

CONSTELLATION

EMERGENCY ACTION LEVELS FOR CRANE CLEAN ENERGY CENTER

REVISION HISTORY

Section 1: Classification of Emergencies

1.1 General

Section D of the Constellation Nuclear Standardized Emergency 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. Depending on the severity of an event, prior to returning to a standard day-to-day organization, a state or phase called RECOVERY may be entered to provide dedicated resources and organization in support of restoration and communication activities following the termination of the emergency.

UNUSUAL EVENT (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-AA-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 6 are defined in the Technical Specifications (T.S). “Defueled” Mode was established for classification purposes to reflect conditions where all fuel has been removed from the Reactor Pressure Vessel.

Mode	Description
1	Power Operation: The plant is in the Power Operation (PwrOps) condition when the indicated neutron power is two percent of rated power, or greater, as indicated on the power range channels.
2	Startup / Hot Standby: The plant shall be considered to be in the Startup (SU) mode when the shutdown margin is reduced with the intent of going critical. The plant is in the Hot Standby (HStby) condition when all of the following conditions exist: <ul style="list-style-type: none"> a. T_{avg} is greater than 525°F b. The reactor is critical c. Indicated neutron power on the power range channels is less than two percent of rated power.
3	Hot Shutdown: The plant is in the Hot Shutdown (HSD) condition when the reactor is subcritical by at least one percent delta k/k and T_{avg} is at or greater than 525°F.
4	Heatup/Cooldown: The plant is in the Heatup/Cooldown (HU/CD) condition when the reactor coolant temperature is greater than 200°F and less than 525°F.
5	Cold Shutdown: The plant is in the Cold Shutdown (CSD) Condition when the reactor is subcritical by at least one percent delta k/k and T_{avg} is no more than 200°F. Additionally the reactor coolant system pressure allowed is defined by Technical Specification 3.1.2.
6	Refueling: The plant is in the Refueling condition when, even with all of the control rods removed, the reactor would be subcritical by at least one percent delta k/k and the reactor coolant temperature at the decay heat removal pump suction is no more than 140°F. Additionally, the allowable reactor coolant system pressure is defined by Technical Specification 3.1.2.
D	Defuel: No fuel in the Reactor Vessel

Hot Matrix - applies in modes (1), (2), (3) and (4)

Cold Matrix - applies in modes (5), (6), and (D)

Individuals responsible for the classification of events will refer to the Initiating Condition and EALs on the matrix of the appropriate station Standardized Emergency Plan Annex (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. Site specific definitions are provided for terms with the intent to be used for a particular IC/EAL and may not be applicable to other uses of that term at other sites, the Emergency Plan or procedures.

References are also included to documents that were used to develop the 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 for the onsite facilities with responsibility assigned to the Shift Emergency Director (Control Room Shift Manager) or the Station Emergency Director (Technical Support Center). Classification of emergencies remains the responsibility of the applicable onsite facility even after Command and Control is transferred to the Corporate 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

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

Concerning ECL Downgrading, Constellation 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. Termination and entry into RECOVERY phase is still required for exiting the present classification. However the reestablishment of the barrier should be considered in determining future classifications should plant conditions or events change.

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.

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 CRANE 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 site. 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.

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 CRANE 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.

1.8 Response to a TMI-2 Emergency

TMI-2 alarms will be monitored on a 24-hour a day basis remotely from Unit 1 or by another appropriate location in the event of a failure of the remote monitoring system. For failures of specific local alarm capabilities, local conditions will be monitored in accordance with the applicable procedures.

A TMI-2 related emergency will be reported to the CRANE Control Room. CRANE Control Room personnel will assess and evaluate the situation; classify the event as required based on impact to the site per the EALs; and provide the appropriate response. ~~When direct monitoring is in effect the individual may leave the monitoring point in order to provide direct assistance to the TMI response team provided that he/she does not leave the monitoring point unattended in excess of one hour for any single event.~~

1.9 State, County and Local Classification System

State, county and local emergency plans incorporate the same emergency classification system as that utilized in this plan annex. Since both the State and CRANE classification schemes include events which have significant potential for radioactive releases, it is imperative that specific guidance for initiating protective actions be available to the "decision-making" personnel in emergency response organizations and agencies. The Commonwealth of Pennsylvania has, for planning purposes, adopted the Environmental Protection Agency (EPA) protective action guides (PAG's).

Emergency Action Level Technical Basis Page Index

General		Site Area		Alert		Unusual Event	
EAL	Pg.	EAL	Pg.	EAL	Pg.	EAL	Pg.
RG1	2-33	RS1	2-35	RA1	2-37	RU1	2-39
RG2	2-41	RS2	2-42	RA2	2-43	RU2	2-45
				RA3	2-47		
						RU4	2-49
FG1	2-50	FS1	2-51	FA1	2-52		
Fuel Clad		RCS		Containment			
FC1	2-53	RC1	2-58	CT1	2-63		
FC2	2-54	RC2	2-60	CT2	2-65		
FC3	2-56	RC3	2-61	CT3	2-66		
				CT4	2-67		
FC5	2-57	RC5	2-62	CT5	2-72		
MG1	2-73	MS1	2-75	MA1	2-77	MU1	2-79
MG2	2-80	MS2	2-82				
		MS3	2-83	MA3	2-85	MU3	2-87
				MA4	2-89	MU4	2-91
				MA5	2-93		
						MU6	2-95
						MU7	2-97
						MU8	2-99
				CA1	2-101	CU1	2-103
				CA2	2-105		
						CU3	2-107
						CU4	2-108
						CA5	2-110
						CU5	2-112
CG6	2-114	CS6	2-117	CA6	2-119	CU6	2-121
HG1	2-123	HS1	2-125	HA1	2-127	HU1	2-129
		HS2	2-131	HA2	2-132		
						HU3	2-133
						HU4	2-136
				HA5	2-138		
						HU6	2-140
HG7	2-142	HS7	2-143	HA7	2-144	HU7	2-145
						E-HU1	2-146

TABLE CRANE 2-1: Emergency Action Level (EAL) Matrix

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT	
Abnormal Rad Levels / Radiological Effluents							
RG1 Release of gaseous radioactivity resulting in offsite dose greater than 1000 mRem TEDE or 5000 mRem thyroid CDE.	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> D	RS1 Release of gaseous radioactivity resulting in offsite dose greater than 100 mRem TEDE or 500 mRem thyroid CDE.	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> D	RA1 Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mRem TEDE or 50 mRem thyroid CDE.	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> D	RU1 Release of gaseous or liquid radioactivity greater than 2 times the ODCM limits for 60 minutes or longer.	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> D
Emergency Action Levels (EAL): Notes: <ul style="list-style-type: none"> 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. <p>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: <ul style="list-style-type: none"> a. > 1000 mRem TEDE. OR b. > 5000 mRem CDE Thyroid. OR 3. Field survey results at or beyond the site boundary indicate EITHER: <ul style="list-style-type: none"> a. Gamma (closed window) dose rates >1000 mR/hr are expected to continue for ≥ 60 minutes. OR b. Analyses of field survey samples indicate > 5000 mRem CDE Thyroid for 60 minutes of inhalation. </p>	Emergency Action Levels (EAL): Notes: <ul style="list-style-type: none"> 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. <p>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: <ul style="list-style-type: none"> a. > 100 mRem TEDE. OR b. > 500 mRem CDE Thyroid. OR 3. Field survey results at or beyond the site boundary indicate EITHER: <ul style="list-style-type: none"> 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. </p>	Emergency Action Levels (EAL): Notes: <ul style="list-style-type: none"> 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. <p>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: <ul style="list-style-type: none"> a. > 10 mRem TEDE. OR b. > 50 mRem CDE Thyroid. OR 3. Field survey results at or beyond the site boundary indicate EITHER: <ul style="list-style-type: none"> 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. </p>	Emergency Action Levels (EAL): Notes: <ul style="list-style-type: none"> 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. <p>1. Reading on ANY of the following effluent monitors > 2 times alarm setpoint established by a current radioactive release discharge permit for ≥ 60 minutes. <ul style="list-style-type: none"> • RM-L-6, Radwaste Discharge • RM-L-12, IWTS / IWFS Discharge • RM-A-7, Waste Gas Decay Tank Discharge • Discharge Permit specified monitor OR 2. Readings on ANY Table R1 Effluent Monitor > Table R1 value for ≥ 60 minutes. OR 3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 2 times ODCM Limit with a release duration of ≥ 60 minutes.</p>				

Table R1 Effluent Monitor Thresholds

Monitor	General Emergency	Site Area Emergency	Alert	Unusual Event
RM-G-25 (Cond Offgas)	9.50 E+06 mR/hr	1.03 E+06 mR/hr	1.03 E+05 mR/hr	1.17 E+03 mR/hr
RM-A-8GH (Station Vent)	3.20 E+05 cpm	3.20 E+04 cpm	3.23 E+03 cpm	7.15 E+01 cpm
RM-G-24 (RB Purge)	5.69 E+05 mR/hr	5.69 E+04 mR/hr	5.69 E+03 mR/hr	6.49 E+01 mR/hr
RM-A-14 (ESF Vent)	7.18 E+02 uCi/cc	7.18 E+01 uCi/cc	7.18 E+00 uCi/cc	8.18 E-02 uCi/cc

TABLE CRANE 2-1: Emergency Action Level (EAL) Matrix

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT													
Abnormal Rad Levels / Radiological Effluents																			
Irradiated Fuel	<p>RG2 Spent fuel pool level cannot be restored to at least 2.050 ft. as indicated on SF-LI- 1219A(B) for 60 minutes or longer..</p> <p>Emergency Action Levels (EAL):</p> <p>Note: The Emergency Director should declare the General Emergency promptly upon determining that the applicable time has been exceeded, or will likely be exceeded. If the equipment in the room or area listed in Table R4 was already inoperable, or out-of-service, before the event occurred, then no emergency classification is warranted.</p> <p>1. Spent fuel pool level cannot be restored to at least 2.050 ft. as indicated on SF-LI- 1219A(B) for 60 minutes or longer.</p>	<p>RS2 Spent fuel pool level at 2.050 ft. 1 2 3 4 5 6 D</p> <p>Emergency Action Levels (EAL):</p> <p>1. Lowering of spent fuel pool level to 2.050 ft. as indicated on SF-LI-1219A(B).</p>	<p>RA2 Significant lowering of water level above, or damage to, irradiated fuel. 1 2 3 4 5 6 D</p> <p>Emergency Action Levels (EAL):</p> <p>1. Uncovery of irradiated fuel in the REFUELING PATHWAY. OR</p> <p>2. Damage to irradiated fuel resulting in a release of radioactivity from the fuel as indicated by ANY Table R2 Radiation Monitor reading >1000 mRem/hr. OR</p> <p>3. Lowering of spent fuel pool level to 10.134 ft. as indicated on SF-LI-1219A(B).</p>	<p>RU2 UNPLANNED loss of water level above irradiated fuel. 1 2 3 4 5 6 D</p> <p>Emergency Action Levels (EAL):</p> <p>1. a. UNPLANNED water level drop in the REFUELING PATHWAY.</p> <p>AND</p> <p>b. UNPLANNED Area Radiation Monitor reading rise on ANY radiation monitors in Table R2.</p>	<p>Table R2 Radiation Monitors</p> <table border="1"> <thead> <tr> <th>RMS</th> <th>Area Monitored</th> <th>Mode</th> </tr> </thead> <tbody> <tr> <td>RM-G-9</td> <td>FHB Bridge Rad Monitor</td> <td>ALL</td> </tr> <tr> <td>RM-G-6</td> <td>RB Auxiliary Bridge Rad Monitor</td> <td>5, 6</td> </tr> <tr> <td>RM-G-7</td> <td>RB Main Bridge Rad Monitor</td> <td>5, 6</td> </tr> </tbody> </table>	RMS	Area Monitored	Mode	RM-G-9	FHB Bridge Rad Monitor	ALL	RM-G-6	RB Auxiliary Bridge Rad Monitor	5, 6	RM-G-7	RB Main Bridge Rad Monitor	5, 6		
RMS	Area Monitored	Mode																	
RM-G-9	FHB Bridge Rad Monitor	ALL																	
RM-G-6	RB Auxiliary Bridge Rad Monitor	5, 6																	
RM-G-7	RB Main Bridge Rad Monitor	5, 6																	
Area Rad Levels		<p>Table R3 Areas Requiring Continuous Occupancy</p> <ul style="list-style-type: none"> • Main Control Room • Central Alarm Station – (by survey) <p>Table R4 Areas with Entry Related Mode Applicability</p> <table border="1"> <thead> <tr> <th>Area</th> <th>Entry Related Mode Applicability</th> </tr> </thead> <tbody> <tr> <td>Auxiliary Building</td> <td>Modes 4, 5, and 6</td> </tr> <tr> <td>• 281' shielded area</td> <td></td> </tr> <tr> <td>• 305' above DH Vaults</td> <td></td> </tr> <tr> <td>Fuel Handling Building</td> <td></td> </tr> <tr> <td>• 281' 1C ES Vlvs MCC</td> <td></td> </tr> </tbody> </table>	Area	Entry Related Mode Applicability	Auxiliary Building	Modes 4, 5, and 6	• 281' shielded area		• 305' above DH Vaults		Fuel Handling Building		• 281' 1C ES Vlvs MCC		<p>RA3 Radiation levels that impede 1 2 3 4 5 6 D access to equipment necessary for normal plant operations, cooldown or shutdown.</p> <p>Emergency Action Levels (EAL):</p> <p>Note: If the equipment in the room or area listed in Table R4 was already inoperable, or out of service, before the event occurred, then no emergency classification is warranted.</p> <p>1. Dose rate > 15 mR/hr in ANY of the areas contained in Table R3.</p> <p>OR</p> <p>2. UNPLANNED event results in radiation levels that prohibit or significantly impede access to ANY of the following Table R4 plant rooms or areas.</p>				
Area	Entry Related Mode Applicability																		
Auxiliary Building	Modes 4, 5, and 6																		
• 281' shielded area																			
• 305' above DH Vaults																			
Fuel Handling Building																			
• 281' 1C ES Vlvs MCC																			
Fuel Clad Degradation						<p>RU4 Reactor coolant activity greater than 1 2 3 4 Technical Specification allowable limits..</p> <p>Emergency Action Levels (EAL):</p> <p>1. Letdown Monitor RM-L-1 alert alarm (high or low channel). OR</p> <p>2. Sample analysis indicates EITHER of the following:</p> <p>a. Dose Equivalent I-131 specific coolant activity > 60.0 uCi/gm. OR</p> <p>b. Dose Equivalent XE-133 specific coolant activity > 797.0 uCi/gm.</p>													

TABLE CRANE 2-1: Emergency Action Level (EAL) Matrix

GENERAL EMERGENCY			SITE AREA EMERGENCY			ALERT			UNUSUAL EVENT									
Fission Product Barrier																		
FG1 Loss of ANY Two Barriers AND Loss or Potential Loss of the third barrier.				1 2 3 4	FS1 Loss or Potential Loss of ANY two barriers.	1 2 3 4	FS1 ANY Loss or ANY Potential Loss of either Fuel Clad or RCS.	1 2 3 4	None									
Sub-Category	Loss	FC – Fuel Clad	Potential Loss	Loss	RC – Reactor Coolant System	Potential Loss	Loss	CT - Containment	Potential Loss									
1. RCS or SG Tube Leakage	None	1. RCITS hot leg instruments indicate 0 inches after lowering trend. AND 2. In-core thermocouples are unavailable. AND 3. ALL RCP's are secured.	1. RCS leakage results in < 25° Sub Cooling Margin. OR 2. Steam Generator tube RUPTURE that requires / results in an ESAS actuation.	1. RCS leakage results in < 25° Sub Cooling Margin. OR 2. Steam Generator tube RUPTURE that requires / results in an ESAS actuation.	3. UNISOLABLE RCS leakage > 150 gpm. OR 4. a. RCS Pressure > 2450 psig. AND b. RCS Pressure not lowering.	1. SG tube leakage > 150 gpm. AND 2. UNISOLABLE steam release from the affected S/G to the environment.	1. SG tube leakage > 150 gpm. AND 2. UNISOLABLE steam release from the affected S/G to the environment.	None										
2. Inadequate Heat Removal	1. T_{clad} > 1400°F.	2. > 25°F Superheat. OR 3. HPI-PORV Cooling in effect.	None	1. HPI-PORV Cooling in effect.			None	1. T_{clad} > 1800°F. AND 2. EOP restoration procedures not effective in < 15 minutes.										
3. Containment Radiation / RCS Activity	1. Containment radiation monitor (RM-G-22 or RM-G-23) reading > 1.95E+03 R/hr. OR 2. Coolant activity > 300uCi/gm Dose Equivalent I-131.	None	1. Containment radiation monitor (RM-G-22 or RM-G-23) reading > 25 R/hr.		None		None	1. Containment radiation monitor (RM-G-22 or RM-G-23) reading > 4.40E+03 R/hr.										
4. Containment Integrity or Bypass	None	None	None	None	None	None	1. Containment isolation is required and ANY of the following: a. UNPLANNED lowering in containment pressure following initial pressure rise. OR b. Containment pressure or water level response not consistent with LOCA conditions. OR c. Indication of RCS leakage outside of containment. OR 2. Indication of RCS leakage outside of containment.	1. Containment isolation is required and ANY of the following: a. UNPLANNED lowering in containment pressure following initial pressure rise. OR b. Containment pressure or water level response not consistent with LOCA conditions. OR c. Indication of RCS leakage outside of containment. OR 2. Indication of RCS leakage outside of containment.	3. Reactor Building Pressure > 55 psig and rising. OR 4. Hydrogen Concentration in Containment ≥ 4%. OR 5. a. Reactor Building pressure > 30 psig. AND b. Reactor Building Emergency cooling is less than ANY one of the following conditions: SPRAY COOLERS <table border="1"><tr><td>2</td><td>0</td></tr><tr><td>0</td><td>3</td></tr><tr><td>1</td><td>1</td></tr></table>	2	0	0	3	1	1			
2	0																	
0	3																	
1	1																	
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.	1. Any Condition in the opinion of the Emergency Director that indicates Loss of the Containment Barrier.	2. Any Condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment Barrier.										

TABLE CRANE 2-1: Emergency Action Level (EAL) Matrix

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT			
System Malfunction									
Loss of AC Power	MG1 Prolonged loss of all offsite and all onsite AC power to emergency busses. 1 2 3 4	MS1 Loss of all offsite and all onsite AC power to emergency busses for 15 minutes or longer. 1 2 3 4	MA1 Loss of all but one AC power source to emergency buses for 15 minutes or longer. 1 2 3 4	MU1 Loss of all offsite AC power capability to emergency buses for 15 minutes or longer. 1 2 3 4					
	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.	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.	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.	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 Emergency 4KV buses. AND 2. Failure of EG-Y-1A, EG-Y-1B Emergency Diesel Generators and EG-Y-4 SBO Diesel Generator to supply power to Emergency 4KV buses. AND 3. EITHER of the following: a. Restoration of at least one Emergency 4KV bus in < 4 hours is not likely. OR b. > 25°F superheat.	1. Loss of ALL offsite AC Power to Emergency 4KV buses. AND 2. Failure of EG-Y-1A, EG-Y-1B Emergency Diesel Generators and EG-Y-4 SBO Diesel Generator to supply power to Emergency 4KV buses. AND 3. Failure to restore power to at least one Emergency 4KV bus in < 15 minutes from the time of loss of both offsite and onsite AC power.	1. AC power capability to Emergency 4KV buses reduced to only one of the following power sources for > 15 minutes . <ul style="list-style-type: none"> • Auxiliary Transformer 1A • Auxiliary Transformer 1B • Emergency Diesel Generator EG-Y-1A • Emergency Diesel Generator EG-Y-1B • SBO Diesel Generator EG-Y-4 AND 2. ANY additional single power source failure will result in a loss of ALL AC power to SAFETY SYSTEMS.						
Loss of DC Power	MG2 Loss of all AC and Vital DC power sources for 15 minutes or longer. 1 2 3 4	MS2 Loss of all vital DC power for 15 minutes or longer. 1 2 3 4							
	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.	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 Emergency 4KV buses. AND 2. Failure of EG-Y-1A, EG-Y-1B Emergency Diesel Generators and EG-Y-4 SBO Diesel Generator to supply power to Emergency 4KV buses. AND 3. Voltage is < 105 VDC on 125 VDC Distribution System 1A and 1B for >15 minutes . AND 4. ALL AC and Vital DC power sources have been lost for > 15 minutes .								

TABLE CRANE 2-1: Emergency Action Level (EAL) Matrix

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT		
System Malfunction								
RPS Failure	<p>MS3 Inability to shutdown the reactor causing a challenge to core cooling or RCS heat removal.</p> <p>Emergency Action Levels (EAL):</p> <ol style="list-style-type: none"> Automatic or Manual Trip did <u>not</u> shutdown the reactor as indicated by Reactor Power $\geq 5\%$. AND ALL manual actions to shutdown the reactor have been unsuccessful as indicated by Reactor Power $\geq 5\%$. AND EITHER of the following conditions exist: <ol style="list-style-type: none"> $T_{clad} > 1400^{\circ}\text{F}$. OR HPI-PORV Cooling in effect. 	<p>1 2</p>	<p>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.</p> <p>Emergency Action Levels (EAL):</p> <p>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.</p> <ol style="list-style-type: none"> Automatic Trip did <u>not</u> shutdown the reactor as indicated by Reactor Power $\geq 5\%$. AND Manual actions taken at the Console Center are <u>not</u> successful in shutting down the reactor as indicated by Reactor Power $\geq 5\%$. 	<p>1 2</p>	<p>MU3 Automatic or manual trip fails to shutdown the reactor.</p> <p>Emergency Action Levels (EAL):</p> <p>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.</p> <ol style="list-style-type: none"> Automatic Trip did not shutdown the reactor as indicated by Reactor Power $\geq 5\%$. AND Subsequent manual action taken at the Console Center is successful in shutting down the reactor as indicated by Reactor Power $< 5\%$. OR Manual Trip did not shutdown the reactor as indicated by Reactor Power $\geq 5\%$. AND Subsequent automatic Trip is successful in shutting down the reactor as indicated by Reactor Power $< 5\%$. 	<p>1 2</p>		
Control Room Indications	<p>Table M1 Control Room Parameters</p> <ul style="list-style-type: none"> Reactor Power PZR Level RCS Pressure In Core/Core Exit Temperature Level in at least one OTSG. OTSG Emergency Feed Water Flow 	<p>Table M2 Significant Transients</p> <ul style="list-style-type: none"> Automatic Turbine Runback $>25\%$ thermal reactor power Electrical Load Rejection $>25\%$ full electrical load Reactor Trip ESAS Actuation Thermal Power oscillations $> 10\%$ 	<p>1 2 3 4</p>	<p>MA4 UNPLANNED loss of Control Room indications for 15 minutes or longer with a significant transient in progress.</p> <p>Emergency Action Levels (EAL):</p> <p>Note: If it is determined that the conditions of MA5 are not met then assess the event via HU3, HU4, or HU6.</p> <ol style="list-style-type: none"> UNPLANNED event results in the inability to monitor ANY Table M1 parameters from within the Control Room for ≥ 15 minutes. AND ANY Table M2 transient in progress. 	<p>1 2 3 4</p>	<p>MU4 UNPLANNED loss of Control Room indications for 15 minutes or longer.</p> <p>Emergency Action Levels (EAL):</p> <p>Note: The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.</p> <ol style="list-style-type: none"> UNPLANNED event results in the inability to monitor ANY Table M1 parameters from within the Control Room for ≥ 15 minutes. 	<p>1 2 3 4</p>	

TABLE CRANE 2-1: Emergency Action Level (EAL) Matrix

GENERAL EMERGENCY		SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
System Malfunction				
Hazard affects Safety System		<p>MA5 Hazardous event affecting a SAFETY SYSTEM required for the current operating mode.</p> <p>Emergency Action Levels (EAL):</p> <p>Note: If it is determined that the conditions of MA5 are not met then assess the event via HU3, HU4, or HU6.</p> <ol style="list-style-type: none"> 1. The occurrence of ANY of the following hazardous events: <ul style="list-style-type: none"> • 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: <ol style="list-style-type: none"> 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. b. The event has caused VISIBLE DAMAGE to a SAFETY SYSTEM component or structure required by Technical Specifications for the current operating mode. OR 		
RCS Leak			<p>MU6 RCS leakage for 15 minutes or longer.</p> <p>Emergency Action Levels (EAL):</p> <p>Note: The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.</p> <ol style="list-style-type: none"> 1. RCS unidentified or pressure boundary leakage > 10 gpm for > 15 minutes. 2. RCS identified leakage >25 gpm for > 15 minutes. 3. Leakage from the RCS to a location outside containment >25 gpm for > 15 minutes. 	1 2 3 4

TABLE CRANE 2-1: Emergency Action Level (EAL) Matrix

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT									
System Malfunction															
Communications				Table M3 Communications Capability		MU7 Loss of all onsite or offsite communications capabilities. Emergency Action Levels (EAL): <ol style="list-style-type: none"> 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. 	1 2 3 4								
				System	Onsite	Offsite	NRC								
				Radios	X										
				Plant page	X										
				Plant Telephone System	X										
				Commercial Telephones	X	X	X								
				NARS		X									
				ENS		X	X								
Containment						MU8 Failure to isolate containment or loss of containment pressure control. Emergency Action Levels (EAL): <ol style="list-style-type: none"> 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. Reactor Building pressure > 30 psig. AND b. Reactor Building Emergency cooling is less than ANY one of the following conditions for > 15 minutes: <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">SPRAY</th> <th style="text-align: center;">COOLERS</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">0</td> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> </tr> </tbody> </table>	SPRAY	COOLERS	2	0	0	3	1	1	1 2 3 4
SPRAY	COOLERS														
2	0														
0	3														
1	1														

TABLE CRANE 2-1: Emergency Action Level (EAL) Matrix

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.	HS1 HOSTILE ACTION within the PROTECTED AREA.	1 2 3 4 5 6 D	HA1 HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes.	1 2 3 4 5 6 D	HU1 Confirmed SECURITY CONDITION or threat.	1 2 3 4 5 6 D
	Emergency Action Levels (EAL):	Emergency Action Levels (EAL):		Emergency Action Levels (EAL):		Emergency Action Levels (EAL):	
Transfer of Plant Control	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.	1. A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.		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.		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.	
	Table H1 Safety Functions <ul style="list-style-type: none">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 <u>Inability to control a key safety function from outside the Control Room. Other conditions exist which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY.</u>	1 2 3 4 5 6 D	HA2 Control Room evacuation resulting in transfer of plant control to alternate locations.	1 2 3 4 5 6 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 OP-TM-EOP-020, Cooldown from Outside the Control Room. AND 2. Control of ANY Table H1 key safety function is not reestablished in < 15 minutes .		1. A Control Room evacuation has resulted in plant control being transferred from the Control Room to alternate locations per OP-TM-EOP-020, Cooldown from Outside the Control Room.			

TABLE CRANE 2-1: Emergency Action Level (EAL) Matrix

GENERAL EMERGENCY		SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other conditions Affecting Plant Safety				
Fire			<p>Table H2 Vital Areas</p> <ul style="list-style-type: none"> • Reactor Building • Intake Building • Intermediate Building • Control Tower • Auxiliary and Fuel Handling Buildings • 1A and 1B Diesel Generator Buildings • BWST • CST 	<p>HU3 FIRE potentially degrading the level of safety of the plant 1 2 3 4 5 6 D</p> <p>Emergency Action Levels (EAL):</p> <p>Note: The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.</p> <p>• Escalation of the emergency classification level would be via IC-GA2 or MA5</p> <ol style="list-style-type: none"> 1. A FIRE in ANY Table H2 area is <u>not</u> extinguished in < 15-minutes of ANY of the following FIRE detection indications: <ul style="list-style-type: none"> • 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). <ul style="list-style-type: none"> • The existence of a FIRE is <u>not</u> verified in < 30-minutes of alarm receipt. AND 3. A FIRE within the plant PROTECTED AREA not extinguished in < 60-minutes of the initial report, alarm or indication. 4. A FIRE within the plant PROTECTED AREA that requires firefighting support by an offsite fire response agency to extinguish.

TABLE CRANE 2-1: Emergency Action Level (EAL) Matrix

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT							
Hazards and Other conditions Affecting Plant Safety													
Earthquake						HU4 Seismic event greater than OBE levels.	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> D						
Toxic Gas	<p style="text-align: center;">Table H3 Areas with Entry Related Mode Applicability</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Area</th><th style="text-align: center;">Entry Related Mode Applicability</th></tr> </thead> <tbody> <tr> <td style="text-align: center;">Auxiliary Building • 281' shielded area • 305' above DH Vaults</td><td style="text-align: center;">Modes 4, 5, and 6</td></tr> <tr> <td style="text-align: center;">Fuel Handling Building • 281' 1C ES Vlvs MCC</td><td></td></tr> </tbody> </table>	Area	Entry Related Mode Applicability	Auxiliary Building • 281' shielded area • 305' above DH Vaults	Modes 4, 5, and 6	Fuel Handling Building • 281' 1C ES Vlvs MCC		HA5 Gaseous release impeding access to equipment necessary for normal plant operations, cooldown or shutdown.	<input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6				
Area	Entry Related Mode Applicability												
Auxiliary Building • 281' shielded area • 305' above DH Vaults	Modes 4, 5, and 6												
Fuel Handling Building • 281' 1C ES Vlvs MCC													

TABLE CRANE 2-1: Emergency Action Level (EAL) Matrix

GENERAL EMERGENCY		SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other conditions Affecting Plant Safety				
Hazardous Event			<p>HU6 Hazardous event. <input type="button" value="1"/> <input type="button" value="2"/> <input type="button" value="3"/> <input type="button" value="4"/> <input type="button" value="5"/> <input type="button" value="6"/> <input type="button" value="D"/></p> <p>Emergency Action Levels (EAL):</p> <p>Note: EAL #4 does not apply to routine traffic impediments such as fog, snow, ice, or vehicle breakdowns or accidents.</p> <p>Escalation of the emergency classification level would be via IC-CA2 or MA5</p> <ol style="list-style-type: none"> 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 onsite conditions sufficient to prohibit the plant staff from accessing the site via personal vehicles. OR 5. a. Abnormal river water level at the intake Pump and Screen House, as indicated by EITHER: <ol style="list-style-type: none"> 1. > 296 ft. el. (high level). OR 2. < 274 ft. el. (low level). OR b. River flow forecasted to exceed 900,000 CFS within the next 12 hours. 	

Mode:

1 – Power Operations

2 – Startup

3 – Hot Standby

4 – Hot Shutdown

5 – Cold Shutdown

6 – Refueling

D - Defueled

TBD

HOT MATRIX

CRANE 2-21

HOT MATRIX

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TABLE CRANE 2-1: Emergency Action Level (EAL) Matrix

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT	
Hazards and Other conditions Affecting Plant Safety							
Emergency Director Judgment	<p>HG7 Other conditions exist which in 1 2 3 4 5 6 D the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY.</p> <p>Emergency Action Levels (EAL):</p> <ol style="list-style-type: none"> 1. 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. 	<p>HS7 Other conditions exist which in 1 2 3 4 5 6 D the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY.</p> <p>Emergency Action Levels (EAL):</p> <ol style="list-style-type: none"> 1. 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. 	<p>HA7 Other conditions exist which in 1 2 3 4 5 6 D the judgment of the Emergency Director warrant declaration of an ALERT.</p> <p>Emergency Action Levels (EAL):</p> <ol style="list-style-type: none"> 1. 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. 	<p>HU7 Other conditions exist which in 1 2 3 4 5 6 D the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT.</p> <p>Emergency Action Levels (EAL):</p> <ol style="list-style-type: none"> 1. 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. 			

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT	
Independent Spent Fuel Storage Facility							
Confinement Boundary						<p>E-HU1 Damage to a loaded cask 1 2 3 4 5 6 D CONFINEMENT BOUNDARY as indicated by a radiation reading greater than ANY of the following:</p> <p>Emergency Action Levels (EAL):</p> <ol style="list-style-type: none"> 1. Damage to a loaded cask CONFINEMENT BOUNDARY as indicated by a radiation reading greater than ANY of the following: <ol style="list-style-type: none"> a. 240 mrem/hour gamma on the vertical concrete surfaces. OR b. 10 mrem/hour neutron on the vertical concrete surfaces. OR c. 900 mrem/hour (neutron + gamma) on the top. 	

TABLE CRANE 2-1: Emergency Action Level (EAL) Matrix

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT	
Abnormal Rad Levels / Radiological Effluents							
RG1 Release of gaseous radioactivity resulting in offsite dose greater than 1000 mRem TEDE or 5000 mRem thyroid CDE.	1 2 3 4 5 6 D	RS1 Release of gaseous radioactivity resulting in offsite dose greater than 100 mRem TEDE or 500 mRem thyroid CDE.	1 2 3 4 5 6 D	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 6 D	RU1 Release of gaseous or liquid radioactivity greater than 2 times the ODCM limits for 60 minutes or longer.	1 2 3 4 5 6 D
Emergency Action Levels (EAL): Notes: <ul style="list-style-type: none"> 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. <p>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: <ul style="list-style-type: none"> > 1000 mRem TEDE. OR > 5000 mRem CDE Thyroid. OR 3. Field survey results at or beyond the site boundary indicate EITHER: <ul style="list-style-type: none"> Gamma (closed window) dose rates >1000 mR/hr are expected to continue for ≥ 60 minutes. OR Analyses of field survey samples indicate > 5000 mRem CDE Thyroid for 60 minutes of inhalation. </p>	Emergency Action Levels (EAL): Notes: <ul style="list-style-type: none"> 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. <p>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: <ul style="list-style-type: none"> > 100 mRem TEDE. OR > 500 mRem CDE Thyroid. OR 3. Field survey results at or beyond the site boundary indicate EITHER: <ul style="list-style-type: none"> Gamma (closed window) dose rates >100 mR/hr are expected to continue for ≥ 60 minutes. OR Analyses of field survey samples indicate > 500 mRem CDE Thyroid for 60 minutes of inhalation. </p>	Emergency Action Levels (EAL): Notes: <ul style="list-style-type: none"> 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. <p>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: <ul style="list-style-type: none"> > 10 mRem TEDE. OR > 50 mRem CDE Thyroid. OR 3. Field survey results at or beyond the site boundary indicate EITHER: <ul style="list-style-type: none"> Gamma (closed window) dose rates >10 mR/hr are expected to continue for ≥ 60 minutes. OR Analyses of field survey samples indicate > 50 mRem CDE Thyroid for 60 minutes of inhalation. </p>	Emergency Action Levels (EAL): Notes: <ul style="list-style-type: none"> 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. <p>1. Reading on ANY of the following effluent monitors > 2 times alarm setpoint established by a current radioactive release discharge permit for ≥ 60 minutes. <ul style="list-style-type: none"> RM-L-6, Radwaste Discharge RM-L-12, IWTS / IWFS Discharge RM-A-7, Waste Gas Decay Tank Discharge Discharge Permit specified monitor OR 2. Readings on ANY Table R1 Effluent Monitor > Table R1 value for ≥ 60 minutes. OR 3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 2 times ODCM Limit with a release duration of ≥ 60 minutes.</p>				

Table R1 Effluent Monitor Thresholds

Monitor	General Emergency	Site Area Emergency	Alert	Unusual Event
RM-G-25 (Cond Offgas)	9.50 E+06 mR/hr	1.03 E+06 mR/hr	1.03 E+05 mR/hr	1.17 E+03 mR/hr
RM-A-8GH (Station Vent)	3.20 E+05 cpm	3.20 E+04 cpm	3.23 E+03 cpm	7.15 E+01 cpm
RM-G-24 (RB Purge)	5.69 E+05 mR/hr	5.69 E+04 mR/hr	5.69 E+03 mR/hr	6.49 E+01 mR/hr
RM-A-14 (ESF Vent)	7.18 E+02 uCi/cc	7.18 E+01 uCi/cc	7.18 E+00 uCi/cc	8.18 E-02 uCi/cc

TABLE CRANE 2-1: Emergency Action Level (EAL) Matrix

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT																			
Abnormal Rad Levels / Radiological Effluents																									
Irradiated Fuel	RG2 Spent fuel pool level cannot be restored to at least 2.050 ft. as indicated on SF-LI- 1219A(B) for 60 minutes or longer..	RS2 Spent fuel pool level at 2.050 ft. as indicated on SF-LI-1219A(B).	RS2 Spent fuel pool level at 2.050 ft. as indicated on SF-LI-1219A(B).	RA2 Significant lowering of water level above, or damage to, irradiated fuel.	RA2 Significant lowering of water level above, or damage to, irradiated fuel.	RU2 UNPLANNED loss of water level above irradiated fuel.	RU2 UNPLANNED loss of water level above irradiated fuel.																		
	Emergency Action Levels (EAL): Note: If the equipment in the room or area listed in Table R4 was already inoperable, or out of service, before the event occurred, then no emergency classification is warranted.	Emergency Action Levels (EAL): 1. Lowering of spent fuel pool level to 2.050 ft. as indicated on SF-LI-1219A(B).		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 R2 Radiation Monitor reading >1000 mRem/hr. OR 3. Lowering of spent fuel pool level to 10.134 ft. as indicated on SF-LI-1219A(B).	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 R2 Radiation Monitor reading >1000 mRem/hr. OR 3. Lowering of spent fuel pool level to 10.134 ft. as indicated on SF-LI-1219A(B).	Emergency Action Levels (EAL): 1. a. UNPLANNED water level drop in the REFUELING PATHWAY. AND b. UNPLANNED Area Radiation Monitor reading rise on ANY radiation monitors in Table R2.	Emergency Action Levels (EAL): 1. a. UNPLANNED water level drop in the REFUELING PATHWAY. AND b. UNPLANNED Area Radiation Monitor reading rise on ANY radiation monitors in Table R2.																		
Area Rad Levels			Table R3 Areas Requiring Continuous Occupancy <ul style="list-style-type: none">• Main Control Room• Central Alarm Station – (by survey) Table R4 Areas with Entry Related Mode Applicability <table border="1"><thead><tr><th>Area</th><th>Entry Related Mode Applicability</th></tr></thead><tbody><tr><td>Auxiliary Building<ul style="list-style-type: none">• 281' shielded area• 305' above DH Vaults</td><td>Modes 4, 5, and 6</td></tr><tr><td>Fuel Handling Building<ul style="list-style-type: none">• 281' 1C ES Vlvs MCC</td><td></td></tr></tbody></table>		Area	Entry Related Mode Applicability	Auxiliary Building <ul style="list-style-type: none">• 281' shielded area• 305' above DH Vaults	Modes 4, 5, and 6	Fuel Handling Building <ul style="list-style-type: none">• 281' 1C ES Vlvs MCC		RA3 Radiation levels that impede access to equipment necessary for normal plant operations, cooldown or shutdown.	RA3 Radiation levels that impede access to equipment necessary for normal plant operations, cooldown or shutdown.	Table R2 Radiation Monitors <table border="1"><thead><tr><th>RMS</th><th>Area Monitored</th><th>Mode</th></tr></thead><tbody><tr><td>RM-G-9</td><td>FHB Bridge Rad Monitor</td><td>ALL</td></tr><tr><td>RM-G-6</td><td>RB Auxiliary Bridge Rad Monitor</td><td>5, 6</td></tr><tr><td>RM-G-7</td><td>RB Main Bridge Rad Monitor</td><td>5, 6</td></tr></tbody></table>	RMS	Area Monitored	Mode	RM-G-9	FHB Bridge Rad Monitor	ALL	RM-G-6	RB Auxiliary Bridge Rad Monitor	5, 6	RM-G-7	RB Main Bridge Rad Monitor	5, 6
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			Emergency Action Levels (EAL): Note: If the equipment in the room or area listed in Table R4 was already inoperable, or out of service, before the event occurred, then no emergency classification is warranted.	Emergency Action Levels (EAL): 1. Dose rate > 15 mR/hr in ANY of the areas contained in Table R3. OR 2. UNPLANNED event results in radiation levels that prohibit or significantly impede access to ANY of the following Table R4 plant rooms or areas.																					

Mode:

1 – Power Operations

2 – Startup

3 – Hot Standby

4 – Hot Shutdown

5 – Cold Shutdown

6 – Refueling

D - Defueled

TBD

TABLE CRANE 2-1: Emergency Action Level (EAL) Matrix

GENERAL EMERGENCY		SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Cold Shutdown / Refueling System Malfunctions				
Loss of AC Power		<p>CA1 Loss of all offsite and all onsite AC power to emergency busses for 15 minutes or longer. 5 6 D</p> <p>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.</p> <ol style="list-style-type: none"> 1. Loss of ALL offsite AC power to Emergency 4KV buses. AND 2. Failure of EG-Y-1A, EG-Y-1B Emergency Diesel Generators and EG-Y-4 SBO Diesel Generator to supply power to Emergency 4KV buses. AND 3. Failure to restore power to at least one Emergency 4KV bus in < 15 minutes from the time of loss of both offsite and onsite AC power. 	<p>CU1 Loss of all but one AC power source to emergency busses for 15 minutes or longer. 5 6 D</p> <p>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.</p> <ol style="list-style-type: none"> 1. AC power capability to Emergency 4KV buses reduced to only one of the following power sources for > 15 minutes. <ul style="list-style-type: none"> • Auxiliary Transformer 1A • Auxiliary Transformer 1B • Emergency Diesel Generator EG-Y-1A • Emergency Diesel Generator EG-Y-1B • SBO Diesel Generator EG-Y-4 AND 2. ANY additional single power source failure will result in a loss of ALL AC power to SAFETY SYSTEMS. 	
Safety System		<p>CA2 Hazardous event affecting SAFETY SYSTEM 5 6 required for the current operating mode.</p> <p>Emergency Action Levels (EAL): Note: If it is determined that the conditions of CA2 are not met then assess the event via HU3, HU4, or HU6.</p> <ol style="list-style-type: none"> 1. The occurrence of ANY of the following hazardous events: <ul style="list-style-type: none"> • 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: <ol style="list-style-type: none"> 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 – Startup

3 – Hot Standby

4 – Hot Shutdown

5 – Cold Shutdown

6 – Refueling

D - Defueled

TBD

COLD SHUTDOWN / REFUELING MATRIX

CRANE 2-25

COLD SHUTDOWN / REFUELING MATRIX EP-AA-1009 Addendum 3 (Rev 3)

TABLE CRANE 2-1: Emergency Action Level (EAL) Matrix

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. 5 6																																						
Communications				Table C1 Communications Capability	<table border="1" style="display: inline-table; vertical-align: middle;"> <thead> <tr> <th>System</th><th>Onsite</th><th>Offsite</th><th>NRC</th></tr> </thead> <tbody> <tr><td>Radios</td><td>X</td><td></td><td></td></tr> <tr><td>Plant page</td><td>X</td><td></td><td></td></tr> <tr><td>Plant Telephone System</td><td>X</td><td></td><td></td></tr> <tr><td>Commercial Telephones</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>NARS</td><td></td><td>X</td><td></td></tr> <tr><td>ENS</td><td></td><td>X</td><td>X</td></tr> <tr><td>HPN</td><td></td><td>X</td><td>X</td></tr> <tr><td>Satellite phones</td><td></td><td>X</td><td>X</td></tr> </tbody> </table>	System	Onsite	Offsite	NRC	Radios	X			Plant page	X			Plant Telephone System	X			Commercial Telephones	X	X	X	NARS		X		ENS		X	X	HPN		X	X	Satellite phones		X	X	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. Indicated voltage is < 105 VDC on required 125 VDC Distribution System 1A and 1B for > 15 minutes .	CU4 Loss of all onsite or offsite communications capabilities. 5 6 D	
System	Onsite	Offsite	NRC																																									
Radios	X																																											
Plant page	X																																											
Plant Telephone System	X																																											
Commercial Telephones	X	X	X																																									
NARS		X																																										
ENS		X	X																																									
HPN		X	X																																									
Satellite phones		X	X																																									
Heat Sink		Table C2 RCS Heat-up Duration Thresholds	<table border="1" style="display: inline-table; vertical-align: middle;"> <thead> <tr> <th>RCS Status</th><th>Containment Closure Status</th><th>Heat-up Duration</th></tr> </thead> <tbody> <tr><td>Intact</td><td>Not Applicable</td><td>60 minutes*</td></tr> <tr><td>Not Intact OR Reduced Inventory</td><td>Established</td><td>20 minutes*</td></tr> <tr><td></td><td>Not Established</td><td>0 minutes</td></tr> </tbody> </table>	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	CA5 <u>Inability to maintain the plant in cold shutdown. Loss of reactor vessel/RCS inventory.</u> 5 6 Emergency Action Levels (EAL): Notes: <ul style="list-style-type: none">• 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. <ol style="list-style-type: none">1. UNPLANNED rise in RCS temperature > 200°F for > Table C2 duration. OR2. UNPLANNED RCS pressure rise > 10 psig as a result of temperature rise. (This EAL does not apply in solid plant conditions.)	CU5 UNPLANNED rise in RCS temperature. 5 6 Emergency Action Levels (EAL): Notes: <ul style="list-style-type: none">• 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. <ol style="list-style-type: none">1. UNPLANNED rise in RCS temperature > 200°F. OR2. Loss of the following for >15 minutes.<ul style="list-style-type: none">• ALL RCS temperature indications AND• ALL RCS level indications																											
RCS Status	Containment Closure Status	Heat-up Duration																																										
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TABLE CRANE 2-1: Emergency Action Level (EAL) Matrix

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT		
Cold Shutdown / Refueling System Malfunctions								
RCS Leakage / Inventory Cold Shutdown / Refueling System Malfunctions CG6 Loss of reactor vessel/RCS inventory [5][6] affecting fuel clad integrity with containment challenged. 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. Reactor Vessel / RCS level <u>cannot</u> be monitored for ≥ 30 minutes . AND b. Core uncover is indicated by ANY of the following: <ul style="list-style-type: none"> Table C3 indications of a sufficient magnitude to indicate core uncover. OR Erratic Source Range Neutron Monitor indication. OR Radiation Monitor RM-G-6 or RM-G-7 reading > 3 R/hr. AND c. ANY Containment Challenge Indication (Table C4).	CS6 Loss of reactor vessel/RCS inventory affecting [5][6] core decay heat removal capability. 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.	CA6 Loss of reactor vessel/RCS inventory. [5][6] 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. Reactor Vessel / RCS level <u>cannot</u> be monitored for ≥ 30 minutes . AND 2. Core uncover is indicated by ANY of the following: <ul style="list-style-type: none"> Table C3 indications of a sufficient magnitude to indicate core uncover. OR Erratic Source Range Neutron Monitor indication. OR Radiation Monitor RM-G-6 or RM-G-7 reading > 3 R/hr. 	2. a. Reactor Vessel / RCS level <u>cannot</u> be monitored for ≥ 15 minutes . AND b. Loss of Reactor Vessel / RCS inventory per Table C3 indications.	Table C4 Containment Challenge Indications <ul style="list-style-type: none"> Hydrogen Concentration in Containment $> 4\%$ UNPLANNED rise in containment pressure CONTAINMENT CLOSURE not established* <small>*if CONTAINMENT CLOSURE is re-established prior to exceeding the 30-minute core uncover time limit, then escalation to a General Emergency is not required.</small>	CU6 UNPLANNED loss of reactor vessel/RCS inventory for 15 minutes or longer. 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 <u>cannot</u> be monitored. AND b. Loss of Reactor Vessel / RCS inventory per Table C3 indications.	Table C3 Indications of RCS Leakage <ul style="list-style-type: none"> UNPLANNED Reactor Bldg Sump level rise* UNPLANNED Auxiliary Bldg. Sump level rise* UNPLANNED BWST level rise* UNPLANNED RCDT level rise* UNPLANNED rise in RCS makeup Observation of leakage or inventory loss <small>* Rise in level is attributed to a loss of reactor vessel/RCS inventory.</small>

TABLE CRANE 2-1: Emergency Action Level (EAL) Matrix

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.	HS1 HOSTILE ACTION within the PROTECTED AREA.	1 2 3 4 5 6 D	HA1 HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes.	1 2 3 4 5 6 D	HU1 Confirmed SECURITY CONDITION or threat.	1 2 3 4 5 6 D
	Emergency Action Levels (EAL):	Emergency Action Levels (EAL):		Emergency Action Levels (EAL):		Emergency Action Levels (EAL):	
Transfer of Plant Control	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 <u>cannot</u> be controlled or maintained. OR b. Damage to spent fuel has occurred or is IMMINENT.	1. A notification from the Security Force that a HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA.		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.		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 <u>not</u> involve a HOSTILE ACTION.	
	Table H1 Safety Functions <ul style="list-style-type: none">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 Other conditions exist which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY.	1 2 3 4 5 6 D	HA2 Control Room evacuation resulting in transfer of plant control to alternate locations.	1 2 3 4 5 6 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 OP-TM-EOP-020, Cooldown from Outside the Control Room. AND 2. Control of ANY Table H1 key safety function is <u>not</u> reestablished in < 15 minutes .		1. A Control Room evacuation has resulted in plant control being transferred from the Control Room to alternate locations per OP-TM-EOP-020, Cooldown from Outside the Control Room.			

TABLE CRANE 2-1: Emergency Action Level (EAL) Matrix

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards and Other conditions Affecting Plant Safety			
Fire		<p>Table H2 Vital Areas</p> <ul style="list-style-type: none"> • Reactor Building • Intake Building • Intermediate Building • Control Tower • Auxiliary and Fuel Handling Buildings • 1A and 1B Diesel Generator Buildings • BWST • CST 	<p>HU3 FIRE potentially degrading the level of safety of the plant 1 2 3 4 5 6 D</p> <p>Emergency Action Levels (EAL):</p> <p>Note: The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.</p> <p>• Escalation of the emergency classification level would be via IC-GA2 or MA5</p> <ol style="list-style-type: none"> 1. A FIRE in ANY Table H2 area is <u>not</u> extinguished in < 15-minutes of ANY of the following FIRE detection indications: <ul style="list-style-type: none"> • 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 <u>not</u> 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.

Mode:

1 – Power Operations

2 – Startup

3 – Hot Standby

4 – Hot Shutdown

5 – Cold Shutdown

6 – Refueling

D - Defueled

TBD

COLD SHUTDOWN / REFUELING MATRIX

CRANE 2-29

COLD SHUTDOWN / REFUELING MATRIX EP-AA-1009 Addendum 3 (Rev 3)

TABLE CRANE 2-1: Emergency Action Level (EAL) Matrix

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT									
Hazards and Other conditions Affecting Plant Safety															
Earthquake						HU4 Seismic event greater than OBE	<input type="button" value="1"/> <input type="button" value="2"/> <input type="button" value="3"/> <input type="button" value="4"/> <input type="button" value="5"/> <input type="button" value="6"/> <input type="button" value="D"/> Emergency Action Levels (EAL): Note: Escalation of the emergency classification level would be via IC-CA2 or MA5 For emergency classification if EAL 2.b 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. 1. Seismic event $>$ Operating Basis Earthquake (OBE) as indicated by seismic Alarms PRF-1-3 Operating Basis earthquake. OR 2. When Seismic Monitoring Equipment is <u>not</u> available: OR a. Control Room personnel feel an actual or potential seismic event. AND b. ANY one of the following confirmed in ≤ 15 mins of the event: <ul style="list-style-type: none"> The earthquake resulted in Modified Mercalli Intensity (MMI) $\geq VI$ and occurred ≤ 3.5 miles of the plant. The earthquake was magnitude ≥ 6.0. The earthquake was magnitude ≥ 5.0 and occurred ≤ 125 miles of the plant. 								
Toxic Gas	Table H3 Areas with Entry Related Mode Applicability <table border="1" data-bbox="959 1360 1579 1592"> <thead> <tr> <th>Area</th> <th>Entry Related Mode Applicability</th> </tr> </thead> <tbody> <tr> <td>Auxiliary Building</td> <td> <ul style="list-style-type: none"> 281' shielded area 305' above DH Vaults </td> </tr> <tr> <td>Fuel Handling Building</td> <td> <ul style="list-style-type: none"> 281' 1C ES Vlvs MCC </td> </tr> <tr> <td colspan="2">Modes 4, 5, and 6</td></tr> </tbody> </table>	Area	Entry Related Mode Applicability	Auxiliary Building	<ul style="list-style-type: none"> 281' shielded area 305' above DH Vaults 	Fuel Handling Building	<ul style="list-style-type: none"> 281' 1C ES Vlvs MCC 	Modes 4, 5, and 6		HA5 Gaseous release impeding access to	<input type="button" value="4"/> <input type="button" value="5"/> <input type="button" value="6"/>	equipment necessary for normal plant operations, cooldown or shutdown.	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.
Area	Entry Related Mode Applicability														
Auxiliary Building	<ul style="list-style-type: none"> 281' shielded area 305' above DH Vaults 														
Fuel Handling Building	<ul style="list-style-type: none"> 281' 1C ES Vlvs MCC 														
Modes 4, 5, and 6															

TABLE CRANE 2-1: Emergency Action Level (EAL) Matrix

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT	
Hazards and Other conditions Affecting Plant Safety							

TABLE CRANE 2-1: Emergency Action Level (EAL) Matrix

GENERAL EMERGENCY		SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Independent Spent Fuel Storage Facility				
Confinement Boundary				<p>E-HU1 Damage to a loaded cask 1 2 3 4 5 6 D</p> <p>CONFINEMENT BOUNDARY as indicated by a radiation reading greater than ANY of the following:</p> <p><u>Emergency Action Levels (EAL):</u></p> <ol style="list-style-type: none"> 1. Damage to a loaded cask CONFINEMENT BOUNDARY as indicated by a radiation reading greater than ANY of the following: <ol style="list-style-type: none"> a. 240 mrem/hour gamma on the vertical concrete surfaces. OR b. 10 mrem/hour neutron on the vertical concrete surfaces. OR c. 900 mrem/hour (neutron + gamma) on the top.

Mode:

1 – Power Operations

2 – Startup

3 – Hot Standby

4 – Hot Shutdown

5 – Cold Shutdown

6 – Refueling

D - Defueled

TBD

COLD SHUTDOWN / REFUELING MATRIX

CRANE 2-32

COLD SHUTDOWN / REFUELING MATRIX EP-AA-1009 Addendum 3 (Rev 3)

Table CRANE 2-2: EAL Technical Basis**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, 6, 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 mR/hr** are expected to continue for **≥ 60 minutes.**

OR

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

Table R1 Effluent Monitor Thresholds

Effluent Monitor	General Emergency
RM-G-25 (Cond Offgas)	9.50 E+06 mR/hr
RM-A-8GH (Station Vent)	3.20 E+05 cpm
RM-G-24 (RB Purge)	5.69 E+05 mR/hr
RM-A-14 (ESF Vent)	7.18 E+02 uCi/cc

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Abnormal Rad Levels / Radiological Effluents****RG1 (cont)****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 unmonitored 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
2. EP-EAL-0609, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values, Three Mile Island Unit-1 (TMI-1)
3. EP-AA-112-500 Emergency Environmental Monitoring
4. FSAR Section 11.4 Radiation Monitoring System
5. EP-AA-110-200 Dose Assessment
6. EP-AA-110-201 On Shift Dose Assessment

Table CRANE 2-2: EAL Technical Basis**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, 6, 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.

Table R1 Effluent Monitor Thresholds

Effluent Monitor	Site Area Emergency
RM-G-25 (Cond Offgas)	1.03 E+06 mR/hr
RM-A-8GH (Station Vent)	3.20 E+04 cpm
RM-G-24 (RB Purge)	5.69 E+04 mR/hr
RM-A-14 (ESF Vent)	7.18 E+01 uCi/cc

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Abnormal Rad Levels / Radiological Effluents****RS1 (cont)****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
2. EP-EAL-0609, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values, Three Mile Island Unit-1 (TMI-1)
3. EP-AA-112-500 Emergency Environmental Monitoring
4. FSAR Section 11.4 Radiation Monitoring System
5. EP-AA-110-200 Dose Assessment
6. EP-AA-110-201 On Shift Dose Assessment

Table CRANE 2-2: EAL Technical Basis**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, 6, 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. 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	Alert
RM-G-25 (Cond Offgas)	1.03 E+05 mR/hr
RM-A-8GH (Station Vent)	3.23 E+03 cpm
RM-G-24 (RB Purge)	5.69 E+03 mR/hr
RM-A-14 (ESF Vent)	7.18 E+00 uCi/cc

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Abnormal Rad Levels / Radiological Effluents****RA1 (cont)****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.

Basis Reference(s):

1. NEI 99-01 Rev 6, AA1
2. OP 1101-2.1 Radiation Monitoring System Setpoints
3. FSAR Section 11.4 Radiation Monitoring System
4. OP-TM-MAP-C0101, Radiation Level HI
5. EP-EAL-0609, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values, Three Mile Island Unit-1 (TMI-1)
6. EP-EAL-0616, Three Mile Island Criteria for Choosing Radiological Liquid Effluent EAL Threshold Values
7. EP-EAL-0622, Three Mile Island Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values for Waste Gas Decay Tanks

Table CRANE 2-2: EAL Technical Basis**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, 6, 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** of the following effluent monitors **> 2 times alarm setpoint** established by a current radioactive release discharge permit for **≥ 60 minutes**.
 - RM-L-6, Radwaste Discharge
 - RM-L-12, IWTS / IWFS Discharge
 - RM-A-7, Waste Gas Decay Tank Discharge
 - Discharge Permit specified monitor
- OR**
2. Readings on **ANY** Table R1 Effluent Monitor **> Table R1 value for ≥ 60 minutes**.
- OR**
3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates **> 2 times ODCM Limit** with a release duration of **≥ 60 minutes**.

Table R1 Effluent Monitor Thresholds

Effluent Monitor	Unusual Event
RM-G-25 (Cond Offgas)	1.17 E+03 mR/hr
RM-A-8GH (Station Vent)	7.15 E+01 cpm
RM-G-24 (RB Purge)	6.49 E+01 mR/hr
RM-A-14 (ESF Vent)	8.18 E-02 uCi/cc

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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Abnormal Rad Levels / Radiological Effluents****RU1 (cont)****Basis (cont):**

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 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.

Basis Reference(s):

1. NEI 99-01 Rev 6, AU1
2. OP 1101-2.1 Radiation Monitoring System Setpoints
3. FSAR Section 11.4 Radiation Monitoring System
4. Offsite Dose Calculation (ODCM)
5. OP-TM-MAP-C0101, Radiation Level HI
6. EP-EAL-0609, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values, Three Mile Island Unit-1 (TMI-1)

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Abnormal Rad Levels / Radiological Effluents****RG2****Initiating Condition:**

Spent fuel pool level cannot be restored to at least 2.050 ft. as indicated on SF-LI- 1219A(B) for 60 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, 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.

1. Spent fuel pool level cannot be restored to at least **2.050 ft.** as indicated on SF-LI- 1219A(B) 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 uncovering 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. EP-EAL-1009, Criteria for Choosing Spent Fuel Pool Level 3 and Level 2 EAL Threshold Values for TMI Station

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Abnormal Rad Levels / Radiological Effluents****RS2****Initiating Condition:**

Spent fuel pool level at 2.050 ft. as indicated on SF-LI-1219A(B).

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

Emergency Action Level (EAL):

1. Lowering of spent fuel pool level to **2.050 ft.** as indicated on SF-LI-1219A(B).

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. EP-EAL-1009, Criteria for Choosing Spent Fuel Pool Level 3 and Level 2 EAL Threshold Values for TMI Station

Table CRANE 2-2: EAL Technical Basis**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, 6, 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 R2 Radiation Monitor reading **>1000 mRem/hr.**

OR

3. Lowering of spent fuel pool level to **10.134 ft.** as indicated on SF-LI-1219A(B).

Table R2 Radiation Monitors

RMS	Area Monitored	Mode
RM-G-9	FHB Bridge Rad Monitor	ALL
RM-G-6	RB Auxiliary Bridge Rad Monitor	5, 6
RM-G-7	RB Main Bridge Rad Monitor	5, 6

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 E-HU1.1.

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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Abnormal Rad Levels / Radiological Effluents****RA2 (cont)****Basis (cont):**

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 assemblies 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. Operating Procedure OP-TM-MAP-C0105 RCS Draindown LVL HI/LO
3. OP-TM-MAP-C0101, Radiation Level HI
4. UFSAR, Section 14.2.2.1 - "Fuel Handling Accident"
5. Technical Specification 3.8.11 (Reactor Cavity Level)
6. Operating Procedure OP 1101-2.1 Radiation Monitoring System Setpoints
7. EP-EAL-1009, Criteria for Choosing Spent Fuel Pool Level 3 and Level 2 EAL Threshold Values for TMI Station

Table CRANE 2-2: EAL Technical Basis**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, 6, D

Emergency Action Level (EAL):

1. a. UNPLANNED water level drop in the REFUELING PATHWAY.

AND

- b. UNPLANNED Area Radiation Monitor reading rise on **ANY** radiation monitors in Table R2.

Table R2 Radiation Monitors

RMS	Area Monitored	Mode
RM-G-9	FHB Bridge Rad Monitor	ALL
RM-G-6	RB Auxiliary Bridge Rad Monitor	5, 6
RM-G-7	RB Main Bridge Rad Monitor	5, 6

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.

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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Abnormal Rad Levels / Radiological Effluents****RU2 (cont)****Basis Reference(s):**

1. NEI 99-01 Rev 6, AU2
2. UFSAR, Section 14.2.2.1 - "Fuel Handling Accident"
3. OP-TM-MAP-C0105 RCS Draindown
4. OP 1202-12, Excessive Radiation Levels
5. OP 1101-2.1 Radiation Monitoring System Setpoints
6. Technical Specification 3.8.11 (Reactor Cavity Level)

Table CRANE 2-2: EAL Technical Basis**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, 6, D

Emergency Action Level (EAL):

Note: If the equipment in the room or area listed in Table R4 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 R3.

Table R3 Areas Requiring Continuous Occupancy

- Main Control Room
- Central Alarm Station – (by survey)

OR

2. UNPLANNED event results in radiation levels that prohibit or significantly impede access to **ANY** of the following Table R4 plant rooms or areas.

Table R4 Areas with Entry Related Mode Applicability

Area	Entry Related Mode Applicability
Auxiliary Building <ul style="list-style-type: none"> • 281' shielded area • 305' above DH Vaults 	Modes 4, 5, and 6
Fuel Handling Building <ul style="list-style-type: none"> • 281' 1C ES Vlvs MCC 	

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 transition the plant from normal plant operation to cooldown and shutdown as specified in normal plant procedures. 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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Abnormal Rad Levels / Radiological Effluents****RA3 (cont)****Basis (cont):**

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 R4 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 (establish shutdown cooling), 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 and the elevated radiation levels preclude the ability to place shutdown cooling in service. 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.).
- 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
2. FSAR Section 5.01 Class I Structures, Components, and Systems
3. OP-TM-MAP-C0101, Radiation Level HI

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Abnormal Rad Levels / Radiological Effluents****RU4****Initiating Condition:**

Reactor coolant activity greater than Technical Specification allowable limits.

Operating Mode Applicability:

1, 2, 3, 4

Emergency Action Level (EAL):

1. Letdown Monitor RM-L-1 **alarm** (high or low channel).
OR
2. Sample analysis indicates **EITHER** of the following:
 - a. Dose Equivalent I-131 specific coolant activity **> 60.0 uCi/gm.**
OR
 - b. Dose Equivalent XE-133 specific coolant activity **> 797.0 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
2. Operating Procedure 1101-2.1 Radiation Monitoring System Setpoints
3. FSAR Section 11.4.4, Liquid Monitoring Subsystem
4. OP-TM-MAP-C0101, Radiation Level HI
5. Technical Specifications 3.1.4, Reactor Coolant System Activity

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Fission Product Barrier Degradation****FG1****Initiating Condition:**

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

Operating Mode Applicability:

1, 2, 3, 4

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

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Fission Product Barrier Degradation****FS1****Initiating Condition:**

Loss or Potential Loss of ANY two barriers.

Operating Mode Applicability:

1, 2, 3, 4

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

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Fission Product Barrier Degradation****FA1****Initiating Condition:**

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

Operating Mode Applicability:

1, 2, 3, 4

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 EAL FS1.

Basis Reference(s):

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

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Fission Product Barrier Degradation****FC1****Sub-Category:**

RCS or SG Tube Leakage

Operating Mode Applicability:

1, 2, 3, 4

Fission Product Barrier (FPB) Threshold:**POTENTIAL LOSS**

1. RCITS hot leg instruments indicate **0 inches** after lowering trend.

AND

2. In-core thermocouples are unavailable.

AND

3. **ALL** RCP's are secured.

Basis:

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

Potential Loss Threshold #1 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
2. FSAR 7.3.2.2.c.10.d
3. OP-TM-EOP-008, RCS Superheated
4. OP-TM-EOP-010, Emergency Procedure Rules Guides and Graphs

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Fission Product Barrier Degradation****FC2****Sub-Category:**

Inadequate Heat Removal

Operating Mode Applicability:

1, 2, 3, 4

Fission Product Barrier (FPB) Threshold:LOSS1. $T_{clad} > 1400^{\circ}\text{F}$.POTENTIAL LOSS2. $> 25^{\circ}\text{F}$ Superheat.**OR**

3. HPI-PORV 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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Fission Product Barrier Degradation****FC2 (cont)****Basis Reference(s):**

1. NEI 99-01 Rev 6, Table 9-F-3
2. OS-24 Attachment D
3. OP-TM-EOP-004, Lack of Primary to Secondary Heat Transfer
4. OP-TM-EOP-008, RCS Superheated
5. OP-TM-EOP-010, Emergency Procedure Rules, Guides And Graphs
6. OS-24, Conduct of Operations during Abnormal and Emergency Events

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Fission Product Barrier Degradation****FC3****Sub-Category:**

Containment Radiation / RCS Activity

Operating Mode Applicability:

1, 2, 3, 4

Fission Product Barrier (FPB) Threshold:**LOSS**1. Containment radiation monitor (RM-G-22 or RM-G-23) reading **> 1.95E+03 R/hr.****OR**2. Coolant activity **> 300uCi/gm** Dose Equivalent I-131.**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 300 μ Ci/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 Basis:

This threshold indicates that RCS radioactivity concentration is greater than 300 μ Ci/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.

Basis Reference(s):

1. NEI 99-01 Rev 6, Table 9-F-3
2. OP-TM-MAP-C0101, Radiation Level HI
3. FSAR Section 11.4.4, Liquid Monitoring System Description
4. Calculation C3640-98-034, Prediction of the Response of RM-G-6 and 7 to Fuel Damage
5. Core Damage Assessment Methodology (CDAM)

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Fission Product Barrier Degradation****FC5****Sub-Category:**

Emergency Director Judgment.

Operating Mode Applicability:

1, 2, 3, 4

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

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Fission Product Barrier Degradation****RC1****Sub-Category:**

RCS or SG Tube Leakage

Operating Mode Applicability:

1, 2, 3, 4

Fission Product Barrier (FPB) Threshold:**LOSS**

1. RCS leakage results in **< 25° Sub Cooling Margin**.
- OR**
2. Steam Generator tube RUPTURE that requires / results in an ESAS actuation.

POTENTIAL LOSS

3. UNISOLABLE RCS leakage **> 150 gpm**.

OR

4. a. RCS Pressure **> 2450 psig**.

AND

- b. RCS Pressure not lowering.

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.

Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

Loss 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.

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 also has an UNISOLABLE steam release outside of containment, the declaration escalates to a Site Area Emergency since the Containment Barrier CT1 Loss threshold will also be met.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Fission Product Barrier Degradation****RC1 (cont)****Basis (cont):****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 ESAS 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 also has an UNISOLABLE steam release outside of containment, the declaration escalates to a Site Area Emergency since the Containment Barrier Loss threshold CT1 will also be met.

Potential Loss Threshold #3 Basis

This condition indicates an extreme challenge to the integrity of the RCS pressure boundary.

Basis Reference(s):

1. NEI 99-01 Rev 6, Table 9-F-3
2. OP-TM-EOP-010 Emergency Procedure Rules, Guides And Graphs
3. OP-TM-EOP-002 Loss of 25°F Subcooled Margin
4. OP-TM-MAP-D031, MU Flow HI
5. OP-TM-EOP-005, OTSG Tube Leakage

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Fission Product Barrier Degradation****RC2****Sub-Category:**

Inadequate Heat Removal

Operating Mode Applicability:

1, 2, 3, 4

Fission Product Barrier (FPB) Threshold:**POTENTIAL LOSS**

1. HPI-PORV Cooling in effect.

Basis:

There is no Loss threshold associated with Inadequate Heat Removal.

Potential Loss Threshold Basis

HPI-PORV 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
2. OP-TM-EOP-004, Lack of Primary to Secondary Heat Transfer

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Fission Product Barrier Degradation****RC3****Sub-Category:**

Containment Radiation / RCS Activity

Operating Mode Applicability:

1, 2, 3, 4

Fission Product Barrier (FPB) Threshold:**LOSS**

1. Containment radiation monitor (RM-G-22 or RM-G-23) reading **> 25 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
2. EP-EAL-0611, Criteria for Choosing Containment Radiation Monitor Reading Indicative of Loss of RCS Barrier

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Fission Product Barrier Degradation****RC5****Sub-Category:**

Emergency Director Judgment.

Operating Mode Applicability:

1, 2, 3, 4

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

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Fission Product Barrier Degradation****CT1****Sub-Category:**

RCS or SG Tube Leakage

Operating Mode Applicability:

1, 2, 3, 4

Fission Product Barrier (FPB) Threshold:**LOSS**

1. SG tube leakage **> 150 gpm**.
2. UNISOLABLE steam release from the affected S/G to the environment.

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.

Loss Threshold Basis

This threshold addresses a leaking or RUPTURED Steam Generator (SG) that also has an UNISOLABLE steam release to the environment. The condition of the SG, whether leaking or RUPTURED, is determined in accordance with the thresholds for RCS Barrier RC1 Potential Loss Threshold 3 and Loss Threshold 2, respectively. This condition represents a bypass of the containment barrier.

The determination of UNISOLABLE steam release is not necessarily dependent upon entry into, or diagnostic steps within, a procedure. For example, if the pressure in a steam generator is decreasing uncontrollably and the affected steam generator isolation procedure is not entered because procedure use rules are dictating implementation of another procedure to address a higher priority condition, the steam generator is still considered to have an UNISOLABLE steam release for emergency classification purposes.

The UNISOLABLE steam release 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 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 an UNISOLABLE steam release condition). The inability to isolate the steam flow without an adverse effect on plant cooldown meets the intent of a loss of containment.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Fission Product Barrier Degradation****CT1 (cont)****Basis (cont):**

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 affected SG, are summarized below.

Primary to Secondary Leak Rate	Affected SG has UNISOLABLE steam release Outside of Containment?	
	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
Greater than 150 gpm. The capacity of one makeup pump in the normal charging mode is exceeded. <i>(RCS Barrier Potential Loss)</i>	Site Area Emergency per FS1	Alert per FA1
Requires an automatic or manual ESAS actuation. <i>(RCS Barrier Loss)</i>	Site Area Emergency per FS1	Alert per FA1

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

Basis Reference(s):

1. NEI 99-01 Rev 6, Table 9-F-3
2. OP-TM-EOP-010, Emergency Procedure Rules, Guides And Graphs
3. OP-TM-EOP-005, OTSG Tube Leakage
4. OP-TM-EOP-001, Reactor Trip

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Fission Product Barrier Degradation****CT2****Sub-Category:**

Inadequate Heat Removal

Operating Mode Applicability:

1, 2, 3, 4

Fission Product Barrier (FPB) Threshold:**POTENTIAL LOSS**

1. **$T_{clad} > 1800^{\circ}\text{F}$.**
 2. EOP restoration procedures **not** effective in **< 15 minutes**.
- AND**

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.

Basis Reference(s):

1. NEI 99-01 Rev 6, Table 9-F-3
2. OP-TM-EOP-008, RCS Superheated
3. OP-TM-EOP-010, Emergency Procedure Rules, Guides And Graphs
4. OP-TM-EOP-006, LOCA Cooldown

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Fission Product Barrier Degradation****CT3****Sub-Category:**

Containment Radiation / RCS Activity

Operating Mode Applicability:

1, 2, 3, 4

Fission Product Barrier (FPB) Threshold:**POTENTIAL LOSS**

1. Containment radiation monitor (RM-G-22 or RM-G-23) reading **> 4.40E+03 R/hr.**

Basis:

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

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
2. Core Damage Assessment Methodology (CDAM)

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Fission Product Barrier Degradation****CT4****Sub-Category:**

Containment Integrity or Bypass

Operating Mode Applicability:

1, 2, 3, 4

Fission Product Barrier (FPB) Threshold:**LOSS**

1. Containment isolation is required and **ANY** of the following:
 - a. UNPLANNED lowering in containment pressure following initial pressure rise.
OR
 - b. Containment pressure or water level response **not** consistent with LOCA conditions.
OR
 - c. UNISOLABLE pathway from containment to the environment exists.
OR
2. Indication of RCS leakage outside of containment.

POTENTIAL LOSS

3. Reactor Building Pressure **> 55 psig** and rising.
OR
4. Hydrogen Concentration in Containment **> 4%**.
OR
5. a. Reactor Building pressure **> 30 psig**.
AND
- b. Reactor Building Emergency cooling is less than **ANY** one of the following conditions:

SPRAY	COOLERS
2	0
0	3
1	1

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.

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

Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

Table CRANE 2-2: EAL Technical Basis**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 three conditions exists as discussed below. Users are reminded that there may be accident and release conditions that simultaneously meet both loss thresholds 1.a, 1.b, and 1.c.

and 1.b – 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.c – 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.

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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Fission Product Barrier Degradation****CT4 (cont)****Basis (cont):**

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.

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.

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.

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 and/or Potential Loss threshold 3 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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Fission Product Barrier Degradation****CT4 (cont)****Basis (cont):****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 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. 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.

Basis Reference(s):

1. NEI 99-01 Rev 6, Table 9-F-3
2. FSAR Section 6.6 Reactor Building Pressure-Time Response
3. Technical Specifications 3.5.3, Engineered Safeguards Protection System Actuation Setpoints
4. FSAR Section 6.3.3, Actuation
5. FSAR Section 6.5.3, Hydrogen Generation
6. OP-TM-EOP-006, LOCA Cooldown
7. 1302-5.25 Reactor Building Sump Level
8. FSAR Section 5.2 Reactor Building
9. FSAR Section 9.2, Chemical Addition and Sampling System
10. OP-TM-EOP-002, Loss of 250F Subcooling Margin
11. OP-TM-EOP-006, LOCA Cooldown
12. OP-TM-EOP-010, Emergency Procedure Rules, Guides and Graphs
13. OP-TM-MAP-D0301, High Make-up Flow

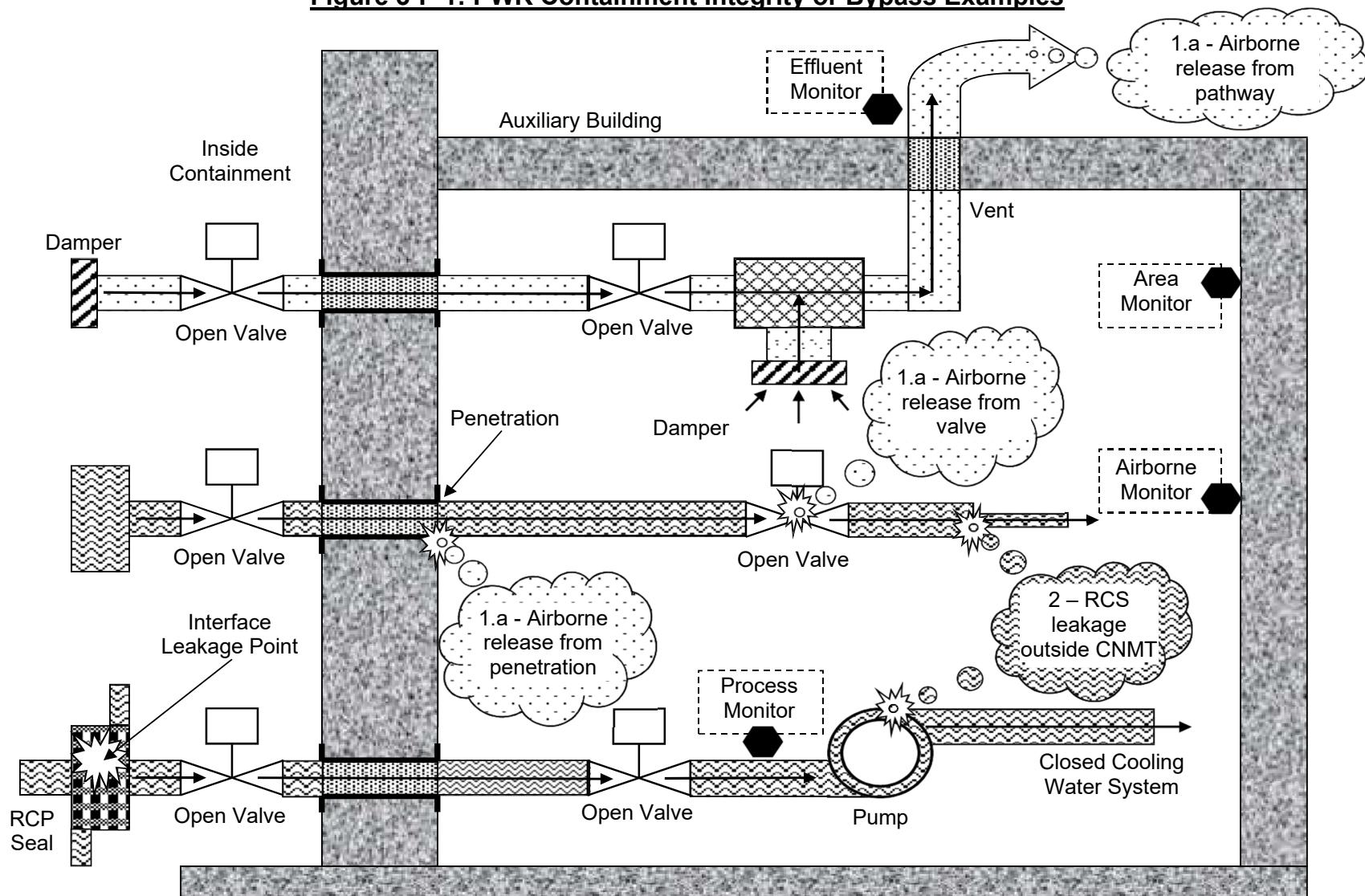
Table CRANE 2-2: EAL Technical Basis**Recognition Category: Fission Product Barrier Degradation****Figure 3-F-1: PWR Containment Integrity or Bypass Examples**

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Fission Product Barrier Degradation****CT5****Sub-Category:**

Emergency Director Judgment.

Operating Mode Applicability:

1, 2, 3, 4

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

Table CRANE 2-2: EAL Technical Basis**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, 4

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 Emergency 4KV buses.

AND

2. Failure of EG-Y-1A, EG-Y-1B Emergency Diesel Generators and EG-Y-4 SBO Diesel Generator to supply power to Emergency 4KV buses.

AND

3. **EITHER** of the following:

- a. Restoration of at least one Emergency 4KV bus in **< 4 hours** is **not** likely.

OR

- b. **> 25°F superheat.**

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 buses. 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 buses 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 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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: System Malfunctions****MG1 (cont)****Basis (cont):**

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
2. OP-TM-EOP-010 Emergency Procedure Rules, Guides And Graphs
3. FSAR Section 8.2.2 Unit Distribution System
4. FSAR Section 8.2.3 Sources of Auxiliary Power
5. FSAR Section 8.5 Station Blackout
6. Technical Specification Section 3.7, Unit Electric Power System
7. 1107-1 Normal Electrical System
8. 1107-2A Emergency Electrical - 4KV and 480 Volt
9. OP-TM-AOP-020 Loss Of Station Power
10. 1107-3 Diesel Generator
11. 1107-9 SBO Diesel Generator
12. OP-TM-EOP-008 RCS Superheated
13. OS-24, Conduct of Operation during Abnormal and Emergency Events

Table CRANE 2-2: EAL Technical Basis
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, 4

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 Emergency 4KV buses.

AND

2. Failure of EG-Y-1A, EG-Y-1B Emergency Diesel Generators and EG-Y-4 SBO Diesel Generator to supply power to Emergency 4KV buses.

AND

3. Failure to restore power to at least one Emergency 4KV 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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: System Malfunctions****MS1 (cont)****Basis Reference(s):**

1. NEI 99-01 Rev 6, SS1
2. FSAR Section 8.2.3, Sources of Auxiliary Power
3. Technical Specification Section 3.7, Unit Electric Power System
4. 1107-1 Normal Electrical System
5. 1107-2A Emergency Electrical - 4KV and 480 Volt
6. OP-TM-AOP-020 Loss Of Station Power
7. 1107-3 Diesel Generator
8. 1107-9 SBO Diesel Generator
9. FSAR Section 8.2.2, Unit Distribution System
10. FSAR Section 8.5, Station Blackout

Table CRANE 2-2: EAL Technical Basis
Recognition Category: System Malfunctions

MA1

Initiating Condition:

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

Operating Mode Applicability:

1, 2, 3, 4

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 Emergency 4KV buses reduced to only one of the following power sources for **≥ 15 minutes.**
 - Auxiliary Transformer 1A
 - Auxiliary Transformer 1B
 - Emergency Diesel Generator EG-Y-1A
 - Emergency Diesel Generator EG-Y-1B
 - SBO Diesel Generator EG-Y-4

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).
- A loss of all offsite power and loss of all emergency power sources (e.g., onsite diesel generators) with a single train of emergency buses 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 buses 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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: System Malfunctions****MA1 (cont)****Basis Reference(s):**

1. NEI 99-01 Rev 6, SA1
2. FSAR Section 8.2.3, Sources of Auxiliary Power
3. FSAR Section 8.5, Station Blackout
4. Technical Specification Section 3.7, Unit Electric Power System
5. 1107-1 Normal Electrical System
6. 1107-2A Emergency Electrical - 4KV and 480 Volt
7. OP-TM-AOP-020 Loss Of Station Power
8. 1107-3 Diesel Generator
9. 1107-9 SBO Diesel Generator
10. FSAR Section 8.2.2, Unit Distribution System

Table CRANE 2-2: EAL Technical Basis**Recognition Category: System Malfunctions****MU1****Initiating Condition:**

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

Operating Mode Applicability:

1, 2, 3, 4

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 capability to Emergency 4KV busses 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 buses. 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 buses, whether or not the buses are powered from it.

The emergency busses of the affected unit can be powered from the unaffected unit through the crosstie breakers. Unit crosstie is considered an adequate source of offsite power when evaluating this EAL.

Fifteen minutes was selected as a threshold to exclude 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
2. FSAR Section 8.2.3, Sources of Auxiliary Power
3. Technical Specification Section 3.7, Unit Electric Power System
4. 1107-1 Normal Electrical System
5. 1107-2A Emergency Electrical - 4KV and 480 Volt
6. OP-TM-AOP-020 Loss Of Station Power
7. 1107-3 Diesel Generator
8. 1107-9 SBO Diesel Generator
9. FSAR Section 8.2.2, Unit Distribution System

Table CRANE 2-2: EAL Technical Basis
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, 4

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 Emergency 4KV buses.

AND

2. Failure of EG-Y-1A, EG-Y-1B Emergency Diesel Generators and EG-Y-4 SBO Diesel Generator to supply power to Emergency 4KV buses.

AND

3. Voltage is **< 105 VDC** on 125 VDC Distribution System 1A and 1B.

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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: System Malfunctions****MG2 (cont)****Basis Reference(s):**

1. NEI 99-01 Rev 6, SG8
2. FSAR Section 8.2.2.6, 250/125 VDC System
3. 1107-2C Vital DC Electrical System
4. OP-TM-AOP-023, A DC System Failure
5. OP-TM-AOP-024, B DC System Failure
6. FSAR Section 8.2.2, Unit Distribution System
7. FSAR Section 8.2.3, Sources of Auxiliary Power
8. Technical Specification Section 3.7, Unit Electric Power System
9. 1107-1 Normal Electrical System
10. 1107-2A Emergency Electrical - 4KV and 480 Volt
11. OP-TM-AOP-020 Loss Of Station Power
12. 1107-3 Diesel Generator
13. 1107-9 SBO Diesel Generator
14. FSAR Section 8.5, Station Blackout

Table CRANE 2-2: EAL Technical Basis**Recognition Category: System Malfunctions****MS2****Initiating Condition:**

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

Operating Mode Applicability:

1, 2, 3, 4

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. Voltage is **< 105 VDC** on 125 VDC Distribution System 1A and 1B 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 MG3.

Basis Reference(s):

1. NEI 99-01 Rev 6, SS8
2. FSAR Section 8.2.2.6, 250/125 VDC System
3. 1107-2C Vital DC Electrical System
4. OP-TM-AOP-023, A DC System Failure
5. OP-TM-AOP-024, B DC System Failure

Table CRANE 2-2: EAL Technical Basis**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 did not shutdown the reactor as indicated by Reactor Power $\geq 5\%$.

AND

2. **ALL** manual actions to shutdown the reactor have been unsuccessful as indicated by Reactor Power $\geq 5\%$.

AND

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

- a. $T_{clad} > 1400^{\circ}\text{F}$.

OR

- b. HPI-PORV 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 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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: System Malfunctions****MS3 (cont)****Basis Reference(s):**

1. NEI 99-01 Rev 6, SS5
2. OP-TM-EOP-004, Lack of Primary-to-Secondary Heat Transfer
3. OP-TM-EOP-010, Emergency Procedure Rules, Guides And Graphs
4. OP-TM-EOP-001, Reactor Trip
5. 1102-4 Power Operation
6. OP-TM-641-000- Reactor Protection System (RPS/DSS)

Table CRANE 2-2: EAL Technical Basis
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 Trip did not shutdown the reactor as indicated by Reactor Power $\geq 5\%$.

AND

2. Manual actions taken at the Console Center are not successful in shutting down the reactor as indicated by Reactor Power $\geq 5\%$.

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 Console Center 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 Console Center since this event entails a significant failure of the RPS.

A manual action at the Console Center 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). 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 Console Center (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 Console Center".

The plant response to the failure of an automatic 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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: System Malfunctions****MA3 (cont)****Basis Reference(s):**

1. NEI 99-01 Rev 6, SA5
2. OP-TM-EOP-004, Lack of Primary-to-Secondary Heat Transfer
3. OP-TM-EOP-010, Emergency Procedure Rules, Guides And Graphs
4. OP-TM-EOP-001, Reactor Trip
5. 1102-4 Power Operation
6. OP-TM-641-000- Reactor Protection System (RPS/DSS)

Table CRANE 2-2: EAL Technical Basis**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 did not shutdown the reactor as indicated by Reactor Power $\geq 5\%$.

AND

- b. Subsequent manual action taken at the Console Center is successful in shutting down the reactor as indicated by Reactor Power $< 5\%$.

OR

2. a. Manual Trip did not shutdown the reactor as indicated by Reactor Power $\geq 5\%$.

AND

- b. Subsequent automatic Trip is successful in shutting down the reactor as indicated by Reactor Power $< 5\%$.

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 Console Center 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.

EAL #1 Basis

Following the failure on an automatic reactor trip, operators will promptly initiate manual actions at the Console Center 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 Console Center 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). This action does not include manually driving in control rods or implementation of boron injection strategies. 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 Console Center".

Table CRANE 2-2: EAL Technical Basis**Recognition Category: System Malfunctions****MU3 (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 subsequent operator manual actions taken at the Console Center 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.

Basis Reference(s):

1. NEI 99-01 Rev 6, SU5
2. OP-TM-EOP-010, Emergency Procedure Rules, Guides And Graphs
3. OP-TM-EOP-001, Reactor Trip
4. 1102-4 Power Operation
5. OP-TM-641-000- Reactor Protection System (RPS/DSS)

Table CRANE 2-2: EAL Technical Basis**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, 4

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. 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 OTSG.
- OTSG Emergency Feed Water Flow

AND

- b. **ANY** Table M2 transient in progress.

Table M2 Significant Transients

- Automatic Turbine Runback **>25%** thermal reactor power
- Electrical Load Rejection **>25%** full electrical load
- Reactor Trip
- ESAS Actuation
- Thermal Power oscillations **> 10%**

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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: System Malfunctions****MA4 (cont)****Basis (cont):**

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

Table CRANE 2-2: EAL Technical Basis**Recognition Category: System Malfunctions****MU4****Initiating Condition:**

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

Operating Mode Applicability:

1, 2, 3, 4

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 OTSG.
- OTSG Emergency 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, 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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: System Malfunctions****MU4 (cont)****Basis (cont):**

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

Table CRANE 2-2: EAL Technical Basis**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, 4

Emergency Action Level (EAL):

Note: If it is determined that the conditions of MA5 are not met then assess the event via HU3, HU4, or HU6.

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.

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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: System Malfunctions****MA5 (cont)****Basis (cont):**

This IC addresses a hazardous event that causes damage to a SAFETY SYSTEM, or a structure containing SAFETY SYSTEM components, required for the current operating mode, "required", i.e. 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

Table CRANE 2-2: EAL Technical Basis**Recognition Category: System Malfunctions****MU6****Initiating Condition:**

RCS leakage for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4

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 \geq 15 minutes.**

OR

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

OR

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

Basis:

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

Failure to isolate the leak, within 15 minutes or if known that the leak cannot be isolated within 15 minutes, from the start of the leak requires immediate classification.

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.

Table CRANE 2-2: EAL Technical Basis**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
2. OP-TM-220-251 RCS Leak Rate Determination
3. OP-TM-220-252, Primary – To – Secondary Leakrate Determination
4. OP-TM-PRF1-0405 RB Sump Level HI
5. UFSAR 6.4.3, Bases of Leakage Estimate
6. UFSAR 6.4.4, Design Basis Leakage
7. OP-TM-AOP-050, Reactor Coolant Leakage
8. Technical Specification 3.1.6, Leakage and Table 4.1-2, Minimum Equipment Test Frequency

Table CRANE 2-2: EAL Technical Basis**Recognition Category: System Malfunctions****MU7****Initiating Condition:**

Loss of all onsite or offsite communications capabilities.

Operating Mode Applicability:

1, 2, 3, 4

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
Radios	X		
Plant page	X		
Plant Telephone System	X		
Commercial Telephones	X	X	X
NARS		X	
ENS		X	X
HPN		X	X
Satellite phones		X	X

Basis:

This IC addresses a significant loss of onsite, 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 onsite information via individuals or multiple radio transmission points, individuals being sent to offsite locations, etc.).

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-MA-114- 100-F-01, State / Local Event Notification Form.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: System Malfunctions****MU7 (cont)****Basis (cont):****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
2. 1105-12 Communications System
3. FSAR Section 7.4.4, Communication

Table CRANE 2-2: EAL Technical Basis**Recognition Category: System Malfunctions****MU8****Initiating Condition:**

Failure to isolate containment or loss of containment pressure control.

Operating Mode Applicability:

1, 2, 3, 4

Emergency Action Level (EAL):

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

AND

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

OR

2. a. Reactor Building pressure **> 30 psig**.

AND

2. b. Reactor Building Emergency cooling is less than **ANY** one of the following conditions for **≥ 15 minutes**:

SPRAY	COOLERS
2	0
0	3
1	1

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.

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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: System Malfunctions****MU8 (cont)****Basis (cont):**

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
2. FSAR Section 6.6 Reactor Building Pressure-Time Response
3. Technical Specifications 3.5.3, Engineered Safeguards Protection System Actuation Setpoints
4. FSAR Section 6.3.3, Actuation
5. FSAR Section 6.5.3, Hydrogen Generation
6. OP-TM-EOP-006, LOCA Cooldown
7. 1302-5.25 Reactor Building Sump Level
8. FSAR Section 5.2 Reactor Building
9. FSAR Section 9.2, Chemical Addition and Sampling System
10. OP-TM-EOP-002, Loss of 250F Subcooling Margin
11. OP-TM-EOP-006, LOCA Cooldown
12. OP-TM-EOP-010, Emergency Procedure Rules, Guides and Graphs
13. OP-TM-MAP-D0301, High Make-up Flow

Table CRANE 2-2: EAL Technical Basis**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:

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. Loss of **ALL** offsite AC power to Emergency 4KV buses.

AND

2. Failure of EG-Y-1A, EG-Y-1B Emergency Diesel Generators and EG-Y-4 SBO Diesel Generator to supply power to Emergency 4KV buses.

AND

3. Failure to restore power to at least one Emergency 4KV 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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Cold Shutdown / Refueling System Malfunctions****CA1 (cont)****Basis Reference(s):**

1. NEI 99-01 Rev 6, CA2
2. FSAR Section 8.2.2, Unit Distribution System
3. FSAR Section 8.2.3, Sources of Auxiliary Power
4. Technical Specification Section 3.7, Unit Electric Power System
5. 1107-1 Normal Electrical System
6. 1107-2A Emergency Electrical - 4KV and 480 Volt
7. OP-TM-AOP-020 Loss Of Station Power
8. 1107-3 Diesel Generator
9. 1107-9 SBO Diesel Generator
10. FSAR Section 8.5, Station Blackout

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Cold Shutdown / Refueling System Malfunctions****CU1****Initiating Condition:**

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

Operating Mode Applicability:

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. AC power capability to Emergency 4KV buses reduced to only one of the following power sources for **≥ 15 minutes**.
 - Auxiliary Transformer 1A
 - Auxiliary Transformer 1B
 - Emergency Diesel Generator EG-Y-1A
 - Emergency Diesel Generator EG-Y-1B
 - SBO Diesel Generator EG-Y-4

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.

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 buses 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 buses being back-fed from an offsite power source.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Cold Shutdown / Refueling System Malfunctions****CU1 (cont)****Basis (cont):**

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
2. FSAR Section 8.2.2, Unit Distribution System
3. FSAR Section 8.2.3, Sources of Auxiliary Power
4. Technical Specification Section 3.7, Unit Electric Power System
5. 1107-1 Normal Electrical System
6. 1107-2A Emergency Electrical - 4KV and 480 Volt
7. OP-TM-AOP-020 Loss Of Station Power
8. 1107-3 Diesel Generator
9. 1107-9 SBO Diesel Generator
10. FSAR Section 8.5, Station Blackout

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Cold Shutdown / Refueling System Malfunctions****CA2****Initiating Condition:**

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

Operating Mode Applicability:

5, 6

Emergency Action Level (EAL):

Note: If it is determined that the conditions of CA2 are not met then assess the event via HU3, HU4, or HU6.

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.

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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Cold Shutdown / Refueling System Malfunctions****CA2 (cont)****Basis (cont):**

This IC addresses a hazardous event that causes damage to a SAFETY SYSTEM, or a structure containing SAFETY SYSTEM components, required for the current operating mode, "required", i.e. 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

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Cold Shutdown / Refueling System Malfunctions****CU3****Initiating Condition:**

Loss of Vital DC power for 15 minutes or longer.

Operating Mode Applicability:

5, 6

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. Indicated voltage is **< 105 VDC** on required 125 VDC Distribution System 1A and 1B 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 buses 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.

Basis Reference(s):

1. NEI 99-01 Rev 6, CU4
2. FSAR Section 8.2.2.6, 250/125 VDC System
3. 1107-2C Vital DC Electrical System
4. OP-TM-AOP-023, A DC System Failure
5. OP-TM-AOP-024, B DC System Failure

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Cold Shutdown / Refueling System Malfunctions****CU4****Initiating Condition:**

Loss of all onsite or offsite communications capabilities.

Operating Mode Applicability:

5, 6, 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
Radios	X		
Plant page	X		
Plant Telephone System	X		
Commercial Telephones	X	X	X
NARS		X	
ENS		X	X
HPN		X	X
Satellite phones		X	X

Basis:

This IC addresses a significant loss of onsite, 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 onsite information via individuals or multiple radio transmission points, individuals being sent to offsite locations, etc.).

EAL #1 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-MA-114- 100-F-01, State / Local Event Notification Form.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Cold Shutdown / Refueling System Malfunctions****CU4 (cont)****Basis (cont):****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
2. 1105-12 Communications System
3. FSAR Section 7.4.4, Communication

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Cold Shutdown / Refueling System Malfunctions****CA5****Initiating Condition:**

Inability to maintain the plant in cold shutdown.

Operating Mode Applicability:

5, 6

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.
- 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 **> 200°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.

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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Cold Shutdown / Refueling System Malfunctions****CA5 (cont)****Basis (cont):**

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.

Basis Reference(s):

1. NEI 99-01 Rev 6, CA3
2. Technical Specifications sections: 1.2.1, 1.7.a and c
3. Technical Specifications sections: 3.6.12.a
4. Technical Specifications sections: 3.6.5
5. Technical Specifications sections: 3.8.6
6. Technical Specifications sections: 1.2.1, 1.7.a and c, 3.6.12.a, 3.6.5, 3.8.6
7. 1101-3 Containment Integrity and Access Limits
8. OP-TM-EOP-030, Loss of Decay Heat Removal
9. Outage Fuel Protection Criteria Document

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Cold Shutdown / Refueling System Malfunctions****CU5****Initiating Condition:**

UNPLANNED rise in RCS temperature.

Operating Mode Applicability:

5, 6

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.
- 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 **> 200°F**.

OR

2. Loss of the following for **≥15 minutes**.

- **ALL** RCS temperature indications

AND

- **ALL** RCS level indications

Basis:

UNPLANNED: A parameter change or an event that is not 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.

EAL #1 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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Cold Shutdown / Refueling System Malfunctions****CU5 (cont)****Basis (cont):**

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 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
2. 1103-11 RCS Water Level Control
3. FSAR Section 7.3.2, Non-Nuclear Instrumentation
4. 1302-6.6 RCS Temp/Press, TSAT Monitor, ATWS and DSS Calibration
5. NEI 99-01 Rev 5, CU4
6. OP-TM-EOP-030, Loss of Decay Heat Removal

Table CRANE 2-2: EAL Technical Basis**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:

5, 6

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

AND

- b. Core uncover is indicated by **ANY** of the following:

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

OR

- Erratic Source Range Neutron Monitor indication.

OR

- Radiation Monitor RM-G-6 or RM-G-7 reading **> 3 R/hr.**

AND

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

Table C3 Indications of RCS Leakage

- UNPLANNED Reactor Bldg Sump level rise*
- UNPLANNED Auxiliary Bldg. Sump level rise*
- UNPLANNED BWST level rise*
- UNPLANNED RCDT 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 **> 4%**
- UNPLANNED rise in containment pressure
- CONTAINMENT CLOSURE **not** established*

*if CONTAINMENT CLOSURE is re-established prior to exceeding the 30-minute core uncover time limit, then escalation to a General Emergency is not required.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Cold Shutdown / Refueling System Malfunctions****CG6 (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.

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.

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 uncover event, it is unlikely that hydrogen buildup due to a core uncover 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 uncover 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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Cold Shutdown / Refueling System Malfunctions****CG6 (cont)****Basis (cont):**

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*.

Basis Reference(s):

1. NEI 99-01 Rev 6, CG1
2. 1103-11 RCS Water Level Control
3. 1101-3 Containment Integrity and Access Limits
4. OP-TM-EOP-030, Loss of Decay Heat Removal
5. FSAR Sections 5.2, Reactor Building
6. FSAR Sections 6.5.2, Hydrogen Monitoring
7. FSAR Sections 6.5.3, Hydrogen Generation
8. Technical Specifications 3.5.5, Accident Monitoring Instrumentation
9. EP-AEL-0501, Estimation of Radiation Monitor Readings Indicating Core Uncovery During Refuel
10. 1301-1 Shift and Daily Checks, Data Sheet 3

Table CRANE 2-2: EAL Technical Basis**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:

5, 6

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

AND

2. Core uncover is indicated by **ANY** of the following:

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

OR

- Erratic Source Range Neutron Monitor indication.

OR

- Radiation Monitor RM-G-6 or RM-G-7 reading **> 3 R/hr.**

Table C3 Indications of RCS Leakage

- | |
|---|
| <ul style="list-style-type: none"> • UNPLANNED Reactor Bldg Sump level rise* • UNPLANNED Auxiliary Bldg. Sump level rise* • UNPLANNED BWST level rise* • UNPLANNED RCDT 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.

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.

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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Cold Shutdown / Refueling System Malfunctions****CS6 (cont)****Basis (cont):**

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.

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

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 uncover 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.

Basis Reference(s):

1. NEI 99-01 Rev 6, CS1
2. OP-TM-PRF1-0405 RB Sump Level Hi
3. 1101-3 Containment Integrity and Access Limits
4. 1301-1 Shift and Daily Checks, Data Sheet 3
5. 1103-11 RCS Water Level Control
6. OP-TM-EOP-030, Loss of Decay Heat Removal

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Cold Shutdown / Refueling System Malfunctions****CA6****Initiating Condition:**

Loss of reactor vessel/RCS inventory.

Operating Mode Applicability:

5, 6

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 RCS level **< 0 inches** on Draindown Level indicator.

OR

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

AND

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

Table C3 Indications of RCS Leakage

- UNPLANNED Reactor Bldg Sump level rise*
- UNPLANNED Auxiliary Bldg. Sump level rise*
- UNPLANNED BWST level rise*
- UNPLANNED RCDT 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 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 0 inches on Draindown Level indicator 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 uncovering.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Cold Shutdown / Refueling System Malfunctions****CA6 (cont)****Basis (cont):**

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
2. OP-TM-PRF1-0405 RB Sump Level Hi
3. 1301-1 Shift and Daily Checks, Data Sheet 3
4. 1103-11 RCS Water Level Control
5. OP-TM-EOP-030, Loss of Decay Heat Removal

Table CRANE 2-2: EAL Technical Basis**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:

5, 6

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

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

Table C3 Indications of RCS Leakage

- UNPLANNED Reactor Bldg Sump level rise*
- UNPLANNED Auxiliary Bldg. Sump level rise*
- UNPLANNED BWST level rise*
- UNPLANNED RCDT 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.

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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Cold Shutdown / Refueling System Malfunctions****CA6 (cont)****Basis (cont):****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
2. Technical Specification 3.1.6. Leakage
3. OP-TM-220-251 RCS Leak Rate Determination Using PPC
4. OP-TM-220-252, Primary – To – Secondary Leakrate Determination (OTSG Leakage): Normal Operations
5. OP-TM-MAP-C0105 RCS Draining LVL HI/LO
6. OP-TM-PRF1-0405 RB Sump Level HI
7. UFSAR 6.4.3, Bases of Leakage Estimate
8. 1103-11 RCS Water Level Control
9. OP-TM-EOP-030, Loss of Decay Heat Removal

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Hazards and Other Conditions Affecting Plant Safety****HG1****Initiating Condition:**

HOSTILE ACTION resulting in loss of physical control of the facility.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, 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

2. 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 CRANE 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 site. 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 CRANE 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.

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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Hazards and Other Conditions Affecting Plant Safety****HG1 (cont)****Basis (cont):**

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
2. Security and Safeguards Contingency Plan Station Security Plan – Appendix C

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Hazards and Other Conditions Affecting Plant Safety****HS1****Initiating Condition:**

HOSTILE ACTION within the PROTECTED AREA.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, 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.

Basis:

HOSTILE ACTION: An act toward CRANE 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 site. 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 CRANE 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.

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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Hazards and Other Conditions Affecting Plant Safety****HS1 (cont)****Basis (cont):**

This IC does not apply to a HOSTILE ACTION directed at an ISFSI PROTECTED AREA located outside the plant PROTECTED AREA; such an attack should be assessed using IC HA1. It also 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
2. Security and Safeguards Contingency Plan Station Security Plan – Appendix C

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Hazards and Other Conditions Affecting Plant Safety****HA1****Initiating Condition:**

HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, 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 CONTROLLED AREA.

Basis:

HOSTILE ACTION: An act toward CRANE 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 site. 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 CRANE 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.

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 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]*.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Hazards and Other Conditions Affecting Plant Safety****HA1 (cont)****Basis (cont):**

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 OP-TM-AOP-008, Security Threat / Intrusion.

EAL #2 is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA. This includes any action directed against an ISFSI that is located outside the plant PROTECTED 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.

Basis Reference(s):

1. NEI 99-01 Rev 6, HA1
2. Security and Safeguards Contingency Plan Station Security Plan – Appendix C
3. OP-TM-AOP-008, Security Threat / Intrusion

Table CRANE 2-2: EAL Technical Basis**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, 6, 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 CRANE 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 site. 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 CRANE that could cause concern for its continued operability, reliability, or personnel safety.

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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Hazards and Other Conditions Affecting Plant Safety****HU1 (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]*.

EAL #1 addresses the receipt of a credible security threat. The credibility of the threat is assessed in accordance with SY-AA-101-132.

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 OP-TM- AOP-008, Security Threat / Intrusion.

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
2. SY-AA-101-132, Security Assessment and Response to Unusual Activities
3. Security And Safeguards Contingency Plan Station Security Plan – Appendix C

Table CRANE 2-2: EAL Technical Basis**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 OP-TM-EOP-020, Cooldown from Outside the Control Room.

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.

The determination of whether or not "control" is established at the remote safe shutdown location(s) is based on Emergency Director judgment. 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
2. OP-TM-EOP-020, Cooldown from Outside the Control Room

Table CRANE 2-2: EAL Technical Basis**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, 6, D

Emergency Action Level (EAL):

1. A Control Room evacuation has resulted in plant control being transferred from the Control Room to alternate locations per OP-TM-EOP-020, Cooldown from Outside the Control Room.

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
2. OP-TM-EOP-020, Cooldown from Outside the Control Room

Table CRANE 2-2: EAL Technical Basis**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, 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.

~~Escalation of the emergency classification level would be via IC CA2 or MA5~~

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

2. b. 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.

Table H2 Vital Areas

- | |
|---|
| <ul style="list-style-type: none"> • Reactor Building • Intake Building • Intermediate Building • Control Tower • Auxiliary and Fuel Handling Buildings • 1A and 1B Diesel Generator Buildings • BWST • CST |
|---|

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Hazards and Other Conditions Affecting Plant Safety****HU3 (cont)****Basis:**

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

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.

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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Hazards and Other Conditions Affecting Plant Safety****HU3 (cont)****Basis (cont):****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.

Basis-Related Requirements from Appendix R

Appendix R to 10 CFR 50, states in part:

Criterion 3 of Appendix A to this part 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."

When considering the effects of fire, those systems associated with achieving and maintaining safe shutdown conditions assume major importance to safety because damage to them can lead to core damage resulting from loss of coolant through boil-off.

Because fire may affect safe shutdown systems and because the loss of function of systems used to mitigate the consequences of design basis accidents under post-fire conditions does not per se impact public safety, the need to limit fire damage to systems required to achieve and maintain safe shutdown conditions is greater than the need to limit fire damage to those systems required to mitigate the consequences of design basis accidents.

In addition, Appendix R to 10 CFR 50, requires, among other considerations, the use of 1-hour fire barriers for the enclosure of cable and equipment and associated non-safety circuits of one redundant train (G.2.c). As used in EAL #2, the 30-minutes to verify a single alarm is well within this worst-case 1-hour time period.

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
2. FSAR Figure 2.1-3, Extended Plot Plan TMINS
3. FSAR Section 5.1, Class I Structures, Components, and Systems
4. OP-TM-AOP-001, Fire
5. OP-TM-EOP-020, Cooldown Outside of Control Room

Table CRANE 2-2: EAL Technical Basis**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, 6, D

Emergency Action Level (EAL):

Note: For emergency classification if EAL 2.b 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.

• ~~Escalation of the emergency classification level would be via IC CA2 or MA5~~

1. Seismic event > **Operating Basis Earthquake (OBE)** as indicated by seismic Alarms **PRF-1-3** Operating Basis earthquake.

OR

2. When Seismic Monitoring Equipment is not available:
 - a. Control Room personnel feel an actual or potential seismic event.

AND

- b. **ANY** one of the following confirmed in ≤ 15 mins of the event:
 - The earthquake resulted in Modified Mercalli Intensity (MMI) \geq VI and occurred ≤ 3.5 miles of the plant.
 - The earthquake was magnitude \geq 6.0.
 - The earthquake was magnitude \geq 5.0 and occurred ≤ 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 onsite 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 appropriate (e.g., a call to the USGS, check internet news sources, etc.); however, the verification action must not preclude a timely emergency declaration.

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.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Hazards and Other Conditions Affecting Plant Safety****HU4 (cont)****Basis (cont):**

EAL #2.b and the accompanying note is included to ensure that a declaration does not result from felt vibrations caused by a non-seismic source (e.g., a dropped load). The Shift Manager or Emergency Director may seek external verification if deemed appropriate (e.g., call to USGS, check internet source, etc.) however, the verification action must not preclude a timely emergency declaration. This guidance recognizes that it may cause the site to declare an Unusual Event while another site, similarly affected but with readily available OBE indications in the Control Room, may not.

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
2. OP-TM-AOP-003, Earthquake
3. PRF 1-3 Operating Bases Earthquake
4. PRF 1-2 Threshold Seismic Event
5. US NRC Reg. Guide 1.166, Pre-Earthquake Planning and Immediate Nuclear Power Plant Operator Earthquake Actions.

Table CRANE 2-2: EAL Technical Basis**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, 6

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.

AND

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

Table H3 Areas with Entry Related Mode Applicability

Area	Entry Related Mode Applicability
Auxiliary Building <ul style="list-style-type: none"> • 281' shielded area • 305' above DH Vaults 	Modes 4, 5, and 6
Fuel Handling Building <ul style="list-style-type: none"> • 281' 1C ES Vlvs MCC 	

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 (establish shutdown cooling), 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).

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 and the gaseous release preclude the ability to place shutdown cooling in service. The emergency classification is not contingent upon whether entry is actually necessary at the time of the release.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Hazards and Other Conditions Affecting Plant Safety****HA5 (cont)****Basis (cont):**

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.

This EAL does not apply to firefighting activities that generate smoke or that automatically or manually activate a fire suppression system in an area.

The Operating Mode Applicability of this EAL has been revised from All Modes to modes 4, 5, and 6 due to the mode applicability of the areas of concern in Table H-3. In the future should the areas of concern in Table H-3 be revised then the Operating Mode Applicability of this EAL should be reevaluated.

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
2. FSAR Figure 2.1-3, Extended Plot Plan TMINS
3. FSAR Section 5.1, Class I Structures, Components, and Systems
4. NEI 99-01, Rev. 5 HA3
5. OP-TM-406-901, Hazardous Material Release
6. AR-660892, Station Halon and IDLH Evaluations
7. 29CFR1910.134(b) and 29CFR1910.134(d)(2)(iii)

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Hazards and Other Conditions Affecting Plant Safety****HU6****Initiating Condition:**

Hazardous event.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, 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.

• ~~Escalation of the emergency classification level would be via IC CA2 or MA5~~

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 onsite conditions sufficient to prohibit the plant staff from accessing the site via personal vehicles.

OR

5. a. Abnormal river water level at the intake Pump and Screen House, as indicated by **EITHER:**

1. **> 296 ft. el.** (high level).

OR

2. **< 274 ft. el.** (low level).

OR

- b. River flow **forecasted** to exceed **900,000 CFS** within the next **12 hours**.

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.

This IC addresses hazardous events that are considered to represent a potential degradation of the level of safety of the plant.

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Hazards and Other Conditions Affecting Plant Safety****HU6 (cont)****Basis (cont):****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 onsite 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 onsite 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 level of the Susquehanna River is approaching flood stage; flood stage is defined as 307 ft el. at the Susquehanna River Gage at Harrisburg.

A low river water condition below 274 ft el. requires a Technical Specification 3.0.1 plant shutdown per OP-TM-AOP-005 and is a precursor to a more serious condition.

Escalation of the emergency classification level would be based on ICs in Recognition Categories R, F, M, H or C.

Basis Reference(s):

1. NEI 99-01, Rev 6 HU3
2. OP-TM-AOP-005 River Water System Failures
3. OP-TM-AOP-002, Flood
4. OP-TM-AOP-0021, Flood Basis Document
5. OP-TM-AOP-004, Tornado / High Winds

Table CRANE 2-2: EAL Technical Basis**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, 6, D

Emergency Action Level (EAL):

1. 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 CRANE 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 site. 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 CRANE 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

Table CRANE 2-2: EAL Technical Basis**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, 6, D

Emergency Action Level (EAL):

1. 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 CRANE 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 site. 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 CRANE 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

Table CRANE 2-2: EAL Technical Basis**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, 6, D

Emergency Action Level (EAL):

1. 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 CRANE 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 site. 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 CRANE 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

Table CRANE 2-2: EAL Technical Basis**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, 6, D

Emergency Action Level (EAL):

1. 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

Table CRANE 2-2: EAL Technical Basis**Recognition Category: Independent Spent Fuel Storage Installation****E-HU1****Initiating Condition:**

Damage to a loaded cask CONFINEMENT BOUNDARY.

Operating Mode Applicability:

1, 2, 3, 4, 5, 6, D

Emergency Action Level (EAL):

1. Damage to a loaded cask CONFINEMENT BOUNDARY as indicated by a radiation reading greater than **ANY** of the following:
 - a. **240 mrem/hour** gamma on the vertical concrete surfaces.
OR
 - b. **10 mrem/hour** neutron on the vertical concrete surfaces.
OR
 - c. **900 mrem/hour** (neutron + gamma) on the top.

Basis:

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

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 any 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 cask technical specification multiple of "2 times" 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 the ISFSI is covered under ICs HU1 and HA1.

Basis Reference(s):

1. NEI 99-01, Rev 6 E-HU1
2. Certificate of Compliance 1031 NAC MAGNASTOR® Canister