Omaha Public Power District

January 11, 2017
LIC-17-0006

10 CFR 72.44(f)
10 CFR 50.54(q)
10 CFR 50, Appendix E
10 CFR 50.4(b)(5)

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

Fort Calhoun Station, Unit No. 1
Renewed Facility Operating License No. DPR-40
NRC Docket No. 50-285

Fort Calhoun Station
Independent Spent Fuel Storage Installation
NRC Docket No. 72-054

SUBJECT: Emergency Plan Update

In accordance with 10 CFR 72.44(f), 10 CFR 50.54(q), 10 CFR 50, Appendix E, Section V, and 10 CFR 50.4(b)(5), please find the procedure: EP-FC-1001 Addendum 3 Rev 3 enclosed for the Document Control Desk (holder of Copy 165) and the NRC Region IV Branch 1 Secretary (holder of Copies 154 and 155).

REMOVE SECTION	INSERT SECTION
EP-FC-1001 Addendum 3 Rev 2 issued 11-22-16	EP-FC-1001 Addendum 3 Rev 3 issued 12-29-16

This change was reviewed and does not constitute a decrease in effectiveness. No commitments are made in this letter. If you have any questions regarding the previous transmittal, please contact Mr. Eric Plautz at 402-533-7308.

Sincerely,

Bradley H. Blome
Director - Licensing and Reg Assurance

BHB/mec

c: NRC Region IV Plant Support Branch 1 Secretary (2 sets)
C.F. Lyon, NRC Project Manager (w/o enclosures)
S. M. Schneider, NRC Senior Resident Inspector (w/o enclosures)
Emergency Planning Department (w/o enclosures)

AX45
NMSS26
NRR
NMSS

☒ Radiological Emergency Response Plan (RERP) EP-FC-1001- (& Addendums)
☐ Emergency Plan Implementing Procedures (EPIP)/(EP-FC-110 thru 115, 1001)
☐ Emergency Planning Forms (EPF)
☐ Emergency Planning Department Manual (EPDM)
☐ Other Emergency Planning Document(s)/ Information

Date:

Transmitted to:

Name:	Document Control Desk	Copy No: 165	Date: _____
Plant	Support Branch Secretary	Copy No: 154	
Plant	Support Branch Secretary	Copy No: 155	

The following document(s) / information are forwarded for your manual:

REMOVE SECTION	INSERT SECTION
EP-FC-1001 Addendum 3 Rev 2 11-22-16	EP-FC-1001 Addendum 3 Rev 3 12-29-16

Summary of Changes: Please see the enclosed summary of changes.

Manager - Emergency Planning

I hereby acknowledge receipt of the above documents/information and have included them in my assigned manuals.

Signature: **Date:**

Please sign above and return by: **02-27-17**

Tammy Collinson
Fort Calhoun Station, FC-2-1
Omaha Public Power District
444 South 16th Street Mall
Omaha, NE 68102-2247

NOTE: If the document(s)/information contained in this transmittal is no longer requested or needed by the recipient, or has been transferred to another individuals, please fill out the information below.

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Name: _____ Mailing Address:

Summary of Analysis

In accordance with the discussion in Section 1.4, NRC Order EA-12-051, it is recommended that initiating conditions (IC) and emergency action levels (EAL) be implemented when the enhanced spent fuel pool level instrumentation is available for use per NEI 99-01 revision 6. This change address the regulatory requirements set forth under NRC Order EA-12-051 with regard to reliable Spent Fuel Pool (SFP) Instrumentation.

Design change EC55864 implements the requirements of NRC Order EA-12-051. Rescission of this order was issued on December 8, 2016, but the rescission letter also states that "*all other regulatory requirements for which rescission was not specifically requested remain applicable and are not impacted by the rescission of this order.*" The safety evaluation documented in NRC-15-106 specifically pre-approved this change and therefore must be implemented.

The requirements for the new instrumentation provides Fort Calhoun with a:

- Primary and backup (secondary) level instrument that will monitor wide range water level in the spent fuel pool;
- A display in an area accessible following a severe event; and
- An independent electrical power to each instrument channel and provide an alternate remote power connection capability.

EC55864 installs two new instrumentation systems, primary and secondary, to measure the SFP level, and meet the requirements set forth in NRC Order EA-12-051.

Range

The NRC Order EA 12-051 defines three water levels that must be measured:

Level 1 – Level that is adequate to support operation of the normal fuel pool cooling system.

Level 2 – Level that is adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck.

Level 3 – Level where fuel remains covered and actions to implement make-up water addition should no longer be deferred.

NEI 12-02 further describes Level 1 as the higher of the two following levels:

a) The level at which reliable suction loss occurs due to uncovering of the coolant inlet pipe, weir or vacuum breaker (depending on the design), or

b) The level at which the water height, assuming saturated conditions, above the centerline of the cooling pump suction provides the required net positive suction head specified by the pump manufacturer or engineering analysis.

NEI 12-02 additionally requires 1 foot of distance minimum between Level 1 and Level 2, and 3.5 feet minimum between Level 2 and Level 3.

Level 2 is further described as either of two following levels in NEI 12-02:

a) 10 feet (± 1 foot) above the highest point of any fuel rack seated in the spent fuel pools, or

b) a designated level that provides adequate radiation shielding to maintain personnel radiological dose levels within acceptable limits while performing local operations in the vicinity of the pool. This level shall be based on either plant-specific or appropriate generic shielding calculations, considering the emergency conditions that may apply at the time and the scope of necessary local operations, including installation of portable SFP instrument channel components. Additional guidance can be found in EPA-400, USNRC Regulatory Guide 1.13 and ANSI/ANS-57.2-1983.

Level 3 is defined nominally (±1 foot) from the highest point of any fuel rack seated in the spent fuel pool.

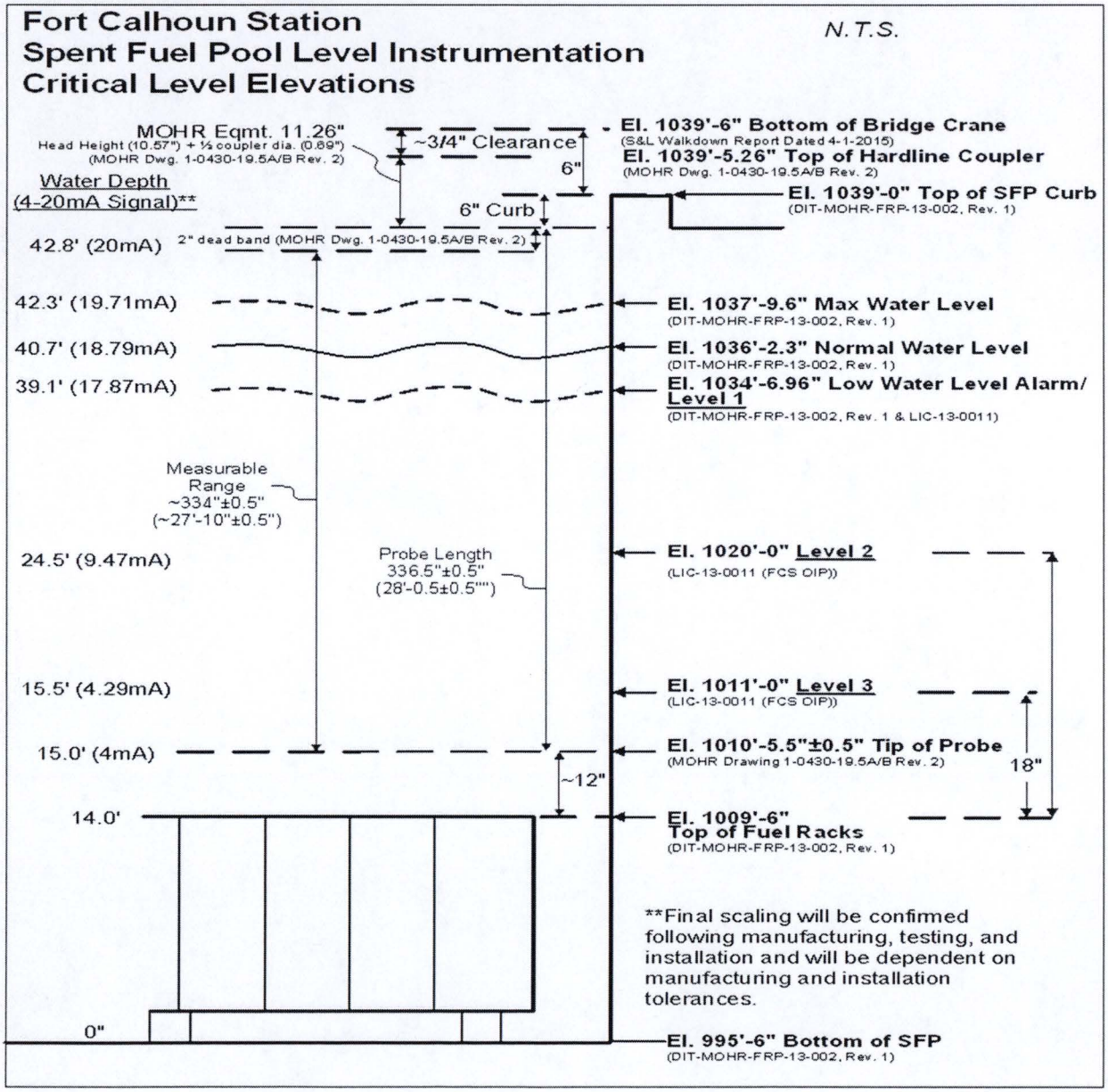
The three critical levels for Fort Calhoun have been selected as follows:

- Level 1: 1034'-6.96" (39.1' of pool depth above pool floor, same level as existing low pool level alarm)
- Level 2: 1020'-0" (24.5' of pool depth, level selected to be 10.5' above top of fuel racks)
- Level 3: 1011'-0" (15.5" pool depth, level selected to be 1.5' above top of fuel racks)

Although NEI 12-02 specifies that Level 3 is defined nominally (±1 foot) from the highest point of any fuel rack seated in the spent fuel pool, NEI 99-01 Rev 6 has a statement from the developers notes for the effected EALs that states "Developers should modify the EAL and/or Basis section to reflect any site-specific constraints or limitations associated with the design or operation of instrumentation used to determine the Level 3 value." The specified value at FCS for Level 3 is consistent with this guidance.

Level Indication Figure from EC55864

This Figure identifies the instrument range relative to the FCS fuel pool elevations and critical levels required to be monitored in accordance with NEI 12-02.The instrument range of the system, including the dead zone of 2" at the top of the probe (Ref. MOHR Drawing No. 1-0430-19.7A), encompasses the maximum water level down to level approximately 12 inches above the fuel racks. The figure demonstrates that the instrumentation range at the installed elevation is adequate to measure the critical levels required for this application.



These EALs are being implemented in accordance LIC-15-0102 "*OPPD Response to NRC Request for Additional Information RE: License Amendment Request to Adopt Emergency Action Level Scheme Pursuant to NEI 99-01, Revision 6 (TAC No. MF5466)*"

FC-RAI-14 Response

Revised the sites proposed EALs to contain the associated RG2, RS2 and additional RA2 threshold related to the enhanced SFP level indicators being installed per NRC Order-EA-12-051. These EALs will be incorporated into the site's EALs when the enhanced spent fuel pool level instrumentation is available for use, in accordance with the discussion in Section 1.4, NRC Order EA-12-051.

Amendment 285 and an attached safety evaluation (NRC-15-106) was issued by the NRC on December 15, 2015 approving the proposed emergency action level scheme associated with the Spent Fuel Pool level instrumentation.

Section 3.1.2 and 3.1.3 of the safety evaluation contains the statement that *"The NRC staff concludes that the pending plant-specific implementation method for this EAL set is in alignment with the key characteristics of an effective EAL scheme, meets the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4), and is, therefore, acceptable for implementation pending installation of EA-12-051 SFP instrumentation."*

This change implements the obligation that OPPD stated in LIC-15-0102 and as pre-approved by in amendment 285.

OPPD NUCLEAR

EMERGENCY ACTION LEVELS FOR FORT CALHOUN STATION

REVISION HISTORY

Rev 0 December 2015		
Rev 1 June 2016		
Rev 2 November 2016		
Rev 3 December 2016		

Section 1: Classification of Emergencies

1.1. General

Section D of the Omaha Public Power District (OPPD) Radiological Emergency Response Plan divides the types of emergencies into four EMERGENCY CLASSIFICATION LEVELS (ECLs). The first four are the UNUSUAL EVENT (UE), ALERT, SITE AREA EMERGENCY (SAE), and GENERAL EMERGENCY (GE). These ECLs are entered by satisfying the Initiating Condition (IC) through meeting an Emergency Action Level (EAL) of the IC provided in this section of the Annex. The ECLs are escalated from least severe to most severe according to relative threat to the health and safety of the public and emergency workers.

UNUSUAL EVENT (UE): Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

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

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

GENERAL EMERGENCY (GE): Events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

RECOVERY: Recovery can be considered as a phase of the emergency and is entered by meeting emergency termination criteria provided in EP-FC-111 Emergency Classification and Protective Action Recommendations.

EMERGENCY CLASSIFICATION LEVEL (ECL): One of a set of names or titles established by the US Nuclear Regulatory Commission (NRC) for grouping off-normal events or conditions according to (1) potential or actual effects or consequences, and (2) resulting onsite and offsite response actions. The emergency classification levels, in ascending order of severity, are:

- UNUSUAL EVENT (UE)
- ALERT
- SITE AREA EMERGENCY (SAE)
- GENERAL EMERGENCY (GE)

INITIATING CONDITION (IC): An event or condition that aligns with the definition of one of the four EMERGENCY CLASSIFICATION LEVELS by virtue of the potential or actual effects or consequences.

EMERGENCY ACTION LEVEL (EAL): A pre-determined, site-specific, observable threshold for an INITIATING CONDITION that, when met or exceeded, places the plant in a given EMERGENCY CLASSIFICATION LEVEL.

An emergency is classified by assessing plant conditions and comparing abnormal conditions to ICs and EALs, based on the designated Operational Condition (MODE). Modes 1 through 5 are defined in the Technical Specifications (T.S). "Defueled" Mode (D) was established for classification purposes to reflect conditions where all fuel has been removed from the Reactor Pressure Vessel.

FCS does not use Standard Technical Specifications for CE PWRs. FCS does not use an operating mode for plant conditions with the reactor subcritical, Tcold greater than or equal to 210 °F, and Tavg less than or equal to 515°F, the only difference between FCS Modes 4 and 5 is the reactor coolant boron concentration, and FCS does not have a defueled mode. To ensure the intent of the NEI 99-01 scheme is met, the following stipulation is added that states: "Unless specific criteria are identified in the "Applicable Modes" section of an EAL, the plant shall always assume to be in the higher Operating Mode (numerically lower) during transitions between modes for the purposes of Emergency Classification (i.e., if Tcold is 246°F, the plant is considered to be in Operating Mode 3 if no temperatures are specified)."

Equivalent Plant Technical Specification Operating Mode Applicability to NEI 99 01	
NEI 99 01 PWR Operating Modes	**FCS Technical Specification Operating Modes**
Power Operation (1): Reactor Power >5%, Keff ≥ 0.99	**Power Operation Condition (Operating Mode 1):** The reactor is in the power operation condition when it is critical and the neutron flux power range instrumentation indicates greater than 2% of rated power.
Startup (2): Reactor Power ≤5%, Keff ≥ 0.99	**Hot Standby Condition (Operating Mode 2):** The reactor is considered to be in a hot standby condition if the average temperature of the reactor coolant (Tavg) is greater than 515 °F, the reactor is critical, and the neutron flux power range instrumentation indicates less than 2% of rated power.
Hot Standby (3): RCS ≥ 350 °F, Keff < 0.99	**Hot Shutdown Condition (Operating Mode 3):** The reactor is in a hot shutdown condition if the average temperature of the reactor coolant (Tavg) is greater than 515 °F and the reactor is subcritical by at least the amount defined in Paragraph 2.10.2.
Hot Shutdown (4): 200 °F <RCS <350 °F, Keff < 0.99	None
Cold Shutdown (5): RCS<200 °F, Keff<0.99	**Cold Shutdown Condition (Operating Mode 4):** The reactor coolant T_{cold} is less than 210°F and the reactor coolant is ≥SHUTDOWN BORON CONCENTRATION but <REFUELING BORON CONCENTRATION.
Refueling (6): One or more vessel head closure bolts less than fully tensioned	**Refueling Shutdown Condition (Operating Mode 5):** The reactor coolant T_{cold} is less than 210 °F and the reactor coolant is ≥ REFUELING BORON CONCENTRATION.
Defueled (none): All reactor fuel removed from reactor pressure vessel. (Full core off load during refueling or extended outage)	None

Hot Matrix - applies in FCS modes (1), (2), (3)

Cold Matrix - applies in FCS modes (4), (5), and (D)

Individuals responsible for the classification of events will refer to the Initiating Condition and EALs on the matrix of this document. This matrix will contain ICs, EALs, Mode Applicability Designators, appropriate EAL numbering system, and additional guidance necessary to classify events. It may be provided as a user aid.

The matrix is set up in six Recognition Categories. The first is designated as "R" and relates to Abnormal Radiological Conditions / Abnormal Radiological Effluent Releases. The second is designated as "F" and relates to Fission Product Barrier Degradation. The third is designated as "M" and relates to hot condition System Malfunctions. The fourth is designated as "C" and relates to Cold Shutdown / Refueling System Malfunctions. The fifth is designated as "H" and relates to Hazards and Other Conditions Affecting Plant Safety. The sixth is designated "E-H" and relates to ISFSI Malfunctions.

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

The Initiating Conditions are coded with a two letter and one number code. The first letter is the Recognition Category designator, the second letter is the Classification Level, "U" for (NOTIFICATION OF) UNUSUAL EVENT, "A" for ALERT, "S" for SITE AREA EMERGENCY and "G" for GENERAL EMERGENCY. The EAL number is a sequential number for that Recognition Category series. All ICs that are describing the severity of a common condition (series) will have the same number.

The EAL number may then be used to reference a corresponding page(s), which provides the basis information pertaining to the IC:

- EAL
- Mode Applicability
- Basis

Classification is not to be made without referencing, comparing and satisfying the specified Emergency Action Levels.

A list of definitions is provided as part of this document for terms having specific meaning to the EALs.

References are also included to documents that were used to develop the EALs.

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 with responsibility assigned to the Shift Manager (Main Control Room), the Control Room Coordinator (Main Control Room), the TSC Site Director (Technical Support Center), or the EOF Emergency Director (Emergency Operations Facility).

Although the majority of the EALs provide very specific thresholds, the Emergency Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL is IMMINENT. If, in the judgment of the Emergency Director, an IMMINENT situation is at hand, the classification should be made as if the EAL has been exceeded. While this is particularly prudent at the higher ECL (as the early classification may provide for more effective implementation of protective measures), it is nonetheless applicable to all ECLs.

1.2 Classification, Instrumentation and Transient Events

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 is the need for timely assessment.

Indications used for monitoring and evaluation of plant conditions include the normally used instrumentation, backup or redundant instrumentation, and the use of other parameters that provide information that supports determination if an EAL has been reached. When an EAL refers to a specific instrument or indication that is determined to be inaccurate or unavailable, then alternate indications shall be used to monitor the specified condition.

During an event that results in changing parameters trending towards an EAL classification, and instrumentation that was available to monitor this parameter becomes unavailable or the parameter goes off scale, the parameter should be assumed to have been exceeded consistent with the trend and the classification made if there are no other direct or indirect means available to determine if the EAL has not been exceeded.

The assessment of some EALs is based on the results of analyses that are necessary to ascertain whether a specific EAL has been exceeded (e.g., dose assessments, chemistry sampling, RCS leak rate calculation, etc.); the EAL and/or the associated basis discussion will identify the necessary analysis. In these cases, the 15-minute declaration period starts with the availability of the analysis results that show the EAL to be exceeded (i.e., this is the time that the EAL information is first available).

Planned evolutions involve preplanning to address the limitations imposed by the condition, the performance of required surveillance testing, and the implementation of specific controls prior to knowingly entering the condition in accordance with the specific requirements of the site's Technical Specifications. Activities which cause the site to operate beyond that allowed by the site's Technical Specifications, planned or unplanned, may result in an EAL being met or exceeded. Planned evolutions to test, manipulate, repair, perform maintenance or modifications to systems and equipment that result in an EAL being met or

exceeded are not subject to classification and activation requirements as long as the evolution proceeds as planned and is within the operational limitations imposed by the specific operating license. However, these conditions may be subject to the reporting requirements of 10 CFR 50.72.

When two or more EALs are determined, declaration will be made on the highest classification level.

Concerning ECL Downgrading, OPPD Nuclear policy is that ECLs shall not be downgraded to a lower classification. Once declared, the event shall remain in effect until no Classification is warranted or until such time as conditions warrant classification to recovery.

There may be cases in which a plant condition that exceeded an EAL was not recognized at the time of occurrence but is identified well after the condition has occurred (e.g., as a result of routine log or record review), and the condition no longer exists. In these cases, an emergency should not be declared. Reporting requirements of 10 CFR 50.72 are applicable, the guidance of NUREG-1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73 and the Reportability Reference Manual, should be applied.

1.3 Mode Applicability

The plant-operating mode that existed at the time that the event occurred, prior to any protective system or operator action initiated in response to the condition, is compared to the mode applicability of the EALs. If an event occurs, and a lower or higher plant-operating mode is reached before the emergency classification can be made, the declaration shall be based on the mode that existed at the time the event occurred.

For events that occur in Cold Shutdown or Refueling, escalation is via EALs that have Cold Shutdown or Refueling for mode applicability, even if Hot Shutdown (or a higher mode) is entered during any subsequent heat-up. In particular, the Fission Product Barrier Matrix EALs are applicable only to events that initiate in Hot Shutdown or higher.

If there is a change in Mode following an event declaration, any subsequent events involving EALs outside of the current declaration escalation path will be evaluated on the Mode of the plant at the time the subsequent events occur.

1.4 Emergency Director Judgment

Emergency Director (ED) Judgment EALs are provided in the Hazards and Other Condition Affecting Plant Safety section and on the Fission Product Barrier (FPB) Matrix. Both of the ED Judgment EALs have specific criteria for when they should be applied.

The Hazards Section ED Judgment EALs are intended to address unanticipated conditions which are not addressed explicitly by other EALs but warrant declaration

of an emergency because conditions exist which are believed by the ED to fall under specific emergency classifications (UE, Alert, SAE or GE).

The FPB Matrix ED Judgment EALs are intended to include unanticipated conditions, which are not addressed explicitly by any of the other FPB threshold values, but warrant determination because conditions exist that fall under the broader definition for a significant Loss or Potential Loss of the barrier (equal to or greater than the defined FPB threshold values).

1.5 Fission Product Barrier (FPB) Threshold

A fission product barrier threshold is a pre-determined, site-specific, observable threshold indicating the loss or potential loss of a fission product barrier.

FPB thresholds represent threats to the defense in depth design concept that precludes the release of radioactive fission products to the environment. This concept relies on multiple physical barriers, any one of which, if maintained intact, precludes the release of significant amounts of radioactive fission products to the environment. The primary FPBs are:

- Fuel Clad (FC)
- Reactor Coolant System (RCS)
- Containment (CT)

Upon determination that one or more FPB thresholds have been exceeded, the combination of barrier loss and/or potential loss thresholds is compared to the FPB IC/EAL criteria to determine the appropriate ECL.

In some accident sequences, the ICs and EALs presented in the Abnormal Radiation Levels/ Radiological Effluent (R) Recognition Category will be exceeded at the same time, or shortly after, the loss of one or more fission product barriers. This redundancy is intentional as the former ICs address radioactivity releases that result in certain offsite doses from whatever cause, including events that might not be fully encompassed by fission product barriers (e.g., spent fuel pool accidents, design containment leakage following a LOCA, etc.).

1.6 Fission Product Barrier Restoration

Fission Product Barriers are not treated the same as EAL threshold values. Conditions warranting declaration of the loss or potential loss of a FPB may occur resulting in a specific classification. The condition that caused the loss or potential loss declaration could be rectified as the result of Operator action, automatic actions, or designed plant response. Barriers will be considered re-established when there are direct verifiable indications (containment penetration or open valve has been isolated, coolant sample results, etc.) that the barrier has been restored and is capable of mitigating future events.

The reestablishment of a FPB does not alter or lower the existing classification. However the reestablishment of the barrier should be considered in determining future classifications should plant conditions or events change.

1.7 Definitions

CONFINEMENT BOUNDARY: The irradiated fuel dry storage cask barrier(s) between areas containing radioactive substances and the environment.

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions.

EXPLOSION: A rapid, violent and catastrophic failure of a piece of equipment due to combustion, chemical reaction or overpressurization. A release of steam (from high energy lines or components) or an electrical component failure (caused by short circuits, grounding, arcing, etc.) should not automatically be considered an explosion. Such events may require a post-event inspection to determine if the attributes of an explosion are present.

FAULTED: The term applied to a steam generator that has a steam leak on the secondary side of sufficient size to cause an uncontrolled drop in steam generator pressure or the steam generator to become completely depressurized.

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fire. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

FISSION PRODUCT BARRIER (FPB) THRESHOLD: A pre-determined, site-specific, observable threshold indicating the loss or potential loss of a fission product barrier.

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTILE FORCE: Any individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

IMMINENT: The trajectory of events or conditions is such that an EAL will be met within a relatively short period of time regardless of mitigation or corrective actions.

INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI): A complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage.

NORMAL LEVELS: As applied to radiological IC/EALs, the highest reading in the past twenty-four hours excluding the current peak value.

OWNER CONTROLLED AREA (OCA): The property associated with the station and owned by the company. Access is normally limited to persons entering for official business.

PROJECTILE: An object directed toward a Nuclear Power Plant (NPP) that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

REFUELING PATHWAY: All the cavities, tubes, canals and pools through which irradiated fuel may be moved or stored, but not including the reactor vessel below the flange.

RUPTURED: The condition of a steam generator in which primary-to-secondary leakage is of sufficient magnitude to require a safety injection.

SAFETY SYSTEM: A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety-related.

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

UNISOLABLE: An open or breached system line that cannot be isolated, remotely or locally.

UNPLANNED: A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

VISIBLE DAMAGE: Damage to a component or structure that is readily observable without measurements, testing, or analysis. The visual impact of the damage is sufficient to cause concern regarding the operability or reliability of the affected component or structure.

Emergency Action Level Technical Basis Page Index

General		Site Area		Alert		Unusual Event	
EAL	Pg.	EAL	Pg.	EAL	Pg.	EAL	Pg.
RG1	2-24	RS1	2-26	RA1	2-28	RU1	2-31
RG2	2-35	RS2	2-36	RA2	2-37	RU2	2-39
				RA3	2-41	RU3	2-44
FG1	2-45	FS1	2-46	FA1	2-47		

Fuel Clad		RCS		Containment	
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				CT4	2-64
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				MA4	2-88	MU4	2-90
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				CA1	2-100	CU1	2-102
				CA2	2-104		
						CU3	2-106
						CU4	2-108
				CA5	2-110	CU5	2-113
CG6	2-115	CS6	2-119	CA6	2-122	CU6	2-124
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		HS2	2-135	HA2	2-137		
						HU3	2-138
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						HU6	2-147
HG7	2-150	HS7	2-151	HA7	2-152	HU7	2-153
						E-HU1	2-154

Abnormal Rad Levels / Radiological Effluents

Radiological Effluents

GENERAL EMERGENCY

RG1 Release of gaseous radioactivity resulting in offsite dose greater than 1,000 mRem TEDE or 5,000 mRem thyroid CDE. 1 2 3 4 5 D

Emergency Action Levels (EAL) :

Notes:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.
- If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 15 minutes.
- Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.
- The pre-calculated effluent monitor values presented in EAL #1 should be used for emergency classification assessments until dose assessment results are available.

1. Readings on **ANY** Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**.

   OR

2. Dose assessment Using actual meteorology indicates doses at or beyond the site boundary of **EITHER**:
   a. **> 1000 mRem TEDE**
   OR
   b. **> 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond the site boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **>1000 mRem/HR** are expected to continue for **> 60 minutes**.
   OR
   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

SITE AREA EMERGENCY

RS1 Release of gaseous radioactivity resulting in offsite dose greater than 100 mRem TEDE or 500 mRem thyroid CDE. 1 2 3 4 5 D

Emergency Action Levels (EAL) :

Notes:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.
- If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 15 minutes.
- Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.
- The pre-calculated effluent monitor values presented in EAL #1 should be used for emergency classification assessments until dose assessment results are available.

1. Readings on **ANY** Table R1 Effluent Monitor **> Table R1value** for **≥ 15 minutes**.

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of **EITHER**:
   a. **> 100 mRem TEDE**
   OR
   b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond the site boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **>100 mRem/HR** are expected to continue for **≥ 60 minutes**.
   OR
   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

ALERT

RA1 Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mRem TEDE or 50 mRem thyroid CDE. 1 2 3 4 5 D

Emergency Action Levels (EAL) :

Notes:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.
- If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 15 minutes.
- Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.
- The pre-calculated effluent monitor values presented in EAL #1 should be used for emergency classification assessments until dose assessment results are available.

1. Readings on **ANY** Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**.

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of **EITHER**:
   a. **> 10 mRem TEDE**
   OR
   b. **> 50 mRem CDE Thyroid**

   OR

3. Analysis of a liquid effluent sample indicates a concentration or release rate that would result in doses greater than **EITHER** of the following at or beyond the site boundary
   a. **10 mRem** TEDE for **60 minutes** of exposure
   OR
   b. **50 mRem** CDE Thyroid for **60 minutes** of exposure

   OR

4. Field survey results at or beyond the site boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 10 mR/hr** are expected to continue for **≥ 60 minutes**.
   OR
   b. Analyses of field survey samples indicate **> 50 mRem CDE Thyroid** for **60 minutes** of inhalation.

UNUSUAL EVENT

RU1 Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer. 1 2 3 4 5 D

Emergency Action Levels (EAL) :

Notes:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.
- If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 60 minutes.
- Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.

1. Reading on **ANY** Table R2 effluent monitors **> 2 times High Alarm setpoint** established by a current radioactive release discharge permit for **≥ 60 minutes**.

   OR

2. Readings on **ANY** Table R3 Effluent Monitor **> Table R3 value** for **≥ 60 minutes**:

   OR

3. Sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Mode: 1 – Power Operations 2 – Hot Standby 3 – Hot Shutdown 4 – Cold Shutdown 5 – Refueling Shutdown D – Defueled

	Monitor	General Emergency	Site Area Emergency	Alert
Table R1 Effluent Monitor Thresholds	RM-063 AB Stack	3.71 E+00 uCi/cc	3.71 E-01 uCi/cc	3.71 E-02 uCi/cc
	RM-062 AB Stack	N/A	N/A	5.25 E+05 cpm
	RM-052 AB Stack	N/A	6.23 E+06 cpm	6.23 E+05 cpm
	RM-043 LRWPB Stack	N/A	5.44 E+06 cpm	5.44 E+05 cpm
	RM-057 Condenser Off-Gas	N/A	N/A	1.34 E+08 cpm

Table R2 Effluent Monitor Thresholds		
Effluent Monitor	Description	2X High Alarm
RM-055 (if discharge not isolated) Minimum 1 CW Pump	Liquid Discharge Header	2.80E+06 cpm
RM-055 (if discharge not isolated) Minimum 2 RW Pumps	Liquid Discharge Header	8.00E+05 cpm

Table R3 Effluent Monitor Thresholds		
Effluent Monitor	Description	NOUE
RM-062	AB Stack (Gas)	3.25 E+04 cpm
RM-052	AB Stack (Gas)	3.85 E+04 cpm
RM-043	LRWPB Stack (Gas)	3.37 E+04 cpm
RM-057	Condenser Off-Gas	8.83 E+06 cpm
RM-054A (if SG blowdown is not isolated)	SG blowdown	9.86E+04 cpm
RM-054B (if SG blowdown is not isolated)	SG blowdown	9.88E+04 cpm

Abnormal Rad Levels / Radiological Effluents

Radiological Effluents

GENERAL EMERGENCY

RG2 Spent fuel pool level cannot Be restored at least to EL. 1011'-0" (15.5-feet) as indicated on LI-4356 **OR** LI-4357 for 60 minutes or longer — 1 2 3 4 5 D

Emergency Action Levels (EAL) :

Notes:

- The Emergency Director should declare the General Emergency promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

1. Spent fuel pool level cannot be restored at least to EL. 1011'-0" (15.5-feet) as indicated on LI-4356 **OR** LI-4357 for 60 minutes or longer.

Table R4
Radiation Monitors

RMS	Area Monitored
RM-73,74,75	Containment Rad Monitor
RM-80,85,87	Spent Fuel Storage Area Radiation Monitor
Portable Area Rad Monitor	Containment and Auxiliary Building near fuel handling areas

SITE AREA EMERGENCY

RS2 Spent fuel pool level at EL. 1011'-0" (15.5-feet) as indicated on LI-4356 **OR** LI-4357. — 1 2 3 4 5 D

Emergency Action Levels (EAL) :

1. Lowering of spent fuel pool level to EL. 1011'-0" (15.5-feet) as indicated on LI-4356 **OR** LI-4357.

Table R5
Areas Requiring Continuous Occupancy

Main Control Room
Central Alarm Station (CAS)

Table R6
Areas with Entry Related Mode Applicability

Area	Entry Related Mode Applicability
Containment	Modes 4, 5 and D
Room 6	Modes 4, 5 and D
Room 13	Modes 4, 5 and D
Room 15A	Modes 4, 5 and D
Room 21	Modes 4, 5 and D
Room 22	Modes 4, 5 and D
Room 56	Modes 4, 5 and D
Room 57	Modes 4, 5 and D
Room 69	Modes 4, 5 and D

ALERT

RA2 Significant lowering of water level above, or damage to, irradiated fuel. — 1 2 3 4 5 D

Emergency Action Levels (EAL) :

1. Uncovery of irradiated fuel in the REFUELING PATHWAY.
   OR
2. Damage to irradiated fuel resulting in a release of radioactivity from the fuel as indicated by **ANY** Table R4 Radiation Monitor reading >1000 mRem/hr
   OR
3. Lowering of spent fuel pool level to EL. 1020'-0" (24.5-feet) as indicated on LI-4356 **OR** LI-4357.

RA3 Radiation levels that impede access to equipment necessary for normal plant operations, cooldown or shutdown. — 1 2 3 4 5 D

Emergency Action Levels (EAL) :

Note: If the equipment in the room or area listed in Table R6 was already inoperable, or out of service, before the event occurred, then no emergency classification is warranted.

1. Dose rate greater than 15 mR/hr in **ANY** of the areas contained in Table R5.
   OR
2. An UNPLANNED event results in radiation levels that prevent or significantly impede access to any of the plant rooms in Table R6.

UNUSUAL EVENT

RU2 Unplanned loss of water level above irradiated fuel. — 1 2 3 4 5 D

Emergency Action Levels (EAL) :

1. UNPLANNED water level drop in the REFUELING PATHWAY as indicated on **ANY** of the following:
   - LI-106 (Cold Shutdown PZR Level)
   - LI-197 (Cold Shutdown RC Level)
   - LI-199 (sight glass)
   - LI-2846 (Spent Fuel Pool Level)

   AND
2. UNPLANNED Area Radiation Monitor reading rise on **ANY** radiation monitor in Table R4.

RU3 Reactor coolant activity greater than Technical Specification allowable limits. — 1 2 3

Emergency Action Levels (EAL) :

1. "Dose rate on Contact" on the primary sample piping immediately adjacent to the Sample Hood (SL-1) is **> 4R/hr**.

   OR
2. Sample analysis indicates that:
   a. Dose Equivalent I-131 specific coolant activity **> 1.0 uCi/gm** for more than **100 hours** during one continuous time interval **OR > 60 uCi/gm**.

   OR

   b. Activity **> 100/E-bar uCi/gm**.

Mode: 1 – Power Operations 2 – Hot Standby 3 – Hot Shutdown 4 – Cold Shutdown 5 – Refueling Shutdown D – Defueled

Fission Product Barrier Matrix		
GNERAL EMERGENCY	SITE AREA EMERGENCY	ALERT
FG1 Loss of ANY two barriers AND Loss or Potential Loss of third barrier. 1 2 3	**FS1** Loss or Potential Loss of ANY two barriers. 1 2 3	**FA1** ANY Loss or ANY Potential Loss of either Fuel Clad or RCS 1 2 3

Sub-Category	FC – Fuel Clad		RC – Reactor Coolant System		CT - Containment	
	Loss	**Potential Loss**	**Loss**	**Potential Loss**	**Loss**	**Potential Loss**
1. RCS or SG Tube Leakage	None	RVLMS indicates **0.0%.**	1. Automatic or manual ECCS (SI) actuation is required by **EITHER** of the following: a. UNISOLABLE RCS leakage **OR** b. Steam Generator tube RUPTURE.	2. UNISOLABLE RCS or S/G tube leakage **> the capacity of one charging pump in the normal mode (greater than 40gpm).** **OR** 3. A transient has caused a rapid RCS cooldown. **AND** Pressure and Temperature is above Attachment PC-12 Pressure Temperature Curve.	A leaking or RUPTURED SG is FAULTED outside of containment.	None
2. Inadequate Heat Removal	1. Core Exit Thermocouple readings **> 1550°F**	2. Core Exit Thermocouple readings **> 700°F** **OR** 3. Once-Through-Cooling in effect.	None	Once-Through-Cooling in effect.	None	1. a. Core exit thermocouples **> 1550°F** **AND** b. Restoration procedures <u>not</u> effective in **< 15 minutes.** **OR** 2. a. Core exit thermocouples **> 700 °F** **AND** b. RVLMS indicates **0.0%** **AND** c. Restoration procedures <u>not</u> effective in **< 15 minutes.**
3. Containment Radiation / RCS Activity	1. Containment radiation monitor RM-091 A/B reading **> 6500 R/hr.** **OR** 2. Coolant activity **> 180 uCi/gm** Dose Equivalent I-131 **OR** 3. 12.1 Rem/hr on contact or 33 mRem/hr at 30 cm on primary sample piping adjacent to the hood SL-1 per CH-SMP-PA-0007	None	Containment radiation monitor RM-091 A/B reading **> 40 R/hr.**	None	None	Containment radiation monitor RM-091 A/B reading **> 26,000 R/hr.**
4. Containment Integrity or Bypass	None	None	None	None	1. Containment isolation is required and **EITHER** of the following: a. UNPLANNED lowering in containment pressure or rise in radiation monitor readings outside of containment in the Emergency Directors judgment indicate a loss of containment integrity. **OR** b. UNISOLABLE pathway from containment to the environment exists. **OR** 2. Indication of RCS leakage outside of containment.	3. Containment Pressure **> 60 psig** and rising. **OR** 4. Hydrogen Concentration in Containment **> 3%.** **OR** 5. Containment pressure **> 5 psig** **AND** Less than one full train of Containment Cooling / Containment Spray equipment operating per design for ≥ 15 minutes.
5. Emergency Director Judgment	1. Any Condition in the opinion of the Emergency Director that indicates Loss of the Fuel Clad Barrier.	2. Any Condition in the opinion of the Emergency Director that indicates Potential Loss of the Fuel Clad Barrier.	1. Any Condition in the opinion of the Emergency Director that indicates Loss of the RCS Barrier.	2. Any Condition in the opinion of the Emergency Director that indicates Potential Loss of the RCS Barrier.	1. Any Condition in the opinion of the Emergency Director that indicates Loss of the Containment Barrier.	2. Any Condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment Barrier.

Mode: 1 – Power Operations 2 – Hot Standby 3 – Hot Shutdown 4 – Cold Shutdown 5 – Refueling Shutdown D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
Loss of AC Power	**MG1** Prolonged loss of all offsite and all onsite AC power to emergency busses. 1 2 3 **Emergency Action Levels (EAL) :** **Note:** The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded 1. Loss of **ALL** offsite AC power to vital 4160 volt busses 1A3 and 1A4. **AND** 2. Failure of **EDGs** DG1 and DG2 to supply power to vital 4160 volt busses 1A3 and 1A4. **AND** 3. **EITHER** of the following: a. Restoration of at least one vital 4160 volt bus in **< 4 hours** is **not** likely. **OR** b. Core exit thermocouples **> 1550°F.**	**MS1** Loss of all Off-site and On-Site AC power to emergency busses for 15 minutes or longer. 1 2 3 **Emergency Action Levels (EAL) :** **Note:** The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded 1. Loss of **ALL** offsite AC Power to vital 4160 volt busses 1A3 and 1A4. **AND** 2. Failure of **EDGs** DG1 and DG2 to supply power to vital 4160 volt busses 1A3 and 1A4. **AND** 3. Failure to restore power to at least one vital 4160 volt bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.	**MA1** Loss of all but one AC power source to emergency busses for 15 minutes or longer. 1 2 3 **Emergency Action Levels (EAL) :** **Note:** The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded 1. AC power to vital 4160 volt busses 1A3 and 1A4 reduced to only one of the following power sources for **≥ 15 minutes.** • 161 Kv Circuit • 345 Kv Circuit • EDG DG1 • EDG DG2 **AND** 2. Any additional single power source failure will result in a loss of **ALL** AC power to SAFETY SYSTEMS.	**MU1** Loss of all offsite AC power capability to emergency busses for 15 minutes or longer. 1 2 3 **Emergency Action Levels (EAL) :** **Note:** The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded Loss of **ALL** offsite AC power capability to vital 4160 volt busses 1A3 and 1A4 for **≥ 15 minutes.**
Loss of DC Power	**MG2** Loss of all AC and Vital DC power sources for 15 minutes or longer. 1 2 3 **Emergency Action Levels (EAL) :** **Note:** The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded 1. Loss of **ALL** offsite AC power to vital 4160 volt busses 1A3 and 1A4. **AND** 2. Failure of **EDGs** DG1 and DG2 to supply power to vital 4160 volt busses 1A3 and 1A4. **AND** 3. Voltage is **< 105 VDC** on 125 VDC Bus 1 and Bus 2. **AND** 4. **ALL** AC and Vital DC power sources have been lost for **≥ 15 minutes.**	**MS2** Loss of all Vital DC power for 15 minutes or longer. 1 2 3 **Emergency Action Levels (EAL) :** **Note:** The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded Voltage is **< 105 VDC** on 125 VDC Bus1and Bus 2 for **≥ 15 minutes.**		

Mode: 1 – Power Operations 2 – Hot Standby 3 – Hot Shutdown 4 – Cold Shutdown 5 – Refueling Shutdown D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
RPS Failure		**MS3** Inability to shutdown the reactor causing a challenge to core cooling or RCS heat removal. 1 2 **Emergency Action Levels (EAL) :** 1. Automatic or Manual Trip failed to shutdown the reactor as indicated by **ANY** of the following: • Reactor power is **not < 2%** • Startup rate **is not negative** **AND** 2. All manual actions failed to shutdown the reactor as indicated by **ANY** of the following: • Reactor power **not < 2%** • Startup rate is **not negative** **AND** 3. **ONE** of the following conditions exist: a. Core exit thermocouples **> 1550°F.** **OR** b. RVLMS indicates **0.0%** **OR** c. Once-Through-Cooling in effect.	**MA3** Automatic or manual trip fails to shutdown the reactor, and subsequent manual actions taken at the reactor control consoles are not successful in shutting down the reactor. 1 2 **Emergency Action Levels (EAL) :** **Note:** A manual action is any operator action, or set of actions, which causes the control rods to be rapidly inserted into the core, and does not include manually driving in control rods or implementation of boron injection strategies. 1. Automatic or Manual Trip failed to shutdown the reactor as indicated by **ANY** of the following: • Reactor power **not < 2%** • Startup rate is **not negative** **AND** 2. Manual actions taken at the Reactor control console failed to shutdown the reactor as indicated by **ANY** of the following: • Reactor power **not < 2%** • Startup rate is **not negative**	**MU3** Automatic or manual trip fails to shutdown the reactor. 1 2 **Emergency Action Levels (EAL) :** **Note:** A manual action is any operator action, or set of actions, which causes the control rods to be rapidly inserted into the core, and does not include manually driving in control rods or implementation of boron injection strategies. 1. a. Automatic Trip failed to shutdown the reactor as indicated by **ANY** of the following: • Reactor power **not < 2%** • Startup rate is **not negative** **AND** b. Subsequent manual action taken at the Reactor control console is successful in shutting down the reactor. **OR** 2. a. Manual Trip failed to shutdown the reactor as indicated by **ANY** of the following: • Reactor power **not < 2%** • Startup rate is **not negative** **AND** b. **EITHER** of the following: 1. Subsequent manual action taken at the Reactor control console is successful in shutting down the reactor. **OR** 2. Subsequent automatic Trip is successful in shutting down the reactor.
Control Room Indications	**Table M1 Control Room Parameters** • Reactor Power • PZR Level • RCS Pressure • In Core/Core Exit Temperature • Level in at least one S/G. • Auxiliary Feed Water Flow	**Table M2 Significant Transients** • Reactor Trip • ECCS Actuation	**MA4** UNPLANNED loss of Control Room indications for 15 minutes or longer with a significant transient in progress. 1 2 3 **Emergency Action Levels (EAL) :** **Note:** The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded 1. An UNPLANNED event results in the inability to monitor **ANY** Table M1 parameters from within the Control Room for **≥ 15 minutes.** **AND** 2. **ANY** Table M2 transient in progress.	**MU4** UNPLANNED loss of Control Room indications for 15 minutes or longer. 1 2 3 **Emergency Action Levels (EAL) :** **Note:** The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded An UNPLANNED event results in the inability to monitor **ANY** Table M1 parameters from within the Control Room for **≥ 15 minutes.**

Mode: 1 – Power Operations 2 – Hot Standby 3 – Hot Shutdown 4 – Cold Shutdown 5 – Refueling Shutdown D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
Hazard affects Safety System			**MA5** Hazardous event affecting a SAFETY SYSTEM required for the current operating mode. 1 2 3 **Emergency Action Levels (EAL) :** 1. The occurrence of **ANY** of the following hazardous events: • Seismic event (earthquake) • Internal or external flooding event • High winds or tornado strike • FIRE • EXPLOSION • Other events with similar hazard characteristics as determined by the Shift Manager **AND** 2. **EITHER** of the following: a. Event damage has caused indications of degraded performance in at least one train of a SAFETY SYSTEM required by Technical Specifications for the current operating mode. **OR** b. The event has caused VISIBLE DAMAGE to a SAFETY SYSTEM component or structure required by Technical Specifications for the current operating mode.	
RCS Leak				**MU6** RCS leakage for 15 minutes or longer. 1 2 3 **Emergency Action Levels (EAL) :** **Note:** The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded 1. RCS unidentified or pressure boundary leakage **> 10 gpm** for **≥ 15 minutes** **OR** 2. RCS identified leakage **>25 gpm** for **≥ 15 minutes** **OR** 3. Leakage from the RCS to a location outside containment **>25 gpm** for **≥ 15 minutes**

Mode: 1 – Power Operations 2 – Hot Standby 3 – Hot Shutdown 4 – Cold Shutdown 5 – Refueling Shutdown D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
Communications			**Table M3 Communications Capability** System / Onsite / Offsite / NRC 800 MHz Radio System: X / / / Gai-tronics System: X / / / Security Building PABX: X / X / X Training Building PABX: X / X / X Commercial Telephones: X / X / X Conference Operations Network (COP): / X / / FTS-ENS: / X / X HPN: / X / X Satellite phones: / X / X	**MU7** Loss of all On-site or Off-site communication capabilities. 1 2 3 **Emergency Action Levels (EAL) :** 1. Loss of **ALL** Table M3 **Onsite** communications capability affecting the ability to perform routine operations. **OR** 2. Loss of **ALL** Table M3 **Offsite** communication capability affecting the ability to perform offsite notifications. **OR** 3. Loss of **ALL** Table M3 **NRC** communication capability affecting the ability to perform NRC notifications.
Containment				**MU8** Failure to isolate containment or loss of containment pressure control. 1 2 3 **Emergency Action Levels (EAL) :** 1. a. Failure of containment to isolate when required by an actuation signal. **AND** b. **ANY** required penetration remains open **> 15 minutes** of the actuation signal. **OR** 2. a. Containment pressure **> 5 psig** **AND** b. Less than one full train of Containment Cooling / Containment Spray equipment operating for **≥ 15 minutes.**

Mode: 1 – Power Operations 2 – Hot Standby 3 – Hot Shutdown 4 – Cold Shutdown 5 – Refueling Shutdown D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other conditions Affecting Plant Safety				
Hostile Action	**HG1** HOSTILE ACTION resulting in loss of physical control of the facility 1 2 3 4 5 D **Emergency Action Levels (EAL) :** 1. A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA. **AND** 2. a. **ANY** Table H1 safety function **cannot** be controlled or maintained. **OR** b. Damage to spent fuel has occurred or is IMMINENT	**HS1** HOSTILE ACTION within the PROTECTED AREA 1 2 3 4 5 D **Emergency Action Levels (EAL) :** A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.	**HA1** HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes. 1 2 3 4 5 D **Emergency Action Levels (EAL) :** 1. A validated notification from NRC of an aircraft attack threat **< 30 minutes** from the site. **OR** 2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.	**HU1** Confirmed SECURITY CONDITION or threat. 1 2 3 4 5 D **Emergency Action Levels (EAL) :** 1. Notification of a credible security threat directed at the site as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities. **OR** 2. A validated notification from the NRC providing information of an aircraft threat. **OR** 3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.
Transfer of Plant Control	**Table H1 Safety Functions** • Reactivity Control (ability to shut down the reactor and keep it shutdown) • Core Cooling (ability to cool the core) • RCS Heat Removal (ability to maintain heat sink)	**HS2** Inability to control a key safety function from outside the Control Room 1 2 3 4 5 D **Emergency Action Levels (EAL) :** **Note:** The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded. 1. A Control Room evacuation has resulted in plant control being transferred from the Control Room to alternate locations per: a. AOP-07 Evacuation of Control Room **OR** b. AOP-06 Fire Emergency **AND** 2. Control of **ANY** Table H1 key safety function is **not** reestablished in **< 15 minutes**.	**HA2** Control Room evacuation resulting in transfer of plant control to alternate locations 1 2 3 4 5 D **Emergency Action Levels (EAL) :** A Control Room evacuation has resulted in plant control being transferred from the Control Room to alternate locations per: A Control Room evacuation has resulted in plant control being transferred from the Control Room to alternate locations per: a. AOP-07 Evacuation of Control Room **OR** b. AOP-06 Fire Emergency	

Mode: 1 – Power Operations 2 – Hot Standby 3 – Hot Shutdown 4 – Cold Shutdown 5 – Refueling Shutdown D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other conditions Affecting Plant Safety				
Fire			**Table H2 Vital Areas** • Containment Building • Auxiliary Building • Intake Structure • FW-54 • Main and Auxiliary Transformer Yard	**HU3** FIRE potentially degrading the level of safety of the plant. 1 2 3 4 5 D **Emergency Action Levels (EAL) :** **Note:** The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded. 1. A FIRE in **ANY** Table H2 area is **not** extinguished in **≤ 15 minutes** of **ANY** of the following FIRE detection indications: • Report from the field (i.e., visual observation) • Receipt of multiple (more than 1) fire alarms or indications • Field verification of a single fire alarm **OR** 2. Receipt of a single fire alarm in **ANY** Table H2 area (i.e., no other indications of a FIRE). **AND** The existence of a FIRE is **not** verified in **≤ 30 minutes** of alarm receipt. **OR** 3. A FIRE within the plant PROTECTED AREA not extinguished in **≤ 60-minutes** of the initial report, alarm or indication. **OR** 4. A FIRE within the plant PROTECTED AREA that requires firefighting support by an offsite fire response agency to extinguish.
Earthquake				**HU4** Seismic event greater than OBE levels 1 2 3 4 5 D **Emergency Action Levels (EAL) :** **Note**: For emergency classification if EAL 2 is not able to be confirmed, then the occurrence of a seismic event is confirmed in manner deemed appropriate by the Shift Manager or Emergency Director in **< 15 mins** of the event. Seismic event **> Operating Basis Earthquake (OBE)** as indicated by 1. Control Room personnel feel an actual or potential seismic event. **AND** 2. **ANY** one of the following confirmed in **≤ 15 mins** of the event: • The earthquake resulted in Modified Mercalli Intensity (MMI) VI or greater within **3.5 miles** of the plant • The earthquake was felt within the plant and was of magnitude **6.0** or greater • The earthquake was of magnitude 5.0 or greater and occurred within **125 miles** of the plant

Mode: 1 – Power Operations 2 – Hot Standby 3 – Hot Shutdown 4 – Cold Shutdown 5 – Refueling Shutdown D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other conditions Affecting Plant Safety				
Hazardous Event				**HU6** Hazardous Event 1 2 3 4 5 D **Emergency Action Levels (EAL) :** **Note:** EAL #4 does not apply to routine traffic impediments such as fog, snow, ice, or vehicle breakdowns or accidents. 1. Tornado strike within the PROTECTED AREA. **OR** 2. Internal room or area flooding of a magnitude sufficient to require manual or automatic electrical isolation of a SAFETY SYSTEM component required by Technical Specifications for the current operating mode. **OR** 3. Movement of personnel within the PROTECTED AREA is impeded due to an offsite event involving hazardous materials (e.g., an offsite chemical spill or toxic gas release). **OR** 4. A hazardous event that results in on-site conditions sufficient to prohibit the plant staff from accessing the site via personal vehicles. **OR** 5. Abnormal River level, as indicated by **EITHER:** a. **> 1004 feet** MSL elevation (high level) **OR** b. **< 976 feet, 9 inches** MSL elevation (low level)
Emergency Director Judgment	**HG7** Other conditions exist which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY. 1 2 3 4 5 D **Emergency Action Levels (EAL) :** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**HS7** Other conditions exist which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY. 1 2 3 4 5 D **Emergency Action Levels (EAL) :** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts, (1) toward site personnel or equipment that could lead to the likely failure of or, (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	**HA7** Other conditions exist which in the judgement of the Emergency Director warrant declaration of an ALERT. 1 2 3 4 5 D **Emergency Action Levels (EAL) :** Other conditions exist which, in the judgment of the Emergency Director, indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**HU7** Other conditions exist which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT. 1 2 3 4 5 D **Emergency Action Levels (EAL) :** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Mode: 1 – Power Operations 2 – Hot Standby 3 – Hot Shutdown 4 – Cold Shutdown 5 – Refueling Shutdown D – Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
ISFSI Malfunctions			
ISFSI			**E-HU1** Damage to a loaded cask CONFINEMENT BOUNDARY 1 2 3 4 5 D **Emergency Action Levels (EAL) :** Damage to a loaded cask CONFINEMENT BOUNDARY as indicated by an on-contact radiation reading: • **≥ 1600mr/hr** (gamma + neutron) on the HSM front surface. **OR** • **≥ 400mr/hr** (gamma + neutron) on the HSM door centerline. **OR** • **≥ 16mr/hr** (gamma + neutron) on the end shield wall exterior

Mode: 1 – Power Operations 2 – Hot Standby 3 – Hot Shutdown 4 – Cold Shutdown 5 – Refueling Shutdown D – Defueled

Abnormal Rad Levels / Radiological Effluents

Radiological Effluents

GENERAL EMERGENCY

RG1 Release of gaseous radioactivity resulting in offsite dose greater than 1,000 mRem TEDE or 5,000 mRem Thyroid CDE. 1 2 3 4 5 D

Emergency Action Levels (EAL) :

Notes:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.
- If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 15 minutes.
- Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.
- The pre-calculated effluent monitor values presented in EAL #1 should be used for emergency classification assessments until dose assessment results are available.

1. Readings on **ANY** Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes.**

   OR

2. Dose assessment Using actual meteorology indicates doses at or beyond the site boundary of **EITHER:**
   - **a. > 1000 mRem TEDE**

     OR
   - **b. > 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond the site boundary indicate **EITHER:**
   - a. Gamma (closed window) dose rates **>1000 mRem/hr** are expected to continue for **≥ 60 minutes.**

     OR
   - b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

SITE AREA EMERGENCY

RS1 Release of gaseous radioactivity resulting in offsite dose greater than 100 mRem TEDE or 500 mRem thyroid CDE. 1 2 3 4 5 D

Emergency Action Levels (EAL) :

Notes:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.
- If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 15 minutes.
- Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.
- The pre-calculated effluent monitor values presented in EAL #1 should be used for emergency classification assessments until dose assessment results are available.

1. Readings on **ANY** Table R1 Effluent Monitor **> Table R1value** for **≥ 15 minutes.**

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of **EITHER:**
   - a. **> 100 mRem TEDE**

     OR
   - b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond the site boundary indicate **EITHER:**
   - a. Gamma (closed window) dose rates **>100 mRem/hr** are expected to continue for **≥ 60 minutes.**

     OR
   - b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

ALERT

RA1 Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mRem TEDE or 50 mRem thyroid CDE. 1 2 3 4 5 D

Emergency Action Levels (EAL) :

Notes:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.
- If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 15 minutes.
- Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.
- The pre-calculated effluent monitor values presented in EAL #1 should be used for emergency classification assessments until dose assessment results are available.

1. Readings on **ANY** Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes.**

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of **EITHER:**
   - a. **> 10 mRem TEDE**

     OR
   - b. **> 50 mRem CDE Thyroid**

   OR

3. Analysis of a liquid effluent sample indicates a concentration or release rate that would result in doses greater than **EITHER** of the following at or beyond the site boundary
   - a. **10 mRem** TEDE for **60 minutes** of exposure

     OR
   - b. **50 mRem** CDE Thyroid for **60 minutes** of exposure

   OR

4. Field survey results at or beyond the site boundary indicate **EITHER:**
   - a. Gamma (closed window) dose rates **> 10 mR/hr** are expected to continue for **≥ 60 minutes.**

     OR
   - b. Analyses of field survey samples indicate **> 50 mRem CDE Thyroid** for **60 minutes** of inhalation.

UNUSUAL EVENT

RU1 Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer. 1 2 3 4 5 D

Emergency Action Levels (EAL) :

Notes:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.
- If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 60 minutes.
- Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.

1. Reading on **ANY** Table R2 effluent monitors **> 2 times alarm setpoint** established by a current radioactive release discharge permit for **≥ 60 minutes.**

   OR

2. Readings on **ANY** Table R3 Effluent Monitor **> Table R3 value** for **≥ 60 minutes:**

   OR

3. Sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes.**

Mode: 1 – Power Operations 2 – Hot Standby 3 – Hot Shutdown 4 – Cold Shutdown 5 – Refueling Shutdown D – Defueled

	Monitor	General Emergency	Site Area Emergency	Alert
Table R1	RM-063 AB Stack	3.71 E+00 uCi/cc	3.71 E-01 uCi/cc	3.71 E-02 uCi/cc
Effluent Monitor Thresholds	RM-062 AB Stack	N/A	N/A	5.25 E+05 cpm
	RM-052 AB Stack	N/A	6.23 E+06 cpm	6.23 E+05 cpm
	RM-043 LRWPB Stack	N/A	5.44 E+06 cpm	5.44 E+05 cpm
	RM-057 Condenser Off-Gas	N/A	N/A	1.34 E+08 cpm

Table R2 Effluent Monitor Thresholds		
Effluent Monitor	Description	2X High Alarm
RM-055 (if discharge not isolated) Minimum 1 CW Pump	Liquid Discharge Header	2.80E+06 cpm
RM-055 (if discharge not isolated) Minimum 2 RW Pump	Liquid Discharge Header	8.00E+05 cpm

Table R3 Effluent Monitor Thresholds		
Effluent Monitor	Description	NOUE
RM-062	AB Stack (Gas)	3.25 E+04 cpm
RM-052	AB Stack (Gas)	3.85 E+04 cpm
RM-043	LRWPB Stack (Gas)	3.37 E+04 cpm
RM-057	Condenser Off-Gas	8.83 E+06 cpm
RM-054A (if SG blowdown is not isolated)	SG blowdown	9.86E+04 cpm
RM-054B (if SG blowdown is not isolated)	SG blowdown	9.88E+04 cpm

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT

Abnormal Rad Levels / Radiological Effluents

Radiological Effluents

RG2 Spent fuel pool level cannot Be restored at least to EL. 1011'-0" (15.5-feet) as indicated on LI-4356 **OR** LI-4357 for 60 minutes or longer 1 2 3 4 5 D

Emergency Action Levels (EAL) :

Notes:

- The Emergency Director should declare the General Emergency promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

1. Spent fuel pool level cannot be restored to at least EL. 1011'-0" (15.5-feet) as indicated on LI-4356 **OR** LI-4357 for 60 minutes or longer.

RS2 Spent fuel pool level at EL. 1011'-0" (15.5-feet) as indicated on LI-4356 **OR** LI-4357. 1 2 3 4 5 D

Emergency Action Levels (EAL) :

1. Lowering of spent fuel pool level to EL. 1011'-0" (15.5-feet) as indicated on LI-4356 **OR** LI-4357.

RA2 Significant lowering of water level above, or damage to, irradiated fuel. 1 2 3 4 5 D

Emergency Action Levels (EAL) :

1. Uncovery of irradiated fuel in the REFUELING PATHWAY.
   OR
2. Damage to irradiated fuel resulting in a release of radioactivity from the fuel as indicated by **ANY** Table R4 Radiation Monitor reading >1000 mRem/hr
   OR
3. Lowering of spent fuel pool level to EL. 1020'-0" (24.5-feet) as indicated on LI-4356 **OR** LI-4357.

RU2 Unplanned loss of water level above irradiated fuel. 1 2 3 4 5 D

Emergency Action Levels (EAL) :

1. UNPLANNED water level drop in the REFUELING PATHWAY as indicated on **ANY** of the following:
   - LI-106 (Cold Shutdown PZR Level)
   - LI-197 (Cold Shutdown RC Level)
   - LI-199 (sight glass)
   - LI-2846 (Spent Fuel Pool Level)

   AND
2. UNPLANNED Area Radiation Monitor reading rise on **ANY** radiation monitor in Table R4.

Table R5
Areas Requiring Continuous Occupancy

Main Control Room
Central Alarm Station (CAS)

Table R6
Areas with Entry Related Mode Applicability

Area	Entry Related Mode Applicability
Containment	Modes 4, 5 and D
Room 6	Modes 4, 5 and D
Room 13	Modes 4, 5 and D
Room 15A	Modes 4, 5 and D
Room 21	Modes 4, 5 and D
Room 22	Modes 4, 5 and D
Room 56	Modes 4, 5 and D
Room 57	Modes 4, 5 and D
Room 69	Modes 4, 5 and D

RA3 Radiation levels that impede access to equipment necessary or normal plant operations, cooldown or shutdown. 1 2 3 4 5 D

Emergency Action Levels (EAL) :

Note: If the equipment in the room or area listed in Table R6 was already inoperable, or out of service, before the event occurred, then no emergency classification is warranted.

1. Dose rate greater than 15 mR/hr in **ANY** of the areas contained in Table R5.
   OR
2. An UNPLANNED event results in radiation levels that prevent or significantly impede access to any of the plant rooms in Table R6.

Table R4
Radiation Monitors

RMS	Area Monitored
RM-73,74,75	Containment Rad Monitor
RM-80,85,87	Spent Fuel Storage Area Radiation Monitor
Portable Area Rad Monitor	Containment and Auxiliary Building near fuel handling areas

Mode: 1 – Power Operations 2 – Hot Standby 3 – Hot Shutdown 4 – Cold Shutdown 5 – Refueling Shutdown D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Cold Shutdown / Refueling System Malfunctions				
Loss of AC Power			**CA1** Loss of all offsite and onsite AC power to emergency busses for 15 minutes or longer. 4 5 D **Emergency Action Levels (EAL) :** **Note:** The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded 1. Loss of all offsite AC power to vital 4160 volt busses 1A3 and 1A4. **AND** 2. Failure of **EDGs** DG1 and DG2 to supply power to vital 4160 volt busses 1A3 and 1A4. **AND** 3. Failure to restore power to at least one vital 4160 volt bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.	**CU1** Loss of all but one AC power source to emergency busses for 15 minutes or longer. 4 5 D **Emergency Action Levels (EAL) :** **Note:** The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded 1. AC power capability to vital 4160 volt busses 1A3 and 1A4 reduced to only one of the following power sources for **≥ 15 minutes.** • 161 Kv Circuit • 345 Kv Circuit • EDG DG1 • EDG DG2 **AND** 2. **ANY** additional single power source failure will result in a loss of **ALL** AC power to SAFETY SYSTEMS.
Safety System			**CA2** Hazardous event affecting SAFETY SYSTEM required for the current operating mode. 4 5 **Emergency Action Levels (EAL) :** 1. The occurrence of **ANY** of the following hazardous events: • Seismic event (earthquake) • Internal or external flooding event • High winds or tornado strike • FIRE • EXPLOSION • Other events with similar hazard characteristics as determined by the Shift Manager **AND** 2. **EITHER** of the following: a. Event damage has caused indications of degraded performance in at least one train of a SAFETY SYSTEM required by Technical Specifications for the current operating mode. **OR** b. The event has caused VISIBLE DAMAGE to a SAFETY SYSTEM component or structure required by Technical Specifications for the current operating mode.	

Mode: 1 – Power Operations 2 – Hot Standby 3 – Hot Shutdown 4 – Cold Shutdown 5 – Refueling Shutdown D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Cold Shutdown / Refueling System Malfunctions				
DC Power				**CU3** Loss of Vital DC power for 15 minutes or longer. 4 5 **Emergency Action Levels (EAL) :** **Note:** The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded Voltage is **<105 VDC** on required 125 VDC Bus 1 and Bus 2 for **≥15 minutes.**
Communications			**Table C1 Communications Capability** System / Onsite / Offsite / NRC 800 MHz Radio System: X / / / Gai-tronics System: X / / / Security Building PABX: X / X / X Training Building PABX: X / X / X Commercial Telephones: X / X / X Conference Operations Network (COP): / X / / FTS-ENS: / X / X HPN: / X / / Satellite phones: / X / X	**CU4** Loss of all onsite or offsite communication capabilities. 4 5 D **Emergency Action Levels (EAL) :** 1. Loss of **ALL** Table C1 **Onsite** communications capability affecting the ability to perform routine operations. **OR** 2. Loss of **ALL** Table C1 **Offsite** communication capability affecting the ability to perform offsite notifications. **OR** 3. Loss of **ALL** Table C1 **NRC** communication capability affecting the ability to perform NRC notifications.
Heat Sink		**Table C2 RCS Heat-up Duration Thresholds** RCS Status / Containment Closure Status / Heat-up Duration Intact / Not Applicable / 60 minutes* Not Intact OR Reduced Inventory / Established / 20 minutes* Not Intact OR Reduced Inventory / Not Established / 0 minutes * If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then EAL Threshold #1 is **not** applicable.	CA5 Inability to maintain plant in cold shutdown 4 5 **Emergency Action Levels (EAL) :** **Note:** • The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded. • A momentary UNPLANNED excursion above the Technical Specification cold shutdown temperature limit when heat removal function is available does not warrant classification. 1. UNPLANNED rise in RCS temperature **> 210°F** for **> Table C2 duration.** **OR** 2. UNPLANNED RCS pressure rise **> 10 psig** as a result of temperature rise. (This EAL threshold does not apply during water- solid plant conditions.)	**CU5** UNPLANNED rise in RCS temperature. 4 5 **Emergency Action Levels (EAL) :** **Note:** • The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded. • A momentary UNPLANNED excursion above the Technical Specification cold shutdown temperature limit when heat removal function is available does not warrant classification. 1. UNPLANNED rise in RCS temperature **> 210°F.** **OR** 2. Loss of the following for **≥ 15 minutes.** a. **ALL** RCS temperature indications **AND** b. **ALL** RPV level indications

Mode: 1 – Power Operations 2 – Hot Standby 3 – Hot Shutdown 4 – Cold Shutdown 5 – Refueling Shutdown D – Defueled

Id Shutdown / Refueling System Malfunctions

RCS Leakage / Inventory

GENERAL EMERGENCY

CG6 Loss of reactor vessel / RCS inventory affecting fuel clad integrity with containment challenged. 4 5

Emergency Action Levels (EAL) :

Note: The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded

1. RVLMS indicates **0.0%** for **≥ 30 minutes.**

   OR

2. a. Reactor Vessel / RCS level **cannot** be monitored for **≥ 30 minutes.**

   AND

   b. Core uncovery is indicated by **ANY** of the following:
   - Table C3 indications of a sufficient magnitude to indicate core uncovery.

     OR
   - Erratic Source Range Neutron Monitor indication.

     OR
   - Containment Area Radiation Monitors reading **> 20 R/hr.**

   AND

   c. **ANY** Containment Challenge Indication (Table C4)

Table C3 Indications of RCS Leakage
• UNPLANNED Containment Sump level rise*
• UNPLANNED Auxiliary Bldg. Sump level rise*
• UNPLANNED Reactor Coolant Drain Tank level rise*
• UNPLANNED Quench Tank level rise*
• UNPLANNED Spent Regenerate Tank level rise*
• UNPLANNED rise in RCS makeup
• Observation of leakage or inventory loss
*Rise in level is attributed to a loss of reactor vessel/RCS inventory.

Table C4 Containment Challenge Indications
• Hydrogen Concentration in Containment **> 3%**
• UNPLANNED rise in containment pressure
• CONTAINMENT CLOSURE **not** established*
* if CONTAINMENT CLOSURE is re-established prior to exceeding the 30-minute core uncovery time limit, then escalation to a General Emergency is **not** required.

SITE AREA EMERGENCY

CS6 Loss of reactor vessel / RCS inventory affecting core decay heat removal capabilities. 4 5

Emergency Action Levels (EAL) :

Note: The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded

1. With CONTAINMENT CLOSURE established RVLMS indicates **0.0%**

   OR

2. With CONTAINMENT CLOSURE **not** established RVLMS **≤ 8.0%**

   OR

3. a. Reactor Vessel / RCS level **cannot** be monitored for **≥30 minutes.**

   AND

   b. Core uncovery is indicated by **ANY** of the following:
   - Table C3 indications of a sufficient magnitude to indicate core uncovery.

     OR
   - Erratic Source Range Neutron Monitor indication.

     OR
   - Containment Area Radiation Monitors reading **> 20 R/hr.**

ALERT

CA6 Loss of reactor vessel / RCS inventory 4 5

Emergency Action Levels (EAL) :

Note: The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded

1. Loss of Reactor Vessel / RCS inventory as indicated by RVLMS **< 14%**

   OR

2. a. Reactor Vessel / RCS level **cannot** be monitored for **≥ 15 minutes.**

   AND

   b. Loss of Reactor Vessel / RCS inventory per Table C3 indications

UNUSUAL EVENT

CU6 UNPLANNED loss of reactor vessel / RCS inventory for 15 minutes or longer. 4 5

Emergency Action Levels (EAL) :

Note: The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded

1. UNPLANNED loss of reactor coolant results in the inability to restore and maintain Reactor Vessel / RCS level to **> procedurally established lower limit** for **≥ 15 minutes.**

   OR

2. a. Reactor Vessel / RCS level **cannot** be monitored.

   AND

   b. Loss of Reactor Vessel / RCS inventory per Table C3 indications.

Mode: 1 – Power Operations 2 – Hot Standby 3 – Hot Shutdown 4 – Cold Shutdown 5 – Refueling Shutdown D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other conditions Affecting Plant Safety				
Hostile Action	**HG1** HOSTILE ACTION resulting in loss of physical control of the facility 1 2 3 4 5 D **Emergency Action Levels (EAL) :** 1. A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA. **AND** 2. a. **ANY** Table H1 safety function **cannot** be controlled or maintained. **OR** b. Damage to spent fuel has occurred or is IMMINENT	**HS1** HOSTILE ACTION within the PROTECTED AREA 1 2 3 4 5 D **Emergency Action Levels (EAL) :** A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.	**HA1** HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes. 1 2 3 4 5 D **Emergency Action Levels (EAL) :** 1. A validated notification from NRC of an aircraft attack threat **< 30 minutes** from the site. **OR** 2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLED AREA.	**HU1** Confirmed SECURITY CONDITION or threat. 1 2 3 4 5 D **Emergency Action Levels (EAL) :** 1. Notification of a credible security threat directed at the site as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities. **OR** 2. A validated notification from the NRC providing information of an aircraft threat. **OR** 3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.
Transfer of Plant Control	**Table H1 Safety Functions** • Reactivity Control (ability to shut down the reactor and keep it shutdown) • Core Cooling (ability to cool the core) • RCS Heat Removal (ability to maintain heat sink)	**HS2** Inability to control a key safety function from outside the Control Room 1 2 3 4 5 D **Emergency Action Levels (EAL) :** **Note:** The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded. 1. A Control Room evacuation has resulted in plant control being transferred from the Control Room to alternate locations per: a. AOP-07 Evacuation of Control Room **OR** b. AOP-06 Fire Emergency **AND** 2. Control of **ANY** Table H1 key safety function is **not** reestablished in **< 15 minutes**.	**HA2** Control Room evacuation resulting in transfer of plant control to alternate locations 1 2 3 4 5 D **Emergency Action Levels (EAL) :** A Control Room evacuation has resulted in plant control being transferred from the Control Room to alternate locations per: c. AOP-07 Evacuation of Control Room **OR** d. AOP-06 Fire Emergency	

Mode: 1 – Power Operations 2 – Hot Standby 3 – Hot Shutdown 4 – Cold Shutdown 5 – Refueling Shutdown D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other conditions Affecting Plant Safety				
Fire			**Table H2 Vital Areas** • Containment Building • Auxiliary Building • Intake Structure • FW-54 • Main and Auxiliary Transformer Yard	**HU3** FIRE potentially degrading the level of safety of the plant. 1 2 3 4 5 D **Emergency Action Levels (EAL) :** **Note:** The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded. 1. A FIRE in **ANY** Table H2 area is **not** extinguished in **≤ 15 minutes** of **ANY** of the following FIRE detection indications: • Report from the field (i.e., visual observation) • Receipt of multiple (more than 1) fire alarms or indications • Field verification of a single fire alarm **OR** 2. Receipt of a single fire alarm in **ANY** Table H2 area (i.e., no other indications of a FIRE). **AND** The existence of a FIRE is **not** verified in **≤ 30 minutes** of alarm receipt. **OR** 3. A FIRE within the plant PROTECTED AREA not extinguished in **≤ 60-minutes** of the initial report, alarm or indication. **OR** 4. A FIRE within the plant PROTECTED AREA that requires firefighting support by an offsite fire response agency to extinguish.
Earthquake				**HU4** Seismic event greater than OBE levels 1 2 3 4 5 D **Emergency Action Levels (EAL) :** **Note:** For emergency classification if EAL 2 is not able to be confirmed, then the occurrence of a seismic event is confirmed in manner deemed appropriate by the Shift Manager or Emergency Director in **< 15 mins** of the event. Seismic event > **Operating Basis Earthquake (OBE)** as indicated by 3. Control Room personnel feel an actual or potential seismic event. **AND** 4. **ANY** one of the following confirmed in **≤ 15 mins** of the event: • The earthquake resulted in Modified Mercalli Intensity (MMI) VI or greater within **3.5 miles** of the plant • The earthquake was felt within the plant and was of magnitude **6.0** or greater • The earthquake was of magnitude 5.0 or greater and occurred within **125 miles** of the plant

Mode: 1 – Power Operations 2 – Hot Standby 3 – Hot Shutdown 4 – Cold Shutdown 5 – Refueling Shutdown D – Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT

Hazards and Other conditions Affecting Plant Safety

Toxic Gas

Table H3
Areas with Entry Related Mode Applicability

Area	Entry Related Mode Applicability
Containment	Modes 4, 5 and D
Room 6	Modes 4, 5 and D
Room 13	Modes 4, 5 and D
Room 15A	Modes 4, 5 and D
Room 21	Modes 4, 5 and D
Room 22	Modes 4, 5 and D
Room 56	Modes 4, 5 and D
Room 57	Modes 4, 5 and D
Room 69	Modes 4, 5 and D

HA5 Gaseous release impeding access to equipment necessary for normal plant operations, cooldown or shutdown. 4 5 D

Emergency Action Levels (EAL) :

Note: If the equipment in the listed room or area was already inoperable, or out of service, before the event occurred, then no emergency classification is warranted.

1. Release of a toxic, corrosive, asphyxiant or flammable gas in **ANY** Table H3 area.

   AND

2. Entry into the room or area is prohibited or impeded

Hazardous Event

HU6 Hazardous Event 1 2 3 4 5 D

Emergency Action Levels (EAL) :

Note: EAL #4 does not apply to routine traffic impediments such as fog, snow, ice, or vehicle breakdowns or accidents.

1. Tornado strike within the PROTECTED AREA.

   OR

2. Internal room or area flooding of a magnitude sufficient to require manual or automatic electrical isolation of a SAFETY SYSTEM component required by Technical Specifications for the current operating mode.

   OR

3. Movement of personnel within the PROTECTED AREA is impeded due to an offsite event involving hazardous materials (e.g., an offsite chemical spill or toxic gas release).

   OR

4. A hazardous event that results in on-site conditions sufficient to prohibit the plant staff from accessing the site via personal vehicles.

   OR

5. Abnormal River level, as indicated by **EITHER:**

   a. **> 1004 feet** MSL elevation (high level)

   OR

   b. **< 976 feet, 9 inches** MSL elevation (low level)

Mode: 1 – Power Operations 2 – Hot Standby 3 – Hot Shutdown 4 – Cold Shutdown 5 – Refueling Shutdown D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other conditions Affecting Plant Safety				
Emergency Director Judgment	**HG7** Other conditions exist which in the judgement of the Emergency Director warrant declaration of a GENERAL EMERGENCY. 1 2 3 4 5 D **Emergency Action Levels (EAL) :** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**HS7** Other conditions exist which in the judgement of the Emergency Director warrant declaration of a SITE AREA EMERGENCY. 1 2 3 4 5 D **Emergency Action Levels (EAL) :** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts, (1) toward site personnel or equipment that could lead to the likely failure of or, (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	**HA7** Other conditions exist which in the judgement of the Emergency Director warrant declaration of an ALERT. 1 2 3 4 5 D **Emergency Action Levels (EAL) :** Other conditions exist which, in the judgment of the Emergency Director, indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**HU7** Other conditions exist which in the judgement of the Emergency Director warrant declaration of an UNUSUAL EVENT. 1 2 3 4 5 D **Emergency Action Levels (EAL) :** Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Mode: 1 – Power Operations 2 – Hot Standby 3 – Hot Shutdown 4 – Cold Shutdown 5 – Refueling Shutdown D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
ISFSI Malfunctions				
ISFSI				**E-HU1** Damage to a loaded cask CONFINEMENT BOUNDARY 1 2 3 4 5 D **Emergency Action Levels (EAL) :** Damage to a loaded cask CONFINEMENT BOUNDARY as indicated by an on-contact radiation reading: • **≥ 1600mr/hr** (gamma + neutron) on the HSM front surface. **OR** • **≥ 400mr/hr** (gamma + neutron) on the HSM door centerline. **OR** • **≥ 16mr/hr** (gamma + neutron) on the end shield wall exterior

Mode: 1 – Power Operations 2 – Hot Standby 3 – Hot Shutdown 4 – Cold Shutdown 5 – Refueling Shutdown D – Defueled

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RG1

Initiating Condition:

Release of gaseous radioactivity resulting in offsite dose greater than 1000 mRem TEDE or 5000 mRem thyroid CDE.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

Notes:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.
- If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 15 minutes.
- Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.
- The pre-calculated effluent monitor values presented in EAL #1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.

1. Readings on **ANY** Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**.

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of **EITHER**:

   a. **> 1000 mRem TEDE**

   OR

   b. **> 5000 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond the site boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **>1000 mRem/hr** are expected to continue for **≥ 60 minutes**.

   OR

   b. Analyses of field survey samples indicate **> 5000 mRem CDE Thyroid** for **60 minutes** of inhalation.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RG1 (cont)

Emergency Action Level (EAL) (cont):

Table R1 Effluent Monitor Thresholds		
Effluent Monitor	**Description**	**General Emergency**
RM-063	AB Stack(Post Accident Gas)	3.71E+00 uCi/cc

Basis:

This IC addresses a release of gaseous radioactivity that results in projected or actual offsite doses greater than or equal to the EPA Protective Action Guides (PAGs). It includes both monitored and un-monitored releases. Releases of this magnitude will require implementation of protective actions for the public.

Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of plant conditions alone. The inclusion of both plant condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

The TEDE dose is set at the EPA PAG of 1000 mRem while the 5000 mRem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

Basis Reference(s):

1. NEI 99-01 Rev 6, AG1

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RS1

Initiating Condition:

Release of gaseous radioactivity resulting in offsite dose greater than 100 mRem TEDE or 500 mRem thyroid CDE.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

Notes:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.
- If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 15 minutes.
- Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.
- The pre-calculated effluent monitor values presented in EAL #1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.

1. Readings on **ANY** Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**.

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of **EITHER**:

   a. **> 100 mRem TEDE**

   OR

   b. **> 500 mRem CDE Thyroid**

   OR

3. Field survey results at or beyond the site boundary indicate **EITHER**:

   a. Gamma (closed window) dose rates **>100 mR/hr** are expected to continue for **≥ 60 minutes**.

   OR

   b. Analyses of field survey samples indicate **> 500 mRem CDE Thyroid** for **60 minutes** of inhalation.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RS1 (cont)

Emergency Action Level (EAL) (cont):

Table R1 Effluent Monitor Thresholds		
Effluent Monitor	**Description**	**Site Area Emergency**
RM-063	AB Stack (Post-Accident Gas)	3.71 E-01 uCi/cc
RM-052	AB Stack (Gas)	6.23 E+06 cpm
RM-043	LRWPB Stack (Gas)	5.44 E+06 cpm

Basis:

This IC addresses a release of gaseous radioactivity that results in projected or actual offsite doses greater than or equal to 10% of the EPA Protective Action Guides (PAGs). It includes both monitored and un-monitored releases. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of plant conditions alone. The inclusion of both plant condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

The TEDE dose is set at 10% of the EPA PAG of 1000 mRem while the 500 mRem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

Escalation of the emergency classification level would be via IC RG1.

Basis Reference(s):

1. NEI 99-01 Rev 6, AS1

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RA1

Initiating Condition:

Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mRem TEDE or 50 mRem thyroid CDE.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

Notes:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.
- If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 15 minutes.
- Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.
- The pre-calculated effluent monitor values presented in EAL #1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.

1. Readings on **ANY** Table R1 Effluent Monitor **> Table R1 value** for **≥ 15 minutes**.

   OR

2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of **EITHER**:

   a. **> 10 mRem TEDE**

   OR

   b. **> 50 mRem CDE Thyroid**

   OR

3. Analysis of a liquid effluent sample indicates a concentration or release rate that would result in doses greater than **EITHER** of the following at or beyond the site boundary

   a. **10 mRem** TEDE for **60 minutes** of exposure

   OR

   b. **50 mRem** CDE Thyroid for **60 minutes** of exposure

   OR

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RA1 (cont)

Emergency Action Level (EAL) (cont):

4. Field survey results at or beyond the site boundary indicate **EITHER**:
   a. Gamma (closed window) dose rates **> 10 mR/hr** are expected to continue for **≥ 60 minutes**.

      OR

   b. Analyses of field survey samples indicate **> 50 mRem CDE Thyroid** for **60 minutes** of inhalation.

Table R1 Effluent Monitor Thresholds

Effluent Monitor	Description	Alert
RM-063	AB Stack(Post Accident Gas)	3.71 E-02 uCi/cc
RM-062	AB Stack (Gas)	5.25 E+05 cpm
RM-052	AB Stack (Gas)	6.23E+05 cpm
RM-043	LRWPB Stack (Gas)	5.44 E+05 cpm
RM-057	Condenser Off-Gas	1.34 E+08 cpm

Basis:

This IC addresses a release of gaseous or liquid radioactivity that results in projected or actual offsite doses greater than or equal to 1% of the EPA Protective Action Guides (PAGs). It includes both monitored and un-monitored releases. Releases of this magnitude represent an actual or potential substantial degradation of the level of safety of the plant as indicated by a radiological release that significantly exceeds regulatory limits (e.g., a significant uncontrolled release).

Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of plant conditions alone. The inclusion of both plant condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

The TEDE dose is set at 1% of the EPA PAG of 1000 mRem while the 50 mRem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

Escalation of the emergency classification level would be via IC RS1.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RA1 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 6, AA1

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RU1

Initiating Condition:

Release of gaseous or liquid radioactivity greater than 2 times the ODCM limits for 60 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

Notes:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.
- If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 60 minutes.
- Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.

1. Reading on **ANY** Table R2 Effluent Monitor **> 2 times High Alarm setpoint** established by a current radioactive release discharge permit for **≥ 60 minutes.**

   OR

2. Readings on **ANY** Table R3 Effluent Monitor **> Table R3 value** for **≥ 60 minutes.**

   OR

3. Sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes.**

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS
RU1 (cont)

Emergency Action Level (EAL) (cont):

Table R2 Effluent Monitor Thresholds		
Effluent Monitor	**Description**	**2X High Alarm**
RM-055 (if discharge not isolated) Minimum 1 CW Pump	Liquid Discharge Header	2.80E+06 cpm
RM-055 (if discharge not isolated) Minimum 2 RW Pump	Liquid Discharge Header	8.00E+05 cpm

Table R3 Effluent Monitor Thresholds		
Effluent Monitor	**Description**	**NOUE**
RM-062	AB Stack (Gas)	3.25 E+04 cpm
RM-052	AB Stack (Gas)	3.85 E+04 cpm
RM-043	LRWPB Stack (Gas)	3.37 E+04 cpm
RM-057	Condenser Off-Gas	8.83 E+06 cpm
RM-054A (if SG blowdown is not isolated)	SG blowdown	9.86E+04 cpm
RM-054B (if SG blowdown is not isolated)	SG blowdown	9.88E+04 cpm

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS
RU1 (cont)

Basis:

This IC addresses a potential decrease in the level of safety of the plant as indicated by a low-level radiological release that exceeds regulatory commitments for an extended period of time (e.g., an uncontrolled release). It includes any gaseous or liquid radiological release, monitored or un-monitored, including those for which a radioactivity discharge permit is normally prepared.

Nuclear power plants incorporate design features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, and to control and monitor intentional releases. The occurrence of an extended, uncontrolled radioactive release to the environment is indicative of degradation in these features and/or controls.

Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of plant conditions alone. The inclusion of both plant condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

Releases should not be prorated or averaged. For example, a release exceeding 4 times release limits for 30 minutes does not meet the EAL.

EAL #1 Basis

This EAL addresses radioactivity releases that cause effluent radiation monitor readings to exceed 2 times the limit established by a radioactivity discharge permit. This EAL will typically be associated with planned batch releases from non-continuous release pathways (e.g., radwaste, waste gas).

The effluent monitors listed are those normally used for planned discharges. If a discharge is performed using a different flowpath or effluent monitor other than those listed (e.g., a portable or temporary effluent monitor), then the declaration criteria will be based on the monitor specified in the Discharge Permit.

EAL #2 Basis

This EAL addresses normally occurring continuous radioactivity releases from monitored gaseous and liquid effluent pathways.

EAL #3 Basis

This EAL addresses uncontrolled gaseous or liquid releases that are detected by sample analyses or environmental surveys, particularly on unmonitored pathways (e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.).

Escalation of the emergency classification level would be via IC RA1.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RU1 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 6, AU1

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RG2

Initiating Condition:

Spent fuel pool level cannot be restored at least to EL. 1011'-0" (15.5-feet) as indicated on LI-4356 **OR** LI-4357 for 60 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

Note: The Emergency Director should declare the General Emergency promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

Spent fuel pool level cannot be restored at least to EL. 1011'-0" (15.5-feet) as indicated on LI-4356 **OR** LI-4357 for **60 minutes** or longer.

Basis:

This IC addresses a significant loss of spent fuel pool inventory control and makeup capability leading to a prolonged uncovery of spent fuel. This condition will lead to fuel damage and a radiological release to the environment.

It is recognized that this IC would likely not be met until well after another General Emergency IC was met; however, it is included to provide classification diversity.

Basis Reference(s):

1. NEI 99-01 Rev 6, AG2
2. EC55864 Rev, 002
3. NRC-15-106, FORT CALHOUN STATION, UNIT NO. 1 -ISSUANCE OF AMENDMENT 285 RE: UPGRADE TO EMERGENCY ACTION LEVEL SCHEME (CAC NO.MF5466)

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RG2

Initiating Condition:

Spent fuel pool level cannot be restored at least to EL. 1011'-0" (15.5-feet) as indicated on LI-4356 **OR** LI-4357 for 60 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

Note: The Emergency Director should declare the General Emergency promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

Spent fuel pool level cannot be restored at least to EL. 1011'-0" (15.5-feet) as indicated on LI-4356 **OR** LI-4357 for **60 minutes** or longer.

Basis:

This IC addresses a significant loss of spent fuel pool inventory control and makeup capability leading to a prolonged uncovery of spent fuel. This condition will lead to fuel damage and a radiological release to the environment.

It is recognized that this IC would likely not be met until well after another General Emergency IC was met; however, it is included to provide classification diversity.

Basis Reference(s):

1. NEI 99-01 Rev 6, AG2
2. EC55864 Rev, 002
3. NRC-15-106, FORT CALHOUN STATION, UNIT NO. 1 -ISSUANCE OF AMENDMENT 285 RE: UPGRADE TO EMERGENCY ACTION LEVEL SCHEME (CAC NO.MF5466)

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RS2

Initiating Condition:

Spent fuel pool level at EL. 1011'-0" (15.5-feet) as indicated on LI-4356 **OR** LI-4357.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

Lowering of spent fuel pool level to EL. 1011'-0" (15.5-feet) as indicated on LI-4356 **OR** LI-4357.

Basis:

This IC addresses a significant loss of spent fuel pool inventory control and makeup capability leading to IMMINENT fuel damage. This condition entails major failures of plant functions needed for protection of the public and thus warrant a Site Area Emergency declaration.

It is recognized that this IC would likely not be met until well after another Site Area Emergency IC was met; however, it is included to provide classification diversity.

Escalation of the emergency classification level would be via IC RG1 or RG2.

Basis Reference(s):

1. NEI 99-01 Rev 6, AS2
2. EC55864 Rev, 002
3. NRC-15-106, FORT CALHOUN STATION, UNIT NO. 1 -ISSUANCE OF AMENDMENT 285 RE: UPGRADE TO EMERGENCY ACTION LEVEL SCHEME (CAC NO.MF5466)

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RA2

Initiating Condition:

Significant lowering of water level above, or damage to, irradiated fuel.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

1. Uncovery of irradiated fuel in the REFUELING PATHWAY.

   OR

2. Damage to irradiated fuel resulting in a release of radioactivity from the fuel as indicated by **ANY Table R4** Radiation Monitor reading **>1000 mRem/hr**

   OR

3. Lowering of spent fuel pool level to EL. 1020'-0" (24.5-feet) as indicated on LI-4356 **OR** LI-4357.

Table R4
Radiation Monitors

RMS	Area Monitored
RM-73,74,75	Containment Rad Monitor
RM-80,85,87	Spent Fuel Storage Area Radiation Monitor
Portable Area Rad Monitor	Containment and Auxiliary Building near fuel handling areas

Basis:

REFUELING PATHWAY: all the cavities, tubes, canals and pools through which irradiated fuel may be moved or stored, but not including the reactor vessel below the flange.

IMMINENT: The trajectory of events or conditions is such that an EAL will be met within a relatively short period of time regardless of mitigation or corrective actions.

This IC addresses events that have caused IMMINENT or actual damage to an irradiated fuel assembly. These events present radiological safety challenges to plant personnel and are precursors to a release of radioactivity to the environment. As such, they represent an actual or potential substantial degradation of the level of safety of the plant.

This IC applies to irradiated fuel that is licensed for dry storage up to the point that the loaded storage cask is sealed. Once sealed, damage to a loaded cask causing loss of the CONFINEMENT BOUNDARY is classified in accordance with IC E-HU1.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RA2 (cont)

Basis (cont):

EAL #1 Basis:

This EAL escalates from RU2 in that the loss of level, in the affected portion of the REFUELING PATHWAY, is of sufficient magnitude to have resulted in uncovery of irradiated fuel. Indications of irradiated fuel uncovery may include direct or indirect visual observation (e.g., reports from personnel or camera images), as well as significant changes in water and radiation levels, or other plant parameters. Computational aids may also be used (e.g., a boil-off curve). Classification of an event using this EAL should be based on the totality of available indications, reports and observations.

While an area radiation monitor could detect a rise in a dose rate due to a lowering of water level in some portion of the REFUELING PATHWAY, the reading may not be a reliable indication of whether or not the fuel is actually uncovered. To the degree possible, readings should be considered in combination with other available indications of inventory loss.

A drop in water level above irradiated fuel within the reactor vessel may be classified in accordance Recognition Category C during the Cold Shutdown and Refueling modes.

EAL #2 Basis:

This EAL addresses a release of radioactive material caused by mechanical damage to irradiated fuel. Damaging events may include the dropping, bumping or binding of an assembly, or dropping a heavy load onto an assembly. A rise in readings on radiation monitors should be considered in conjunction with in-plant reports or observations of a potential fuel damaging event (e.g., a fuel handling accident).

EAL #3 Basis:

Spent fuel pool water level at this value is within the lower end of the level range necessary to prevent significant dose consequences from direct gamma radiation to personnel performing operations in the vicinity of the spent fuel pool. This condition reflects a significant loss of spent fuel pool water inventory and thus it is also a precursor to a loss of the ability to adequately cool the irradiated fuel assembles stored in the pool.

Escalation of the emergency would be based on either Recognition Category R or C ICs.

Basis Reference(s):

1. NEI 99-01 Rev 6, AA2
2. EC55864 Rev, 002
3. NRC-15-106, FORT CALHOUN STATION, UNIT NO. 1 -ISSUANCE OF AMENDMENT 285 RE: UPGRADE TO EMERGENCY ACTION LEVEL SCHEME (CAC NO.MF5466)

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RU2

Initiating Condition:

UNPLANNED loss of water level above irradiated fuel.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

1. UNPLANNED water level drop in the REFUELING PATHWAY as indicated on **ANY** of the following:
   - LI-106 (Cold Shutdown PZR Level)
   - LI-197 (Cold Shutdown RC Level)
   - LI-199 (Sight Glass)
   - LI-2846 (Spent Fuel Pool Level)

   AND

2. UNPLANNED Area Radiation Monitor reading rise on **ANY** radiation monitors in **Table R4**.

Table R4
Radiation Monitors

RMS	Area Monitored
RM-73,74,75	Containment Rad Monitor
RM-80,85,87	Spent Fuel Storage Area Radiation Monitor
Portable Area Rad Monitor	Containment and Auxiliary Building near fuel handling areas

Basis:

UNPLANNED: A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

REFUELING PATHWAY: all the cavities, tubes, canals and pools through which irradiated fuel may be moved or stored, but not including the reactor vessel below the flange.

This IC addresses a loss in water level above irradiated fuel sufficient to cause elevated radiation levels. This condition could be a precursor to a more serious event and is also indicative of a minor loss in the ability to control radiation levels within the plant. It is therefore a potential degradation in the level of safety of the plant.

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RU2 (cont)

Basis (cont):

A water level loss will be primarily determined by indications from available level instrumentation. Other sources of level indications may include reports from plant personnel (e.g., from a refueling crew) or video camera observations (if available) or from any other temporarily installed monitoring instrumentation. A significant drop in the water level may also cause a rise in the radiation levels of adjacent areas that can be detected by monitors in those locations.

The effects of planned evolutions should be considered. For example, a refueling bridge area radiation monitor reading may rise due to planned evolutions such as lifting of the reactor vessel head or movement of a fuel assembly. Note that this EAL is applicable only in cases where the elevated reading is due to an UNPLANNED loss of water level.

A drop in water level above irradiated fuel within the reactor vessel may be classified in accordance Recognition Category C during the Cold Shutdown and Refueling modes.

Escalation of the emergency classification level would be via IC RA2.

Basis Reference(s):

1. NEI 99-01 Rev 6, AU2

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RA3

Initiating Condition:

Radiation levels that impede access to equipment necessary for normal plant operations, cooldown or shutdown.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

Note:

- If the equipment in the room or area listed in Table R6 was already inoperable, or out of service, before the event occurred, then no emergency classification is warranted.

1. Dose rate **> 15 mR/hr** in **ANY** of the areas contained in Table R5:

Table R5 Areas Requiring Continuous Occupancy
• Main Control Room • Central Alarm Station (CAS)

OR

2. UNPLANNED event results in radiation levels that prohibit or significantly impede access to **ANY** of the following Table R6 plant rooms or areas:

Table R6
Areas with Entry Related Mode Applicability

Area	Entry Related Mode Applicability
Containment	Modes 4, 5 and D
Room 6	Modes 4, 5 and D
Room 13	Modes 4, 5 and D
Room 15A	Modes 4, 5 and D
Room 21	Modes 4, 5 and D
Room 22	Modes 4, 5 and D
Room 56	Modes 4, 5 and D
Room 57	Modes 4, 5 and D
Room 69	Modes 4, 5 and D

RECOGNITION CATEGORY

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RA3 (cont)

Basis:

UNPLANNED: A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

This IC addresses elevated radiation levels in certain plant rooms/areas sufficient to preclude or impede personnel from performing actions necessary to maintain normal plant operation, or to perform a normal plant cooldown and shutdown. As such, it represents an actual or potential substantial degradation of the level of safety of the plant. The Emergency Director should consider the cause of the increased radiation levels and determine if another IC may be applicable.

Assuming all plant equipment is operating as designed, normal operation is capable from the Main Control Room (MCR). The plant is also able to transition into a hot shutdown condition from the MCR, therefore Table R6 is a list of plant rooms or areas with entry-related mode applicability that contain equipment which require a manual/local action necessary to transition the plant from normal plant operation, cooldown and shutdown as specified in normal operating procedures, where if this action is not completed the plant would not be able to attain and maintain cold shutdown. This Table does not include rooms or areas for which entry is required solely to perform actions of an administrative or record keeping nature (e.g., normal rounds or routine inspections).

Rooms and areas listed in EAL #1 do not need to be included in EAL #2, including the Control Room.

For EAL #2, an Alert declaration is warranted if entry into the affected room/area is, or may be, procedurally required during the plant operating mode in effect at the time of the elevated radiation levels. The emergency classification is not contingent upon whether entry is actually necessary at the time of the increased radiation levels. Access should be considered as impeded if extraordinary measures are necessary to facilitate entry of personnel into the affected room/area (e.g., installing temporary shielding beyond that required by procedures, requiring use of non-routine protective equipment, requesting an extension in dose limits beyond normal administrative limits).

An emergency declaration is not warranted if any of the following conditions apply.

- The plant is in an operating mode different than the mode specified for the affected room/area (i.e., entry is not required during the operating mode in effect at the time of the elevated radiation levels). For example, the plant is in Mode 1 when the radiation rise occurs, and the procedures used for normal operation, cooldown and shutdown do not require entry into the affected room until Mode 4.
- The increased radiation levels are a result of a planned activity that includes compensatory measures which address the temporary inaccessibility of a room or area (e.g., radiography, spent filter or resin transfer, etc.).

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RA3 (cont)

Basis (cont):

- The action for which room/area entry is required is of an administrative or record keeping nature (e.g., normal rounds or routine inspections).
- The access control measures are of a conservative or precautionary nature, and would not actually prevent or impede a required action.

Escalation of the emergency classification level would be via Recognition Category R, C or F ICs.

Basis Reference(s):

1. NEI 99-01 Rev 6, AA3

RECOGNITION CATEGORY
ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENTS

RU3

Initiating Condition:

Reactor coolant activity greater than Technical Specification allowable limits.

Operating Mode Applicability:

1, 2, 3

Emergency Action Level (EAL):

1. "Dose rate on Contact" on the primary sample piping immediately adjacent to the Sample Hood (SL-1) is **> 4R/hr**.

   OR

2. Sample analysis indicates that:

   a. Dose Equivalent I-131 specific coolant activity **> 1.0 uCi/gm** for more than **100 hours** during one continuous time interval **OR > 60 uCi/gm**.

   OR

   b. Activity **> 100/E-bar uCi/gm**.

Basis:

This IC addresses a reactor coolant activity value that exceeds an allowable limit specified in Technical Specifications. This condition is a precursor to a more significant event and represents a potential degradation of the level of safety of the plant.

Conditions that cause the specified monitor to alarm that are not related to fuel clad degradation should not result in the declaration of an Unusual Event.

This EAL addresses site-specific radiation monitor readings that provide indication of a degradation of fuel clad integrity.

Escalation of the emergency classification level would be via ICs FA1 or the Recognition Category R ICs.

Basis Reference(s):

1. NEI 99-01 Rev 6, SU3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FG1

Initiating Condition:

Loss of ANY Two Barriers AND Loss or Potential Loss of the third barrier.

Operating Mode Applicability:

1, 2, 3

Emergency Action Level (EAL):

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the General Emergency classification level each barrier is weighted equally.

Basis Reference(s):

1. NEI 99-01 Rev 6, Table 9-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FS1

Initiating Condition:

Loss or Potential Loss of ANY two barriers.

Operating Mode Applicability:

1, 2, 3

Emergency Action Level (EAL):

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the Site Area Emergency classification level, each barrier is weighted equally.

Basis Reference(s):

1. NEI 99-01 Rev 6, Table 9-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FA1

Initiating Condition:

ANY Loss or ANY Potential Loss of either Fuel Clad or RCS.

Operating Mode Applicability:

1, 2, 3

Emergency Action Level (EAL):

Refer to Fission Product Barrier Loss and Potential Loss threshold values to determine barrier status.

Basis:

Fuel Cladding, RCS and Containment comprise the fission product barriers.

At the Alert classification level, Fuel Cladding and RCS barriers are weighted more heavily than the Containment barrier. Unlike the Containment barrier, loss or potential loss of either the Fuel Cladding or RCS barrier may result in the relocation of radioactive materials or degradation of core cooling capability. Note that the loss or potential loss of Containment barrier in combination with loss or potential loss of either Fuel Cladding or RCS barrier results in declaration of a Site Area Emergency under IC FS1.

Basis Reference(s):

1. NEI 99-01 Rev 6, Table 9-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FC1

Initiating Condition:

RCS or SG Tube Leakage

Operating Mode Applicability:

1, 2, 3

Fission Product Barrier (FPB) Threshold:

POTENTIAL LOSS

RVLMS indicates **0.0%.**

Basis:

There is no Loss threshold associated with RCS or SG Tube Leakage.

Potential Loss Threshold Basis:

This reading indicates a reduction in reactor vessel water level sufficient to allow the onset of heat-induced cladding damage.

Basis Reference(s):

1. NEI 99-01 Rev 6, Table 9-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FC2

Initiating Condition:

Inadequate Heat Removal

Operating Mode Applicability:

1, 2, 3

Fission Product Barrier (FPB) Threshold:

LOSS

1. Core Exit Thermocouple readings **> 1550°F**

POTENTIAL LOSS

2. Core Exit Thermocouple readings **> 700°F**

OR

3. Once-Through-Cooling in effect.

Basis:

Loss Threshold #1 Basis

This reading indicates temperatures within the core are sufficient to cause significant superheating of reactor coolant.

Potential Loss Threshold #2 Basis

This reading indicates temperatures within the core are sufficient to allow the onset of heat-induced cladding damage.

Potential Loss Threshold #3 Basis

This condition indicates an extreme challenge to the ability to remove RCS heat using the steam generators (i.e., loss of an effective secondary-side heat sink). This condition represents a potential loss of the Fuel Clad Barrier. In accordance with EOPs, there may be unusual accident conditions during which operators intentionally reduce the heat removal capability of the steam generators; during these conditions, classification using threshold is not warranted.

Meeting this threshold results in a Site Area Emergency because this threshold is identical to RCS Barrier RC2 Potential Loss threshold; both will be met. This condition warrants a Site Area Emergency declaration because inadequate RCS heat removal may result in fuel heat-up sufficient to damage the cladding and raise RCS pressure to the point where mass will be lost from the system.

Basis Reference(s):

1. NEI 99-01 Rev 6, Table 9-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FC3

Initiating Condition:

Containment Radiation / RCS Activity

Operating Mode Applicability:

1, 2, 3

Fission Product Barrier (FPB) Threshold:

LOSS

1. Containment radiation monitor RM-091 A/B reading **> 6500 R/hr**.

   OR

2. Coolant activity **> 180 uCi/gm** Dose Equivalent I-131

   OR

3. **12.1 Rem/hr** on contact or **33 mRem/hr at 30 cm** on primary sample piping adjacent to the hood SL-1 per CH-SMP-PA-0007

Basis:

Loss Threshold #1 Basis:

The radiation monitor reading corresponds to an instantaneous release of all reactor coolant mass into the containment, assuming that reactor coolant activity equals 180μCi/gm dose equivalent I-131. Reactor coolant activity above this level is greater than that expected for iodine spikes and corresponds to an approximate range of 2% to 5% fuel clad damage. Since this condition indicates that a significant amount of fuel clad damage has occurred, it represents a loss of the Fuel Clad Barrier.

The radiation monitor reading in this threshold is higher than that specified for RCS Barrier RC3 Loss Threshold since it indicates a loss of both the Fuel Clad Barrier and the RCS Barrier. Note that a combination of the two monitor readings appropriately escalates the emergency classification level to a Site Area Emergency.

Loss Threshold #2 and #3 Basis:

This threshold indicates that RCS radioactivity concentration is greater than 180 μCi/gm dose equivalent I-131. Reactor coolant activity above this level is greater than that expected for iodine spikes and corresponds to an approximate range of 2% to 5% fuel clad damage. Since this condition indicates that a significant amount of fuel clad damage has occurred, it represents a loss of the Fuel Clad Barrier.

It is recognized that sample collection and analysis of reactor coolant with highly elevated activity levels could require several hours to complete. Nonetheless, a sample-related threshold is included as a backup to other indications

There is no Fuel Clad Barrier Potential Loss threshold associated with RCS Activity / Containment Radiation.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FC3 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 6, Table 9-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

FC5

Initiating Condition:

Emergency Director Judgment.

Operating Mode Applicability:

1, 2, 3

Fission Product Barrier (FPB) Threshold:

LOSS

1. Any condition in the opinion of the Emergency Director that indicates Loss of the Fuel Clad Barrier.

POTENTIAL LOSS

2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Fuel Clad Barrier.

Basis:

Loss Threshold #1 Basis

This threshold addresses any other factors that may be used by the Emergency Director in determining whether the Fuel Clad Barrier is lost.

Potential Loss Threshold #2 Basis

This threshold addresses any other factors that may be used by the Emergency Director in determining whether the Fuel Clad Barrier is potentially lost. The Emergency Director should also consider whether or not to declare the barrier potentially lost in the event that barrier status cannot be monitored.

Basis Reference(s):

1. NEI 99-01 Rev 6, Table 9-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

RC1

Initiating Condition:

RCS or SG Tube Leakage

Operating Mode Applicability:

1, 2, 3

Fission Product Barrier (FPB) Threshold:

LOSS

1. Automatic or manual ECCS (SI) actuation is required by **EITHER** of the following:
   a. UNISOLABLE RCS leakage

   OR

   b. Steam Generator tube RUPTURE.

POTENTIAL LOSS

2. UNISOLABLE RCS **or** S/G Tube leakage **> the capacity of one charging pump in the normal mode (greater than 40gpm).**

   OR

3. a. A transient has caused a rapid RCS cooldown.

   AND

   b. Pressure and Temperature is above Attachment PC-12 Pressure Temperature Curve.

Basis:

UNISOLABLE: An open or breached system line that cannot be isolated, remotely or locally.

RUPTURE (D): The condition of a steam generator in which primary-to-secondary leakage is of sufficient magnitude to require a safety injection.

FAULTED: The term applied to a steam generator that has a steam leak on the secondary side of sufficient size to cause an uncontrolled drop in steam generator pressure or the steam generator to become completely depressurized.

Loss Threshold #1 Basis

This threshold is based on an UNISOLABLE RCS leak of sufficient size to require an automatic or manual actuation of the Emergency Core Cooling System (ECCS). This condition clearly represents a loss of the RCS Barrier.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

RC1 (cont)

Basis (cont):

This threshold is applicable to unidentified and pressure boundary leakage, as well as identified leakage. It is also applicable to UNISOLABLE RCS leakage through an interfacing system. The mass loss may be into any location – inside containment, to the secondary-side (i.e., steam generator tube leakage) or outside of containment.

A steam generator with primary-to-secondary leakage of sufficient magnitude to require a safety injection is considered to be RUPTURED. If a RUPTURED steam generator is also FAULTED outside of containment, the declaration escalates to a Site Area Emergency since the Containment Barrier CT1 Loss threshold will also be met.

Potential Loss Threshold #2 Basis

This threshold is based on an UNISOLABLE RCS leak that results in the inability to maintain pressurizer level within specified limits by operation of a normally used charging (makeup) pump, but an ECCS (SI) actuation has not occurred. The threshold is met when an operating procedure, or operating crew supervision, directs that a standby charging (makeup) pump be placed in service to restore and maintain pressurizer level.

This threshold is applicable to unidentified and pressure boundary leakage, as well as identified leakage. It is also applicable to UNISOLABLE RCS leakage through an interfacing system. The mass loss may be into any location – inside containment, to the secondary-side (i.e., steam generator tube leakage) or outside of containment.

If a leaking steam generator is also FAULTED outside of containment, the declaration escalates to a Site Area Emergency since the Containment Barrier CT1 Loss Threshold #1 will also be met.

Potential Loss Threshold #3 Basis

This condition indicates an extreme challenge to the integrity of the RCS pressure boundary due to pressurized thermal shock – a transient that causes rapid RCS cooldown while the RCS is in Mode 3 or higher (i.e., hot and pressurized).

Basis Reference(s):

1. NEI 99-01 Rev 6, Table 9-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

RC2

Initiating Condition:

Inadequate Heat Removal

Operating Mode Applicability:

1, 2, 3, 4

Fission Product Barrier (FPB) Threshold:

POTENTIAL LOSS

Once-Through-Cooling in effect.

Basis:

There is no Loss threshold associated with Inadequate Heat Removal.

Potential Loss Threshold Basis

Once-Through-Cooling in effect indicates a Lack of Primary to Secondary Heat Transfer capability.

This condition indicates an extreme challenge to the ability to remove RCS heat using the steam generators (i.e., loss of an effective secondary-side heat sink). This condition represents a potential loss of the RCS Barrier. In accordance with EOPs, there may be unusual accident conditions during which operators intentionally reduce the heat removal capability of the steam generators; during these conditions, classification using threshold is not warranted.

Meeting this threshold results in a Site Area Emergency because this threshold is identical to Fuel Clad Barrier FC2 Potential Loss Threshold #3; both will be met. This condition warrants a Site Area Emergency declaration because inadequate RCS heat removal may result in fuel heat-up sufficient to damage the cladding and raise RCS pressure to the point where mass will be lost from the system.

Basis Reference(s):

1. NEI 99-01 Rev 6, Table 9-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

RC3

Initiating Condition:

Containment Radiation / RCS Activity

Operating Mode Applicability:

1, 2, 3

Fission Product Barrier (FPB) Threshold:

LOSS

Containment radiation monitor RM-091 A/B reading **> 40 R/hr**.

Basis:

Loss Threshold Basis

The radiation monitor reading corresponds to an instantaneous release of all reactor coolant mass into the containment, assuming that reactor coolant activity equals Technical Specification allowable limits. This value is lower than that specified for Fuel Clad Barrier FC3 Loss Threshold #1 since it indicates a loss of the RCS Barrier only.

There is no RCS Potential Loss threshold associated with RCS Activity / Containment Radiation.

Basis Reference(s):

1. NEI 99-01 Rev 6, Table 9-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

RC5

Initiating Condition:

Emergency Director Judgment.

Operating Mode Applicability:

1, 2, 3

Fission Product Barrier (FPB) Threshold:

LOSS

1. Any condition in the opinion of the Emergency Director that indicates Loss of the RCS Barrier.

POTENTIAL LOSS

2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the RCS Barrier.

Basis:

Loss Threshold #1 Basis

This threshold addresses any other factors that may be used by the Emergency Director in determining whether the RCS Barrier is lost.

Potential Loss Threshold #2 Basis

This threshold addresses any other factors that may be used by the Emergency Director in determining whether the RCS Barrier is potentially lost. The Emergency Director should also consider whether or not to declare the barrier potentially lost in the event that barrier status cannot be monitored.

Basis Reference(s):

1. NEI 99-01 Rev 6, Table 9-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT1

Initiating Condition:

RCS or SG Tube Leakage

Operating Mode Applicability:

1, 2, 3

Fission Product Barrier (FPB) Threshold:

LOSS

A leaking or RUPTURED SG is FAULTED outside of containment.

Basis:

FAULTED: The term applied to a steam generator that has a steam leak on the secondary side of sufficient size to cause an uncontrolled drop in steam generator pressure or the steam generator to become completely depressurized.

RUPTURE (D): The condition of a steam generator in which primary-to-secondary leakage is of sufficient magnitude to require a safety injection.

Loss Threshold Basis

This threshold addresses a leaking or RUPTURED Steam Generator (SG) that is also FAULTED outside of containment. The condition of the SG, whether leaking or RUPTURED, is determined in accordance with the thresholds for RCS Barrier RC1 Potential Loss Threshold #2 and Loss Threshold #1.b, respectively. This condition represents a bypass of the containment barrier.

FAULTED is a defined term within the NEI 99-01 methodology; this determination is not necessarily dependent upon entry into, or diagnostic steps within, an EOP. For example, if the pressure in a steam generator is decreasing uncontrollably [*part of the FAULTED definition*] and the faulted steam generator isolation procedure is not entered because EOP user rules are dictating implementation of another procedure to address a higher priority condition, the steam generator is still considered FAULTED for emergency classification purposes.

The FAULTED criterion establishes an appropriate lower bound on the size of a steam release that may require an emergency classification. Steam releases of this size are readily observable with normal Control Room indications. The lower bound for this aspect of the containment barrier is analogous to the lower bound criteria specified in IC RU3 for the fuel clad barrier (i.e., RCS activity values) and IC MU6 for the RCS barrier (i.e., RCS leak rate values).

This threshold also applies to prolonged steam releases necessitated by operational considerations such as the forced steaming of a leaking or RUPTURED steam

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT1 (cont)

Basis (cont):

generator directly to atmosphere to cooldown the plant, or to drive an auxiliary (emergency) feed water pump. These types of conditions will result in a significant and sustained release of radioactive steam to the environment (and are thus similar to a FAULTED condition). The inability to isolate the steam flow without an adverse effect on plant cooldown meets the intent of a loss of containment.

Steam releases associated with the expected operation of a SG power operated relief valve or safety relief valve do not meet the intent of this threshold. Such releases may occur intermittently for a short period of time following a reactor trip as operators process through emergency operating procedures to bring the plant to a stable condition and prepare to initiate a plant cooldown. Steam releases associated with the unexpected operation of a valve (e.g., a stuck-open safety valve) meets this threshold.

Following an SG tube leak or rupture, there may be minor radiological releases through a secondary-side system component (e.g., air ejectors, glad seal exhausters, valve packing, etc.). These types of releases do not constitute a loss or potential loss of containment but should be evaluated using the Recognition Category R ICs.

The emergency classification levels resulting from primary-to-secondary leakage, with or without a steam release from the FAULTED SG, are summarized below.

	Affected SG is FAULTED Outside of Containment?	
Primary to Secondary Leak Rate	**Yes**	**No**
Less than or equal to 25 gpm	No classification	No classification
Greater than 25 gpm	Unusual Event per MU6	Unusual Event per MU6
The capacity of one charging pump in the normal charging mode (greater than 40 gpm) is exceeded (*RCS Barrier Potential Loss*)	Site Area Emergency per FS1	Alert per FA1
Requires an automatic or manual ECCS actuation (*RCS Barrier Loss*)	Site Area Emergency per FS1	Alert per FA1

There is no Potential Loss threshold associated with RCS or SG Tube Leakage.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT1 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 6, Table 9-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT2

Initiating Condition:

Inadequate Heat Removal

Operating Mode Applicability:

1, 2, 3

Fission Product Barrier (FPB) Threshold:

POTENTIAL LOSS

1. a. Core exit thermocouples **> 1550°F**

   AND

   b. Restoration procedures **not** effective in **< 15 minutes**.

OR

2. a. Core exit thermocouples **> 700 °F**

   AND

   b. RVLMS indicates **0.0%**

   AND

   c. Restoration procedures **not** effective in **< 15 minutes**.

Basis:

IMMINENT: The trajectory of events or conditions is such that an EAL will be met within a relatively short period of time regardless of mitigation or corrective actions.

There is no Loss threshold associated with Inadequate Heat Removal.

Potential Loss Threshold Basis

This condition represents an IMMINENT core melt sequence which, if not corrected, could lead to vessel failure and an increased potential for containment failure. For this condition to occur, there must already have been a loss of the RCS Barrier and the Fuel Clad Barrier. If implementation of a procedure(s) to restore adequate core cooling is not effective (successful) within 15 minutes, it is assumed that the event trajectory will likely lead to core melting and a subsequent challenge of the Containment Barrier.

The restoration procedure is considered "effective" if core exit thermocouple readings are decreasing and/or if reactor vessel level is increasing. Whether or not the procedure(s) will be effective should be apparent within 15 minutes. The Emergency Director should escalate the emergency classification level as soon as it is determined that the procedure(s) will not be effective.

Severe accident analyses (e.g., NUREG-1150) have concluded that function restoration procedures can arrest core degradation in a significant fraction of core damage scenarios, and that the likelihood of containment failure is very small in these events. Given this, it is appropriate to provide 15 minutes beyond the required entry point to determine if procedural actions can reverse the core melt sequence.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT2 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 6, Table 9-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT3

Initiating Condition:

Containment Radiation / RCS Activity

Operating Mode Applicability:

1, 2, 3

Fission Product Barrier (FPB) Threshold:

POTENTIAL LOSS

Containment radiation monitor RM-091 A/B reading **> 26,000 R/hr**.

Basis:

There is no Loss threshold associated with Containment Radiation/RCS Activity.

Potential Loss Threshold Basis

The radiation monitor reading corresponds to an instantaneous release of all reactor coolant mass into the containment, assuming that 20% of the fuel cladding has failed. This level of fuel clad failure is well above that used to determine the analogous Fuel Clad Barrier Loss and RCS Barrier Loss thresholds.

NUREG-1228, *Source Estimations During Incident Response to Severe Nuclear Power Plant Accidents*, indicates the fuel clad failure must be greater than approximately 20% in order for there to be a major release of radioactivity requiring offsite protective actions. For this condition to exist, there must already have been a loss of the RCS Barrier and the Fuel Clad Barrier. It is therefore prudent to treat this condition as a potential loss of containment which would then escalate the emergency classification level to a General Emergency.

Basis Reference(s):

1. NEI 99-01 Rev 6, Table 9-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT4

Initiating Condition:

Containment Integrity or Bypass

Operating Mode Applicability:

1, 2, 3

Fission Product Barrier (FPB) Threshold:

LOSS

1. Containment isolation is required and **EITHER** of the following:
   a. UNPLANNED lowering in containment pressure or rise in radiation monitor readings outside of containment in the Emergency Directors judgment indicate a loss of containment integrity.

   OR

   b. UNISOLABLE pathway from containment to the environment exists.

OR

2. Indication of RCS leakage outside of containment

POTENTIAL LOSS

3. Containment Pressure **> 60 psig** and rising.

OR

4. Hydrogen Concentration in Containment **> 3%.**

OR

5. a. Containment pressure **> 5 psig**

   AND

   b. Less than one full train of Containment Cooling / Containment Spray equipment operating per design for ≥ 15 minutes.

Basis:

FAULTED: The term applied to a steam generator that has a steam leak on the secondary side of sufficient size to cause an uncontrolled drop in steam generator pressure or the steam generator to become completely depressurized.

UNPLANNED: A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

UNISOLABLE: An open or breached system line that cannot be isolated, remotely or locally.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT4 (cont)

Basis (cont):

Loss Threshold #1 Basis

These thresholds address a situation where containment isolation is required and one of two conditions exists as discussed below. Users are reminded that there may be accident and release conditions that simultaneously meet both Loss Thresholds #1.a and #1.b.

1.a – Containment integrity has been lost, i.e., the actual containment atmospheric leak rate likely exceeds that associated with allowable leakage (or sometimes referred to as design leakage). Following the release of RCS mass into containment, containment pressure will fluctuate based on a variety of factors; a loss of containment integrity condition may (or may not) be accompanied by a noticeable drop in containment pressure. Recognizing the inherent difficulties in determining a containment leak rate during accident conditions, it is expected that the Emergency Director will assess this threshold using judgment, and with due consideration given to current plant conditions, and available operational and radiological data (e.g., containment pressure, readings on radiation monitors outside containment, operating status of containment pressure control equipment, etc.).

Refer to the middle piping run of Figure 3-F-1. Two simplified examples are provided. One is leakage from a penetration and the other is leakage from an in-service system valve. Depending upon radiation monitor locations and sensitivities, the leakage could be detected by any of the four monitors depicted in the figure.

Another example would be a loss or potential loss of the RCS barrier, and the simultaneous occurrence of two FAULTED locations on a steam generator where one fault is located inside containment (e.g., on a steam or feedwater line) and the other outside of containment. In this case, the associated steam line provides a pathway for the containment atmosphere to escape to an area outside the containment.

Following the leakage of RCS mass into containment and a rise in containment pressure, there may be minor radiological releases associated with allowable (design) containment leakage through various penetrations or system components. These releases do not constitute a loss or potential loss of containment but should be evaluated using the Recognition Category R ICs.

1.b - Conditions are such that there is an UNISOLABLE pathway for the migration of radioactive material from the containment atmosphere to the environment. As used here, the term "environment" includes the atmosphere of a room or area, outside the containment, that may, in turn, communicate with the outside-the-plant atmosphere (e.g., through discharge of a ventilation system or atmospheric leakage). Depending upon a variety of factors, this condition may or may not be accompanied by a noticeable drop in containment pressure.

CT4 (cont)

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

Basis (cont):

Refer to the top piping run of Figure 3-F-1. In this simplified example, the inboard and outboard isolation valves remained open after a containment isolation was required (i.e., containment isolation was not successful). There is now an UNISOLABLE pathway from the containment to the environment.

The existence of a filter is not considered in the threshold assessment. Filters do not remove fission product noble gases. In addition, a filter could become ineffective due to iodine and/or particulate loading beyond design limits (i.e., retention ability has been exceeded) or water saturation from steam/high humidity in the release stream.

Leakage between two interfacing liquid systems, by itself, does not meet this threshold. Refer to the bottom piping run of Figure 3-F-1. In this simplified example, leakage in an RCP seal cooler is allowing radioactive material to enter the Auxiliary Building. The radioactivity would be detected by the Process Monitor. If there is no leakage from the closed water cooling system to the Auxiliary Building, then no threshold has been met. If the pump or system piping developed a leak that allowed steam/water to enter the Auxiliary Building, then Loss Threshold #2 would be met. Depending upon radiation monitor locations and sensitivities, this leakage could be detected by any of the four monitors depicted in the figure and cause Loss Threshold #1.a to be met as well.

Following the leakage of RCS mass into containment and a rise in containment pressure, there may be minor radiological releases associated with allowable (design) containment leakage through various penetrations or system components. Minor releases may also occur if a containment isolation valve(s) fails to close but the containment atmosphere escapes to a closed system. These releases do not constitute a loss or potential loss of containment but should be evaluated using the Recognition Category R ICs.

The status of the containment barrier during an event involving steam generator tube leakage is assessed using Containment Barrier CT1 Loss Threshold.

Loss Threshold #2 Basis

Containment sump, temperature, pressure and/or radiation levels will rise if reactor coolant mass is leaking into the containment. If these parameters have not increased, then the reactor coolant mass may be leaking outside of containment (i.e., a containment bypass sequence). Raises in sump, temperature, pressure, flow and/or radiation level readings outside of the containment may indicate that the RCS mass is being lost outside of containment.

Unexpected elevated readings and alarms on radiation monitors with detectors outside containment should be corroborated with other available indications to confirm that the source is a loss of RCS mass outside of containment. If the fuel clad barrier has not been lost, radiation monitor readings outside of containment may not rise significantly; however, other unexpected changes in sump levels, area temperatures or pressures, flow rates, etc. should be sufficient to determine if RCS mass is being lost outside of the containment.

CT4 (cont)

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

Basis (cont):

Refer to the middle piping run of Figure 3-F-1. In this simplified example, a leak has occurred at a reducer on a pipe carrying reactor coolant in the Auxiliary Building. Depending upon radiation monitor locations and sensitivities, the leakage could be detected by any of the four monitors depicted in the figure and cause Loss Threshold #1.a to be met as well. To ensure proper escalation of the emergency classification, the RCS leakage outside of containment must be related to the mass loss that is causing the RCS Barrier RC1 Loss Threshold 1.a and/or Potential Loss Threshold #2 to be met.

Potential Loss Threshold #3 Basis

If containment pressure exceeds the design pressure, there exists a potential to lose the Containment Barrier. To reach this level, there must be an inadequate core cooling condition for an extended period of time; therefore, the RCS and Fuel Clad barriers would already be lost. Thus, this threshold is a discriminator between a Site Area Emergency and General Emergency since there is now a potential to lose the third barrier.

Potential Loss Threshold #4 Basis

The existence of an explosive mixture means, at a minimum, that the containment atmospheric hydrogen concentration is sufficient to support a hydrogen burn (i.e., at the lower deflagration limit). A hydrogen burn will raise containment pressure and could result in collateral equipment damage leading to a loss of containment integrity. It therefore represents a potential loss of the Containment Barrier.

Potential Loss Threshold #5 Basis

This threshold describes a condition where containment pressure is greater than the set point at which containment energy (heat) removal systems are designed to automatically actuate, and less than one full train of equipment is capable of operating per design. The 15-minute criterion is included to allow operators time to manually start equipment that may not have automatically started, if possible. This threshold represents a potential loss of containment in that containment heat removal/depressurization systems (e.g., containment sprays, ice condenser fans, etc., but not including containment venting strategies) are either lost or performing in a degraded manner.

In the FCS USAR, section 6.3 the Containment Spray System function is to limit the containment pressure rise by providing a means for cooling the containment following a Main Steam Line Break (MSLB). The Containment Spray System actuates only on a MSLB.

Section 6.4 of the FCS USAR defines the design of the containment air cooling and filtering system (CACFS) to limit the leakage of airborne activity from the containment and provide long term core cooling in the event of a loss-of-coolant accident. Containment Cooling and Filtering initiates on containment high pressure (CPHS) and/or a pressurizer low pressure signal (PPLS).

CT4 (cont)

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

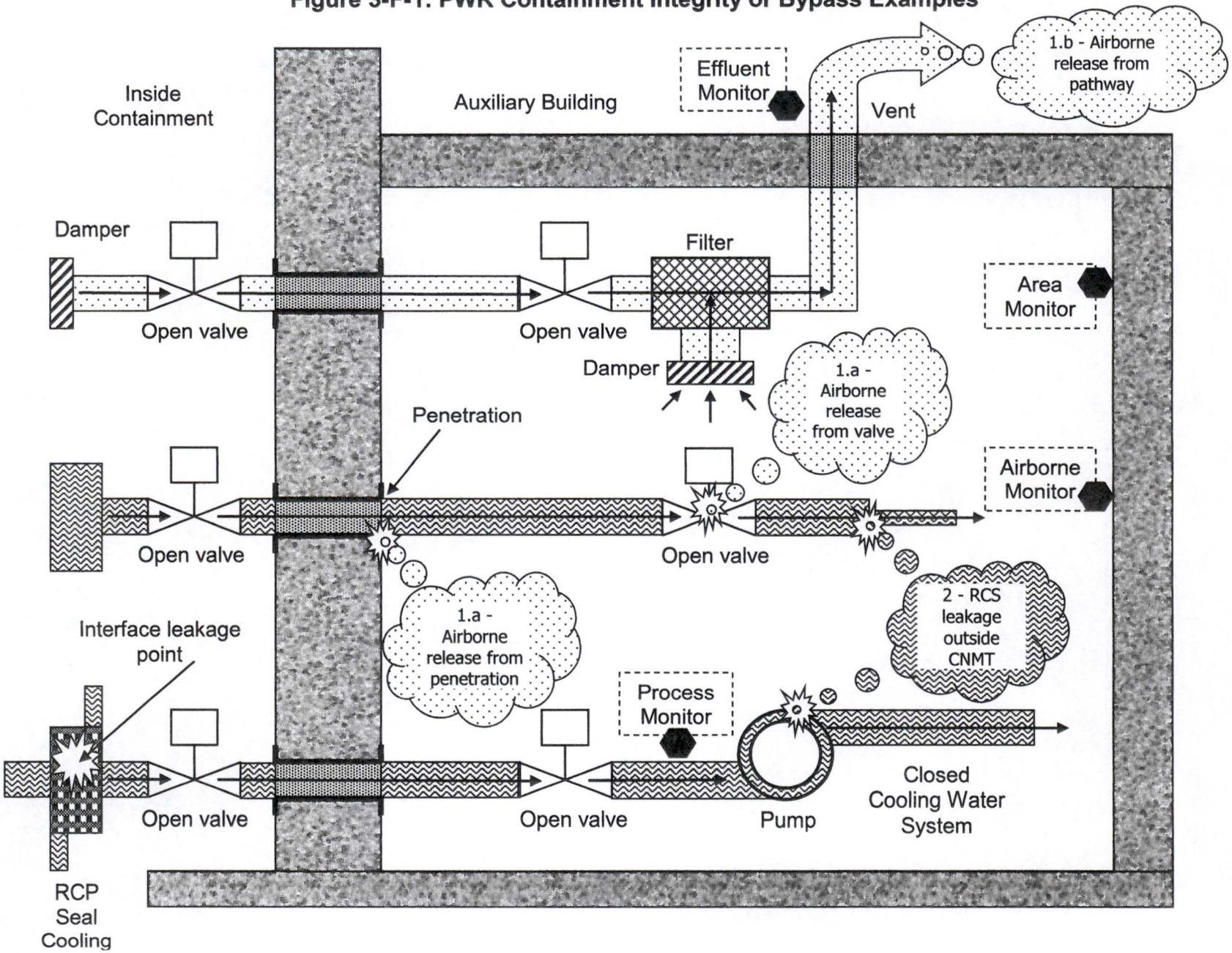
Basis (cont):

As a result of having two separate and distinct heat removal systems for Containment, evaluation of this threshold must be based on knowledge of which initiating signal was received, and which equipment did not start automatically.

Basis Reference(s):

1. NEI 99-01 Rev 6, Table 9-F-3

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION
Figure 3-F-1: PWR Containment Integrity or Bypass Examples



RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

CT5

Initiating Condition:

Emergency Director Judgment.

Operating Mode Applicability:

1, 2, 3

Fission Product Barrier (FPB) Threshold:

LOSS

1. Any condition in the opinion of the Emergency Director that indicates Loss of the Containment Barrier.

POTENTIAL LOSS

2. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment Barrier.

Basis:

Loss Threshold #1 Basis

This threshold addresses any other factors that may be used by the Emergency Director in determining whether the Containment Barrier is lost.

Potential Loss Threshold #2 Basis

This threshold addresses any other factors that may be used by the Emergency Director in determining whether the Containment Barrier is potentially lost. The Emergency Director should also consider whether or not to declare the barrier potentially lost in the event that barrier status cannot be monitored.

Basis Reference(s):

1. NEI 99-01 Rev 6, Table 9-F-3

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG1

Initiating Condition:

Prolonged loss of all offsite and all onsite AC power to emergency busses.

Operating Mode Applicability:

1, 2, 3

Emergency Action Level (EAL):

Note:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

1. Loss of **ALL** offsite AC power to vital 4160 volt busses 1A3 and 1A4.

   AND

2. Failure of **EDGs** DG1 and DG2 to supply power to vital 4160 volt busses 1A3 and 1A4.

   AND

3. **EITHER** of the following:

   a. Restoration of at least one vital 4160 volt bus in **< 4 hours** is **not** likely.

   OR

   b. Core exit thermocouples **> 1550°F.**

Basis:

SAFETY SYSTEM: A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety-related.

This IC addresses a prolonged loss of all power sources to AC emergency busses. A loss of all AC power compromises the performance of all SAFETY SYSTEMS requiring electric power including those necessary for emergency core cooling, containment heat removal/pressure control, spent fuel heat removal and the ultimate heat sink. A prolonged loss of these busses will lead to a loss of any fission product barriers. In addition, fission product barrier monitoring capabilities may be degraded under these conditions.

The EAL should require declaration of a General Emergency prior to meeting the thresholds for IC FG1. This will allow additional time for implementation of offsite protective actions.

Escalation of the emergency classification from Site Area Emergency will occur if it is projected that power cannot be restored to at least one AC emergency bus by the end of the analyzed station blackout coping period. Beyond this time, plant responses and

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG1 (cont)

Basis (cont):

event trajectory are subject to greater uncertainty, and there is an increased likelihood of challenges to multiple fission product barriers.

The estimate for restoring at least one emergency bus should be based on a realistic appraisal of the situation. Mitigation actions with a low probability of success should not be used as a basis for delaying a classification upgrade. The goal is to maximize the time available to prepare for, and implement, protective actions for the public.

The EAL will also require a General Emergency declaration if the loss of AC power results in parameters that indicate an inability to adequately remove decay heat from the core.

Basis Reference(s):

1. NEI 99-01 Rev 6, SG1

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS1

Initiating Condition:

Loss of all offsite and all onsite AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

Emergency Action Level (EAL):

Note:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

1. Loss of **ALL** offsite AC Power to vital 4160 volt busses 1A3 and 1A4.

   AND

2. Failure of **EDGs** DG1 and DG2 to supply power to vital 4160 volt busses 1A3 and 1A4.

   AND

3. Failure to restore power to at least one vital 4160 volt bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.

Basis:

SAFETY SYSTEM: A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety-related.

This IC addresses a total loss of AC power that compromises the performance of all SAFETY SYSTEMS requiring electric power including those necessary for emergency core cooling, containment heat removal/pressure control, spent fuel heat removal and the ultimate heat sink. In addition, fission product barrier monitoring capabilities may be degraded under these conditions. This IC represents a condition that involves actual or likely major failures of plant functions needed for the protection of the public.

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Escalation of the emergency classification level would be via ICs RG1, FG1, MG1, or MG2.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS1 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 6, SS1

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA1

Initiating Condition:

Loss of all but one AC power source to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

Emergency Action Level (EAL):

Note:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

1. AC power to vital 4160 volt busses 1A3 and 1A4 reduced to only one of the following power sources for **≥ 15 minutes.**
   - 161 Kv Circuit
   - 345 Kv Circuit
   - EDG DG1
   - EDG DG2

   AND
2. Any additional single power source failure will result in a loss of **ALL** AC power to SAFETY SYSTEMS.

Basis:

SAFETY SYSTEM: A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety-related.

This IC describes a significant degradation of offsite and onsite AC power sources such that any additional single failure would result in a loss of all AC power to SAFETY SYSTEMS. In this condition, the sole AC power source may be powering one, or more than one, train of safety-related equipment. This IC provides an escalation path from IC MU1.

An "AC power source" is a source recognized in AOPs and EOPs, and capable of supplying required power to an emergency bus. Some examples of this condition are presented below.

- A loss of all offsite power with a concurrent failure of all but one emergency power source (e.g., an onsite diesel generator).

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA1 (cont)

Basis (cont):

- A loss of all offsite power and loss of all emergency power sources (e.g., onsite diesel generators) with a single train of emergency busses being back-fed from the unit main generator.
- A loss of emergency power sources (e.g., onsite diesel generators) with a single train of emergency busses being back-fed from an offsite power source.

Fifteen minutes was selected as a threshold to exclude transient or momentary losses of power.

Escalation of the emergency classification level would be via IC MS1.

Basis Reference(s):

1. NEI 99-01 Rev 6, SA1

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU1

Initiating Condition:

Loss of all offsite AC power capability to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

Emergency Action Level (EAL):

Note:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

Loss of **ALL** offsite AC power capability to vital 4160 volt busses 1A3 and 1A4 for **≥ 15 minutes**.

Basis:

This IC addresses a prolonged loss of offsite power. The loss of offsite power sources renders the plant more vulnerable to a complete loss of power to AC emergency busses. This condition represents a potential reduction in the level of safety of the plant.

For emergency classification purposes, "capability" means that an offsite AC power source(s) is available to the emergency busses, whether or not the busses are powered from it.

Fifteen minutes was selected as a threshold to exclude transient or momentary losses of offsite power.

Escalation of the emergency classification level would be via IC MA1.

Basis Reference(s):

1. NEI 99-01 Rev 6, SU1

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG2

Initiating Condition:

Loss of all AC and Vital DC power sources for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

Emergency Action Level (EAL):

Note:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

1. Loss of **ALL** offsite AC power to vital 4160 volt busses 1A3 and 1A4.

   AND

2. Failure of **EDGs** DG1 and DG2 to supply power to vital 4160 volt busses 1A3 and 1A4.

   AND

3. Voltage is **< 105 VDC** on 125 VDC Bus 1 and Bus 2.

   AND

4. **ALL** AC and Vital DC power sources have been lost for **≥ 15 minutes.**

Basis:

SAFETY SYSTEM: A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety-related.

This IC addresses a concurrent and prolonged loss of both AC and Vital DC power. A loss of all AC power compromises the performance of all SAFETY SYSTEMS requiring electric power including those necessary for emergency core cooling, containment heat removal/pressure control, spent fuel heat removal and the ultimate heat sink. A loss of Vital DC power compromises the ability to monitor and control SAFETY SYSTEMS. A sustained loss of both AC and DC power will lead to multiple challenges to fission product barriers.

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses. The 15-minute emergency declaration clock begins at the point when all EALs are met.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MG2 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 6, SG8

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS2

Initiating Condition:

Loss of all vital DC power for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

Emergency Action Level (EAL):

Note:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

Voltage is **< 105 VDC** on 125 VDC Bus 1and Bus 2 for **≥ 15 minutes**.

Basis:

SAFETY SYSTEM: A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety-related.

This IC addresses a loss of Vital DC power which compromises the ability to monitor and control SAFETY SYSTEMS. In modes above Cold Shutdown, this condition involves a major failure of plant functions needed for the protection of the public.

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Escalation of the emergency classification level would be via ICs RG1, FG1 or MG2.

Basis Reference(s):

1. NEI 99-01 Rev 6, SS8

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS3

Initiating Condition:

Inability to shutdown the reactor causing a challenge to core cooling or RCS heat removal.

Operating Mode Applicability:

1, 2

Emergency Action Level (EAL):

1. Automatic or Manual Trip failed to shutdown the reactor as indicated by **ANY** of the following:
   - Reactor power is **not < 2%**
   - Startup rate **is not negative**

AND

2. All manual actions failed to shutdown the reactor as indicated by **ANY** of the following:
   - Reactor power **not < 2%**
   - Startup rate is **not negative**

AND

3. **ONE** of the following conditions exist:

   a. Core exit thermocouples **> 1550°F.**

   OR

   b. RVLMS indicates **0.0%**

   OR

   d. Once-Through-Cooling in effect.

Basis:

This IC addresses a failure of the RPS to initiate or complete an automatic or manual reactor trip that results in a reactor shutdown, all subsequent operator manual actions, both inside and outside the Control Room including driving in control rods and boron injection, are unsuccessful, and continued power generation is challenging the capability to adequately remove heat from the core and/or the RCS. This condition will lead to fuel damage if additional mitigation actions are unsuccessful and thus warrants the declaration of a Site Area Emergency.

In some instances, the emergency classification resulting from this IC/EAL may be higher than that resulting from an assessment of the plant responses and symptoms against the Recognition Category F ICs/EALs. This is appropriate in that the Recognition Category F ICs/EALs do not address the additional threat posed by a failure to shutdown the reactor. The inclusion of this IC and EAL ensures the timely

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MS3 (cont)

Basis (cont):

declaration of a Site Area Emergency in response to prolonged failure to shutdown the reactor.

A reactor shutdown is determined in accordance with applicable Emergency Operating Procedure criteria.

Escalation of the emergency classification level would be via IC RG1 or FG1.

Basis Reference(s):

1. NEI 99-01 Rev 6, SS5

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA3

Initiating Condition:

Automatic or manual trip fails to shutdown the reactor, and subsequent manual actions taken at the reactor control consoles are not successful in shutting down the reactor.

Operating Mode Applicability:

1, 2

Emergency Action Level (EAL):

Note:

- A manual action is any operator action, or set of actions, which causes the control rods to be rapidly inserted into the core, and does not include manually driving in control rods or implementation of boron injection strategies.

1. Automatic or Manual Trip failed to shutdown the reactor as indicated by **ANY** of the following:
   - Reactor power **not < 2%**
   - Startup rate is **not negative**

   AND
2. Manual actions taken at the reactor control console failed to shutdown the reactor as indicated by **ANY** of the following:
   - Reactor power **not < 2%**
   - Startup rate is **not negative**

Basis:

This IC addresses a failure of the RPS to initiate or complete an automatic reactor trip that results in a reactor shutdown, and subsequent operator manual actions taken at the reactor control console to shutdown the reactor are also unsuccessful. This condition represents an actual or potential substantial degradation of the level of safety of the plant. An emergency declaration is required even if the reactor is subsequently shutdown by an action taken away from the reactor control console since this event entails a significant failure of the RPS.

A manual action at the reactor control console is any operator action, or set of actions, which causes the control rods to be rapidly inserted into the core (e.g., initiating a manual reactor trip. Manual actions taken at the reactor control console is initiated from CB-4, AI-31, or using the DSS Manual Trip Switches on AI 66A/B. This action does not include manually driving in control rods or implementation of boron injection strategies. If this action(s) is unsuccessful, operators would immediately pursue additional manual actions at locations away from the reactor control console (e.g., locally opening breakers). Actions taken at back-panels or other locations within the Control Room, or any location outside the Control Room, are not considered to be "at the reactor control console".

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA3 (cont)

Basis (cont):

The plant response to the failure of an automatic or manual reactor trip will vary based upon several factors including the reactor power level prior to the event, availability of the condenser, performance of mitigation equipment and actions, other concurrent plant conditions, etc. If the failure to shutdown the reactor is prolonged enough to cause a challenge to the core cooling or RCS heat removal safety functions, the emergency classification level will escalate to a Site Area Emergency via IC MS3. Depending upon plant responses and symptoms, escalation is also possible via IC FS1. Absent the plant conditions needed to meet either IC MS3 or FS1, an Alert declaration is appropriate for this event.

It is recognized that plant responses or symptoms may also require an Alert declaration in accordance with the Recognition Category F ICs; however, this IC and EAL are included to ensure a timely emergency declaration.

A reactor shutdown is determined in accordance with applicable Emergency Operating Procedure criteria.

Basis Reference(s):

1. NEI 99-01 Rev 6, SA5

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU3

Initiating Condition:

Automatic or manual trip fails to shutdown the reactor.

Operating Mode Applicability:

1, 2

Emergency Action Level (EAL):

Note:

- A manual action is any operator action, or set of actions, which causes the control rods to be rapidly inserted into the core, and does not include manually driving in control rods or implementation of boron injection strategies.

1. a. Automatic Trip failed to shutdown the reactor as indicated by **ANY** of the following:
   - Reactor power **not < 2%**
   - Startup rate is **not negative**

   AND

   b. Subsequent manual action taken at the Reactor control console is successful in shutting down the reactor.

   OR

2. a. Manual Trip failed to shutdown the reactor as indicated by **ANY** of the following:
   - Reactor power **not < 2%**
   - Startup rate is **not negative**

   AND

   b. **EITHER** of the following:
      1. Subsequent manual action taken at the Reactor control console is successful in shutting down the reactor.

         OR

      2. Subsequent automatic Trip is successful in shutting down the reactor.

Basis:

This IC addresses a failure of the RPS to initiate or complete an automatic or manual reactor trip that results in a reactor shutdown, and either a subsequent operator manual action taken at the Reactor control console or an automatic trip is successful in shutting down the reactor. This event is a precursor to a more significant condition and thus represents a potential degradation of the level of safety of the plant.

Basis (cont):

EAL #1 Basis

Following the failure on an automatic reactor trip, operators will promptly initiate manual actions at the reactor control console to shutdown the reactor (e.g., initiate a manual reactor trip). If these manual actions are successful in shutting down the reactor, core heat generation will quickly fall to a level within the capabilities of the plant's decay heat removal systems.

EAL #2 Basis

If an initial manual reactor trip is unsuccessful, a concurrent plant condition, may lead to the generation of an automatic reactor trip signal. If a subsequent automatic trip is successful in shutting down the reactor, core heat generation will quickly fall to a level within the capabilities of the plant's decay heat removal systems.

A manual action at the reactor control console is any operator action, or set of actions, which causes the control rods to be rapidly inserted into the core (e.g., initiating a manual reactor trip. Manual actions taken at the reactor control console is initiated from CB-4, AI-31, or using the DSS Manual Trip Switches on AI 66A/B. This action does not include manually driving in control rods or implementation of boron injection strategies. If this action(s) is unsuccessful, operators would immediately pursue additional manual actions at locations away from the reactor control console (e.g., locally opening breakers). Actions taken at back-panels or other locations within the Control Room, or any location outside the Control Room, are not considered to be "at the reactor control console".

The plant response to the failure of an automatic or manual reactor trip will vary based upon several factors including the reactor power level prior to the event, availability of the condenser, performance of mitigation equipment and actions, other concurrent plant conditions, etc. If subsequent operator manual actions taken at the Reactor control console are also unsuccessful in shutting down the reactor, then the emergency classification level will escalate to an Alert via IC MA3. Depending upon the plant response, escalation is also possible via IC FA1. Absent the plant conditions needed to meet either IC MA3 or FA1, an Unusual Event declaration is appropriate for this event.

A reactor shutdown is determined in accordance with applicable Emergency Operating Procedure criteria.

Should a reactor trip signal be generated as a result of plant work (e.g., RPS setpoint testing), the following classification guidance should be applied.

- If the signal generated as a result of plant work causes a plant transient that creates a real condition that should have included an automatic reactor trip and the RPS fails to automatically shutdown the reactor, then this IC and the EALs are applicable, and should be evaluated.
- If the signal generated as a result of plant work does not cause a plant transient but should have generated an RPS trip signal and the trip failure is determined through other means (e.g., assessment of test results), then this IC and the EALs are not applicable and no classification is warranted.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU3 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 6, SU5

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA4

Initiating Condition:

UNPLANNED loss of Control Room indications for 15 minutes or longer with a significant transient in progress.

Operating Mode Applicability:

1, 2, 3

Emergency Action Level (EAL):

Note:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

1. UNPLANNED event results in the inability to monitor **ANY** Table M1 parameters from within the Control Room for **≥ 15 minutes**.

Table M1 Control Room Parameters
• Reactor Power • PZR Level • RCS Pressure • In Core/Core Exit Temperature • Level in at least one Steam Generator • Auxiliary Feed Water Flow

AND

2. **ANY** Table M2 transient in progress.

Table M2 Significant Transients
• Reactor Trip • ECCS Actuation

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA4 (cont)

Basis:

UNPLANNED: A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

SAFETY SYSTEM: A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety-related.

This IC addresses the difficulty associated with monitoring rapidly changing plant conditions during a transient without the ability to obtain SAFETY SYSTEM parameters from within the Control Room. During this condition, the margin to a potential fission product barrier challenge is reduced. It thus represents a potential substantial degradation in the level of safety of the plant.

As used in this EAL, an "inability to monitor" means that values for any of the listed parameters cannot be determined from within the Control Room. This situation would require a loss of all of the Control Room sources for the given parameter(s). For example, the reactor power level cannot be determined from any analog, computer point, digital and recorder source within the Control Room.

An event involving a loss of plant indications, annunciators and/or display systems is evaluated in accordance with 10 CFR 50.72 (and associated guidance in NUREG-1022) to determine if an NRC event report is required. The event would be reported if it significantly impaired the capability to perform emergency assessments. In particular, emergency assessments necessary to implement abnormal operating procedures, emergency operating procedures, and emergency plan implementing procedures addressing emergency classification, accident assessment, or protective action decision-making.

This EAL is focused on a selected subset of plant parameters associated with the key safety functions of reactivity control, core cooling and RCS heat removal. The loss of the ability to determine any of these parameters from within the Control Room is considered to be more significant than simply a reportable condition. In addition, if all indication sources for any of the listed parameters are lost, then the ability to determine the values of other SAFETY SYSTEM parameters may be impacted as well. For example, if the value for reactor vessel level cannot be determined from the indications and recorders on a main control board, the SPDS or the plant computer, the availability of other parameter values may be compromised as well.

Fifteen minutes was selected as a threshold to exclude transient or momentary losses of indication.

Escalation of the emergency classification level would be via ICs FS1 or IC RS1.

Basis Reference(s):

1. NEI 99-01 Rev 6, SA2

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU4

Initiating Condition:

UNPLANNED loss of Control Room indications for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

Emergency Action Level (EAL):

Note:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

UNPLANNED event results in the inability to monitor **ANY** Table M1 parameters from within the Control Room for **≥ 15 minutes.**

Table M1 Control Room Parameters
• Reactor Power • PZR Level • RCS Pressure • In Core/Core Exit Temperature • Level in at least one Steam Generator • Auxiliary Feed Water Flow

Basis:

UNPLANNED: A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

SAFETY SYSTEM: A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety-related.

This IC addresses the difficulty associated with monitoring normal plant conditions without the ability to obtain SAFETY SYSTEM parameters from within the Control Room. This condition is a precursor to a more significant event and represents a potential degradation in the level of safety of the plant.

As used in this EAL, an "inability to monitor" means that values for any of the listed parameters cannot be determined from within the Control Room. This situation would require a loss of all of the Control Room sources for the given parameter(s). For example, the reactor power level cannot be determined from any analog, digital and recorder source within the Control Room. An event involving a loss of plant indications,

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU4 (cont)

Basis (cont):

annunciators and/or display systems is evaluated in accordance with 10 CFR 50.72 (and associated guidance in NUREG-1022) to determine if an NRC event report is required. The event would be reported if it significantly impaired the capability to perform emergency assessments. In particular, emergency assessments necessary to implement abnormal operating procedures, emergency operating procedures, and emergency plan implementing procedures addressing emergency classification, accident assessment, or protective action decision-making.

This EAL is focused on a selected subset of plant parameters associated with the key safety functions of reactivity control, core cooling and RCS heat removal. The loss of the ability to determine any of these parameters from within the Control Room is considered to be more significant than simply a reportable condition. In addition, if all indication sources for any of the listed parameters are lost, then the ability to determine the values of other SAFETY SYSTEM parameters may be impacted as well. For example, if the value for reactor vessel level cannot be determined from the indications and recorders on a main control board, the SPDS or the plant computer, the availability of other parameter values may be compromised as well.

Fifteen minutes was selected as a threshold to exclude transient or momentary losses of indication.

Escalation of the emergency classification level would be via IC MA4.

Basis Reference(s):

1. NEI 99-01 Rev 6, SU2

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MA5

Initiating Condition:

Hazardous event affecting a SAFETY SYSTEM required for the current operating mode.

Operating Mode Applicability:

1, 2, 3

Emergency Action Level (EAL):

1. The occurrence of **ANY** of the following hazardous events:
   - Seismic event (earthquake)
   - Internal or external flooding event
   - High winds or tornado strike
   - FIRE
   - EXPLOSION
   - Other events with similar hazard characteristics as determined by the Shift Manager

   AND

2. **EITHER** of the following:
   a. Event damage has caused indications of degraded performance in at least one train of a SAFETY SYSTEM required by Technical Specifications for the current operating mode.

   OR

   b. The event has caused VISIBLE DAMAGE to a SAFETY SYSTEM component or structure required by Technical Specifications for the current operating mode.

Basis:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute FIRES. Observation of flame is preferred but is not required if large quantities of smoke and heat are observed.

EXPLOSION: A rapid, violent and catastrophic failure of a piece of equipment due to combustion, chemical reaction or overpressurization. A release of steam (from high energy lines or components) or an electrical component failure (caused by short circuits, grounding, arcing, etc.) should not automatically be considered an explosion. Such events may require a post-event inspection to determine if the attributes of an explosion are present.

Basis (cont):

SAFETY SYSTEM: A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety-related.

VISIBLE DAMAGE: Damage to a component or structure that is readily observable without measurements, testing, or analysis. The visual impact of the damage is sufficient to cause concern regarding the operability or reliability of the affected component or structure.

This IC addresses a hazardous event that causes damage to a SAFETY SYSTEM, or a structure containing SAFETY SYSTEM components, required to be operable by Technical Specifications for the current operating mode. This condition significantly reduces the margin to a loss or potential loss of a fission product barrier, and therefore represents an actual or potential substantial degradation of the level of safety of the plant. Manual or automatic electrical isolation of safety equipment due to flooding, in and of itself, does not constitute degraded performance and is classified under HU6.

EAL #2.a Basis

This EAL addresses damage to a SAFETY SYSTEM train that is required to be operable by Technical Specifications for the current operating mode, and is in operation since indications for it will be readily available. The indications of degraded performance should be significant enough to cause concern regarding the operability or reliability of the SAFETY SYSTEM train.

EAL #2.b Basis

This EAL addresses damage to a SAFETY SYSTEM component that is required to be operable by Technical Specifications for the current operating mode, and is not in operation or readily apparent through indications alone, as well as damage to a structure containing SAFETY SYSTEM components. Operators will make this determination based on the totality of available event and damage report information. This is intended to be a brief assessment not requiring lengthy analysis or quantification of the damage.

Escalation of the emergency classification level would be via IC FS1 or RS1.

If the EAL conditions of MA5 are not met then assess the event via HU3, HU4, or HU6.

Basis Reference(s):

1. NEI 99-01, Rev 6 SA9

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU6

Initiating Condition:

RCS leakage for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3

Emergency Action Level (EAL):

Note:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

1. RCS unidentified or pressure boundary leakage **> 10 gpm** for **≥ 15 minutes.**

   OR

2. RCS identified leakage **>25 gpm** for **≥ 15 minutes.**

   OR

3. Leakage from the RCS to a location outside containment **>25 gpm** for **≥ 15 minutes.**

Basis:

UNISOLABLE: An open or breached system line that cannot be isolated, remotely or locally.

This IC addresses RCS leakage which may be a precursor to a more significant event. In this case, RCS leakage has been detected and operators, following applicable procedures, have been unable to promptly isolate the leak. This condition is considered to be a potential degradation of the level of safety of the plant.

EAL #1 and EAL #2 Basis

These EALs are focused on a loss of mass from the RCS due to "unidentified leakage", "pressure boundary leakage" or "identified leakage" (as these leakage types are defined in the plant Technical Specifications).

EAL #3 Basis

This EAL addresses a RCS mass loss caused by an UNISOLABLE leak through an interfacing system.

These EALs thus apply to leakage into the containment, a secondary-side system (e.g., steam generator tube leakage) or a location outside of containment.

The leak rate values for each EAL were selected because they are usually observable with normal Control Room indications. Lesser values typically require time-consuming calculations to determine (e.g., a mass balance calculation). EAL #1 uses a lower value that reflects the greater significance of unidentified or pressure boundary leakage.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU6 (cont)

Basis (cont):

The release of mass from the RCS due to the as-designed/expected operation of a relief valve does not warrant an emergency classification. An emergency classification would be required if a mass loss is caused by a relief valve that is not functioning as designed/expected (e.g., a relief valve sticks open and the line flow cannot be isolated). The 15-minute threshold duration allows sufficient time for prompt operator actions to isolate the leakage, if possible.

Escalation of the emergency classification level would be via ICs of Recognition Category R or F.

Basis Reference(s):

1. NEI 99-01 Rev 6, SU4

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU7

Initiating Condition:

Loss of all On-site or Off-site communications capabilities.

Operating Mode Applicability:

1, 2, 3

Emergency Action Level (EAL):

1. Loss of **ALL** Table M3 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of **ALL** Table M3 **Offsite** communication capability affecting the ability to perform offsite notifications.

   OR

3. Loss of **ALL** Table M3 **NRC** communication capability affecting the ability to perform NRC notifications.

Table M3 Communications Capability

System	Onsite	Offsite	NRC
800 MHz Radio System	X		
Gai-tronics System	X		
Security Building PABX	X	X	X
Training Building PABX	X	X	X
Commercial Telephones	X	X	X
Conference Operations Network (COP)		X	
FTS-ENS		X	X
HPN		X	X
Satellite phones		X	X

Basis:

This IC addresses a significant loss of on-site, offsite, or NRC communications capabilities. While not a direct challenge to plant or personnel safety, this event warrants prompt notifications to Offsite Response Organizations (OROs) and the NRC.

This IC should be assessed only when extraordinary means are being utilized to make communications possible (e.g., use of non-plant, privately owned equipment, relaying of on-site information via individuals or multiple radio transmission points, individuals being sent to offsite locations, etc.).

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU7 (cont)

Basis (cont):

EAL #1 Basis

Addresses a total loss of the communications methods used in support of routine plant operations.

EAL #2 Basis

Addresses a total loss of the communications methods used to notify all OROs of an emergency declaration. The OROs referred to here are listed on EP-FC-114-100-F-01, State / Local Event Notification Form.

EAL #3 Basis

Addresses a total loss of the communications methods used to notify the NRC of an emergency declaration.

Basis Reference(s):

1. NEI 99-01 Rev 6, SU6

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS

MU8

Initiating Condition:

Failure to isolate containment or loss of containment pressure control.

Operating Mode Applicability:

1, 2, 3

Emergency Action Level (EAL):

1. a. Failure of containment to isolate when required by an actuation signal.

   AND

   b. **ANY** required penetration remains open **> 15 minutes** of the actuation signal.

   OR

2. a. Containment pressure **> 5 psig**

   AND

   b. Less than one full train of Containment Cooling / Containment Spray equipment operating for **≥ 15 minutes.**

Basis:

This IC addresses a failure of any containment penetrations to automatically isolate (close) when required by an actuation signal. It also addresses an event that results in high containment pressure with a concurrent failure of containment pressure control systems. Absent challenges to another fission product barrier, either condition represents potential degradation of the level of safety of the plant.

EAL #1 Basis

The containment isolation signal must be generated as the result on an off-normal/accident condition (e.g., a safety injection or high containment pressure); a failure resulting from testing or maintenance does not warrant classification. The determination of containment and penetration status – isolated or not isolated – should be made in accordance with the appropriate criteria contained in the plant AOPs and EOPs. The 15-minute criterion is included to allow operators time to manually isolate the required penetrations, if possible.

Basis (cont):

EAL #2 Basis

Addresses a condition where containment pressure is greater than the setpoint at which containment energy (heat) removal systems are designed to automatically actuate, and less than one full train of equipment is capable of operating per design. The 15-minute criterion is included to allow operators time to manually start equipment that may not have automatically started, if possible. The inability to start the required equipment indicates that containment heat removal/depressurization systems (e.g., containment sprays or ice condenser fans) are either lost or performing in a degraded manner.

In the FCS USAR, section 6.3 the Containment Spray System function is to limit the containment pressure rise by providing a means for cooling the containment following a Main Steam Line Break (MSLB). The Containment Spray System actuates only on a MSLB.

Section 6.4 of the FCS USAR defines the design of the containment air cooling and filtering system (CACFS) to limit the leakage of airborne activity from the containment and provide long term core cooling in the event of a loss-of-coolant accident. Containment Cooling and Filtering initiates on containment high pressure (CPHS) and/or a pressurizer low pressure signal (PPLS).

As a result of having two separate and distinct heat removal systems for Containment, evaluation of this EAL must be based on knowledge of which initiating signal was received, and which equipment did not start automatically.

This event would escalate to a Site Area Emergency in accordance with IC FS1 if there were a concurrent loss or potential loss of either the Fuel Clad or RCS fission product barriers.

Basis Reference(s):

1. NEI 99-01 Rev 6, SU7

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA1

Initiating Condition:

Loss of all offsite and all onsite AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

4, 5, D

Emergency Action Level (EAL):

Note:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

1. Loss of all offsite AC power to vital 4160 volt busses 1A3 and 1A4.

   AND

2. Failure of **EDGs** DG1 and DG2 to supply power to vital 4160 volt busses 1A3 and 1A4.

   AND

3. Failure to restore power to at least one vital 4160 volt bus in **< 15 minutes** from the time of loss of both offsite and onsite AC power.

Basis:

SAFETY SYSTEM: A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety-related

This IC addresses a total loss of AC power that compromises the performance of all SAFETY SYSTEMS requiring electric power including those necessary for emergency core cooling, containment heat removal/pressure control, spent fuel heat removal and the ultimate heat sink.

When in the cold shutdown, refueling, or defueled mode, this condition is not classified as a Site Area Emergency because of the increased time available to restore an emergency bus to service. Additional time is available due to the reduced core decay heat load, and the lower temperatures and pressures in various plant systems. Thus, when in these modes, this condition represents an actual or potential substantial degradation of the level of safety of the plant.

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Escalation of the emergency classification level would be via IC CS6 or RS1.

RECOGNITION CATEGORY

COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA1 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 6, CA2

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU1

Initiating Condition:

Loss of all but one AC power source to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

4, 5, D

Emergency Action Level (EAL):

Note:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

1. AC power capability to vital 4160 volt busses 1A3 and 1A4 reduced to only one of the following power sources for **≥ 15 minutes.**
   - 161 Kv Circuit
   - 345 Kv Circuit
   - EDG DG1
   - EDG DG2

   AND
2. **ANY** additional single power source failure will result in a loss of **ALL** AC power to SAFETY SYSTEMS.

Basis:

SAFETY SYSTEM: A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety-related.

This IC describes a significant degradation of offsite and onsite AC power sources such that any additional single failure would result in a loss of all AC power to SAFETY SYSTEMS. In this condition, the sole AC power source may be powering one, or more than one, train of safety-related equipment.

When in the cold shutdown, refueling, or defueled mode, this condition is not classified as an Alert because of the increased time available to restore another power source to service. Additional time is available due to the reduced core decay heat load, and the lower temperatures and pressures in various plant systems. Thus, when in these modes, this condition is considered to be a potential degradation of the level of safety of the plant.

RECOGNITION CATEGORY

COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU1 (cont)

Basis (cont):

An "AC power source" is a source recognized in AOPs and EOPs, and capable of supplying required power to an emergency bus. Some examples of this condition are presented below.

- A loss of all offsite power with a concurrent failure of all but one emergency power source (e.g., an onsite diesel generator).
- A loss of all offsite power and loss of all emergency power sources (e.g., onsite diesel generators) with a single train of emergency busses being back-fed from the unit main generator.
- A loss of emergency power sources (e.g., onsite diesel generators) with a single train of emergency busses being back-fed from an offsite power source.

Fifteen minutes was selected as a threshold to exclude transient or momentary losses of power.

The subsequent loss of the remaining single power source would escalate the event to an Alert in accordance with IC CA1.

Basis Reference(s):

1. NEI 99-01 Rev 6 CU2

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA2

Initiating Condition:

Hazardous event affecting SAFETY SYSTEM required for the current operating mode.

Operating Mode Applicability:

4, 5

Emergency Action Level (EAL):

1. The occurrence of **ANY** of the following hazardous events:
   - Seismic event (earthquake)
   - Internal or external flooding event
   - High winds or tornado strike
   - FIRE
   - EXPLOSION
   - Other events with similar hazard characteristics as determined by the Shift Manager

   AND

2. **EITHER** of the following:
   a. Event damage has caused indications of degraded performance in at least one train of a SAFETY SYSTEM required by Technical Specifications for the current operating mode.

   OR

   b. The event has caused VISIBLE DAMAGE to a SAFETY SYSTEM component or structure required by Technical Specifications for the current operating mode.

Basis:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute FIRES. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

EXPLOSION: A rapid, violent and catastrophic failure of a piece of equipment due to combustion, chemical reaction or overpressurization. A release of steam (from high energy lines or components) or an electrical component failure (caused by short circuits, grounding, arcing, etc.) should not automatically be considered an explosion. Such events may require a post-event inspection to determine if the attributes of an explosion are present.

SAFETY SYSTEM: A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety-related.

RECOGNITION CATEGORY

COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA2 (cont)

Basis (cont):

VISIBLE DAMAGE: Damage to a component or structure that is readily observable without measurements, testing, or analysis. The visual impact of the damage is sufficient to cause concern regarding the operability or reliability of the affected component or structure.

This IC addresses a hazardous event that causes damage to a SAFETY SYSTEM, or a structure containing SAFETY SYSTEM components, required to be operable by Technical Specifications for the current operating mode. This condition significantly reduces the margin to a loss or potential loss of a fission product barrier, and therefore represents an actual or potential substantial degradation of the level of safety of the plant. Manual or automatic electrical isolation of safety equipment due to flooding, in and of itself, does not constitute degraded performance and is classified under HU6.

EAL #2.a Basis

Addresses damage to a SAFETY SYSTEM train that is required to be operable by Technical Specifications for the current operating mode, and is in operation since indications for it will be readily available. The indications of degraded performance should be significant enough to cause concern regarding the operability or reliability of the SAFETY SYSTEM train.

EAL #2.b Basis

Addresses damage to a SAFETY SYSTEM component that is required to be operable by Technical Specifications for the current operating mode, and is not in operation or readily apparent through indications alone, or to a structure containing SAFETY SYSTEM components. Operators will make this determination based on the totality of available event and damage report information. This is intended to be a brief assessment not requiring lengthy analysis or quantification of the damage.

Escalation of the emergency classification level would be via IC CS6 or RS1.

If the EAL conditions of CA2 are not met then assess the event via HU3, HU4, or HU6.

Basis Reference(s):

1. NEI 99-01 Rev 6, CA6

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU3

Initiating Condition:

Loss of Vital DC power for 15 minutes or longer.

Operating Mode Applicability:

4, 5

Emergency Action Level (EAL):

Note:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

Voltage is **<105 VDC** on required 125 VDC Bus 1 and Bus 2 for **≥15 minutes**.

Basis:

SAFETY SYSTEM: A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety-related.

This IC addresses a loss of Vital DC power which compromises the ability to monitor and control operable SAFETY SYSTEMS when the plant is in the cold shutdown or refueling mode. In these modes, the core decay heat load has been significantly reduced, and coolant system temperatures and pressures are lower; these conditions raise the time available to restore a vital DC bus to service. Thus, this condition is considered to be a potential degradation of the level of safety of the plant.

As used in this EAL, "required" means the Vital DC busses necessary to support operation of the in-service, or operable, train or trains of SAFETY SYSTEM equipment. For example, if Train A is out-of-service (inoperable) for scheduled outage maintenance work and Train B is in-service (operable), then a loss of Vital DC power affecting Train B would require the declaration of an Unusual Event. A loss of Vital DC power to Train A would not warrant an emergency classification.

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Depending upon the event, escalation of the emergency classification level would be via IC CA6 or CA5, or an IC in Recognition Category R.

RECOGNITION CATEGORY

COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU3 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 6, CU4

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU4

Initiating Condition:

Loss of all onsite or offsite communications capabilities.

Operating Mode Applicability:

4, 5, D

Emergency Action Level (EAL):

1. Loss of **ALL** Table C1 **Onsite** communications capability affecting the ability to perform routine operations.

   OR

2. Loss of **ALL** Table C1 **Offsite** communication capability affecting the ability to perform offsite notifications.

   OR

3. Loss of **ALL** Table C1 **NRC** communication capability affecting the ability to perform NRC notifications.

Table C1 – Communications Capability

System	Onsite	Offsite	NRC
800 MHz Radio System	X		
Gai-tronics System	X		
Security Building PABX	X	X	X
Training Building PABX	X	X	X
Commercial Telephones	X	X	X
Conference Operations Network (COP)		X	
FTS-ENS		X	X
HPN		X	X
Satellite phones		X	X

Basis:

This IC addresses a significant loss of on-site, offsite, or NRC communications capabilities. While not a direct challenge to plant or personnel safety, this event warrants prompt notifications to Offsite Response Organizations (OROs) and the NRC.

This IC should be assessed only when extraordinary means are being utilized to make communications possible (e.g., use of non-plant, privately owned equipment, relaying of on-site information via individuals or multiple radio transmission points, individuals being sent to offsite locations, etc.).

RECOGNITION CATEGORY

COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU4 (cont)

Basis (cont):

EAL #1 Basis

Addresses a total loss of the communications methods used in support of routine plant operations.

EAL #2 Basis

Addresses a total loss of the communications methods used to notify all OROs of an emergency declaration. The OROs referred to here are listed in procedure EP-FC-114-100-F-01, State / Local Event Notification Form.

EAL #3 Basis

Addresses a total loss of the communications methods used to notify the NRC of an emergency declaration.

Basis Reference(s):

1. NEI 99-01 Rev 6, CU5

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5

Initiating Condition:

Inability to maintain the plant in cold shutdown.

Operating Mode Applicability:

4, 5

Emergency Action Level (EAL):

Note:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.
- A momentary UNPLANNED excursion above the Technical Specification cold shutdown temperature limit when heat removal function is available does not warrant classification.

1. UNPLANNED rise in RCS temperature **> 210°F** for **> Table C2 duration**.

   OR

2. UNPLANNED RCS pressure rise **> 10 psig** as a result of temperature rise. (This EAL does not apply in solid plant conditions.)

Table C2 RCS Heat-up Duration Thresholds		
RCS Status	**Containment Closure Status**	**Heat-up Duration**
Intact	Not Applicable	60 minutes*
Not Intact **OR** Reduced Inventory	Established	20 minutes*
	Not Established	0 minutes
* If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then EAL #1 is not applicable.		

RECOGNITION CATEGORY

COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5 (cont)

Basis:

UNPLANNED: A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

CONTAINMENT CLOSURE: The procedurally defined conditions or actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under shutdown conditions.

RCS is intact when the RCS pressure boundary is in its normal condition for the Cold Shutdown mode of operation (e.g. no freeze seals, etc.).

This IC addresses conditions involving a loss of decay heat removal capability or an addition of heat to the RCS in excess of that which can currently be removed. Either condition represents an actual or potential substantial degradation of the level of safety of the plant.

A momentary UNPLANNED excursion above the Technical Specification cold shutdown temperature limit when the heat removal function is available does not warrant a classification.

The RCS Heat-up Duration Thresholds table addresses a rise in RCS temperature when CONTAINMENT CLOSURE is established but the RCS is not intact, or RCS inventory is reduced (e.g., mid-loop operation in PWRs). The 20-minute criterion was included to allow time for operator action to address the temperature rise.

The RCS Heat-up Duration Thresholds table also addresses a rise in RCS temperature with the RCS intact. The status of CONTAINMENT CLOSURE is not crucial in this condition since the intact RCS is providing a high pressure barrier to a fission product release. The 60-minute time frame should allow sufficient time to address the temperature rise without a substantial degradation in plant safety.

Finally, in the case where there is a rise in RCS temperature, the RCS is not intact or is at reduced inventory, and CONTAINMENT CLOSURE is not established, no heat-up duration is allowed (i.e., 0 minutes). This is because 1) the evaporated reactor coolant may be released directly into the Containment atmosphere and subsequently to the environment, and 2) there is reduced reactor coolant inventory above the top of irradiated fuel.

EAL #2 Basis

Provides a pressure-based indication of RCS heat-up.

Escalation of the emergency classification level would be via IC CS6 or RS1.

RECOGNITION CATEGORY

COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA5 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 6, CA3

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU5

Initiating Condition:

UNPLANNED rise in RCS temperature

Operating Mode Applicability:

4, 5

Emergency Action Level (EAL):

Note:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.
- A momentary UNPLANNED excursion above the Technical Specification cold shutdown temperature limit when heat removal function is available does not warrant classification.

1. UNPLANNED rise in RCS temperature **> 210°F.**

   OR

2. Loss of the following for **≥15 minutes.**
   - **ALL** RCS temperature indications

     AND
   - **ALL** RCS level indications

Basis:

UNPLANNED: A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

CONTAINMENT CLOSURE: The procedurally defined conditions or actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under shutdown conditions.

This IC addresses an UNPLANNED rise in RCS temperature above the Technical Specification cold shutdown temperature limit, or the inability to determine RCS temperature and level, represents a potential degradation of the level of safety of the plant. If the RCS is not intact and CONTAINMENT CLOSURE is not established during this event, the Emergency Director should also refer to IC CA5.

RCS is intact when the RCS pressure boundary is in its normal condition for the Cold Shutdown mode of operation (e.g. no freeze seals, etc.).

A momentary UNPLANNED excursion above the Technical Specification cold shutdown temperature limit when the heat removal function is available does not warrant a classification.

RECOGNITION CATEGORY

COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU5 (cont)

Basis (cont):

EAL #1 Basis

Involves a loss of decay heat removal capability, or an addition of heat to the RCS in excess of that which can currently be removed, such that reactor coolant temperature cannot be maintained below the cold shutdown temperature limit specified in Technical Specifications. During this condition, there is no immediate threat of fuel damage because the core decay heat load has been reduced since the cessation of power operation.

During an outage, the level in the reactor vessel will normally be maintained above the reactor vessel flange. Refueling evolutions that lower water level below the reactor vessel flange are carefully planned and controlled. A loss of forced decay heat removal at reduced inventory may result in a rapid rise in reactor coolant temperature depending on the time after shutdown.

EAL #2 Basis

EAL #2 reflects a condition where there has been a significant loss of instrumentation capability necessary to monitor RCS conditions and operators would be unable to monitor key parameters necessary to assure core decay heat removal. During this condition, there is no immediate threat of fuel damage because the core decay heat load has been reduced since the cessation of power operation.

Fifteen minutes was selected as a threshold to exclude transient or momentary losses of indication.

Escalation to Alert would be via IC CA6 based on an inventory loss or IC CA5 based on exceeding plant configuration-specific time criteria.

Basis Reference(s):

1. NEI 99-01 Rev 6, CU3

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6

Initiating Condition:

Loss of reactor vessel/RCS inventory affecting fuel clad integrity with containment challenged.

Operating Mode Applicability:

4, 5

Emergency Action Level (EAL):

Note:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

1. RVLMS indicates **0.0%** for **≥ 30 minutes.**
   OR
2. a. Reactor Vessel / RCS level **cannot** be monitored for **≥ 30 minutes.**
   AND
   b. Core uncovery is indicated by **ANY** of the following:
   - Table C3 indications of a sufficient magnitude to indicate core uncovery.
     OR
   - Erratic Source Range Neutron Monitor indication.
     OR
   - Containment Area Radiation Monitors reading **> 20 R/hr.**

   AND
   c. **ANY** Containment Challenge Indication (Table C4)

Table C3 Indications of RCS Leakage
• UNPLANNED Containment Sump level rise* • UNPLANNED Auxiliary Bldg. Sump level rise* • UNPLANNED Reactor Coolant Drain Tank level rise* • UNPLANNED Quench Tank level rise* • UNPLANNED Spent Regenerate Tank level rise* • UNPLANNED rise in RCS makeup • Observation of leakage or inventory loss
*Rise in level is attributed to a loss of reactor vessel/RCS inventory.

RECOGNITION CATEGORY

COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6 (cont)

Emergency Action Level (EAL) (cont):

Table C4 Containment Challenge Indications
• Hydrogen Concentration in Containment **> 3%** • UNPLANNED rise in containment pressure • CONTAINMENT CLOSURE **not** established*
* if CONTAINMENT CLOSURE is re-established prior to exceeding the 30-minute core uncovery time limit, then escalation to a General Emergency is **not** required.

Basis:

UNPLANNED: A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

IMMINENT: The trajectory of events or conditions is such that an EAL will be met within a relatively short period of time regardless of mitigation or corrective actions.

CONTAINMENT CLOSURE: The procedurally defined conditions or actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under shutdown conditions.

This IC addresses the inability to restore and maintain reactor vessel level above the top of active fuel with containment challenged. This condition represents 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 Guidelines (PAG) exposure levels offsite for more than the immediate site area.

Following an extended loss of core decay heat removal and inventory makeup, decay heat will cause reactor coolant boiling and a further reduction in reactor vessel level. If RCS/reactor vessel level cannot be restored, fuel damage is probable.

With CONTAINMENT CLOSURE not established, there is a high potential for a direct and unmonitored release of radioactivity to the environment. If CONTAINMENT CLOSURE is re-established prior to exceeding the 30-minute time limit, then declaration of a General Emergency is not required.

RECOGNITION CATEGORY

COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6 (cont)

Basis (cont):

The existence of an explosive mixture means, at a minimum, that the containment atmospheric hydrogen concentration is sufficient to support a hydrogen burn (i.e., at the lower deflagration limit). A hydrogen burn will raise containment pressure and could result in collateral equipment damage leading to a loss of containment integrity. It therefore represents a challenge to Containment integrity.

In the early stages of a core uncovery event, it is unlikely that hydrogen buildup due to a core uncovery could result in an explosive gas mixture in containment. If all installed hydrogen gas monitors are out-of-service during an event leading to fuel cladding damage, it may not be possible to obtain a containment hydrogen gas concentration reading as ambient conditions within the containment will preclude personnel access. During periods when installed containment hydrogen gas monitors are out-of-service, operators may use the other listed indications to assess whether or not containment is challenged.

The 30-minute criterion is tied to a readily recognizable event start time (i.e., the total loss of ability to monitor level), and allows sufficient time to monitor, assess and correlate reactor and plant conditions to determine if core uncovery has actually occurred (i.e., to account for various accident progression and instrumentation uncertainties). It also allows sufficient time for performance of actions to terminate leakage, recover inventory control/makeup equipment and/or restore level monitoring.

The inability to monitor reactor vessel/RCS level may be caused by instrumentation and/or power failures, or water level dropping below the range of available instrumentation. If water level cannot be monitored, operators may determine that an inventory loss is occurring by observing changes in sump and/or tank levels. Sump and/or tank level changes must be evaluated against other potential sources of water flow to ensure they are indicative of leakage from the reactor vessel/RCS.

These EALs address concerns raised by Generic Letter 88-17, *Loss of Decay Heat Removal*; SECY 91-283, *Evaluation of Shutdown and Low Power Risk Issues*; NUREG-1449, *Shutdown and Low-Power Operation at Commercial Nuclear Power Plants in the United States*; and NUMARC 91-06, *Guidelines for Industry Actions to Assess Shutdown Management.*

RECOGNITION CATEGORY

COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CG6 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 6, CG1

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6

Initiating Condition:

Loss of reactor vessel/RCS inventory affecting core decay heat removal capability.

Operating Mode Applicability:

4, 5

Emergency Action Level (EAL):

Note:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

1. With CONTAINMENT CLOSURE established RVLMS indicates **0.0%**

   OR

2. With CONTAINMENT CLOSURE **not** established RVLMS **≤ 8.0%**

   OR

3. Reactor Vessel / RCS level **cannot** be monitored for **≥30 minutes.**

   AND

   Core uncovery is indicated by **ANY** of the following:

   - Table C3 indications of a sufficient magnitude to indicate core uncovery.

     OR

   - Erratic Source Range Neutron Monitor indication.

     OR

   - Containment Area Radiation Monitors reading **> 20 R/hr.**

Table C3 Indications of RCS Leakage
• UNPLANNED Containment Sump level rise* • UNPLANNED Auxiliary Bldg. Sump level rise* • UNPLANNED Reactor Coolant Drain Tank level rise* • UNPLANNED Quench Tank level rise* • UNPLANNED Spent Regenerate Tank level rise* • UNPLANNED rise in RCS makeup. • Observation of leakage or inventory loss
*Rise in level is attributed to a loss of reactor vessel/RCS inventory.

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6 (cont)

Basis:

UNPLANNED: A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

CONTAINMENT CLOSURE: The procedurally defined conditions or actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under shutdown conditions.

EAL #1 Basis

The lost inventory may be due to a RCS component failure, a loss of configuration control or prolonged boiling of reactor coolant. These conditions entail major failures of plant functions needed for protection of the public and thus warrant a Site Area Emergency declaration.

Following an extended loss of core decay heat removal and inventory makeup, decay heat will cause reactor coolant boiling and a further reduction in reactor vessel level. If RCS/reactor vessel level cannot be restored, fuel damage is probable.

EAL #2 Basis

Outage/shutdown contingency plans typically provide for re-establishing or verifying CONTAINMENT CLOSURE following a loss of heat removal or RCS inventory control functions.

EAL #3 Basis

The 30-minute criterion is tied to a readily recognizable event start time (i.e., the total loss of ability to monitor level), and allows sufficient time to monitor, assess and correlate reactor and plant conditions to determine if core uncovery has actually occurred (i.e., to account for various accident progression and instrumentation uncertainties). It also allows sufficient time for performance of actions to terminate leakage, recover inventory control/makeup equipment and/or restore level monitoring.

The inability to monitor reactor vessel/RCS level may be caused by instrumentation and/or power failures, or water level dropping below the range of available instrumentation. If water level cannot be monitored, operators may determine that an inventory loss is occurring by observing changes in sump and/or tank levels. Sump and/or tank level changes must be evaluated against other potential sources of water flow to ensure they are indicative of leakage from the reactor vessel/RCS.

These EALs address concerns raised by Generic Letter 88-17, *Loss of Decay Heat Removal*; SECY 91-283, *Evaluation of Shutdown and Low Power Risk Issues*; NUREG-1449, *Shutdown and Low-Power Operation at Commercial Nuclear Power Plants in the United States*; and NUMARC 91-06, *Guidelines for Industry Actions to Assess Shutdown Management*.

Escalation of the emergency classification level would be via IC CG6 or RG1.

RECOGNITION CATEGORY

COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CS6 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 6, CS1

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA6

Initiating Condition:

Loss of reactor vessel/RCS inventory.

Operating Mode Applicability:

4, 5

Emergency Action Level (EAL):

Note:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

1. Loss of Reactor Vessel / RCS inventory as indicated by RVLMS **< 14%**

OR

2. a. Reactor Vessel / RCS level **cannot** be monitored for **≥ 15 minutes**.

   AND

   b. Loss of Reactor Vessel / RCS inventory per Table C3 indications.

Table C3 Indications of RCS Leakage
• UNPLANNED Containment Sump level rise* • UNPLANNED Auxiliary Bldg. Sump level rise* • UNPLANNED Reactor Coolant Drain Tank level rise* • UNPLANNED Quench Tank level rise* • UNPLANNED Spent Regenerate Tank level rise • *UNPLANNED rise in RCS makeup. • Observation of leakage or inventory loss
*Rise in level is attributed to a loss of reactor vessel/RCS inventory.

RECOGNITION CATEGORY

COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CA6 (cont)

Basis:

UNPLANNED: A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

This IC addresses conditions that are precursors to a loss of the ability to adequately cool irradiated fuel (i.e., a precursor to a challenge to the fuel clad barrier). This condition represents a potential substantial reduction in the level of plant safety.

EAL #1 Basis

A lowering of water level below 14% on RVLMS indicates that operator actions have not been successful in restoring and maintaining reactor vessel/RCS water level. The heat-up rate of the coolant will rise as the available water inventory is reduced. A continuing drop in water level will lead to core uncovery.

Although related, EAL #1 is concerned with the loss of RCS inventory and not the potential concurrent effects on systems needed for decay heat removal (e.g., loss of a Residual Heat Removal suction point). A rise in RCS temperature caused by a loss of decay heat removal capability is evaluated under IC CA5.

EAL #2 Basis

The inability to monitor reactor vessel/RCS level may be caused by instrumentation and/or power failures, or water level dropping below the range of available instrumentation. If water level cannot be monitored, operators may determine that an inventory loss is occurring by observing changes in sump and/or tank levels. Sump and/or tank level changes must be evaluated against other potential sources of water flow to ensure they are indicative of leakage from the reactor vessel/RCS.

The 15-minute duration for the loss of level indication was chosen because it is half of the EAL duration specified in IC CS6

If the reactor vessel/RCS inventory level continues to lower, then escalation to Site Area Emergency would be via IC CS6.

Basis Reference(s):

1. NEI 99-01 Rev 6, CA1

RECOGNITION CATEGORY
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU6

Initiating Condition:

UNPLANNED loss of reactor vessel/RCS inventory for 15 minutes or longer.

Operating Mode Applicability:

4, 5

Emergency Action Level (EAL):

Note:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

1. UNPLANNED loss of reactor coolant results in the inability to restore and maintain Reactor Vessel / RCS level to **> procedurally established lower limit** for **≥ 15 minutes**.

   OR

2. a. Reactor Vessel / RCS level **cannot** be monitored.

   AND

   b. Loss of Reactor Vessel / RCS inventory per Table C3 indications.

Table C3 Indications of RCS Leakage
• UNPLANNED Containment Sump level rise* • UNPLANNED Auxiliary Bldg. Sump level rise* • UNPLANNED Reactor Coolant Drain Tank level rise* • UNPLANNED Quench Tank level rise* • UNPLANNED Spent Regenerate Tank level rise* • UNPLANNED rise in RCS makeup • Observation of leakage or inventory loss
*Rise in level is attributed to a loss of reactor vessel/RCS inventory.

Basis:

UNPLANNED: A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

This IC addresses the inability to restore and maintain water level to a required minimum level (or the lower limit of a level band), or a loss of the ability to monitor reactor vessel/RCS level concurrent with indications of coolant leakage. Either of these conditions is considered to be a potential degradation of the level of safety of the plant.

RECOGNITION CATEGORY

COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTIONS

CU6 (cont)

Basis (cont):

The procedurally established lower limit is not an operational band established above the procedural limit to allow for operator action prior to exceeding the procedural limit, but it is the procedurally established lower limit.

Refueling evolutions that lower RCS water inventory are carefully planned and controlled. An UNPLANNED event that results in water level decreasing below a procedurally required limit warrants the declaration of an Unusual Event due to the reduced water inventory that is available to keep the core covered.

EAL #1 Basis

Recognizes that the minimum required reactor vessel/RCS level can change several times during the course of a refueling outage as different plant configurations and system lineups are implemented. This EAL is met if the minimum level, specified for the current plant conditions, cannot be maintained for 15 minutes or longer. The minimum level is typically specified in the applicable operating procedure but may be specified in another controlling document.

The 15-minute threshold duration allows sufficient time for prompt operator actions to restore and maintain the expected water level. This criterion excludes transient conditions causing a brief lowering of water level.

EAL #2 Basis

Addresses a condition where all means to determine reactor vessel/RCS level have been lost. In this condition, operators may determine that an inventory loss is occurring by observing changes in sump and/or tank levels. Sump and/or tank level changes must be evaluated against other potential sources of water flow to ensure they are indicative of leakage from the reactor vessel/RCS.

Continued loss of RCS inventory may result in escalation to the Alert emergency classification level via either IC CA6 or CA5.

Basis Reference(s):

1. NEI 99-01, Rev. 6 CU1

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1

Initiating Condition:

HOSTILE ACTION resulting in loss of physical control of the facility.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

1. A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.

   AND

2. a. **ANY** Table H1 safety function **cannot** be controlled or maintained.

   OR

   b. Damage to spent fuel has occurred or is IMMINENT

Table H1 Safety Functions
• Reactivity Control (ability to shut down the reactor and keep it shutdown) • Core Cooling (ability to cool the core) • RCS Heat Removal (ability to maintain heat sink)

Basis:

HOSTILE ACTION: An act toward a NPP or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a NPP that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

IMMINENT: The trajectory of events or conditions is such that an EAL will be met within a relatively short period of time regardless of mitigation or corrective actions.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY
HG1 (cont)

Basis (cont):

HOSTILE FORCE: Any individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

This IC addresses an event in which a HOSTILE FORCE has taken physical control of the facility to the extent that the plant staff can no longer operate equipment necessary to maintain key safety functions. It also addresses a HOSTILE ACTION leading to a loss of physical control that results in actual or IMMINENT damage to spent fuel due to 1) damage to a spent fuel pool cooling system (e.g., pumps, heat exchangers, controls, etc.) or, 2) loss of spent fuel pool integrity such that sufficient water level cannot be maintained.

Timely and accurate communications between Security Shift Supervision and the Control Room is essential for proper classification of a security-related event.

Security plans and terminology are based on the guidance provided by NEI 03-12, *Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan [and Independent Spent Fuel Storage Installation Security Program].*

Basis Reference(s):

1. NEI 99-01, Rev. 6 HG1

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS1

Initiating Condition:

HOSTILE ACTION within the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.

Basis:

HOSTILE ACTION: An act toward a NPP or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a NPP that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

HOSTILE FORCE: Any individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI): A complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage.

This IC addresses the occurrence of a HOSTILE ACTION within the PROTECTED AREA. This event will require rapid response and assistance due to the possibility for damage to plant equipment.

Timely and accurate communications between Security Shift Supervision and the Control Room is essential for proper classification of a security-related event.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY
HS1 (cont)

Basis (cont):

Security plans and terminology are based on the guidance provided by NEI 03-12, *Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan [and Independent Spent Fuel Storage Installation Security Program].*

As time and conditions allow, these events require a heightened state of readiness by the plant staff and implementation of onsite protective measures (e.g., evacuation, dispersal or sheltering). The Site Area Emergency declaration will mobilize ORO resources and have them available to develop and implement public protective actions in the unlikely event that the attack is successful in impairing multiple safety functions.

This IC does not apply to incidents that are accidental events, acts of civil disobedience, or otherwise are not a HOSTILE ACTION perpetrated by a HOSTILE FORCE. Examples include the crash of a small aircraft, shots from hunters, physical disputes between employees, etc. Reporting of these types of events is adequately addressed by other EALs, or the requirements of 10 CFR § 73.71 or 10 CFR § 50.72.

Escalation of the emergency classification level would be via IC HG1.

Basis Reference(s):

1. NEI 99-01 Rev 6, HS1

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1

Initiating Condition:

HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

1. A validated notification from NRC of an aircraft attack threat **< 30 minutes** from the site.

   OR

2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLED AREA.

Basis:

HOSTILE ACTION: An act toward a NPP or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a NPP that could cause concern for its continued operability, reliability, or personnel safety.

OWNER CONTROLLED AREA (OCA): The property associated with the station and owned by the company. Access is normally limited to persons entering for official business.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

HOSTILE FORCE: Any individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY
HA1 (cont)

Basis (cont):

This IC addresses the occurrence of a HOSTILE ACTION within the OWNER CONTROLLED AREA or notification of an aircraft attack threat. This event will require rapid response and assistance due to the possibility of the attack progressing to the PROTECTED AREA, or the need to prepare the plant and staff for a potential aircraft impact. Timely and accurate communications between Security Shift Supervision and the Control Room is essential for proper classification of a security-related event.

Security plans and terminology are based on the guidance provided by NEI 03-12, *Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan [and Independent Spent Fuel Storage Installation Security Program].*

As time and conditions allow, these events require a heightened state of readiness by the plant staff and implementation of onsite protective measures (e.g., evacuation, dispersal or sheltering). The Alert declaration will also heighten the awareness of Offsite Response Organizations, allowing them to be better prepared should it be necessary to consider further actions.

This IC does not apply to incidents that are accidental events, acts of civil disobedience, or otherwise are not a HOSTILE ACTION perpetrated by a HOSTILE FORCE. Examples include the crash of a small aircraft, shots from hunters, physical disputes between employees, etc. Reporting of these types of events is adequately addressed by other EALs, or the requirements of 10 CFR § 73.71 or 10 CFR § 50.72.

EAL #1 addresses the threat from the impact of an aircraft on the plant, and the anticipated arrival time is within 30 minutes. The intent of this EAL is to ensure that threat-related notifications are made in a timely manner so that plant personnel and OROs are in a heightened state of readiness. This EAL is met when the threat-related information has been validated in accordance with AOP-37.

EAL #2 is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an aircraft. The status and size of the plane may be provided by NORAD through the NRC.

In some cases, it may not be readily apparent if an aircraft impact within the OWNER CONTROLLED AREA was intentional (i.e., a HOSTILE ACTION). It is expected, although not certain, that notification by an appropriate Federal agency to the site would clarify this point. In this case, the appropriate federal agency is intended to be NORAD, FBI, FAA or NRC. The emergency declaration, including one based on other ICs/EALs, should not be unduly delayed while awaiting notification by a Federal agency.

Escalation of the emergency classification level would be via IC HS1.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY
HA1 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 6, HA1

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1

Initiating Condition:

Confirmed SECURITY CONDITION or threat.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

1. Notification of a credible security threat directed at the site as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities.

   OR

2. A validated notification from the NRC providing information of an aircraft threat.

   OR

3. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

Basis:

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION

SAFETY SYSTEM: A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety-related.

HOSTILE ACTION: An act toward a NPP or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

PROJECTILE: An object directed toward a NPP that could cause concern for its continued operability, reliability, or personnel safety.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY
HU1 (cont)

Basis (cont):

This IC addresses events that pose a threat to plant personnel or SAFETY SYSTEM equipment, and thus represent a potential degradation in the level of plant safety. Security events which do not meet one of these EALs are adequately addressed by the requirements of 10 CFR § 73.71 or 10 CFR § 50.72. Security events assessed as HOSTILE ACTIONS are classifiable under ICs HA1, HS1 and HG1.

Timely and accurate communications between Security Shift Supervision and the Control Room is essential for proper classification of a security-related event. Classification of these events will initiate appropriate threat-related notifications to plant personnel and OROs.

Security plans and terminology are based on the guidance provided by NEI 03-12, *Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan [and Independent Spent Fuel Storage Installation Security Program]*.

EAL #1 addresses the receipt of a credible security threat. The credibility of the threat is assessed in accordance with SY-AA-101-132, Security Assessment and Response to Unusual Activities.

EAL #2 addresses the threat from the impact of an aircraft on the plant. The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an aircraft. The status and size of the plane may also be provided by NORAD through the NRC. Validation of the threat is performed in accordance with AOP-37.

EAL #3 references Security Force because these are the individuals trained to confirm that a security event is occurring or has occurred. Training on security event confirmation and classification is controlled due to the nature of Safeguards and 10 CFR § 2.39 information.

Escalation of the emergency classification level would be via IC HA1.

Basis Reference(s):

1. NEI 99-01 Rev 6, HU1

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS2

Initiating Condition:

Inability to control a key safety function from outside the Control Room.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

Emergency Action Level (EAL):

Note:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

1. A Control Room evacuation has resulted in plant control being transferred from the Control Room to alternate locations per:
   a. AOP-07 Evacuation of Control Room
   OR
   b. AOP-06 Fire Emergency

AND

2. Control of **ANY** Table H1 key safety function is **not** reestablished in **< 15 minutes**.

Table H1 Safety Functions
• Reactivity Control (ability to shut down the reactor and keep it shutdown) • Core Cooling (ability to cool the core) • RCS Heat Removal (ability to maintain heat sink)

Basis:

The time period to establish control of the plant starts when either:

a. Control of the plant is no longer maintained in the Main Control Room

OR

b. The last Operator has left the Main Control Room.

This IC addresses an evacuation of the Control Room that results in transfer of plant control to alternate locations, and the control of a key safety function cannot be reestablished in a timely manner. The failure to gain control of a key safety function following a transfer of plan control to alternate locations is a precursor to a challenge to any fission product barriers within a relatively short period of time.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY
HS2 (cont)

Basis (cont):

The determination of whether or not "control" is established at the remote safe shutdown location(s) is based on judgment of the Emergency Director. The Emergency Director is expected to make a reasonable, informed judgment within 15 minutes whether or not the operating staff has control of key safety functions from the remote safe shutdown location(s).

Escalation of the emergency classification level would be via IC FG1 or CG6.

Basis Reference(s):

1. NEI 99-01, Rev 6 HS6

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA2

Initiating Condition:

Control Room evacuation resulting in transfer of plant control to alternate locations.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

A Control Room evacuation has resulted in plant control being transferred from the Control Room to alternate locations per:

a. AOP-07 Evacuation of Control Room

OR

b. AOP-06 Fire Emergency

Basis:

This IC addresses an evacuation of the Control Room that results in transfer of plant control to alternate locations outside the Control Room. The loss of the ability to control the plant from the Control Room is considered to be a potential substantial degradation in the level of plant safety.

Following a Control Room evacuation, control of the plant will be transferred to alternate shutdown locations. The necessity to control a plant shutdown from outside the Control Room, in addition to responding to the event that required the evacuation of the Control Room, will present challenges to plant operators and other on-shift personnel. Activation of the ERO and emergency response facilities will assist in responding to these challenges.

Escalation of the emergency classification level would be via IC HS2.

Basis Reference(s):

1. NEI 99-01, Rev 6 HA6

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3

Initiating Condition:

FIRE potentially degrading the level of safety of the plant.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

Note:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

1. A FIRE in **ANY** Table H2 area is **not** extinguished in **< 15-minutes** of **ANY** of the following FIRE detection indications:
   - Report from the field (i.e., visual observation)
   - Receipt of multiple (more than 1) fire alarms or indications
   - Field verification of a single fire alarm

   OR

2. a. Receipt of a single fire alarm in **ANY** Table H2 area (i.e., no other indications of a FIRE).

   AND

   b. The existence of a FIRE is **not** verified within **< 30 minutes** of alarm receipt.

   OR

3. A FIRE within the plant PROTECTED AREA not extinguished in **< 60-minutes** of the initial report, alarm or indication.

   OR

4. A FIRE within the plant PROTECTED AREA that requires firefighting support by an offsite fire response agency to extinguish.

Table H2 Vital Areas
• Containment Building • Auxiliary Building • Intake Structure • FW-54 • Main and Auxiliary Transformer Yard

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY
HU3 (cont)

Basis:

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute FIRES. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

This IC addresses the magnitude and extent of FIRES that may be indicative of a potential degradation of the level of safety of the plant.

EAL #1 Basis

The intent of the 15-minute duration is to size the FIRE and to discriminate against small FIRES that are readily extinguished (e.g., smoldering waste paper basket). In addition to alarms, other indications of a FIRE could be a drop in fire main pressure, automatic activation of a suppression system, etc.

Upon receipt, operators will take prompt actions to confirm the validity of an initial fire alarm, indication, or report. For EAL assessment purposes, the emergency declaration clock starts at the time that the initial alarm, indication, or report was received, and not the time that a subsequent verification action was performed. Similarly, the fire duration clock also starts at the time of receipt of the initial alarms, indication or report.

EAL #2 Basis

Addresses receipt of a single fire alarm, and the existence of a FIRE is not verified (i.e., proved or disproved) within 30-minutes of the alarm. Upon receipt, operators will take prompt actions to confirm the validity of a single fire alarm. For EAL assessment purposes, the 30-minute clock starts at the time that the initial alarm was received, and not the time that a subsequent verification action was performed.

A single fire alarm, absent other indication(s) of a FIRE, may be indicative of equipment failure or a spurious activation, and not an actual FIRE. For this reason, additional time is allowed to verify the validity of the alarm. The 30-minute period is a reasonable amount of time to determine if an actual FIRE exists; however, after that time, and absent information to the contrary, it is assumed that an actual FIRE is in progress.

If an actual FIRE is verified by a report from the field, then EAL #1 is immediately applicable, and the emergency must be declared if the FIRE is not extinguished within 15-minutes of the report. If the alarm is verified to be due to an equipment failure or a spurious activation, and this verification occurs within 30-minutes of the receipt of the alarm, then this EAL is not applicable and no emergency declaration is warranted.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY
HU3 (cont)

Basis (cont):

EAL #3 Basis

In addition to a FIRE addressed by EAL #1 or EAL #2, a FIRE within the plant PROTECTED AREA not extinguished within 60-minutes may also potentially degrade the level of plant safety.

EAL #4 Basis

If a FIRE within the plant PROTECTED AREA is of sufficient size to require a response by an offsite firefighting agency (e.g., a local town Fire Department), then the level of plant safety is potentially degraded. The dispatch of an offsite firefighting agency to the site requires an emergency declaration only if it is needed to actively support firefighting efforts because the fire is beyond the capability of the Fire Brigade to extinguish. Declaration is not necessary if the agency resources are placed on stand-by, or supporting post-extinguishment recovery or investigation actions.

The ISFSI is not specifically addressed in EAL #3 and #4 since it is within the plant PROTECTED AREA.

Basis-Related Requirements from NFPA 805

> Criterion 3 of Appendix A specifies that "Structures, systems, and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions. Noncombustible and heat resistant materials shall be used wherever practical throughout the unit, particularly in locations such as the containment and control room. Fire detection and fighting systems of appropriate capacity and capability shall be provided and designed to minimize the adverse effects of fires on structures, systems, and components important to safety. Firefighting systems shall be designed to assure that their rupture or inadvertent operation does not significantly impair the safety capability of these structures, systems, and components."
>
> 10CFR50.48 states in part that the fire protection can have risk-informed or performance-based alternatives to compliance with NFPA 805 as long as the alternatives "satisfy the performance goals, performance objectives, and performance criteria specified in NFPA 805 related to nuclear safety and radiological release; maintain safety margins; and maintain fire protection defense-in-depth (fire prevention, fire detection, fire suppression, mitigation, and post-fire safe shutdown capability).

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY
HU3 (cont)

Basis (cont):

Depending upon the plant mode at the time of the event, escalation of the emergency classification level would be via IC CA2 or MA5.

Basis Reference(s):

1. NEI 99-01, Rev 6 HU4

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4

Initiating Condition:

Seismic event greater than OBE levels.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

- For emergency classification if EAL 2 is not able to be confirmed, then the occurrence of a seismic event is confirmed in manner deemed appropriate by the Shift Manager or Emergency Director in **≤ 15 mins** of the event.

Seismic event **> Operating Basis Earthquake (OBE)** as indicated by

1. Control Room personnel feel an actual or potential seismic event.
   AND
2. **ANY** one of the following confirmed in **≤ 15 mins** of the event:
   - The earthquake resulted in Modified Mercalli Intensity (MMI) VI or greater within **3.5 miles** of the plant
   - The earthquake was felt within the plant and was of magnitude 6.0 or greater
   - The earthquake was of magnitude 5.0 or greater and occurred within **125 miles** of the plant

Basis:

This IC addresses a seismic event that results in accelerations at the plant site greater than those specified for an Operating Basis Earthquake (OBE)[1]. An earthquake greater than an OBE but less than a Safe Shutdown Earthquake (SSE)[2] should have no significant impact on safety-related systems, structures and components; however, some time may be required for the plant staff to ascertain the actual post-event condition of the plant (e.g., performs walk-downs and post-event inspections). Given the time necessary to perform walk-downs and inspections, and fully understand any impacts, this event represents a potential degradation of the level of safety of the plant.

Event verification with external sources should not be necessary during or following an OBE. Earthquakes of this magnitude should be readily felt by on-site personnel and recognized as a seismic event (e.g., typical lateral accelerations are in excess of 0.08g). The Shift Manager or Emergency Director may seek external verification if deemed

[1] An OBE is vibratory ground motion for which those features of a nuclear power plant necessary for continued operation without undue risk to the health and safety of the public will remain functional.
[2] An SSE is vibratory ground motion for which certain (generally, safety-related) structures, systems, and components must be designed to remain functional.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

appropriate (e.g., a call to the USGS, check internet news sources, etc.); however, the verification action must not preclude a timely emergency declaration.

Depending upon the plant mode at the time of the event, escalation of the emergency classification level would be via IC CA2 or MA5.

Basis Reference(s):

1. NEI 99-01, Rev 6 HU2

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5

Initiating Condition:

Gaseous release impeding access to equipment necessary for normal plant operations, cooldown or shutdown.

Operating Mode Applicability:

4, 5, D

Emergency Action Level (EAL):

Note: If the equipment in the listed room or area was already inoperable, or out of service, before the event occurred, then no emergency classification is warranted.

1. Release of a toxic, corrosive, asphyxiant or flammable gas in **ANY** Table H3 area.

Table H3
Area with Entry Related Mode Applicability

Area	Entry Related Mode Applicability
Containment	Modes 4, 5 and D
Room 6	Modes 4, 5 and D
Room 13	Modes 4, 5 and D
Room 15A	Modes 4, 5 and D
Room 21	Modes 4, 5 and D
Room 22	Modes 4, 5 and D
Room 56	Modes 4, 5 and D
Room 57	Modes 4, 5 and D
Room 69	Modes 4, 5 and D

AND

2. Entry into the room or area is prohibited or impeded.

Basis:

This IC addresses an event involving a release of a hazardous gas that precludes or impedes access to equipment necessary to transition the plant from normal plant operation to cooldown and shutdown as specified in normal plant procedures. This condition represents an actual or potential substantial degradation of the level of safety of the plant.

Assuming all plant equipment is operating as designed, normal operation is capable from the Main Control Room (MCR). The plant is also able to transition into a hot shutdown condition from the MCR, therefore Table H3 is a list of plant rooms or areas with entry-related mode applicability that contain equipment which require a manual/local action necessary to transition the plant from normal plant operation to cooldown and shutdown as specified in normal operating procedures, where if this action is not completed the plant would not be able to attain and maintain cold

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY
HA5 (cont)

Basis (cont):

shutdown.

This Table does not include rooms or areas for which entry is required solely to perform actions of an administrative or record keeping nature (e.g., normal rounds or routine inspections).

This Table does not include the Control Room since adequate engineered safety/design features are in place to preclude a Control Room evacuation due to the release of a hazardous gas.

An Alert declaration is warranted if entry into the affected room/area is, or may be, procedurally required during the plant operating mode in effect at the time of the gaseous release. The emergency classification is not contingent upon whether entry is actually necessary at the time of the release.

Evaluation of the IC and EAL do not require atmospheric sampling; it only requires the Emergency Director's judgment that the gas concentration in the affected room/area is sufficient to preclude or significantly impede procedurally required access. This judgment may be based on a variety of factors including an existing job hazard analysis, report of ill effects on personnel, advice from a subject matter expert or operating experience with the same or similar hazards. Access should be considered as impeded if extraordinary measures are necessary to facilitate entry of personnel into the affected room/area (e.g., requiring use of protective equipment, such as SCBAs, that is not routinely employed).

An emergency declaration is not warranted if any of the following conditions apply.

- The plant is in an operating mode different than the mode specified for the affected room/area (i.e., entry is not required during the operating mode in effect at the time of the gaseous release). For example, the plant is in Mode 1 when the gaseous release occurs, and the procedures used for normal operation, cooldown and shutdown do not require entry into the affected room until Mode 4.
- The gas release is a planned activity that includes compensatory measures which address the temporary inaccessibility of a room or area (e.g., fire suppression system testing).
- The action for which room/area entry is required is of an administrative or record keeping nature (e.g., normal rounds or routine inspections).
- The access control measures are of a conservative or precautionary nature, and would not actually prevent or impede a required action.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of around 19%, which can lead to breathing difficulties, unconsciousness or even death.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5 (cont)

Basis (cont):

This EAL does not apply to firefighting activities that generate smoke or that automatically or manually activate a fire suppression system in an area.

Escalation of the emergency classification level would be via Recognition Category R, C or F ICs.

Basis Reference(s):

1. NEI 99-01, Rev 6 HA5

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU6

Initiating Condition:

Hazardous Event

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

Note:

- EAL #4 does not apply to routine traffic impediments such as fog, snow, ice, or vehicle breakdowns or accidents.

1. Tornado strike within the PROTECTED AREA.

   OR

2. Internal room or area flooding of a magnitude sufficient to require manual or automatic electrical isolation of a SAFETY SYSTEM component required by Technical Specifications for the current operating mode.

   OR

3. Movement of personnel within the PROTECTED AREA is impeded due to an offsite event involving hazardous materials (e.g., an offsite chemical spill or toxic gas release).

   OR

4. A hazardous event that results in on-site conditions sufficient to prohibit the plant staff from accessing the site via personal vehicles.

   OR

5. Abnormal River level, as indicated by **EITHER:**

   a. > **1004 feet** MSL elevation (high level)

   OR

   b. < **976 feet, 9 inches** MSL elevation (low level)

Basis:

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

SAFETY SYSTEM: A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety-related.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY
HU6 (cont)

Basis (cont):

This IC addresses hazardous events that are considered to represent a potential degradation of the level of safety of the plant.

EAL 1 Basis

Addresses a tornado striking (touching down) within the Protected Area.

EAL #2 Basis

Addresses flooding of a building room or area that results in operators isolating power to a SAFETY SYSTEM component due to water level or other wetting concerns. Classification is also required if the water level or related wetting causes an automatic isolation of a SAFETY SYSTEM component from its power source (e.g., a breaker or relay trip). To warrant classification, operability of the affected component must be required by Technical Specifications for the current operating mode.

EAL #3 Basis

Addresses a hazardous materials event originating at an offsite location and of sufficient magnitude to impede the movement of personnel within the PROTECTED AREA.

EAL #4 Basis

Addresses a hazardous event that causes an on-site impediment to vehicle movement and significant enough to prohibit the plant staff from accessing the site using personal vehicles. Examples of such an event include site flooding caused by a hurricane, heavy rains, up-river water releases, dam failure, etc., or an on-site train derailment blocking the access road.

This EAL is not intended to apply to routine impediments such as fog, snow, ice, or vehicle breakdowns or accidents, but rather to more significant conditions such as the Hurricane Andrew strike on Turkey Point in 1992, the flooding around the Cooper Station during the Midwest floods of 1993, or the flooding around Ft. Calhoun Station in 2011.

EAL #5 Basis

The minimum level of 976 feet 9 inches provides adequate suction to the pumps for cooling plant components. The minimum elevation of the raw water pump suction is 973 feet 9 inches. High river level of 1004 feet is based on elevation of the plant site and on Technical Specification 2.16 indicating that the flooding plan to protect the plant will be instituted at 1004 feet and rising.

Escalation of the emergency classification level would be based on ICs in Recognition Categories R, F, M, H or C.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY
HU6 (cont)

Basis Reference(s):

1. NEI 99-01, Rev 6 HU3

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG7

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Basis:

IMMINENT: The trajectory of events or conditions is such that an EAL will be met within a relatively short period of time regardless of mitigation or corrective actions.

HOSTILE ACTION: An act toward a NPP or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station

PROJECTILE: An object directed toward a NPP that could cause concern for its continued operability, reliability, or personnel safety.

This IC addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for a General Emergency.

Basis Reference(s):

1. NEI 99-01, Rev 6 HG7

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS7

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts, (1) toward site personnel or equipment that could lead to the likely failure of or, (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

Basis:

HOSTILE ACTION: An act toward a NPP or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station

PROJECTILE: An object directed toward a NPP that could cause concern for its continued operability, reliability, or personnel safety.

This IC addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for a Site Area Emergency.

Basis Reference(s):

1. NEI 99-01, Rev 6 HS7

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA7

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an ALERT.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

Other conditions exist which, in the judgment of the Emergency Director, indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Basis:

HOSTILE ACTION: An act toward a NPP or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station

PROJECTILE: An object directed toward a NPP that could cause concern for its continued operability, reliability, or personnel safety.

This IC addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for an Alert.

Basis Reference(s):

1. NEI 99-01, Rev 6 HA7

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU7

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Unusual Event.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Basis:

This IC addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for an UNUSUAL EVENT.

Basis Reference(s):

1. NEI 99-01, Rev 6 HU7

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

E-HU1

Initiating Condition

Damage to a loaded cask CONFINEMENT BOUNDARY.

Operating Mode Applicability:

1, 2, 3, 4, 5, D

Emergency Action Level (EAL):

Emergency Action Levels (EAL) :

Damage to a loaded cask CONFINEMENT BOUNDARY as indicated by an on-contact radiation reading:

- **≥ 1600mr/hr** (gamma + neutron) on the HSM front surface.

  OR

- **≥ 400mr/hr** (gamma + neutron) on the HSM door centerline.

  OR

- **≥ 16mr/hr** (gamma + neutron) on the end shield wall exterior

Basis:

CONFINEMENT BOUNDARY: The irradiated fuel dry storage cask barrier(s) between areas containing radioactive substances and the environment.

INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI): A complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage.

This IC addresses an event that results in damage to the CONFINEMENT BOUNDARY of a storage cask containing spent fuel. It applies to irradiated fuel that is licensed for dry storage beginning at the point that the loaded storage cask is sealed. The word cask, as used in this EAL, refers to the storage container in use at the site for dry storage of irradiated fuel. The issues of concern are the creation of a potential or actual release path to the environment, degradation of one or more fuel assemblies due to environmental factors, and configuration changes which could cause challenges in removing the cask or fuel from storage.

The existence of "damage" is determined by radiological survey. The technical specification multiple of "2 times", which is also used in Recognition Category R IC RU1, is used here to distinguish between non-emergency and emergency conditions. The emphasis for this classification is the degradation in the level of safety of the spent fuel cask and not the magnitude of the associated dose or dose rate. It is recognized that in the case of extreme damage to a loaded cask, the fact that the "on-contact" dose rate limit is exceeded may be determined based on measurement of a dose rate at some distance from the cask.

Security-related events for ISFSIs are covered under ICs HU1 and HA1.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

Basis Reference(s):

1. NEI 99-01, Rev 6 E-HU1

2. Technical Specifications TRANSNUCLEAR, INC Standardized NUHOMS® horizontal modular storage system certificate of compliance no. 1004 amendment no. 9