within 15 min. to at least: ▪ Bus 23-1 (33-1). **OR** ▪ Bus 24-1(34-1).	**MA1** Power to ECCS Buses reduced to a single source for ≥ 15 minutes such that failure of that single source would result in Unit Blackout. 1 2 3 EAL Threshold Value: Available ECCS bus AC power reduced to **only one** of the following sources for ≥ 15 minutes: • Reserve auxiliary transformer TR-22 (TR-32). • Unit auxiliary transformer TR-21 (TR-31). • Unit Emergency Diesel Generator. • Shared Emergency Diesel Generator. • Unit crosstie breakers. • SBO Diesel Generator. **MA2** Loss of all ECCS bus AC power for ≥ 15 min. 4 5 D EAL Threshold Value: 1. Loss of all AC power to ECCS bus 23-1 (33-1). **AND** 2. Loss of all AC power to ECCS bus 24-1(34-1). **AND** 3. Failure to restore power within 15 min. to at least: Bus 23-1 (33-1). **OR** Bus 24-1(34-1).	**MU1** Unplanned loss of all offsite AC power to a unit's ECCS buses. 1 2 3 4 5 D EAL Threshold Value: Unplanned loss of ability to power ECCS buses from: TR-21(TR-31). **AND** TR-22 (TR-32).
Failure of Reactor Protection System	**MG3** Auto and manual SCRAM not successful and loss of core cooling or heat sink. 1 2 3 EAL Threshold Value: 1. Failure of **BOTH** automatic and manual SCRAMs to establish shutdown criteria.. **AND** 2. **ANY ONE** of the following when reactor power is **> IRM Range 7**: • Indications exist that adequate core cooling is **NOT** assured. **OR** • Indications exist that Torus temperature has **OR** is predicted to exceed **110 °F.**	**MS3** Auto and Manual SCRAM not successful. 1 2 3 EAL Threshold Value: Failure of **BOTH** automatic **AND** manual SCRAMs to establish shutdown criteria.	**MA3** Auto SCRAM not successful. 1 2 3 EAL Threshold Value: Failure of the Reactor Protection System to initiate **AND** complete an automatic reactor SCRAM **AND** a successful manual SCRAM occurred.	
Loss of DC		**MS4** Loss of vital 125 VDC power. 1 2 3 EAL Threshold Value: 125 VDC Battery buses **#2 AND #3** bus voltage **≤ 110 volts** for **≥ 15 mins.**		**MU4** Loss of vital 125 VDC power. 4 5 EAL Threshold Value: 125 VDC Battery buses **#2 AND #3** bus voltage **≤ 110 volts** for **≥ 15 mins.**
Heat Sink		**MS5** Loss of Mode 4 Capability (HCTL Exceeded). 1 2 3 EAL Threshold Value: Emergency Depressurization is required due to the inability to maintain Torus bulk temperature below the Heat Capacity Limit curve of DEOP 0200-01.		
Loss of Annunciators	**Plant Modes** (white boxes indicate applicable modes) 1 **Power Operations** 2 **Startup** 3 **Hot Shutdown** 4 **Cold Shutdown** 5 **Refueling** D **Defueled**	**MS6** Loss of annunciators and indications with transient in progress. 1 2 3 EAL Threshold Values: 1. Loss of **ALL** Safety System Annunciator Panels**:** ▪ **902(3)-3** ▪ **902(3)-5** ▪ **902(3)-8** **AND** 2. A significant transient is in progress **AND** • 3. Loss of **ALL** indications needed to monitor **ANY** of the following: Criticality **OR** Core Heat Removal **OR** Fission Product Barrier status	**MA6** Loss of annunciators or indications requiring increased monitoring. 1 2 3 EAL Threshold Values: 1. Unplanned loss of **MOST OR ALL** Safety System Annunciators on Panels (below) for **≥ 15 mins**.: • **902(3)-3** • **902(3)-5** • **902(3)-8** **AND** 2. **ANY** of the following: • A significant transient is in progress **OR** • • Loss of **ALL** indications needed to monitor; Criticality **OR** Core Heat Removal **OR** Fission Product Barrier status.	**MU6** Unplanned loss of annunciators or indications for ≥ 15 mins. 1 2 3 EAL Threshold Value: Unplanned loss of **MOST OR ALL** Safety System Annunciators **OR** indications for **≥ 15 mins.** Panels: • **902(3)-3** • **902(3)-5** • **902(3)-8**

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
SYSTEM MALFUNCTIONS (cont.)				
Decay Heat Removal / Coolant Activity		**MS7** Loss of decay heat removal and core uncovery. (4, 5) EAL Threshold Values: 1. Reactor core is **OR** will be uncovered. **AND** 2. **ANY** of the Following: • Reactor coolant temperature > **212 °F.** **OR** • Uncontrolled temperature increase approaching **212 °F.**	**MA7** Inability to establish or maintain Mode 4. (3, 4, 5) EAL Threshold Values: 1. Inability to establish Mode 4 when required. **OR** 2. Inability to maintain Mode 4 conditions as indicated by **EITHER**: • RCS Temperature increase that exceeds **212 °F**. **OR** • Uncontrolled RCS temperature increase approaching **212 °F.**	**MU7** Offgas radiation trip or high reactor coolant activity. (1, 2, 3, 4, 5, D) EAL Threshold Values: 1. Offgas system isolation due to valid Offgas post-treatment radiation monitor signal. **OR** 2. Coolant activity **≥ 5 µCi/gm I-131** dose equivalent.
RCS Leakage	**Table M1** **Onsite Communications Equipment** • Plant Radio System • Plant Paging System • Sound Power Phones • In-plant Telephones **Table M2** **Offsite Communications Equipment** • All telephone lines (commercial and microwave) • NARS • ENS • HPN • Cellular Phones			**MU8** RCS leakage (1, 2, 3) EAL Threshold Values: 1. Unidentified RCS leakage into the primary containment > **10 gpm.** **OR** 2. Total RCS leakage (identified + unidentified) into primary containment > **35 gpm**.
Loss of Communic.				**MU9** Unplanned loss of all onsite or offsite communications capabilities. (1, 2, 3, 4, 5, D) EAL Threshold Values: 1. Loss of **ALL** onsite communications equipment, **Table M1.** **OR** 2. Loss of **ALL** offsite communications capability, **Table M2.**
Technical Specs				**MU10** Inability to reach required mode within Technical Specification time limits. (1, 2, 3) EAL Threshold Value: Plant is not brought to required mode within Tech. Spec. LCO Action Statement time.
Spent Fuel Events			**MA11** Major fuel damage or fuel uncovery in the Spent Fuel Pool. (1, 2, 3, 4, 5, D) EAL Threshold Values: 1. Refuel Floor Radiation Monitors Unit 2 / 3 reading **≥ 10 R/hr.** **OR** 2. Report of visual observation of a rapid decrease of Spent Fuel Pool water level such that irradiated fuel is predicted to become uncovered.	**MU11** Unplanned decrease in Spent Fuel Pool level. (1, 2, 3, 4, 5, D) EAL Threshold Value: Inability to maintain Unit 2 **OR** 3 Spent Fuel Pool water level **≥ 33.9 ft.** above the fuel.
Refueling	**Plant Modes** (white boxes indicate applicable modes) 1 **Power Operations** 2 **Startup** 3 **Hot Shutdown** 4 **Cold Shutdown** 5 **Refueling** D **Defueled**		**MA12** Unplanned loss of Refueling Cavity level. (5) EAL Threshold Values: 1. Report of visual observation of a rapid decrease of refueling cavity water level such that irradiated fuel is predicted to become uncovered. **OR** 2. Reactor vessel level **≤ -143"** (TAF).	**MU12** Unplanned loss of Refueling Cavity Level. (5) EAL Threshold Value: Inability to maintain Refueling Cavity Level **≥ -59"**.

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
	HAZARDS AND OTHER CONDITIONS			
Security Events	**HG1** Security event resulting in loss of physical control of the facility. 1 2 3 4 5 D EAL Threshold Value: 1. Loss of physical control of the Main Control Room due to a security event. **OR** 2. Loss of physical control of the facility (remote shutdown capability) due to a security event.	**HS1** Confirmed Security Event in a Vital Area. 1 2 3 4 5 D EAL Threshold Values: 1. Intrusion into plant Vital Area by a hostile force. **OR** 2. A security event that results in the loss of control of **ANY** Vital Area (other than the Main Control Room). **OR** 3. Imminent loss of physical control of the facility due to a security event. **OR** 4. A confirmed bomb device discovered in a Vital Area.	**HA1** Confirmed Security Event in the Protected Area. 1 2 3 4 5 D EAL Threshold Values: 1. Intrusion into the Protected Area by a hostile force. **OR** 2. Other Security Events of increasing severity that persist for **≥ 30 mins.** (see **Table H2** for example events). **Table H2 - Examples of Security Events** Credible bomb device. Extortion. Suspicious fire or explosion. Significant security system hardware failure. Loss of guard post contact.	**HU1** Confirmed Security Event that indicates a potential degradation in level of safety of the plant. 1 2 3 4 5 D EAL Threshold Values: 1. A credible threat to the station reported by the NRC. **OR** 2. An Actual Threat that meets **ALL** of the following criteria: • A credible threat reported by **ANY** other outside agency **OR** security procedures. **AND** • Is specifically directed towards the station. **AND** • Is imminent (within **2 hrs**.). **OR** 3. Bomb device discovered within the Protected Area **AND** outside a plant Vital Area. **OR** 4. Confirmed tampering with safety related equipment. **OR** 5. A hostage situation that disrupts normal plant operations. **OR** 6. A disturbance (civil, internal **OR** strike) which disrupts normal plant operations.
Discretionary	**HG2** Conditions indicate imminent core damage and release affecting the public. 1 2 3 4 5 D EAL Threshold Value: 1. Actual **OR** imminent core degradation **AND** potential loss of **Containment**. **OR** 2. Potential uncontrolled radionuclide release which can reasonably be expected to reach or exceed **1 Rem** TEDE **OR 5 Rem** CDE thyroid plume exposure levels at the Site Boundary.	**HS2** Conditions indicate actual or likely failure of functions needed for public protection. 1 2 3 4 5 D EAL Threshold Value: Other conditions exist which in the judgment of the Emergency Director indicate actual **OR** likely major failures of plant functions needed for protection of the public.	**HA2** Conditions indicate actual or potential substantial degradation of the level of safety of the plant. 1 2 3 4 5 D EAL Threshold Value: Other conditions exist which in the judgment of the Emergency Director indicate that plant safety systems may be degraded **AND** that increased monitoring of plant functions is warranted.	**HU2** Conditions indicate a potential degradation of the level of safety of the plant. 1 2 3 4 5 D EAL Threshold Value: Other conditions exist which in the judgment of the Emergency Director indicate a potential degradation in the level of safety of the plant (See **Table H1** for example conditions). **Table H1 – Example Conditions** An event onsite **OR** near the site which requires the assistance of the local Police **OR** Fire Department. Uncontrolled RCS cooldown. Plant conditions require operation outside analyzed conditions. Approaching **ANY** Unusual Event Threshold Value as an anticipatory judgment call. Abnormal operating conditions persist because mitigation activities are **NOT** effective. Additional assistance is required to ensure the protection of the health and safety of the workers and the public. Unusual aircraft activity over the Protected Area.
Control Room Evacuation		**HS3** Main Control Room evacuated and control not established in ≤ 30 mins. 1 2 3 4 5 D EAL Threshold Values: 1. Main Control Room evacuation initiated. **AND** 2. Control of the plant **CANNOT** be established per **DSSP 0100-CR** in **≤ 30 mins.**	**HA3** Main Control Room evacuation initiated. 1 2 3 4 5 D EAL Threshold Value: Entry into **DSSP 0100-CR** for Control Room evacuation.	

Plant Modes (white boxes indicate applicable modes)

1 **Power Operations** 2 **Startup** 3 **Hot Shutdown** 4 **Cold Shutdown** 5 **Refueling** D **Defueled**

		ALERT	UNUSUAL EVENT
HAZARDS AND OTHER CONDITIONS (cont.)			
Natural Events	**ISFSI Malfunctions** Unusual Event **E-RU1** Unexpected Increase in ISFSI Radiation. EAL Threshold Values: 1. Radiation reading on a HI-STAR spent fuel storage cask **EITHER**: • **≥ 250 mR/hr.** (neutron + gamma) on contact of **ANY** exterior vertical surface. **OR** • **≥ 160 mR/hr.** (neutron + gamma) on contact of **ANY** top horizontal surface. **OR** 2. **ANY** of the following radiation readings on a HI-STORM spent fuel storage cask: • **≥ 80 mR/hr.** (neutron + gamma) on contact of **ANY** exterior vertical surface. • **≥ 20 mR/hr.** (neutron + gamma) on contact of **ANY** top horizontal surface. • **≥ 32 mR/hr.** (neutron + gamma) at the inlet **AND** outlet vent ducts. **RU3** Increase in radiation levels by a factor of **1000**. EAL Threshold Value: Area Radiation Monitor **OR** survey results indicate an unplanned increase in plant radiation levels by a factor of **1000**.	**HA4** Natural or destructive phenomena inside a Vital Area. 1 2 3 4 5 D EAL Threshold Values: 1. Confirmed seismic event ≥ Operating Basis Earthquake (OBE) as indicated by seismic instrumentation registering > **0.1g.** **OR** 2. Tornado striking structures containing systems required to establish **OR** maintain Mode 4. **OR** 3. Sustained high winds **≥ 90 mph.** on PPDS, **OR** indicated for **≥ 15 mins.** by Control Room report, computer point **OR** chart recorders. **OR** 4. Report of visible structural damage to a structure containing systems required to establish or maintain Mode 4. **OR** 5. Vehicle collision affecting a Vital Area. **OR** 6. Main Turbine rotating component failure that penetrates the casing **AND** generates missiles causing damage to structures containing safety related equipment. **OR** 7. Flooding in a Vital Area > **Max. Safe Water Level** for any area listed in DEOP 300-1.	**HU4** Natural or destructive phenomena inside the Protected Area or Switchyard. 1 2 3 4 5 D EAL Threshold Values: 1. Confirmed seismic event **EITHER**: • Felt by onsite personnel **OR** • Indicated by installed seismic accelograph reading **≥ 0.01 g.** **OR** 2. Report of a tornado strike within the Protected Area **OR** Switchyard. **OR** 3. Vehicle collision into structures containing systems necessary for safe shutdown within the Protected Area **OR** in the Switchyard. **OR** 4. Main Turbine rotating component failure causing visible casing damage **OR** damage to the generator seals.
Fire	**E-HU1** Damaged to loaded cask confinement boundary. EAL Threshold Value: 1. Natural **OR** destructive phenomena affecting a loaded cask confinement boundary. Natural **AND** destructive phenomena may include: • dropped cask • tipped over cask • flood • explosion • fire • lightning • seismic event • tornado • burial under debris **OR** 2. **ANY** condition in the opinion of the Emergency Director that indicates loss of loaded fuel storage cask confinement boundary	**HA5** Fire or explosion affecting operability of systems required to establish or maintain Mode 4. 1 2 3 4 5 D EAL Threshold Values: 1. Fire **OR** explosion in **OR** near any structure containing systems required to establish **OR** maintain Mode 4. (**Table H3** Example Safe Shutdown Areas) **AND** 2. **ANY ONE** of the following: • Affected system parameter indications show degraded performance. **OR** • Report received of visible damage to permanent structures **OR** equipment within the affected area.	**HU5** Fire in the Protected Area not extinguished in ≤ 15 mins. or explosion in the Protected Area 1 2 3 4 5 D EAL Threshold Values: 1. Fire in the Protected Area **NOT** extinguished in **≤ 15 mins**. of **EITHER**: • Control Room notification **OR** • Verification of alarms. **OR** 2. Explosion in the Protected Area.
Toxic or Flammable Gas	**E-HU2** Confirmed Security Event with potential loss of level of safety of the ISFSI. EAL Threshold Value: Security Event in **OR** around the ISFSI as determined by the Security Shift Supervisor.	**HA6** Release of toxic or flammable gases within or adjacent to a Vital Area. 1 2 3 4 5 D EAL Threshold Value: 1. Unanticipated report **OR** detection of toxic gases within **OR** adjacent to a Vital Area in concentrations that may be life threatening to personnel. **OR** 2. Unanticipated report **OR** detection of flammable gases within **OR** adjacent to a Vital Area in concentration greater than the lower flammability limit.	**HU6** Toxic or flammable gas release affecting normal plant operations. 1 2 3 4 5 D EAL Threshold Value: 1. Report **OR** detection of toxic **OR** flammable gases in amounts that can 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 involving toxic **OR** flammable gases in amounts that can affect normal plant operations.
Contaminated Injury			**HU7** Transportation of radiologically contaminated or potentially contaminated person(s) to an offsite medical facility. 1 2 3 4 5 D EAL Threshold Value: Radiologically contaminated **OR** potentially contaminated injured person(s) transferred to an offsite medical facility for treatment.

Table H3
Safe Shutdown Areas

▪ Reactor Building	▪ Cribhouse
▪ Control Room	▪ Aux. Electric Room
▪ Diesel Generator	▪ Electrical Switchyard
▪ Switchgear and Battery	▪ Remote Shutdown

Plant Modes (white boxes indicate applicable modes)

1 **Power Operations** 2 **Startup** 3 **Hot Shutdown** 4 **Cold Shutdown** 5 **Refueling** D **Defueled**

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS

RG1

INITIATING CONDITION

Actual or projected Site Boundary dose:

- **≥ 1 Rem** TEDE

  OR

- **≥ 5 Rem** CDE Thyroid

EAL THRESHOLD VALUES

1. Radiological release in excess of **Table R1** "General Emergency" threshold **UNLESS** release can be determined to be below available **Table R2** "General Emergency" thresholds within **15 mins.**

   OR

2. Radiological release exceeds **ANY Table R2** column "General Emergency" threshold.

Table R1 **Effluent Monitor Thresholds**	
Low, mid or high Range as determined by DOP 1700-10 or PPDS	**General Emergency**
Total Station Release **Unit 2 / 3 Rx Bldg SPING** **Plus** **Unit 2 / 3 Chimney SPING**	**≥ 1.5 E+07 μCi/sec**

Table R2 **Dose Assessment Thresholds**	
Method	**General Emergency**
Field Team Monitoring **(At or beyond Site Boundary)**	**≥ 1 R/hr.** for **≥ 1 hr.** **OR** **≥ 5 Rem** CDE Thyroid
Dose Projection **(At or beyond Site Boundary)**	**≥ 1 Rem** TEDE **OR** **≥ 5 Rem** CDE Thyroid

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS

RG1 (cont.)

MODE APPLICABILITY

ALL

BASIS: (**References**)

Table R1

Effluent Monitors - Classification is based on effluent monitor reading which would meet or exceed an EPA Protective Action Guideline (1 Rem TEDE or 5 Rem CDE) at the Site Boundary. It is the instantaneous release rate value if **NO** dose projections can be performed or verified **within 15 minutes** of meeting or exceeding the total Chimney and Reactor Building Release Rate values. The Effluent Monitor values were determined using methodologies described in the Dresden DAPAR software requirement specifications, with following assumptions:

- Worst Sector (lowest speed)10 year average meteorology specified in the OCDM -- Wind Speed 8.9 mph and Stability Class D
- Quick Assessment Process Reduction Factors (0.012 for Rx Bldg Release).
- 10 % Gap Damage
- 1 hour Release Duration
- Time after reactor shutdown = 1:00 hour
- The same value is used for ground level (Rx Bldg Vent) and elevated (Chimney) release points. An elevated release may not effect offsite areas as close to plant as ground level release, however use of ground level values will provide conservative estimates for exposure (cloud shine) to an overhead plume. (EPA-400, Section 5.6.1)

Table R2

Field Team Monitoring – The values are for surveys or iodine air samples taken at or beyond the SITE BOUNDARY and are the most accurate indicator of the condition. Field data are independent of release elevation and meteorology. The assumed release duration is 1 hour. 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 charcoal or silver ziolite media followed by field analysis are used for determining the iodine value.

Dose Projection - Any calculated dose projections of 1 Rem total effective dose equivalent or 5 Rem committed dose equivalent to the thyroid is classified based on the Environmental Protection Agency Protective Action Guidelines which indicate that public protection is needed at these levels. Source term and release elevation values are options of the program. Actual meteorology provides the most accurate dose assessment and is used whenever possible. The assumed release duration is 1 hour.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS

RS1

INITIATING CONDITION

Actual or projected Site Boundary dose:

- **≥ 100 mR**em TEDE

  OR

- **≥ 500 mRem** CDE Thyroid

EAL THRESHOLD VALUES

1. Radiological release in excess of **Table R1** "Site Area Emergency " threshold **UNLESS** release can be determined to be below available **Table R2** "Site Area Emergency " thresholds within **15 mins.**

   OR

2. Radiological release exceeds **ANY Table R2** column "Site Area Emergency " threshold.

Table R1 Effluent Monitor Thresholds	
Low, mid or high Range as determined by DOP 1700-10 or PPDS	**Site Area Emergency**
Total Station Release Unit 2 / 3 Rx Bldg SPING Plus Unit 2 / 3 Chimney SPING	**≥ 1.5 E+06 µCi/sec**

Table R2 Dose Assessment Thresholds	
Method	**Site Area Emergency**
Field Team Monitoring (At or beyond Site Boundary)	**≥ 100 mR/hr.** for **≥ 1 hr.** **OR** **≥ 500 mRem** CDE Thyroid
Dose Projection (At or beyond Site Boundary)	**≥ 100 mRem** TEDE **OR** **≥ 500 mRem** CDE Thyroid

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS

RS1 (cont.)

MODE APPLICABILITY

ALL

BASIS: (References)

Table R1

Effluent Monitors - Classification is based on effluent monitor reading which would meet or exceed an EPA Protective Action Guideline (1 Rem TEDE or 5 Rem CDE) at the Site Boundary. It is the instantaneous release rate value if **NO** dose projections can be performed or verified **within 15 minutes** of meeting or exceeding the total Chimney and Reactor Building Release Rate values. The Effluent Monitor values were determined using methodologies described in the Dresden DAPAR software requirement specifications, with following assumptions:

- Worst Sector (lowest speed)10 year average meteorology specified in the OCDM -- Wind Speed 8.9 mph and Stability Class D
- Quick Assessment Process Reduction Factors (0.012 for Rx Bldg Release).
- 10 % Gap Damage
- 1 hour Release Duration
- Time after reactor shutdown = 1:00 hour
- The same value is used for ground level (Rx Bldg Vent) and elevated (Chimney) release points. An elevated release may not effect offsite areas as close to plant as ground level release, however use of ground level values will provide conservative estimates for exposure (cloud shine) to an overhead plume. (EPA-400, section 5.6.1)

Table R2

Field Team Monitoring - The values are for surveys or iodine air samples taken at or beyond the SITE BOUNDARY and are the most accurate indicator of the condition. Field data are independent of release elevation and meteorology. The assumed release duration is 1 hour. 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 charcoal or silver ziolite media followed by field analysis are used for determining the iodine value.

Dose Projection - Any calculated dose projections of 100 mRem total effective dose equivalent or 500 mRem committed dose equivalent to the thyroid is classified based on 10% of the EPA Protective Action Guidelines for radiological exposures to the public. Source term and release elevation values are options of the program. Actual meteorology provides the most accurate dose assessment and is used whenever possible. The assumed release duration is 1 hour.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS

RA2

INITIATING CONDITION

Release ≥ 10 X ODCM limit for ≥ 15 mins.

EAL THRESHOLD VALUES

1. Unplanned radiological release in excess of **Table R1** "Alert" threshold for **≥ 15 mins. UNLESS** release can be determined to be below available **Table R2** "Alert" thresholds within this period.

   OR

2. Unplanned Gaseous or Liquid radiological release exceeds **ANY Table R2** column "Alert" threshold for **≥ 15 mins.**.

Table R1 **Effluent Monitor Thresholds**	
Low, mid or high Range as determined by DOP 1700-10 or PPDS	**Alert**
Total Station Release **Unit 2 / 3 Rx Bldg SPING** **Plus** **Unit 2 / 3 Chimney SPING**	**≥ 8.5 E+05 µCi/sec** for ≥ **15 mins**.

Table R2 **Dose Assessment Thresholds**	
Method	**Alert**
Sample / Release Package	**≥ 10 X ODCM** limit for **≥ 15 mins.**
Field Team Monitoring **(At or beyond Site Boundary)**	**≥ 10 mR/hr.** for ≥ **15 mins.**

MODE APPLICABILITY

ALL

BASIS (References)

Dose Assessment using actual meteorology should be performed a soon as possible to ensure that a Site Area Emergency is not warranted.

A sustained unplanned release of this greater magnitude that cannot be terminated in 15 minutes represents an uncontrolled situation that is an actual or potential substantial degradation of the level of safety of the plant. The degradation in plant control implied by the fact that the release can not terminated in 15 minutes is the primary concern. The Emergency Director should not wait until 15 minutes has elapsed, but should declare an Alert as soon as the release is determined to be uncontrolled or projected to be non-isolable within 15 minutes.

Table R1

Effluent Monitors - The sum of 2/3 Rx Building SPING and 2/3 Chimney SPING will provide a Total Station Release Rate. The Alert value for gaseous effluents was reduced to 10 X ODCM to ensure sequential classifications. The Effluent Monitor value was determined in accordance with Sargent & Lundy calculation ATD-0212, Rev. 0, 1/12/93 and BR-PR-10, Rev. 1, 2/9/93. The values chosen is on a per station basis for a one-hour ground level release using a 10-year Annual Average Meteorology as specified by ODCM. The release rate was determined in the units of a station-generated normal operating mixture for the no clad damage condition.

Table R2

Grab samples – are used to determine release concentrations or rates to confirm meter readings or when the effluent monitors are not in service. The ODCM uses 10 CFR 20 Appendix B Table 2 data to generate maximum instantaneous release rate limits. These are indicated on Release Packages that are approved.

Field Team Monitoring - Prorating the 10 CFR 20 criteria of 500 mR/year for both time and the multiplier, the associated restricted area dose rate would be 10 mR/hr. The release duration was reduced to 15 minutes in recognition of the increased severity and therefore represents a substantial degradation in the level of safety of the plant.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS

RU2

INITIATING CONDITION

Release ≥ 2 X ODCM limit for ≥ 60 mins.

EAL THRESHOLD VALUE

1. Unplanned radiological release in excess of **Table R1** "Unusual Event" for **≥ 60 mins. UNLESS** release can be determined to be below available **Table R2** "Unusual Event" thresholds within this period.

   OR

2. Unplanned Gaseous **OR** Liquid radiological release exceeds **Table R2** column "Unusual Event" threshold for **≥ 60 mins.**.

Table R1 **Effluent Monitor Thresholds**	
Low, mid or high Range as determined by DOP 1700-10 or PPDS	**Unusual Event**
Total Station Release Rate **Unit 2 / 3 Rx Bldg SPING** **Plus** **Unit 2 / 3 Chimney SPING**	**≥ 1.7 E+05 µCi/sec** for ≥ **60 mins.**

Table R2 **Dose Assessment Thresholds**	
Method	**Unusual Event**
Sample / Release Package	**≥ 2 X ODCM** limit for **≥ 60 mins.**

MODE APPLICABILITY

ALL

BASIS (References)

Dose Assessment using actual meteorology should be performed as soon as possible to ensure that an Alert is not warranted.

An unplanned release that cannot be terminated in 60 minutes represents an uncontrolled situation that is a potential degradation of the level of safety of the plant. The degradation in plant control implied by the fact that the release can not be terminated in 60 minutes is the primary concern**.** The Emergency Director should not wait until 60 minutes has elapsed, but should declare an Unusual Event as soon as the release is determined to be uncontrolled or projected to be non-isolable within 60 minutes.

Table R1

Effluent Monitors - The Unusual Event value for gaseous effluents was reduced to 2 X ODCM to ensure sequential classifications. The Effluent Monitor value was determined in accordance with Sargent & Lundy calculation ATD-0223, Rev. 0, 1/12/93. The values chosen is on a per station basis for a one-hour ground level release using a 10-year Annual Average Meteorology as specified by ODCM. The release rate was determined in the units of a station-generated normal operating mixture for the no clad damage condition. The sum of 2/3 Rx Building SPING and 2/3 Chimney SPING will provide a Total Station Release Rate.

Table R2

Release Package - The ODCM uses 10 CFR 20 Appendix B Table 2 data to generate maximum instantaneous release rate limits.

Grab samples - Grab samples are used to determine release concentrations or rates to confirm meter readings or when the effluent monitors are not in service.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS

RA3

INITIATING CONDITION

In plant radiation levels impede plant operations.

EAL THRESHOLD VALUES

1. Radiation readings **≥ 15 mR/hr.** in **ANY** area requiring continuous occupancy, **Table R3.**

   OR

2. Radiation readings **≥ 2500 mR/hr.** in **ANY** area requiring infrequent access for safe plant operations, **Table R4.**

Table R3 Areas Requiring Continuous Occupancy
Main Control Room
Central Alarm Station
Secondary Alarm Station
Radwaste Control Room
Gatehouse

Table R4 Areas Requiring Infrequent Access
HPCI Cubicle
East and West LPCI Pump Areas
East and West CRD Module Areas
Vessel Instrument Rack Area
RWCU Area
Isolation Condenser Area

MODE APPLICABILITY

ALL

BASIS (References)

This EAL addresses increased radiation levels that impede necessary access to operator stations, or other areas containing equipment that must be operated manually in order to maintain safe operation or to perform a safe shutdown. The concern of the EAL is a loss of control of radioactive material causing high radiation levels. The cause of the increase in radiation levels is not the major concern of this EAL. The source of the increased radiation levels should be considered in view of other EALs. The Emergency Director should also evaluate how these conditions will affect the unaffected unit.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS

RA3 (cont)

Threshold Value 1 (Table R3) - The value of 15 mR/hr is derived from the general design criteria value of 5 REM in 30 days with adjustment for expected occupancy times. Although Section III.D.3 of NUREG-0737 "Clarification of TMI Action Plan Requirements" provides that the 15 mR/hr value can be averaged over the 30 days, the value is used here without averaging, as a 30 day duration implies an event potentially more significant than an Alert.

Threshold Value 2 (Table R4) - Areas requiring infrequent access and dose rate values are based on those specified in the Emergency Operating Procedures and have associated Maximum Safe Values assigned to each area. Dose rates above these values will impede necessary access. When the source of the high radiation condition is the result of the manipulation of a known source and radiological controls are in place to minimize exposure, classification should be considered based on the ability to access the area to safely operate or perform a safe shutdown of the Station.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / EFFLUENTS

RU3

INITIATING CONDITION

Increase in plant radiation levels by a factor of 1000.

EAL THRESHOLD VALUE

Area Radiation Monitor readings **OR** survey results indicate an unplanned increase in plant radiation levels by a factor of **1000.**

MODE APPLICABILITY

ALL

BASIS (References)

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

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FG1

INITIATING CONDITION

Loss of 2 Fission Product Barriers with Loss or Potential Loss of third barrier.

EAL THRESHOLD VALUE

Review of Fission Product Barrier Matrix indicates:

- Loss of 2 Fission Product Barriers.

  AND

- Loss **OR** Potential Loss of THIRD barrier.

MODE APPLICABILITY

1, 2, 3

BASIS (References)

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

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FS1

INITIATING CONDITION

Loss or Potential Loss of 2 Fission Product Barriers.

EAL THRESHOLD VALUE

Review of Fission Product Barrier Matrix indicates **ANY 2** of the following:

- Loss **OR** Potential Loss of **Fuel Clad.**
- Loss **OR** Potential Loss of **RCS.**
- Loss **OR** Potential Loss of **Containment.**

MODE APPLICABILITY

1, 2, 3

BASIS (References)

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

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FA1

INITIATING CONDITION

Loss or Potential Loss of Fuel Clad or RCS Barrier.

EAL THRESHOLD VALUE

Review of Fission Product Barrier Matrix indicates **EITHER**:

- Loss **OR** Potential Loss of **Fuel Clad**.

  OR

- Loss **OR** Potential Loss of **RCS**.

MODE APPLICABILITY

1, 2, 3

BASIS (References)

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

Loss or potential loss of either the Fuel Cladding or the Reactor Coolant System would be a substantial degradation in the level of plant safety.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FU1

INITIATING CONDITION

Loss or Potential Loss of Containment Barrier.

EAL THRESHOLD VALUE

Review of Fission Product Barrier Matrix indicates:

- Loss **OR** Potential Loss of **Containment**.

MODE APPLICABILITY

1, 2, 3

BASIS (References)

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

The Fission Product Barrier EALs place a higher significance on the Fuel Clad barrier and the Reactor Coolant System barrier than the Containment Barrier which is reflected in the classification matrices.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CONTAINMENT 1.a

INITIATING CONDITION

Drywell or Torus Pressure.

THRESHOLD VALUE

LOSS: .....Rapid pressure decrease in containment after increase without containment spray.

OR

Drywell **OR** Torus pressure response **NOT** consistent with LOCA conditions during LOCA.

POTENTIAL LOSS: .....Containment Pressure **≥ 62 psig.**

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS - A rapid unexplained loss of pressure not due to use of containment sprays following an initial pressure increase indicates a loss of containment integrity.

Drywell or Torus pressure should increase as a result of mass and energy release into the containment from a LOCA. Drywell or Torus pressure NOT increasing under these conditions indicates a breach of the primary containment.

POTENTIAL LOSS - A containment pressure ≥ 62 psig is based on the containment design pressure. If the containment design pressure is exceeded this represents a challenge to the containment structure because assumptions used in the accident analysis are no longer valid and an unanalyzed condition exists. This constitutes a potential loss of the containment barrier even if a breach has NOT occurred.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CONTAINMENT 1.b

INITIATING CONDITION

Drywell or Torus Hydrogen Concentration.

THRESHOLD VALUE

LOSS: .....NONE

POTENTIAL LOSS: .....Drywell **OR** Torus Hydrogen concentration **≥ 6%.**

AND

Drywell **OR** Torus Oxygen concentration **≥ 5%.**

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS - NONE

POTENTIAL LOSS - The Emergency Procedure Guidelines and Severe Accident Guidelines identify that deflagration will occur at a minimum Hydrogen concentration of > 6% and Oxygen concentration > 5%. The deflagration of Hydrogen represents a potential loss of the primary containment.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CONTAINMENT 1.c.1

INITIATING CONDITION

Containment Breached / Bypassed.

THRESHOLD VALUE

LOSS: .....Failure of **ALL** automatic containment isolation valves in **ANY ONE** line penetrating the primary containment to isolate on isolation actuation signal.

POTENTIAL LOSS: .....NONE

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS - A failure of all isolation valves in any one line indicates a breach of the primary containment integrity as described in the Primary Containment Technical Specifications bases section or primary containment Limiting Conditions for Operation.

The breach is NOT isolable from the Control Room OR an attempt for isolation from the Control Room has been made and was unsuccessful. An attempt for isolation should be made prior to the accident classification. If isolable upon identification this Initiating Condition is not applicable.

The intent of this Initiating Condition is to address those isolation devices which should close upon receipt of a containment isolation signal whether the signal is valid or not. The concern in this EAL is the open path to the environment.

POTENTIAL LOSS – NONE

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CONTAINMENT 1.c.2

INITIATING CONDITION

Containment Breached / Bypassed.

THRESHOLD VALUE

LOSS: .....Breach of primary containment, **NOT** part of Primary Containment Isolation, that is unisolable from the Main Control Room.

POTENTIAL LOSS: .....NONE

MODE APPLICABILITY

1, 2, 3

BASIS: (REFERENCES)

LOSS - The breach or bypass is NOT isolable from the Control Room OR an attempt for isolation from the Control Room has been made and was unsuccessful. An attempt for isolation should be made prior to the accident classification. If isolable upon identification this Initiating Condition is not applicable.

FPB 1.c.1 addresses a breach of primary containment referring to a loss of primary containment integrity as described in the Primary Containment Technical Specifications bases section or primary containment Limiting Conditions for Operation (LCO).

The intent of this Initiating Condition (FPB 1.c.2) is to address all penetrations not included in Primary Containment Isolation (PCI) and are a release path to the environment. Leakage into a closed system is to be considered only if the closed system is breached and thereby creates a path to the environment.

A bypassed containment is the opening of penetration isolations such that a path to the environment exists.

POTENTIAL LOSS - NONE

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CONTAINMENT 1.c.3

INITIATING CONDITION

Containment Breached / Bypassed.

THRESHOLD VALUE

LOSS: .....Intentional venting of the primary containment per DEOPs or SAMG-1 **AFTER** containment isolation.

POTENTIAL LOSS: .....NONE

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS - Venting of the primary containment as required by the Emergency Operating Procedures (DEOPs) or Severe Accident Management Guidelines (SAMGs) is considered to be a breach of the primary containment for the purposes of accident classification.

POTENTIAL LOSS - NONE

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CONTAINMENT 1.c.4

INITIATING CONDITION

Containment Breached / Bypassed.

THRESHOLD VALUES

LOSS: .....Unisolable primary system leakage outside containment as indicated by **EITHER**:

1. Area Temperatures, **Table F1 ≥ Max Safe Value.**

OR

2. Area Radiation Levels, **Table F2**. **≥ Max. Safe Value.**

Table F1 -- Area Temperatures

	Max. Normal	Max. Safe
HPCI Area	150 ºF	210 ºF
Shutdown Cooling Pump Room	150 ºF	180 ºF
Shutdown Cooling Heat Exch Room	150 ºF	180 ºF
RWCU Demin Rooms	150 ºF	210 ºF
RWCU Pump and Heat Exchanger Area	150 ºF	210 ºF
Isolation Condenser Area	150 ºF	180 ºF

Table F2 -- Area Radiation

	Max. Normal mR/hr	Max. Safe mR/hr
HPCI Cubicle Unit 2 (3)	150 (100)	2500
East LPCI Pump Area	12	2500*
West LPCI Pump Area	9	2500*
East CRD Module Area	30	2500*
West CRD Module Area	50	2500*
Vessel Inst Rack Area	30	2500*
RWCU Area	30	2500*
Isolation Condenser Area	10	2500

* Measured by Local Survey

POTENTIAL LOSS: .....NONE

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS - Primary system leakage that bypasses the primary containment would not cause the primary containment pressure to increase. Area temperatures or radiation levels greater than the maximum safe values listed in the Emergency Operating Procedures (DEOPs) resulting from a primary system discharging into the reactor building is indicative of conditions in which equipment necessary for the safe shutdown of the plant will fail, or personnel access necessary for the safe shutdown of the plant may be precluded. This condition is therefore deemed to be of such a magnitude as to constitute a loss of containment.

The maximum safe temperature or radiation level is the highest above which equipment necessary for the safe shutdown of the plant will fail, or personnel access necessary for the safe shutdown of the plant will be precluded.

POTENTIAL LOSS – NONE

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CONTAINMENT 1.d

INITIATING CONDITION

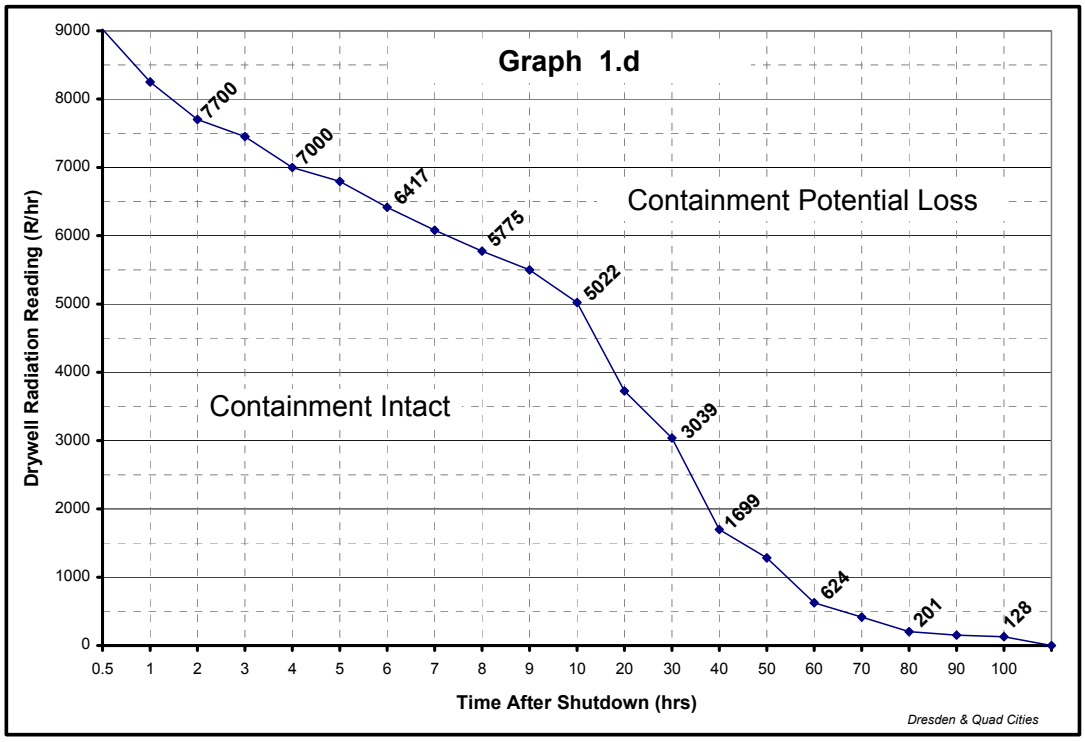
Drywell Radiation Monitors.

THRESHOLD VALUE

LOSS: .....NONE

POTENTIAL LOSS: .....Drywell radiation monitor readings in the **Containment Potential Loss** range of **Graph 1.d**.

Note: From time after shutdown to 0.5 hrs., use the 0.5 hrs. value.



MODE APPLICABILITY

1, 2, 3

CONTAINMENT 1.d (cont.)

BASIS: (References)

LOSS - NONE

POTENTIAL LOSS – A containment radiation monitor reading of 7000 R/hr @ 4 hours after reactor shutdown indicates a fuel clad damage of 20% and a failure of the primary system allowing the entire inventory to be disbursed inside the drywell. Regardless of whether containment is challenged this amount of activity, if released, could have such severe consequences that it is prudent to treat this as a potential loss of primary containment.

Clad damage assessment is NOT required to be performed by control room personnel.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CONTAINMENT 1.e

INITIATING CONDITION

Reactor Vessel Water Level.

THRESHOLD VALUE

LOSS: .....NONE

POTENTIAL LOSS:**.....**Entry into Primary Containment Flooding. **SAMG-1.**

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS- NONE

POTENTIAL LOSS - Entry into SAMG-1, Primary Containment Flooding, as required by the DEOPs occurs when the reactor water level is less than the minimum steam cooling level (-164") without spray cooling OR When Reactor Pressure Vessel water level is below the Jet Pump suction (-191"). This is indicative of substantial core degradation and represents imminent core melt sequences that if not corrected could lead to reactor vessel failure and increase potential for containment failure.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CONTAINMENT 1.f

INITIATING CONDITION

Drywell Temperature.

THRESHOLD VALUE

LOSS: .....NONE

POTENTIAL LOSS: .....Drywell Temperature **≥ 281 °F**.

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS - NONE

POTENTIAL LOSS - Drywell temperatures greater than the design temperature represent a challenge to the containment structure because assumptions used in the accident analysis are no longer valid and an unanalyzed condition exists. This is considered a potential loss of primary containment.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FUEL CLAD 2.a

INITIATING CONDITION

Primary Coolant Activity.

THRESHOLD VALUE

LOSS: .....Coolant Activity **≥ 300 µCi/gm I-131** dose equivalent.

POTENTIAL LOSS: .....NONE

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS - Reactor coolant activity provides for the most accurate assessment of the extent of fuel clad degradation. Classifications based on this criterion may be delayed due to the time involved in obtaining and analyzing a coolant sample. 300 µCi/gm I-131 equivalent indicates a degradation of approximately 0.7% (S&L calculation D-2-91, Rev 0) of the fuel cladding and is indicative of a loss of the fuel clad fission product barrier.

POTENTIAL LOSS - NONE

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FUEL CLAD 2.b

INITIATING CONDITION

Reactor Vessel Water Level.

THRESHOLD VALUE

LOSS:.....1. **BOTH** of the following:

- Reactor water level ≤ **-164"** (Minimum Steam Cooling).

AND

- **NEITHER** core spray loop flows **≥ 4750 gpm.**

OR

2. Reactor water level **≤ -191"** (2/3 Core Height).

POTENTIAL LOSS:.....Reactor water Level ≤ **-143"** (TAF).

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS - Reactor vessel water level less than the minimum steam cooling RPV water level (-164) without spray cooling is the minimum value below which further substantial degradation of the cladding will occur and corrective actions as described in the Emergency Operating Procedures (DEOPs) and Severe Accident Management Guidelines (SAMGs).

Entry into SAMG-1, Primary Containment Flooding, as required by the DEOPs occurs when the reactor water level is less than the minimum steam cooling level (-164") without spray cooling or When Reactor Pressure Vessel water level is below the Jet Pump suction (-191"). This is indicative of substantial core degradation and represents imminent core melt sequences that if not corrected could lead to reactor vessel failure and increase potential for containment failure.

POTENTIAL LOSS - The top of the active fuel is the point at which adequate core cooling is still assured but is sufficiently low that any further drop in water level could result in the significant degradation of the cladding. Therefore this is considered to be a potential loss of the fuel cladding barrier.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FUEL CLAD 2.c

INITIATING CONDITION

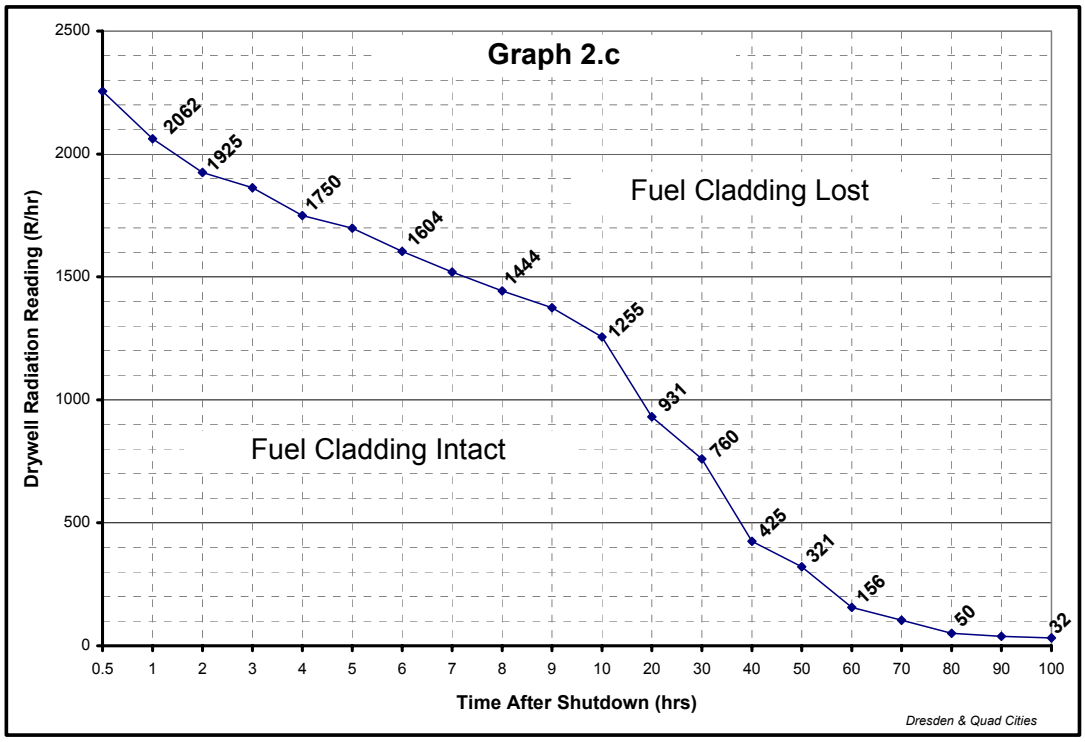
Drywell Radiation Monitors.

THRESHOLD VALUE

LOSS: .....Drywell radiation in the **Fuel Cladding Lost** range of **Graph 2.c**.

POTENTIAL LOSS: .....NONE

Note: From time after shutdown to 0.5 hrs., use the 0.5 hrs. value.



MODE APPLICABILITY

1, 2, 3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FUEL CLAD 2.c (cont.)

BASIS: (References)

LOSS – A drywell radiation monitor reading of 1750 R/hr @ 4 hours after reactor shutdown is indicative of both the loss of the reactor coolant system and 5% clad failure and the instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory into the drywell atmosphere. Clad damage of 5% assumes reactor coolant concentrations of this magnitude are several times larger than the maximum concentrations allowed by Technical Specifications. Therefore readings of this level are indicative of a loss of the fuel cladding barrier.

Clad damage assessment is NOT required to be performed by control room personnel.

POTENTIAL LOSS - NONE

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FUEL CLAD 2.d

INITIATING CONDITION

Steamline Radiation.

THRESHOLD VALUE

LOSS: .....MSL radiation **≥ 2 X MSL high** radiation alarm setpoint.

POTENTIAL LOSS: .....NONE

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS - 2 times the Main Steam Line high radiation alarm setpoint provides an indication of gross fuel failures in accordance with UFSAR accident scenarios. This is considered to be a loss of the fuel clad fission product barrier.

This EAL is NOT intended to apply to cases when the isolation is due to spiking caused by resin intrusion, reactor trips, sensing line air intrusion or other known factors. Confirmatory data should be used before relying on this indication.

POTENTIAL - NONE

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

REACTOR COOLANT SYSTEM 3.a.1

INITIATING CONDITION

RCS Leak Rate.

THRESHOLD VALUE

LOSS: .....Unisolable Main Steam Line break.

POTENTIAL LOSS: .....Unisolable RCS leakage **≥ 50 gpm.**

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS - A Main Steam Line break represents a loss of the integrity of the reactor coolant system. The result of a MSL break inside the Drywell with MSIV closure is a loss of the RCS Barrier. The result of a MSL break on either side of the MSIVs without closure is a Loss of both the RCS and the Containment Barriers. Design basis accident analysis indicates that even if MSIV closure occurs within design limits, dose consequences from a release would be in excess of 10 mR.

The leak is NOT isolable IF an attempt for isolation has been made and was unsuccessful within 15 minutes. An attempt for isolation should be made prior to the accident classification. If isolable upon identification this Initiating Condition is not applicable.

POTENTIAL LOSS - A reactor coolant system leak rate of greater than 50 gallons per minute is at a level indicative of a small breach of the RCS but which is well within 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 a significantly larger loss of inventory is possible. A leak of this magnitude would be readily observable on the main control board. A leak of this size is a precursor of the loss of the reactor coolant system integrity and is therefore considered to be a potential loss of this barrier.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

REACTOR COOLANT SYSTEM 3.a.2

INITIATING CONDITION

RCS Leak Rate.

THRESHOLD VALUE

LOSS: .....NONE

POTENTIAL LOSS: .....Unisolable primary system leakage outside the primary containment into specified area **AND EITHER**:

- Area Temperatures, **Table F1 ≥ Max. Normal Value.**

  OR

- Area Radiation, **Table F2 ≥ Max. Normal Value.**

Table F1 -- Area Temperatures

	Max. Normal	Max. Safe
▪ HPCI Area	150 ºF	210 ºF
▪ Shutdown Cooling Pump Room	150 ºF	180 ºF
▪ Shutdown Cooling Heat Exchanger Room	150 ºF	180 ºF
▪ RWCU Demin Rooms	150 ºF	210 ºF
▪ RWCU Pump and Heat Exchanger Area	150 ºF	210 ºF
▪ Isolation Condenser Area	150 ºF	180 ºF

Table F2 -- Area Radiation

	Max. Normal mR/hr	Max. Safe mR/hr
▪ HPCI Cubicle Unit 2 (3)	150 (100)	2500
▪ East LPCI Pump Area	12	2500*
▪ West LPCI Pump Area	9	2500*
▪ East CRD Module Area	30	2500*
▪ West CRD Module Area	50	2500*
▪ Vessel Instrument Rack Area	30	2500*
▪ RWCU Area	30	2500*
▪ Isolation Condenser Area	10	2500

* Measured by Local Survey

POTENTIAL LOSS: .....NONE

MODE APPLICABILITY

1, 2, 3

REACTOR COOLANT SYSTEM 3.a.2 (cont)

BASIS: (References)

LOSS - NONE

POTENTIAL LOSS - Area temperatures or radiation levels greater than the maximum normal values listed in the Emergency Operating Procedures (DEOPs) resulting from a primary system discharging into the reactor building is indicative of conditions in which significant RCS inventory is being lost. This is therefore considered to be a potential loss of the reactor coolant system boundary. Maximum normal levels are determined by using historical data from previous years. These values are found in the Emergency Operating Procedures (DEOPs). Since these values are subject to change specific values are not given here and the DEOPs should be consulted.

The leak is NOT isolable if an attempt for isolation has been made and was unsuccessful within 15 minutes. An attempt for isolation should be made prior to the accident classification. If isolable upon identification this Initiating Condition is not applicable.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

REACTOR COOLANT SYSTEM 3.b

INITIATING CONDITION

Drywell Pressure.

THRESHOLD VALUE

LOSS: .....Drywell pressure ≥ ECCS Setpoint.

AND

Pressure increase due to reactor coolant leakage.

POTENTIAL LOSS: .....NONE

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS- Drywell pressure in excess of the emergency core cooling system initiation setpoint resulting from primary system leakage into the drywell is of such a magnitude indicating a loss of the reactor coolant system boundary. Cycling of safety relief valves to reduce primary system overpressure when no fuel damage is indicated is NOT considered reactor coolant leakage. Cycling of safety relief valves to reduce primary system overpressure when fuel damage is indicated is considered reactor coolant leakage. Primary containment pressure increases due solely to loss of containment heat removal capability are also NOT considered to exceed this threshold.

POTENTIAL LOSS- NONE

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

REACTOR COOLANT SYSTEM 3.c

INITIATING CONDITION

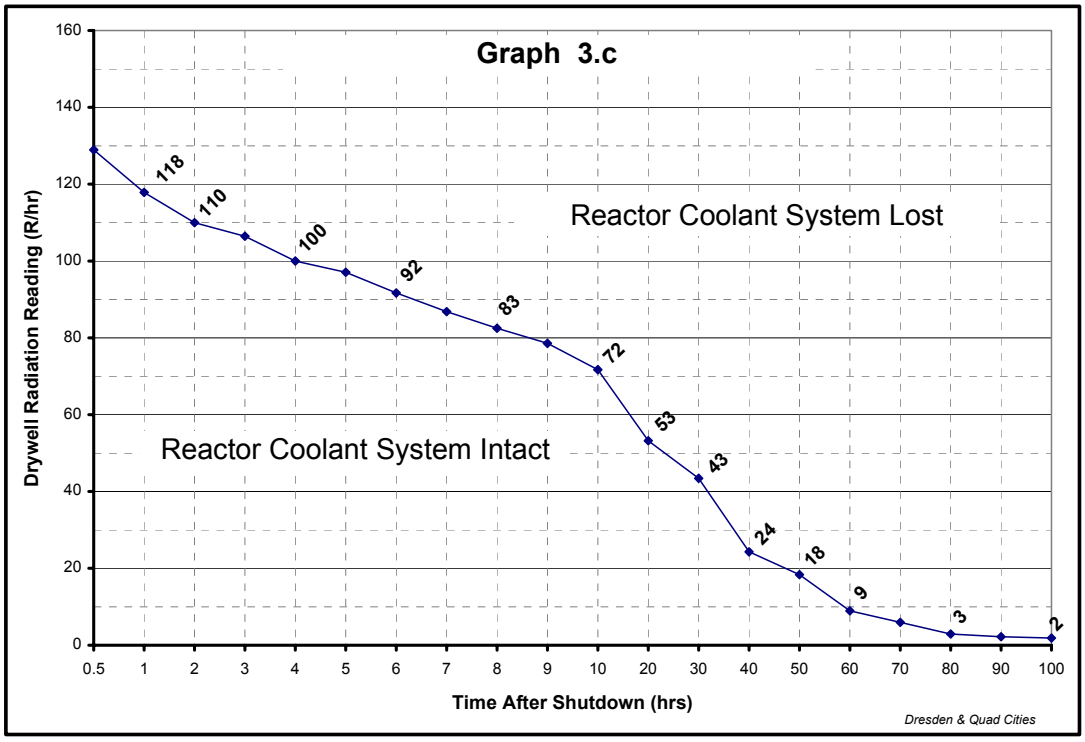
Drywell Radiation Monitoring.

THRESHOLD VALUE

LOSS: .....Drywell radiation monitors readings in the **RCS Lost** range of **Graph 3.c.**

POTENTIAL LOSS: .....NONE

Note: From time after shutdown to 0.5 hrs., use the 0.5 hrs. value.



MODE APPLICABILITY

1, 2, 3

REACTOR COOLANT SYSTEM 3.c (cont.)

BASIS: (References)

LOSS - Radiation from an instantaneous release of the entire primary coolant system inventory with Technical Specification allowed radiochemistry into the drywell would not be discernible on the installed drywell radiation monitors.

Therefore a value of 100 R/hr 4 hours after reactor shutdown was chosen because it is above the 1Rem/hr level maintained by the radiation monitors, above ambient background radiation and represents a detectable radiation level if coolant is released to the Drywell above allowed Technical Specification radiochemistry limits but less than the 5% Fuel Clad damage used in the Fuel Clad Fission Product Barrier Threshold Value.

POTENTIAL LOSS - NONE

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

REACTOR COOLANT SYSTEM 3.d

INITIATING CONDITION

Reactor Vessel Water Level.

THRESHOLD VALUE

LOSS: .....Reactor vessel level **≤ -143"** (TAF).

POTENTIAL LOSS: .....NONE

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS - In order to provide normal means to cool the fuel, water level must be maintained above the top of active fuel otherwise extraordinary means must be taken to assure that adequate core cooling exists. In certain failure event sequences reactor vessel water level may be procedurally lowered to the top of active fuel and the reactor coolant system depressurized to allow for steam cooling of the core. Even though fuel clad damage is not predicted under these conditions several safety system failures need to have occurred to reach the condition where steam cooling would be procedurally required. Therefore this is indicative of a loss of the reactor coolant system boundary. Water levels below this value indicate a challenge to core cooling which is a precursor to more serious events. If intentional lowering of the vessel level is required during an ATWS event EAL MS3 should also be consulted.

POTENTIAL LOSS - NONE

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

REACTOR COOLANT SYSTEM 3.e

INITIATING CONDITION

Primary System Relief Valves.

THRESHOLD VALUE

LOSS: .....Primary system relief valve stuck open.

AND

Torus temperature **≥ 110 °F.**

POTENTIAL LOSS: .....NONE

MODE APPLICABILITY

1, 2, 3

BASIS: (References)

LOSS - Technical Specifications require a SCRAM when Torus bulk temperature levels reach 110°F. Below this point, the reactor is considered in a safe condition even with relief valves stuck open.

POTENTIAL LOSS - NONE

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG1

INITIATING CONDITION

Prolonged (>4hrs) loss of all ECCS AC power.

EAL THRESHOLD VALUES

1. Loss of all AC power to ECCS bus 23-1 (33-1).

   AND

2. Loss of all AC power to ECCS bus 24-1(34-1).

   AND

3. Any of the following:

   - Restoration of power to **EITHER** bus 23-1 (33-1) OR 24-1(34-1) within **4 hours** is NOT likely.

     OR

   - Conditions are imminent that a loss of 2 Fission Product Barriers and Loss or Potential Loss of the 3rd (FG1) will occur prior to restoration of AC power to the Unit.

MODE APPLICABILITY

1, 2, 3

BASIS (References)

Conditions are degraded to the point that Loss or Potential Loss of three Fission Product Barriers can be predicted to occur.

Restoration of power cannot be predicted with confidence in a time that will prevent Loss or Potential Loss of three Fission Product Barriers.

The prolonged loss of all AC power compromises all plant safety systems and represents conditions which indicate imminent substantial core degradation or melting with potential for the loss of containment integrity. Resultant releases can be reasonably expected to exceed Environmental Protection Agency Protective Action Guideline exposure levels offsite for more than the immediate site area.

The four (4) hours for restoration is based on the site blackout coping analysis performed in conformance with 10 CFR 50.63 and Regulatory Guide 1.155, Station Blackout, which includes an appropriate allowance for offsite response. This EAL is used as an anticipatory condition for the Fission Product Barrier EALs in that under these conditions, the capability to monitor the Fission Product Barriers may be degraded.

A General Emergency should be declared when conditions degrade to the point that a General Emergency (FG1) classification can be predicted by trending Fission Product Barrier Threshold Values. Classification of General Emergency under the predictive conditions will allow as much time as possible for protective actions to be implemented.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS1

INITIATING CONDITION

Loss of all ECCS bus AC power for ≥ 15 minutes.

EAL THRESHOLD VALUES

1. Loss of all AC power to ECCS bus 23-1 (33-1).

   AND

2. Loss of all AC power to ECCS bus 24-1(34-1).

   AND

3. Failure to restore power within 15 minutes to at least:

   - Bus 23-1 (33-1).

     OR

   - Bus 24-1(34-1).

MODE APPLICABILITY

1, 2, 3

BASIS (References)

The loss of all onsite and offsite AC power compromises all plant safety systems and represents failures of plant functions required for the protection of the public. Loss of all ECCS AC power is a precursor to events that could result in losses or potential losses of Fission Product Barriers. For a prolonged loss of all ECCS AC power, upgrade to a General Emergency via MG1 may be appropriate.

The Emergency Director should address how the loss of power to the affected unit may affect the operation of the other unit due to the possible loss of power for common or shared systems.

15 minutes allows adequate time to cross tie or address diesel generator failures and excludes transient or momentary power losses.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA1

INITIATING CONDITION

Power to ECCS Buses reduced to a single source for ≥ 15 minutes such that failure of that single source would result in Unit Blackout.

EAL THRESHOLD VALUE

Available ECCS bus AC power reduced to **only one** of the following sources for ≥ 15 minutes:

- Reserve auxiliary transformer TR-22 (TR-32).
- Unit auxiliary transformer TR-21 (TR-31).
- Unit Emergency Diesel Generator.
- Shared Emergency Diesel Generator.
- Unit crosstie breakers.
- SBO Diesel Generator.

MODE APPLICABILITY

1, 2, 3

BASIS (References)

The reduction of available reliable power sources to a condition where ANY additional single failure will result in a Unit Blackout is a substantial degradation in the level of safety of the plant. That is, the Unit is down to its last source of AC power. Loss of the single power supply would escalate to a Site Area Emergency via Initiating Condition MS1.

The power supplies listed take into account sources and distribution buses that, if unavailable, establish a single failure vulnerability. This EAL allows for the use of unit crosstie breakers if they are the only source of power to the affected unit. The impact of using the crosstie breakers in so far as they affect the other (unaffected) unit must be addressed by the Emergency Director.

15 minutes was selected as a Threshold Value to exclude transient or momentary power losses.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU1

INITIATING CONDITION

Unplanned loss of all offsite AC power to a unit's ECCS buses.

EAL THRESHOLD VALUE

Unplanned loss of ability to power ECCS buses from:

- TR-21 (TR-31).

  AND

- TR-22 (TR-32).

MODE APPLICABILITY

ALL

BASIS (References)

A loss of offsite AC power reduces the 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. In Modes 1, 2, and 3, Unit crosstie breakers are NOT considered an adequate source and an Alert declaration based on EAL MA1 would be appropriate should they be the sole source of AC power. In Modes 4 and 5, Unit crosstie breakers are considered an adequate source due to the less severe threat to the protection of the health and safety of the public because of the much longer time available to restore power to the decay heat removal systems. Backfeed through the unit auxiliary transformer is considered an adequate source of offsite power.

The intent of this EAL is to declare an Unusual Event when offsite power has been lost and at least one of the emergency diesel generators has successfully started and energized at least one ECCS bus.

Declaration of an Unusual Event is not applicable when the loss of the offsite power sources is due to a planned evolution. As stated in the Emergency Plan in Section 2, 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.
Although the NEI guidance for this initiating condition allows 15 minutes for restoration of power prior to declaration of NOUE, it is not used here because current station procedures for power restoration call for surveillance measures, which will not be completed within 15 minutes.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA2

INITIATING CONDITION

Loss of all ECCS bus AC power for ≥ 15 minutes.

EAL THRESHOLD VALUES

1. Loss of all AC power to ECCS bus 23-1 (33-1).

   AND

2. Loss of all AC power to ECCS bus 24-1 (34-1).

   AND

3. Failure to restore power within 15 minutes to at least:

   - Bus 23-1 (33-1).

   OR

   - Bus 24-1 (34-1).

MODE APPLICABILITY

4, 5, Defueled

BASIS (References)

The loss of both offsite and onsite AC power to the ECCS buses when in Mode 4 or 5 compromises safety systems required for decay heat removal and a substantial degradation of the level of safety of the plant. An Alert is declared in Mode 4 or 5 due to the less severe threat to the protection of the health and safety of the public because of the much longer time available to restore power and decay heat removal systems. 15 minutes was selected to exclude transient or momentary power losses. The inability to restore power within 15 minutes is an indicator of a potential substantial degradation in the level of safety of the plant.

Declaration of an Alert is not applicable when ECCS buses are deenergized for a planned evolution. A planned evolution involves significant preplanning and specific controls are in place prior to knowingly entering the condition.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG3

INITIATING CONDITION

Auto and manual SCRAM not successful and loss of core cooling or heat sink.

EAL THRESHOLD VALUES

1. Failure of **BOTH a**utomatic **AND** manual SCRAMs to establish shutdown criteria..

AND

2. **ANY ONE** of the following when reactor power is **> IRM Range 7**:

- Indications exist that adequate core cooling is **NOT** assured.

  OR

- Indications exist that Torus temperature has **OR** is predicted to exceed **110 °F.**

MODE APPLICABILITY

1, 2, 3

BASIS (References)

The conditions of the threshold value are precursors to a core melt sequence and represent imminent substantial core degradation or melting with the potential for loss of containment integrity. Resultant releases can be reasonably expected to exceed Environmental Protection Agency Protective Action Guideline exposure levels offsite for more than the immediate site area.

This EAL is used as an anticipatory condition for the Fission Product Barrier EALs due to the rapid core melt sequence associated with heat generation above the decay heat removal capabilities. When either inadequate core cooling or a degraded heat sink exists at a time when the reactor has not been brought below the power associated with the safety systems design criteria, a core melt sequence condition exists. An uncontrolled temperature rise in the Torus after Standby Liquid Control injection indicates that this means of reactor shutdown is not effective. Inadequate core cooling and a degraded heat sink are indicators of the rapid core melt sequence while the reactor is still critical after an ATWS. Core cooling is extremely challenged when adequate core cooling is not assured as used in the EOPs and the heat sink is extremely challenged when the Torus is used as the last resort heat sink for decay heat removal.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG3 (cont.)

This EAL is used as an anticipatory condition for the Fission Product Barrier EALs due to the rapid core melt sequence associated with heat generation above the decay heat removal capabilities. When either inadequate core cooling or a degraded heat sink exists at a time when the reactor has not been brought below the power associated with the safety systems design criteria, a core melt sequence condition exists. An uncontrolled temperature increase in the Torus after Standby Liquid Control injection indicates that this means of reactor shutdown is not effective. Inadequate core cooling and a degraded heat sink are indicators of the rapid core melt sequence while the reactor is still critical after an ATWS. Core cooling is extremely challenged when adequate core cooling is not assured as used in the EOPs and the heat sink is extremely challenged when the Torus is used as the last resort heat sink for decay heat removal.

These thresholds should be evaluated until the reactor is made subcritical by any means.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS3

INITIATING CONDITION

Auto and manual SCRAM not successful.

EAL THRESHOLD VALUE

Failure of **BOTH** automatic **AND** manual SCRAMs to establish shutdown criteria.

MODE APPLICABILITY

1, 2, 3

BASIS (References)

Automatic or manual SCRAMs are not considered successful if action away from the reactor control console was required to cause control rods to be inserted into the core or any other actions taken to establish shutdown criteria.

Under these conditions the reactor may be producing more heat than the maximum decay heat capacity for which the safety systems were designed. Loss of both the automatic and manual SCRAM capability represents a failure of plant functions necessary for the protection of the public.

This Initiating Condition could lead to observable conditions that could be classified under the Fission Product Barriers. This condition would be recognized earlier than the resultant FPB degradation and is therefore included to provide for more timely recognition and emergency response to potential clad damage and loss of RCS integrity conditions.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA3

INITIATING CONDITION

Auto SCRAM not successful.

EAL THRESHOLD VALUE

Failure of Reactor Protection System to initiate **AND** complete an automatic SCRAM **AND** a successful manual SCRAM occurred.

MODE APPLICABILITY

1, 2, 3

BASIS (References)

The concern of this EAL is the failure of the automatic Reactor Protection System to initiate and complete a SCRAM to establish shutdown criteria.

The ATWS condition represents a substantial degradation in the level of safety of the plant in that a safety system malfunctioned. Conditions resulting from the ATWS may lead to potential loss of fuel clad or RCS.

The minimum classification for an ATWS is an Alert regardless of actions taken subsequent to the event.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS4

INITIATING CONDITION

Loss of vital 125 VDC power.

EAL THRESHOLD VALUE

125 VDC Battery buses **#2 AND #3** bus voltage **≤ 110 volts** for **≥ 15 mins.**

MODE APPLICABILITY

1, 2, 3

BASIS (References)

The loss of all vital DC power compromises the ability to monitor and control plant functions required for the protection of the public and is considered a loss of those functions. A prolonged loss of control power may result in core uncovering and loss of containment integrity if there is sufficient decay heat generated by the core and sensible heat in the RCS.

The Threshold Value was chosen to recognize a loss of DC power at a voltage level low enough to be indicative of a severe control system problem. The value is high enough to provide reasonable assurance that the 125-volt batteries will last at least 15 minutes prior to reaching a designed minimum voltage of 105 volts.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU4

INITIATING CONDITION

Loss of vital 125 VDC power.

EAL THRESHOLD VALUE

125 VDC Battery buses **#2 AND #3** bus voltage **≤ 110 volts** for **≥ 15 mins.**

MODE APPLICABILITY

4, 5

BASIS (References)

The Threshold Value was chosen to recognize a loss of DC buses compromising the ability to monitor and control the removal of decay heat during the Modes 4 and 5.

The Threshold Value was chosen to recognize a loss of DC power at a voltage level low enough to be indicative of a severe control system problem. The value is high enough to provide reasonable assurance that the 125-volt batteries will last at least 15 minutes prior to reaching a designed minimum voltage of 105 volts.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS5

INITIATING CONDITION

Loss of Mode 4 capability (HCTL exceeded).

EAL THRESHOLD VALUE

Emergency Depressurization is required due to the inability to maintain Torus bulk temperature below the Heat Capacity Limit curve of DEOP 0200-01.

MODE APPLICABILITY:

1, 2, 3

BASIS: (References)

The value chosen is indicative of a loss heat sink available to reject decay and sensible heat available in a shutdown condition. The value allows a sufficient heat capacity in the Torus water for complete condensation and allows time to establish cooling.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS6

INITIATING CONDITION

Loss of annunciators and indications with a transient in progress.

EAL THRESHOLD VALUE

1. Loss of **ALL** Safety System Annunciator Panels:

   - **902(3)-3**
   - **902(3)-5**
   - **902(3)-8**

   AND

2. A significant transient is in progress.

   AND

3. Loss of **ALL** indications needed to monitor **ANY** of the following; Criticality **OR** Core Heat Removal **OR** Fission Product Barrier status.

MODE APPLICABILITY

1, 2, 3

BASIS (References)

The inability of the Control Room Operators to monitor safety functions or a significant transient in progress represents functions needed for the protection of the public. The inability to monitor functions includes criticality, core heat removal, and the status of the Fission Product Barriers.

Planned actions and time limits are excluded from this EAL since the loss of instrumentation of this magnitude is of such significance during a transient that the cause of the loss or length of the loss is not a factor.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA6

INITIATING CONDITION

Loss of annunciators or indications requiring increased monitoring.

EAL THRESHOLD VALUES

1. Unplanned loss of **MOST OR ALL** Safety System Annunciators on Panels (below) for ≥ **15 mins.:**

   - **902(3)-3**
   - **902(3)-5**
   - **902(3)-8**

   AND

2. **ANY** of the following:

   - A significant transient is in progress.

     OR

   - Loss of **ALL** indications needed to monitor; Criticality **OR** Core Heat Removal **OR** Fission Product Barrier status

MODE APPLICABILITY:

1, 2, 3

BASIS: (References)

These Threshold Values describe the difficulty associated with assessment of plant conditions during a transient which indicate a potential substantial degradation of the level of safety of the plant. The loss of specific, or several, safety system annunciators or indications should remain a function of the system or component operability status and addressed through Technical Specifications.

The use and definition of MOST is not intended to require a detailed count of lost annunciators or indications but should be used as a guide to assess the ability to monitor the transient. The control panels listed include Reactor Controls, ECCS, Radiological, and Electrical.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU6

INITIATING CONDITION

Unplanned loss of annunciators or indications for ≥ 15 mins.

EAL THRESHOLD VALUE

Unplanned loss of **MOST OR ALL** Safety System Annunciators **OR** indications for **≥ 15 mins.** Panels:

- **902(3)-3**
- **902(3)-5**
- **902(3)-8**

MODE APPLICABILITY:

1, 2, 3

BASIS: (References)

These Threshold Values describe a loss of Reactor Control, ECCS, and Electrical panels in the Control Room and represents a potential degradation of the level of safety of the plant in that the ability to monitor the plant is impaired. The loss of specific, or several, safety system annunciators or Control Board indications should remain a function of the system or component operability status and addressed through Technical Specifications. A loss of annunciators is more likely than the loss of indications, both are considered equally for classification purposes in that the ability to monitor the unit is the concern.

The use and definition of MOST is not intended to require a detailed count of lost annunciators or indications but should be used as a guide to assess the ability to monitor the operation of the plant.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS7

INITIATING CONDITION

Loss of decay heat removal and core uncovery.

EAL THRESHOLD VALUES

1. Reactor core is **OR** will be uncovered.

   AND

2. **ANY** of the following:

   - Reactor coolant temperature **> 212 °F.**

     OR

   - Uncontrolled temperature increase approaching **212 °F.**

MODE APPLICABILITY

4, 5

BASIS (References)

The Threshold Values indicate that severe core damage may occur and Reactor Coolant System (RCS) integrity may not be assured and thus indicate failures of functions needed for the protection of the public.

The conditions address concerns raised by the NRC AEOD Report AEOD/EG09, "BWR Operating Experience Involving Inadvertent Draining of the Reactor Vessel", dated August 8,1986. This report states:

In broadest terms, the dominant cause of inadvertent reactor vessel draining are related to the operational and design problems associated with the residual heat removal system when it is entering into or exiting from the shutdown cooling mode. During this transitional period water is drawn from the reactor vessel, cooled by Shutdown Cooling heat exchangers (from the cooling provided by the RBCCW system), and returned to the reactor vessel.

First there are piping and valves in the Shutdown Cooling system which are common to both the shutdown cooling mode and other modes of operation such as low pressure coolant injection and suppression pool cooling. These valves, when improperly positioned provide a drain path for the reactor coolant to flow from the reactor vessel to the suppression pool or the radwaste system.

Second, establishing or exiting the shutdown cooling mode of operation is entirely manual making such evolutions vulnerable to personnel and procedural errors.

Third, there is no comprehensive valve interlock arrangement for all the Shutdown Cooling system valves that could be activated during shutdown cooling. Collectively, these factors have contributed to the repetitive occurrences of the operational events involving the inadvertent draining of the reactor vessel.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA7

INITIATING CONDITION

Inability to establish or maintain Mode 4.

EAL THRESHOLD VALUE

1. Inability to establish Mode 4 when required.

   OR

2. Inability to maintain Mode 4 conditions as indicated by **EITHER**:

   - RCS temperature increase that exceeds **212 °F**.

     OR

   - Uncontrolled RCS temperature increase approaching **212 °F**.

MODE APPLICABILITY

3, 4, 5

BASIS (References)

The inability to establish Mode 4 includes instances when decay heat removal capability is lost prior to reaching Mode 4 when the operational intent is to enter Mode 4 using existing procedures.

The Threshold Values indicate a substantial degradation of the level of safety of the plant by indicating a complete loss of the ability to remove decay heat in Modes 3, 4 and 5.

The Threshold Value related to an uncontrolled temperature increase is necessary to preserve the anticipatory philosophy of NUREG-0654 for events starting from temperatures much lower than 212 °F.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU7

INITIATING CONDITION

Offgas radiation trip or high reactor coolant activity.

EAL THRESHOLD VALUES

1. Offgas system isolation due to valid Offgas post-treatment radiation monitor signal.

   OR

2. Coolant activity **≥ 5 µCi/gm I-131** dose equivalent.

MODE APPLICABILITY:

ALL

BASIS: (References)

The isolation of the offgas system (i.e. chimney isolation valve auto closes) on a valid high radiation signal is an indication of fuel clad degradation and a potential degradation in the level of safety of the plant. The coolant activity level selected exceeds the Technical Specification limits for Iodine spikes and is also indicative of fuel clad degradation. These events are precursors of more severe conditions.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU8

INITIATING CONDITION

RCS leakage.

EAL THRESHOLD VALUES

1. Unidentified RCS leakage into the primary containment **> 10 gpm.**

   OR

2. Total RCS leakage (identified + unidentified) into primary containment **> 35 gpm.**

MODE APPLICABILITY

1, 2, 3

BASIS (References)

RCS leakage is a precursor to more severe conditions and therefore represents a potential degradation in the level of safety of the plant. The basis for the limit is potential crack propagation of the RCS boundary. Escalation of this EAL to the Alert level is via Fission Product Barrier Degradation RCS Leakage 3.a.1.

The unidentified leakage Threshold Value is twice the Technical Specification limit and is observable in the Control Room but does not require a mass balance calculation.

The total leakage Threshold Value exceeds the Technical Specification limit and is observable in the Control Room but does not require a mass balance calculation.

The Identified leakage contribution to total leakage is a higher value because the source is know, has been evaluated and is therefore of lesser significance than unidentified leakage.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU9

INITIATING CONDITION

Unplanned loss of all onsite or offsite communications capabilities.

EAL THRESHOLD VALUES

1. Loss of **ALL** onsite communications equipment, **Table M1.**

   OR

2. Loss of **ALL** offsite communications capability, **Table M2.**

Table M1 Onsite Communications Equipment
Plant radio system
Plant paging system
Sound power phones
In-plant telephones

Table M2 Offsite Communications Equipment
All telephone lines (commercial and microwave)
NARS
ENS
HPN
Cellular Phones

MODE APPLICABILITY

ALL

BASIS (References)

The Threshold Values recognize a loss of communications capability that either inhibits the ability to perform routine tasks necessary for plant operations or the ability to communicate problems to offsite authorities. The loss of offsite communications capabilities Threshold Value is more comprehensive than those reportable in 10 CFR 50.72. The loss of offsite communications capability is applicable when no direct means is available to communicate with or make notifications to the Electric Operations, State and Federal authorities.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU10

INITIATING CONDITION

Inability to reach required mode within Technical Specification time limits.

EAL THRESHOLD VALUE

Plant is **NOT** brought to required mode within Tech. Spec. LCO Action Statement time.

MODE APPLICABILITY

1, 2, 3

BASIS (References)

Limiting Conditions for Operations require the plant to be brought to a specific mode when an LCO has been entered. Depending on the circumstances this may or may not be an emergency or a precursor to a more serious event. In any case when a plant initiates a shutdown due to having entered an LCO action statement a one-hour report must be made under 10 CFR 50.72(b) non-emergency events. The plant is within its safety envelope when being shutdown within the allowable action statement time of a Tech Spec. An immediate classification of Unusual Event should be made when the plant is not brought to the required mode within the allowable action statement time of any Tech Spec LCO. Declaration is based on the time at which the LCO Action Statement specified time period elapses and is **NOT** related to how long a condition may have existed.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA11

INITIATING CONDITION

Major fuel damage or fuel uncovery in the Spent Fuel Pool.

EAL THRESHOLD VALUES

1. Radiation reading **≥ 10 R/hr**. Unit 2 / 3 Refuel Floor

   OR

2. Report of visual observation of a rapid decrease of Spent Fuel Pool water level such that irradiated fuel is predicted to become uncovered.

MODE APPLICABILITY

ALL

BASIS: (References)

Uncovering spent fuel represents a substantial degradation of the level of safety of the plant and warrants an Alert classification. Time is available to take corrective actions. NUREG/CR-4982, "Severe Accident in Spent Fuel Pools in Support of Generic Safety Issue 82," (July, 1987) indicates that even if corrective actions are not taken, no prompt fatalities are predicted, and the risk of injury is low.

Rather than classify based on the fuel pool level falling below the top of irradiated fuel, a conservative radiation level has been chosen. Verification of fuel pool level represents a major ALARA concern considering that radiation levels in excess of 10,000 R/hr on the refuel bridge may be reached when fuel uncovery begins. The value of 10 R/hr was conservatively chosen for classification purposes.

All spent fuel has been removed from Unit 1 Fuel Building.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU11

INITIATING CONDITION

Unplanned decrease in Spent Fuel Pool level.

EAL THRESHOLD VALUE

Inability to maintain Unit 2 **OR** 3 Spent Fuel Pool water level **≥ 33.9 ft.** above the fuel.

MODE APPLICABILITY

ALL

BASIS (References)

Classification of an Unusual Event for the Threshold Values is warranted as a precursor to more serious events and thus is a potential degradation of the level of safety of the plant. The events described as Threshold Values tend to have a long lead time relative to a radiological release and thus the threat to public health and safety is very low. The levels provided are the minimum allowed by Technical Specifications.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA12

INITIATING CONDITION

Unplanned loss of Refueling Cavity level.

EAL THRESHOLD VALUES

1. Report of visual observation of a rapid decrease of refueling cavity water level such that irradiated fuel is predicted to become uncovered.

   OR

2. Reactor vessel level **≤ -143"** (TAF).

MODE APPLICABILITY

5

BASIS (References)

Uncovering irradiated fuel represents a substantial degradation of the level of safety of the plant and therefore warrants an Alert classification. Time is available to take corrective actions. NUREG/CR-4982, "Severe Accidents in Spent Fuel pools in Support of Generic Safety Issue 82," indicates that even if corrective actions are not taken, no prompt fatalities are predicted, and the risk of injury is low.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU12

INITIATING CONDITION

Unplanned loss of Refueling Cavity level.

EAL THRESHOLD VALUE

Inability to maintain Refueling Cavity Level **≥ - 59”**.

MODE APPLICABILITY

5

BASIS (References)

Classification of an Unusual Event for the Threshold Values is warranted as a precursor to more serious events and thus are a potential degradation of the level of safety of the plant. The events described as Threshold Values tend to have a long lead time relative to a radiological release and thus the threat to public health and safety is very low.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HG1

INITIATING CONDITION

Security event resulting in loss of physical control of the facility.

EAL THRESHOLD VALUES

1. Loss of physical control of the Main Control Room due to a security event.

   OR

2. Loss of physical control of the facility (remote shutdown capability) due to a security event.

MODE APPLICABILITY

ALL

BASIS (References)

This EAL is an escalation of the Site Area Emergency declaration for a hostile force intrusion into a Vital Area. A hostile force taking physical control of either the Control Room or all remote shutdown capabilities (e.g., control of Remote Shutdown Panels, ability to perform critical plant activities/manipulations) results in a loss of physical control of the facility.

Threshold #2: A security shift supervisor should be consulted to determine which areas of the plant are affected, and the extent of the effects, prior to making the determination of these threshold values.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HS1

INITIATING CONDITION

Confirmed Security Event in a Vital Area.

EAL THRESHOLD VALUES

1. Intrusion into plant Vital Area by a hostile force.

   OR

2. A security event that results in the loss of control of **ANY** Vital Area (other than the Main Control Room).

   OR

3. Imminent loss of physical control of the facility due to a security event.

   OR

4. A confirmed bomb device discovered in a Vital Area.

MODE APPLICABILITY

ALL

BASIS (References)

This Threshold Value escalates from the Alert Protected Area intrusion to a Vital Area intrusion of a hostile force.

A security event is as defined in the Security Plan. A security shift supervisor should be consulted when making the determination of these threshold values.

Loss of physical control of the Control Room or remote shutdown capabilities (e.g., control of Remote Shutdown Panels, ability to perform critical plant activities/manipulations) due to a security event is to be classified as a General Emergency via HG1.

A "confirmed bomb device" is a determination made by the security force through the Security Plan, contingency procedures and other guidance documentation, or any other Federal Law Enforcement Agency.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA1

INITIATING CONDITION

Confirmed Security Event in the Protected Area.

EAL THRESHOLD VALUES

1. Intrusion into the Protected Area by a hostile force.

   OR

2. Other Security Events of increasing severity that persists for **≥ 30 mins**. (see **Table H2** for example events).

Table H2 - Examples of Security Events
Credible bomb device.
Extortion.
Suspicious fire or explosion.
Significant security system hardware failure.
Loss of Guard Post contact.

MODE APPLICABILITY

ALL

BASIS (References)

A civil disturbance that penetrates the Protected Area can be considered a hostile force. Intrusion of a hostile force into the Protected Area represents a potential for a substantial degradation in the level of safety of the plant.

A security event is considered "of increasing severity" if it is discovered within the Protected Area and is NOT under control of the security force within 30 minutes.

A security shift supervisor should be consulted when making the determination of these threshold values.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HU1

INITIATING CONDITION

Confirmed Security Event that indicates a potential degradation in level of safety of the plant.

EAL THRESHOLD VALUES

1. A credible threat to the station reported by the NRC.

   OR

2. An Actual Threat that meets **ALL** of the following criteria:

   - A credible threat reported by **ANY** other outside agency **OR** security procedures.

     AND

   - Is specifically directed towards the station.

     AND

   - Is imminent (within **2 hrs.**).

   OR

3. Bomb device discovered within the Protected Area **AND** outside a plant Vital Area.

   OR

4. Confirmed tampering with safety related equipment.

   OR

5. A hostage situation that disrupts normal plant operations.

   OR

6. A disturbance (civil, internal **OR** strike) which disrupts normal plant operations.

MODE APPLICABILITY

ALL

BASIS (References)

A security shift supervisor should be consulted when making the determination of these threshold values.

A bomb device discovered within the PA but outside an area that contains safety functions or systems is a potential degradation in the level of safety of the plant and therefore an Unusual Event.

Confirmed tampering is adapted from the list of security plan contingencies.

A hostage situation is considered to disrupt normal operations if it results in the inability to perform surveillance activities, alters unit operations, or as described in the security plan.

A disturbance is considered to disrupt normal plant operations if it obstructs ingress or egress to the owner controlled or protected area, or if it requires actions to intervene and control by Local Law Enforcement Agencies (LLEA).

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HG2

INITIATING CONDITION

Conditions indicate imminent core damage and release affecting the public.

EAL THRESHOLD VALUES

1. Actual **OR** imminent core degradation **AND** potential loss of **Containment**.

   OR

2. Potential uncontrolled radionuclide release which can reasonably be expected to reach or exceed **1 Rem** TEDE **OR 5 Rem** CDE thyroid plume exposure levels at the Site Boundary.

MODE APPLICABILITY

ALL

BASIS (References)

This Emergency Action Level allows for classification of events which in the judgement of the Emergency Director warrant the General Emergency classification but do not fit into any other General Emergency criteria.

Emergency Director judgement is to be based on known conditions and the expected response to mitigating activities within a short time period arbitrarily set at 2 hours. Classification of a General Emergency is not to be delayed pending an extended evaluation of possibilities and probabilities. If time allows and the offsite response organizations are active, consultation with the effected state and the NRC is prudent prior to classification.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HS2

INITIATING CONDITION

Conditions indicate actual or likely failure of functions needed for public protection.

EAL THRESHOLD VALUE

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

MODE APPLICABILITY

ALL

BASIS (References)

The judgment call of the Emergency Director that conditions indicate actual or likely major failures of plant functions needed for protection of the public is intended for unanticipated conditions not explicit in other EALs. Additional assistance, monitoring and direction is made available by activation of the Emergency Operations Facility consistent with declaration of a Site Area Emergency.

Emergency Director judgement is to be based on known conditions and the expected response to mitigating activities within a short time period. Classification of a Site Area Emergency is not to be delayed pending an extended evaluation of possibilities and probabilities.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA2

INITIATING CONDITION

Conditions indicate actual or potential substantial degradation of the level of safety of the plant.

EAL THRESHOLD VALUE

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

MODE APPLICABILITY

ALL

BASIS (References)

A condition exists which, in the judgement of the Emergency Director, presents an actual or potential substantial degradation in the level of safety of the plant. Emergency Director judgement is to be based on known conditions and the expected response to mitigating activities within a short time period.

The Emergency Director should further consider how these Threshold Values may affect both units at the site due to the effects on common or shared plant systems. These effects may warrant upgrading the Emergency Class based on the nature of the combined effects between the units.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HU2

INITIATING CONDITION

Conditions indicate a potential degradation of the level of safety of the plant.

EAL THRESHOLD VALUE

Other conditions exist which in the judgment of the Emergency Director indicate a potential degradation in the level of safety of the plant (see **Table H1** for example conditions).

Table H1 – Example Conditions
• An event onsite **OR** near the site which requires the assistance of the local Police **OR** Fire Department.
• Uncontrolled RCS cooldown.
• Plant conditions require operation outside analyzed conditions.
• Approaching **ANY** Unusual Event Threshold Value as an anticipatory judgment call.
• Abnormal operating conditions persist because mitigation activities are **NOT** effective.
• Additional assistance is required to ensure the protection of the health and safety of the workers and the public.
• Unusual aircraft activity over the Protected Area.

MODE APPLICABILITY

ALL

BASIS (References)

Any condition not explicitly detailed as an EAL Threshold Value that in the judgment of the Emergency Director is a potential degradation in the level of safety of the plant. Emergency Director judgement is to be based on known conditions and the expected response to mitigating activities within a short time period.

Some examples of actual events that may require emergency director judgement are listed here for consideration. However this list is by no means all-inclusive and is not intended to limit the discretion of the Emergency Director. This list is provided solely as examples for consideration and it is recognized that actual events may not always follow a preconceived description.

The Emergency Director should further consider how these Threshold Values may affect both units at the site due to the effects on common or shared plant systems. These effects may warrant upgrading the Emergency Class based on the nature of the combined effects between the units.

A security shift supervisor should be consulted when making the determination of the security related threshold values.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HS3

INITIATING CONDITION

Main Control Room evacuated and control not established in ≤ 30 mins.

EAL THRESHOLD VALUES

1. Main Control Room evacuation initiated.

   AND

2. Control of the plant **CANNOT** be established per **DSSP 0100-CR** in **≤ 30 mins.**

MODE APPLICABILITY:

All

BASIS: (References)

A station without Remote Shutdown Panels may not be able to meet the 15-minute criteria per NUMARC NESP-007. 30 minute provides a reasonable time period to gain local control and establish communications DSSP 0100-CR .This Threshold Value is an escalation of the Alert for Control Room evacuation and is more serious because control of plant systems has not been established within 30 minutes of the reactor SCRAM.

The primary concern of establishing control in Mode 3 is ensuring the integrity of the Fission product Barriers. The primary concern of establishing control in Modes 4 and 5 is decay heat removal.

The Emergency Director should further consider how these Threshold Values may affect both units at the site due to the effects on common or shared plant systems. These effects may warrant upgrading the emergency class based on the nature of the combined effects between the Units.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA3

INITIATING CONDITION

Main Control Room evacuation initiated.

EAL THRESHOLD VALUE

Entry into **DSSP 0100-CR** for Control Room evacuation.

MODE APPLICABILITY

All

BASIS (References)

Evacuation of the Control Room represents a potential for substantial degradation of the level of safety of the plant and therefore requires an Alert declaration. Additional support, monitoring and direction is required and accomplished by activation of the Technical Support Center at the Alert classification level.

The primary concern of establishing control in Mode 3 is ensuring the integrity of the Fission product Barriers. The primary concern of establishing control in Modes 4 and 5 is decay heat removal.

The Emergency Director should further consider how these Threshold Values may affect both units at the site due to the effects on common or shared plant systems. These effects may warrant upgrading the Emergency class based on the nature of the combined effects between the Units.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA4

INITIATING CONDITION

Natural or destructive phenomena inside a Vital Area.

EAL THRESHOLD VALUE

1. Confirmed seismic event ≥ Operating Basis Earthquake (OBE) as indicated by seismic instrumentation registering > **0.1g.**

   OR

2. Tornado striking structures containing systems required to establish **OR** maintain Mode 4.

   OR

3. Sustained high winds **≥ 90 mph** on PPDS, **OR** indicated for **≥ 15 mins.** by Control Room report, computer point **OR** chart recorders.

   OR

4. Report of visible structural damage to a structure containing systems required to establish or maintain Mode 4.

   OR

5. Vehicle collision affecting a Vital Area.

   OR

6. Main Turbine rotating component failure that penetrates the casing **AND** generates missiles causing damage to structures containing safety related equipment.

   OR

7. Flooding in a Vital Area > **Max. Safe Water Level** for **ANY** area listed in DEOP 300-1.

MODE APPLICABILITY

ALL

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA4 (cont.)

BASIS (References)

These Threshold Values are natural or destructive phenomena that represent actual or potential substantial degradation of the level of safety of the plant. The affects of the phenomena should also be evaluated on a system or component basis in relation to Technical Specification and evaluated for further classification via the System Malfunction and Fission Product Barrier Recognition Categories.

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

Threshold Value 1 – Seismic events at the UFSAR (2.2.6) Operating Basis Earthquake (OBE) level may cause damage to safety systems and represent a potential substantial degradation of the level of safety of the plant. A confirmation call to the National Earthquake Center will only confirm that an earthquake has occurred and will not provide a confirmation of the amplitude of the earthquake.

Threshold Value 2, 4, and 5 – The destructive phenomena must include an affect on systems or components that affects the operability or integrity of the system or structure within a Vital Area.

Threshold Value 3 – Sustained winds present a more severe loading on the buildings than a gust. The Threshold Value is 90% of the maximum measurable wind speed.

Threshold Value 4 – Should be used in conjunction with investigations of Threshold Values 1 and 2. A detailed description or assessment of damage is not intended to be used to meet the intent of this Threshold Value.

Threshold Value 5 – A collision by any vehicle on land, from the air or on water that affects structures or equipment necessary for safe operation within a Vital Area.

Threshold Value 6 – This Value addresses the threat to safety equipment imposed by missiles generated by main turbine rotating component failures. This includes all areas containing safety related equipment, controls or power supplies.

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

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HU4

INITIATING CONDITION

Natural or destructive phenomena inside the Protected Area or Switchyard.

EAL THRESHOLD VALUE

1. Confirmed Seismic event **EITHER**:

   - Felt by onsite personnel

     OR

   - Indicated by installed seismic accelograph reading **≥ 0.01 g.**

   OR

2. Report of a tornado strike within the Protected Area **OR** Switchyard.

   OR

3. Vehicle collision into structures containing systems necessary for safe shutdown within the Protected Area **OR** in the Switchyard.

   OR

4. Main Turbine rotating component failure causing visible casing damage or damage to the generator seals.

MODE APPLICABILITY:

ALL

BASIS: (References)

These Threshold Values are natural or destructive phenomena which represent potential degradation of the level of safety of the plant. The affects of the phenomena should also be evaluated on a system or component basis in relation to Technical Specification and evaluated for further classification via the System Malfunction Recognition Category.

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

Threshold Value 1 - Seismic events at the lowest instrumentation actuation level may cause damage to systems and represent a potential degradation of the level of safety of the plant. Following initial indication of a seismic event, a call to the National Earthquake Center will only confirm that an earthquake has occurred and will not provide a value for the amplitude of the earthquake.

Threshold Value 2 - Any report that a tornado has touched down in the Protected Area meets this Threshold Value. The switchyard is considered within the Protected Area for classification purposes.

Threshold Value 3 - A collision by any vehicle on land, from the air or on water which affects structures or equipment necessary for safe shutdown within the Protected Area or in the Switchyard.

Threshold Value 4 - Failure of the rotating components has the potential for leakage of flammable fluids (oil and hydrogen) into the Turbine Building.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA5

INITIATING CONDITION

Fire or explosion affecting operability of systems required to establish or maintain Mode 4.

EAL THRESHOLD VALUES

1. Fire **OR** explosion in **OR** near **ANY** structure containing systems required to establish **OR** maintain Mode 4. (**Table H3** Example Safe Shutdown Areas).

   AND

2. **ANY ONE** of the following:

   - Affected system parameter indications show degraded performance.

     OR

   - Report received of visible damage to permanent structures **OR** equipment within the affected area.

Table H3 Example Safe Shutdown Areas	
Reactor Building	Cribhouse
Control Room	Aux. Electric Room
Diesel Generator	Electrical Switchyard
Switchgear and Battery Rooms	Remote Shutdown Areas

MODE APPLICABILITY

ALL

BASIS (References)

Only explosions of sufficient force to cause damage (deformation, scorching) to structures or equipment required for safe operation should be considered. This EAL is based on fires or explosions that have damaged plant structures that will affect the safe operation of the plant. These structures include buildings and areas immediately adjacent or connected to plant Vital Areas and other significant buildings or areas.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA5 (cont.)

To meet the Alert criteria, monitoring of systems in the affected area must also indicate a degradation of the system or reports of conditions from the location indicate visible damage to equipment. Damage assessment should not be extended beyond the report of visible damage for classification purposes. A classification should be made based on a report of visible damage and not delayed for assessment activities.

The declaration of an Alert and the activation of the TSC will provide the Emergency Director with the necessary resources to perform these damage assessments.

The Emergency Director should further consider how these Threshold Values may affect both units at the site due to the effects on common or shared plant systems. These effects may warrant upgrading the Emergency class based on the nature of the combined effects between the Units.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HU5

INITIATING CONDITION

Fire in the Protected Area not extinguished in ≤ 15 mins. or explosion in the Protected Area.

EAL THRESHOLD VALUE

1. Fire in the Protected Area **NOT** extinguished in **≤ 15 mins**. of **EITHER**:

   - Main Control Room notification.

     OR

   - Verification of alarms.

   OR

2. Explosion in the Protected Area.

MODE APPLICABILITY

ALL

BASIS (References)

The purpose of this EAL is to address only fires that are potentially significant precursors to safety system damage. This excludes such items as fires within administration buildings, wastebasket fires, and other small fires of no consequence. This EAL applies to buildings and areas immediately adjacent or connected to plant Vital Areas or other significant buildings or areas. The intent is not to include buildings (e.g. warehouses) or areas that are not immediately adjacent or connected to plant Vital Areas. Any other areas would not be considered for classification of an Unusual Event.

Only explosions of sufficient force (including high energy line breaks) to cause damage should be considered. Damage assessment should not be beyond the report of visual damage for classification purposes. The Emergency Director also needs to consider any security aspects of the explosion.

The Emergency Director should further consider how these Threshold Values may affect both units at the site due to the effects on common or shared plant systems. These effects may warrant upgrading the Emergency Class based on the nature of the combined effects between the units.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HA6

INITIATING CONDITION

Release of toxic or flammable gases within or adjacent to a Vital Area.

EAL THRESHOLD VALUE

1. Unanticipated report **OR** detection of toxic gases within **OR** adjacent to a Vital Area in concentrations that may be life threatening to personnel.

   OR

2. Unanticipated report **OR** detection of flammable gases within **OR** adjacent to a Vital Area in concentration greater than the lower flammability limit.

MODE APPLICABILITY

ALL

BASIS (References)

The EAL Threshold values are met if the conditions are not an anticipated result of a planned evolution that includes compensatory measures

This IC is based on gases that affect the safe operation of the plant. It applies to buildings and areas immediately adjacent or connected to plant Vital Areas and other significant buildings or areas. The intent is not to include buildings or other areas that are not immediately adjacent or connected to plant Vital Areas.

EAL #1 is met if, by reasonable determination or measurement of toxic gas concentration results in an atmosphere that is Immediately Dangerous to Life and Health (IDLH) and is not an anticipated result of a planned evolution that includes compensatory measures. Exposure to an IDLH atmosphere will result in immediate harm to unprotected personnel, and would preclude access to any such affected areas.

EAL #2 is met when, by reasonable determination or measurement the flammable gas concentration exceeds the Lower Flammability Limit and is not an anticipated results of a planned evolution that includes compensatory measures. This EAL addresses concentrations at which gases can ignite/support combustion. An uncontrolled release of flammable gasses 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.

It is appropriate that increased monitoring be done to ascertain whether consequential damage has occurred. Escalation to a higher emergency class, if appropriate, will be based on other ICs.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HU6

INITIATING CONDITION

Toxic or flammable gas release affecting normal plant operations.

EAL THRESHOLD VALUES

1. Report or detection of toxic **OR** flammable gases in amounts that can 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 involving toxic **OR** flammable gases in amounts that can affect normal plant operations.

MODE APPLICABILITY

ALL

BASIS: (References)

This IC is based on the existence of uncontrolled releases of toxic or flammable gas that may enter the site boundary and affect normal plant operations. The IC assumes an uncontrolled process that has the potential to affect plant operations, or personnel safety. The source of the toxic or flammable gas could be from inside or outside the site and is NOT the issue. The event is considered to affect normal operations if it results in the inability to perform surveillance activities, alters unit operations, or as described in the Security Plan.

It is intended that releases of toxic or flammable gases are of sufficient quantity, and the release point of such gases is such that normal plant operations would be affected. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation.

The EALs are intended to not require significant assessment or quantification.

Escalation of this EAL is via HA6, which involves a quantified release of toxic or flammable gas affecting Vital Areas.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS

HU7

INITIATING CONDITION

Transportation of radiologically contaminated or potentially contaminated person(s) to an offsite medical facility.

EAL THRESHOLD VALUE

Radiologically contaminated **OR** potentially contaminated injured person(s) transferred to an offsite medical facility for treatment.

MODE APPLICABILITY

ALL

BASIS (References)

This EAL insures that proper authorities are notified when a contaminated or potentially contaminated individual is transported to an offsite medical facility. If it is uncertain that the individual is contaminated an Unusual Event should be conservatively declared until proven otherwise.

RECOGNITION CATEGORY
ISFSI MALFUNCTION

E-RU1

INITIATING CONDITION

Unexpected Increase in ISFSI Radiation.

EAL THRESHOLD VALUES

1. Radiation reading on a HI-STAR spent fuel storage cask **EITHER**:

   - **≥ 250 mR/hr.** (neutron + gamma) on contact of **ANY** exterior vertical surface.

     OR

   - **≥ 160 mR/hr.** (neutron + gamma) on contact of **ANY** top horizontal surface.

   OR

2. **ANY** of the following radiation readings on a HI-STORM spent fuel storage cask:

   - **≥ 80 mR/hr.** (neutron + gamma) on contact of **ANY** exterior vertical surface.
   - **≥ 20 mR/hr.** (neutron + gamma) on contact of **ANY** top horizontal surface.
   - **≥ 32 mR/hr.** (neutron + gamma) at the inlet **AND** outlet vent ducts.

MODE APPLICABILITY

N/A

BASIS (References)

This EAL addresses the degradation of irradiated spent fuel stored onsite in HI-STAR or HI-STORM spent fuel casks. These casks are designed to standards identified in 10 CFR Part 72. The dry storage casks are routinely monitored by Radiation Protection personnel, such that any degradation would be detected. Increases in radiation levels may indicate a potential criticality event. Readings of ≥ 2 times the ISFSI Technical Specification radiation limits are indicative of degradation of the irradiated spent fuel storage cask.

This EAL is applicable for spent fuel storage casks in the Storage Operations mode as defined by the cask certificate of compliance.

RECOGNITION CATEGORY
ISFSI MALFUNCTION

E-HU1

INITIATING CONDITION

Damage to a loaded cask confinement boundary.

EAL THRESHOLD VALUE:

1. Natural or destructive phenomena affecting a loaded cask confinement boundary.

Natural and Destructive Phenomena may include:	
dropped cask	tipped over cask
explosion	fire
seismic event	tornado
flood	lightning
burial under debris	

OR

2. **ANY** condition in the opinion of the Emergency Director that indicates loss of loaded fuel storage cask confinement boundary

MODE APPLICABILITY

N/A

BASIS (References)

An Unusual Event in this Initiating Condition is categorized on the basis of the occurrence of an event of sufficient magnitude that a loaded cask confinement boundary is damaged (visible conditions exist that may have caused violation of the boundary) or violated (indication that the containment boundary is no longer intact). 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.

For the second Threshold Value, any condition not explicitly detailed as an EAL Threshold Value, which, in the judgment of the Emergency Director, is a potential degradation in the level of safety of the ISFSI. Emergency Director judgment is to be based on known conditions and the expected response to mitigating activities within a short time period.

ISFSI Technical Specifications allow time to complete required actions if cask seal integrity is not maintained; therefore, classification should not be made based on a loss of seal integrity by itself. However, loss of seal integrity coincident with an accident condition or natural phenomena affecting a cask would justify classification.

RECOGNITION CATEGORY
ISFSI MALFUNCTION

E-HU2

INITIATING CONDITION

Confirmed Security Event with potential loss of level of safety of the ISFSI.

THRESHOLD VALUE

Security Event in **OR** around the ISFSI as determined by the Security Shift Supervisor.

MODE APPLICABILITY

N/A

BASIS: (References)

This EAL is based on the Security Plan. Security events that do not represent a potential degradation in the level of safety of the ISFSI, are reported under 10 CFR 73.71 or in some cases under 10 CFR 50.72.

Reference is made to the Security Shift Supervisor because these individuals are the designated personnel qualified and trained to confirm that a security event is occurring or has occurred.

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 to samples of plant fluids and atmospheres. Core damage is qualitatively evaluated per NRC Core Condition Categories (1-10) as shown in the table below.

Degree of Degradation	Minor (<10%)	Intermediate (10% to 50%)	Major (>50)
No Core Damage	**1**	**1**	**1**
Cladding Failure	**2**	**3**	**4**
Fuel Overheat	**5**	**6**	**7**
Fuel Melt	**8**	**9**	**10**

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 evacuation time estimates were developed per the requirements of NUREG-0654, and to support the Illinois Plan For Radiological Accidents (IPRA) - Dresden Volume II. The purpose of the evacuation time estimates is to assess the postulated evacuation times for the Dresden Station Emergency Planning Zone (EPZ).

The evacuation time estimate data was updated per a study performed by Earth Tech. Inc. documented in their report dated December, 2003 entitled "Evacuation Time Estimates for the Dresden Station Plume Exposure Pathway Emergency Planning Zone."

The evacuation times are based on a detailed consideration of the EPZ roadway network and population distribution. The information in Table 4-1 presents representative evacuation times for daytime and nighttime scenarios, for summer and winter seasons, and under various weather conditions for the evacuation of various areas around the Dresden Station, once a decision has been made to evacuate. The evacuation times noted include notification, mobilization, and travel time. These times are for the general population which include permanent population and special facilities (schools, nursing homes, hospitals, and recreational areas). Table 4-2 provides information on the permanent population distribution (by compass sector) that was used for this study.

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 Dresden Station Relocation Centers or sent home if there is no release or radiological or safety concerns. The designated relocation centers for Dresden Station are:

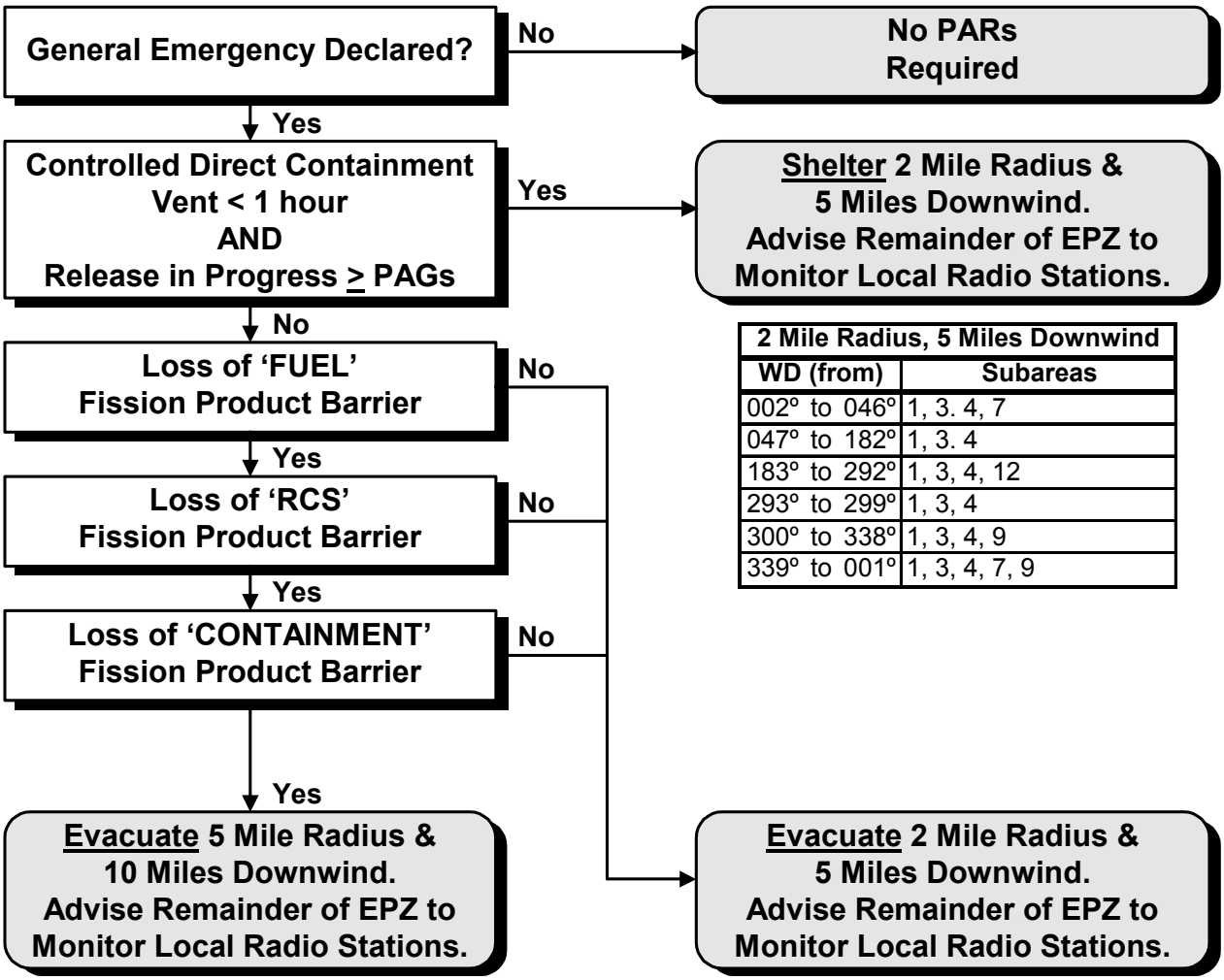
- LaSalle County Nuclear Power Station;

- Braidwood Nuclear Power Station;

For evacuation routes, refer to Figure 4-3 and 4-4. 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 and Braidwood Station for monitoring, decontamination and bioassay. 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

5 Mile Radius, 10 Miles Downwind	
WD (from)	Subareas
002º to 026º	1, 3, 4, 7, 9, 10, 11, 12
027º to 044º	1, 3, 4, 7, 8, 9, 11, 12
045º to 068º	1, 3, 4, 7, 8, 9, 12
069º to 083º	1, 2, 3, 4, 5, 7, 8, 9, 12
084º to 092º	1, 2, 3, 4, 5, 7, 9, 12
093º to 112º	1, 2, 3, 4, 7, 9, 12
113º to 143º	1, 2, 3, 4, 6, 7, 9, 12
144º to 177º	1, 3, 4, 6, 7, 9, 12
178º to 199º	1, 3, 4, 6, 7, 9, 12, 13
200º to 225º	1, 3, 4, 7, 9, 12, 13
226º to 249º	1, 3, 4, 7, 9, 12, 13, 14
250º to 266º	1, 3, 4, 7, 9, 12, 14
267º to 286º	1, 3, 4, 7, 9, 12, 14, 15
287º to 321º	1, 3, 4, 7, 9, 12, 15
322º to 344º	1, 3, 4, 7, 9, 12, 15, 16
345º to 353º	1, 3, 4, 7, 9, 10, 12, 15, 16
354º to 001º	1, 3, 4, 7, 9, 10, 12, 16

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

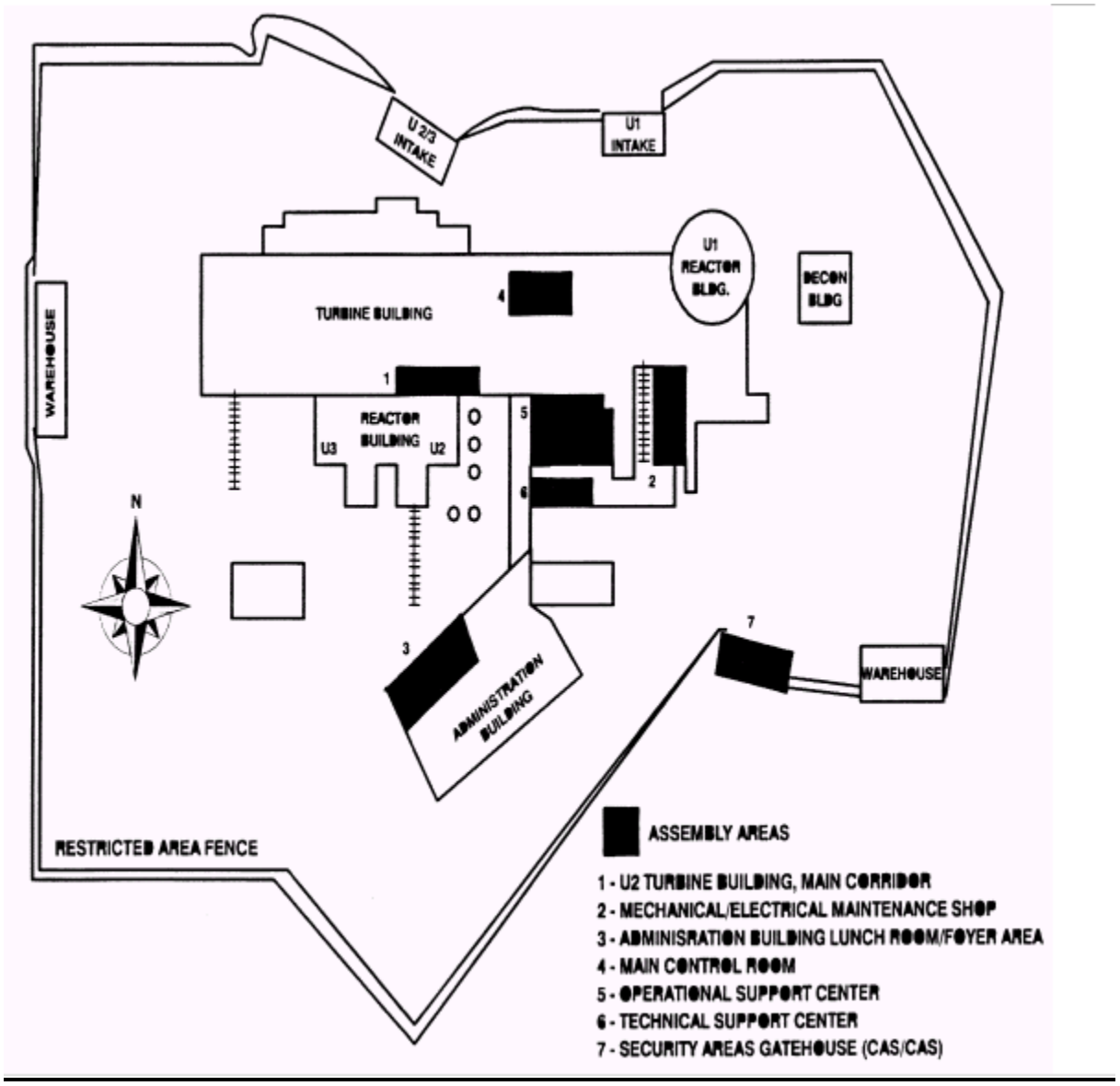
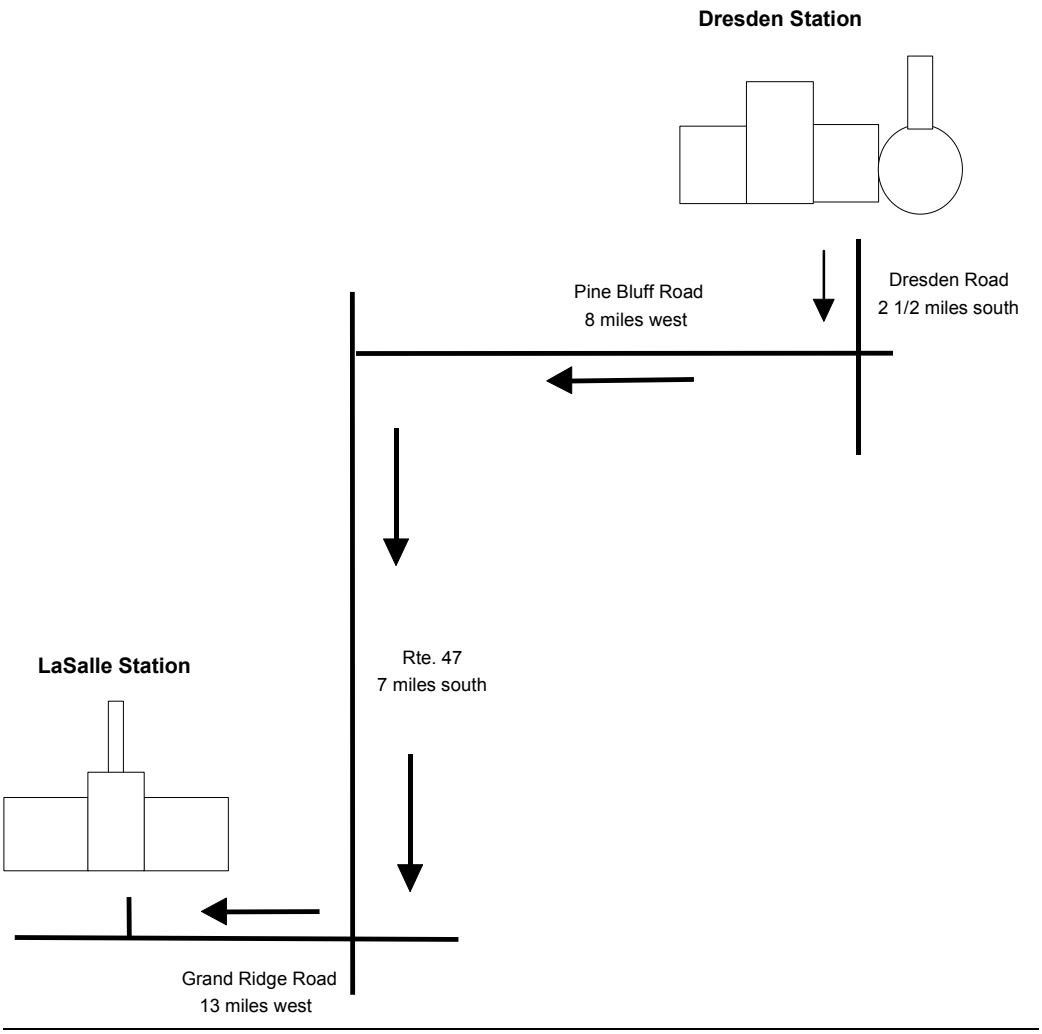
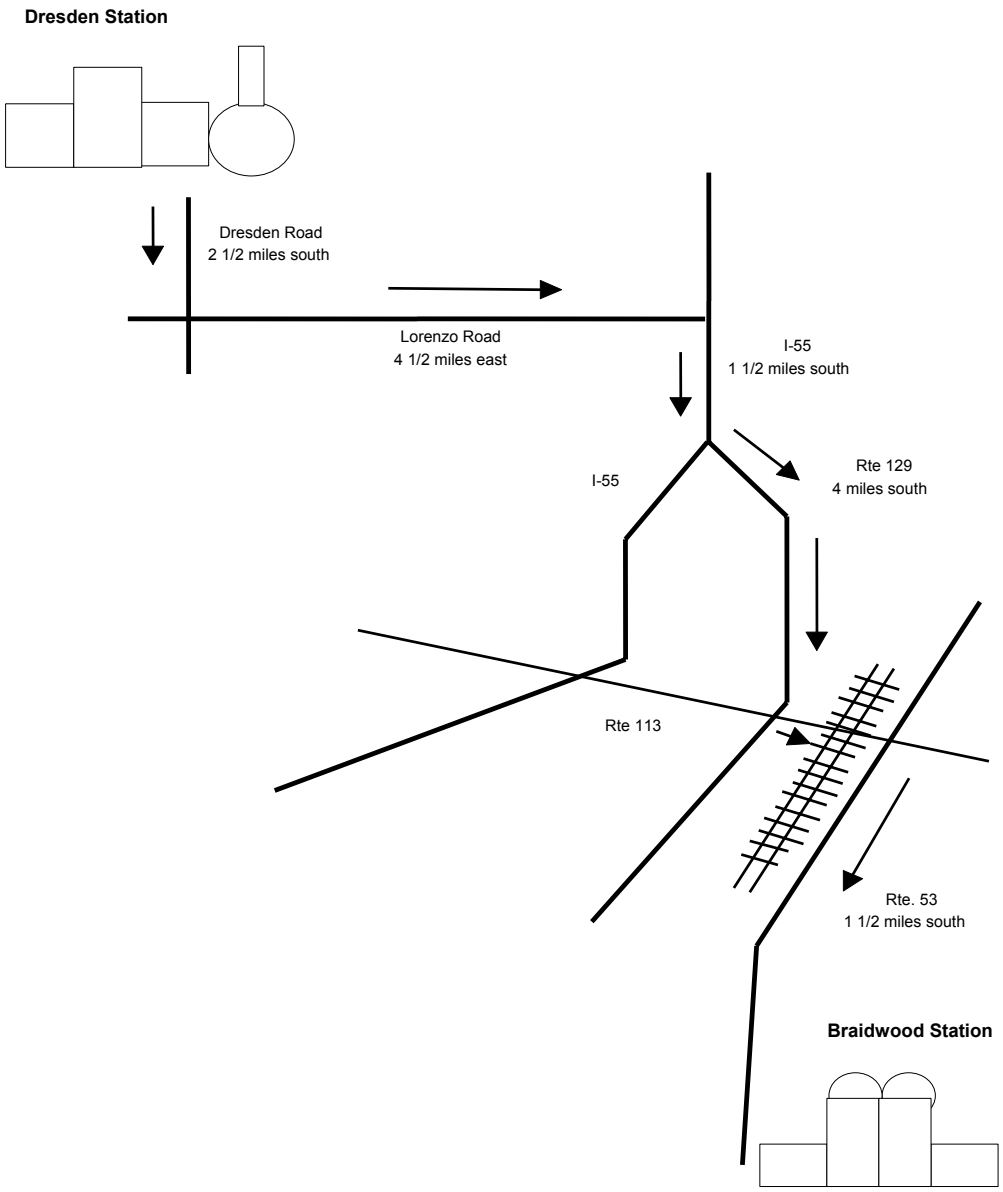


Figure 4-3: Dresden Evacuation Route to LaSalle Station



Directions:
Take Pine Bluff Rd west to Rt. 47. Turn south on Rt. 47 to Grand Ridge Rd in Mazon. Turn west on Grand Ridge Rd. and proceed 13 miles to LaSalle Station.

Figure 4-4: Dresden Evacuation Route to Braidwood Station



Directions:

Take Lorenzo Rd east to I-55. Turn south on I-55 and proceed to the Rt. 129 Braidwood Exit. Exit left off I-55 and proceed to Rt. 113 in Braidwood. Turn east on Rt. 113 and immediately upon crossing the RR tracks turn south on Rt. 53. Proceed 1 1/2 miles south on Rt. 53 to Braidwood Station.

Table 4-1: Dresden Evacuation Time Estimates (in minutes) (1)

PAR Evacuation Zone	Summer Daytime fair	Summer Daytime adverse	Summer Nighttime fair	Summer Nighttime adverse	Winter Daytime fair	Winter Daytime adverse	Winter Nighttime fair	Winter Nighttime adverse
2 Mile Radius & 5 Miles Downwind								
WD 002 to 046 [1, 3, 4, 7]	190	215	125	130	180	220	120	130
WD 047 to 182 [1, 3, 4]	185	210	120	125	175	215	115	125
WD 183 to 292 [1, 3, 4, 12]	190	215	125	130	180	220	120	130
WD 293 to 299 [1, 3, 4]	185	210	120	125	175	215	115	125
WD 300 to 338 [1, 3, 4, 9]	185	210	120	125	175	215	115	125
WD 339 to 001 [1, 3, 4, 7, 9]	190	215	125	130	180	220	120	130
5 Mile Radius & 10 Miles Downwind								
WD 002 to 026 [5R, 10, 11]	190	220	130	135	180	225	125	135
WD 027 to 044 [5R, 8, 11]	190	220	130	135	180	225	125	135
WD 045 to 068 [5R, 8]	190	220	130	135	180	225	125	135
WD 069 to 083 [5R, 2, 5, 8]	190	220	130	135	180	230	125	135
WD 084 to 092 [5R, 2, 5]	190	220	130	135	180	230	125	135
WD 093 to 112 [5R, 2]	190	220	130	135	180	225	125	135
WD 113 to 143 [5R, 2, 6]	190	220	130	135	180	225	125	135
WD 144 to 177 [5R, 6]	190	220	130	135	180	225	125	135
WD 178 to 199 [5R, 6, 13]	215	265	140	170	200	280	125	175
WD 200 to 225 [5R, 13]	215	265	140	170	200	280	125	175
WD 226 to 249 [5R, 13, 14]	215	265	140	170	200	280	125	175
WD 250 to 266 [5R, 14]	190	220	130	140	180	225	125	135
WD 267 to 286 [5R, 14, 15]	190	220	130	140	185	230	130	140
WD 287 to 321 [5R, 15]	190	220	130	135	180	225	125	135
WD 322 to 344 [5R, 15, 16]	195	220	130	135	180	225	125	135
WD 345 to 353 [5R, 10, 15, 16]	195	220	130	135	190	235	125	140
WD 354 to 001 [5R, 10, 16]	195	220	130	135	180	225	125	135
Full EPZ	215	265	140	170	200	280	130	175

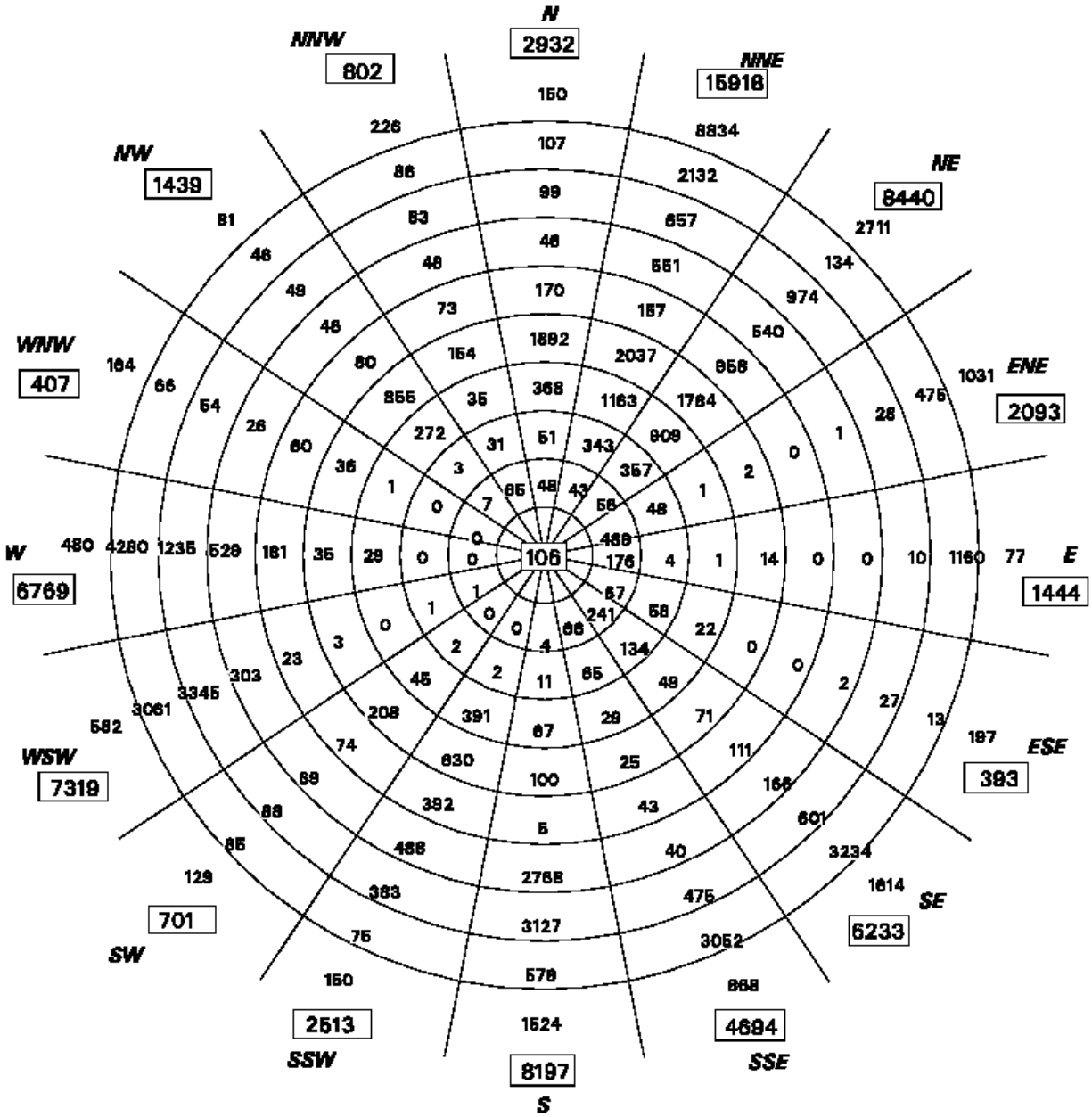
(1) Times are rounded to the nearest 5 minutes

(2) Sub-Areas in brackets. See Figure 1-2 for Sub-Area locations. PAR evacuation zones per EP-AA-111

(3) "5R" designates all Sub-Areas within 5-mile radius (Sub-Areas 1, 3, 4, 7, 9, 12)

(4) WD is the direction (in degrees) from which the wind is blowing (00 or 360 represents a wind from north to south)

Table 4-2: Dresden Permanent Population Distribution By Compass Sector



0 - 2 MI	0 - 5 MI	0 - 10 MI	2 - 5 MI	5 - 10 MI
1263	13707	70294	12338	56587

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 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 located West of Chicago at the Exelon Nuclear Cantera Offices, in Warrenville, IL.

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 $1x10^{-7}$ µCi/cc to $1x10^{5}$ µCi/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 Chapter 11 of the station specific Offsite Dose Calculation Manual (ODCM) for the most current location for fixed continuous air samplers and TLD.

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
Figure 4-3 → 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 Corp 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. Morris Fire Protection and Ambulance District - Fire protection.

7. Coal City Fire Protection and District - Fire protection and advanced life support for transportation of accident victims.

Appendix 3: EAL Wallboard