

10 HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY ICS/EALS

Table H-1: Recognition Category "H" Initiating Condition Matrix

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
HU1—Confirmed SECURITY CONDITION or threat. <i>Op. Modes: All</i>	HA1—HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes. <i>Op. Modes: All</i>	HS1—HOSTILE ACTION within the PROTECTED AREA. <i>Op. Modes: All</i>	HG1—HOSTILE ACTION resulting in loss of physical control of the facility. <i>Op. Modes: All</i>
HU2—Seismic event greater than OBE levels. <i>Op. Modes: All</i>			
HU3—Hazardous event. <i>Op. Modes: All</i>			
HU4—FIRE potentially degrading the level of safety of the plant. <i>Op. Modes: All</i>			
	HA5—Gaseous release impeding access to equipment necessary for normal plant operations; cooldown or shutdown. <i>Op. Modes: All</i>		
	HA6—Control Room evacuation resulting in transfer of plant control to alternate locations. <i>Op. Modes: All</i>	HS6—Inability to control a key safety function from outside the Control Room. <i>Op. Modes: All</i>	

Table intended for use by EAL developers; Inclusion in licensee documents is not required.

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
HU7—Other conditions exist which in the judgment of the Emergency Director warrant declaration of a (NO)UE. Op. Modes: All	HA7—Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert. Op. Modes: All	HS7—Other conditions exist which in the judgment of the Emergency Director warrant declaration of a Site Area Emergency. Op. Modes: All	HG7—Other conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency. Op. Modes: All

HU1

ECL: Notification of Unusual Event

Initiating Condition: Confirmed SECURITY CONDITION or threat.

Operating Mode Applicability: All

Emergency Action Levels:

~~(1 or 2 or 3)~~ Example Emergency Action Levels:

- HU1.1 A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by ~~the (site specific security shift supervision).~~ DAEC Security Shift Supervision.
- HU1.2 Notification of a credible security threat directed at ~~the site~~ DAEC.
- HU1.3 A validated notification from the NRC providing information of an aircraft threat.

Definitions:

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

HOSTILE ACTION: An act toward DAEC 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 nuclear power plant. Non-terrorist-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

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 systems are classified as safety-related.

Basis:

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 DAEC 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 ~~OR~~ offsite response organizations.

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 HU1.1 references ~~(site-specific security shift supervision)~~ DAEC Security Shift Supervision 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 § 2.390 information.

EAL HU1.2 addresses the receipt of a credible security threat. The credibility of the threat is assessed in accordance with Abnormal Operating Procedure (AOP) 914, Security Events. ~~(site-specific procedure).~~

EAL HU1.3 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 ~~(site-specific procedure)~~ Abnormal Operating Procedure (AOP) 914, Security Events.

Emergency plans and implementing procedures are public documents; therefore, EALs should do not incorporate Security-sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security-sensitive information should be contained in ~~non-public documents such as~~ the Security Plan.

Escalation of the emergency classification level would be via IC HA1.

Developer Notes:

~~The (site-specific security shift supervision) is the title of the on-shift individual responsible for supervision of the on-shift security force.~~

~~The (site-specific procedure) is the procedure(s) used by Control Room and/or Security personnel to determine if a security threat is credible, and to validate receipt of aircraft threat information.~~

~~Emergency plans and implementing procedures are public documents; therefore, EALs should not incorporate Security-sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security-sensitive information should be contained in non-public documents such as the Security Plan.~~

~~With due consideration given to the above developer note, EALs may contain alpha or numbered references to selected events described in the Security Plan and associated implementing procedures. Such references should not contain a recognizable description of the event. For example, an EAL may be worded as "Security event #2, #5 or #9 is reported by the (site-specific security shift supervision)."~~

~~ECL Assignment Attributes: 3.1.1.A~~

HU2

ECL: Notification of Unusual Event

Initiating Condition: Seismic event greater than OBE levels.

Operating Mode Applicability: All

~~Example~~ Emergency Action Levels:

HU2.1 Seismic event greater than Operating Basis Earthquake (OBE) as indicated by:

receipt of the Amber Operating Basis Earthquake Light and the wailing seismic alarm on 1C35.

(1) (site specific indication that a seismic event met or exceeded OBE limits)

Definitions:

DESIGN BASIS EARTHQUAKE (DBE): A DBE is vibratory ground motion for which certain (generally, safety-related) structures, systems, and components must be designed to remain functional.

OPERATING BASIS EARTHQUAKE (OBE): 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.

None

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~~Design Basis Earthquake (~~SSED~~DBE)² should have no significant impact on safety-related systems, structures and components; however, some time may be required for the plant staff to ascertain the actual post-event condition of the plant (e.g., performs walk-downs and post-event inspections). Given the time necessary to perform walk-downs and inspections, and fully understand any impacts, this event represents a potential degradation of the level of safety of the plant.

Event verification with external sources should not be necessary during or following an OBE. Earthquakes of this magnitude should be readily felt by on-site personnel and recognized as a seismic event ~~(e.g., typical lateral accelerations are in excess of 0.08g)~~. The Shift Manager or Emergency Director may seek external verification if deemed appropriate (e.g., a call to the

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.~~

USGS, check internet news sources, etc.); however, the verification action must not preclude a timely emergency declaration.

OBE events are detected in accordance with AOP 901. The OBE is associated with a peak horizontal acceleration of $\pm 0.06g$.

Depending upon the plant mode at the time of the event, escalation of the emergency classification level would be via IC CA6 or SA9SA8.

Developer Notes:

~~This “site-specific indication that a seismic event met or exceeded OBE limits” should be based on the indications, alarms and displays of site-specific seismic monitoring equipment.~~

~~Indications described in the EAL should be limited to those that are immediately available to Control Room personnel and which can be readily assessed. Indications available outside the Control Room and/or which require lengthy times to assess (e.g., processing of scratch plates or recorded data) should not be used. The goal is to specify indications that can be assessed within 15 minutes of the actual or suspected seismic event.~~

~~For sites that do not have readily assessable OBE indications within the Control Room, developers should use the following alternate EAL (or similar wording):~~

~~(1) — a. — Control Room personnel feel an actual or potential seismic event.~~

~~— AND —~~

~~— b. — The occurrence of a seismic event is confirmed in manner deemed appropriate by the Shift Manager or Emergency Director.~~

~~The EAL 1.b statement is included to ensure that a declaration does not result from felt vibrations caused by a non-seismic source (e.g., a dropped heavy load). 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. It is recognized that this alternate EAL wording may cause a site to declare an Unusual Event while another site, similarly affected but with readily assessable OBE indications in the Control Room, may not.~~

~~The above alternate wording may also be used to develop a compensatory EAL for use during periods when a seismic monitoring system capable of detecting an OBE is out of service for maintenance or repair.~~

~~ECL Assignment Attributes: 3.1.1.A~~

HU3

ECL: Notification of Unusual Event

Initiating Condition: Hazardous events

Operating Mode Applicability: All

Emergency Action Levels:

~~Example Emergency Action Levels: (1 or 2 or 3 or 4 or 5 or 6)~~

Note: EAL HU3.4 does not apply to routine traffic impediments such as fog, snow, ice, or vehicle breakdowns or accidents.

HU3.1 A tornado strike within the PROTECTED AREA.

HU3.2 Internal room or area flooding of a magnitude sufficient to require manual or automatic electrical isolation of a SAFETY SYSTEM component needed for the current operating mode.

HU3.3 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).

HU3.4 A hazardous event that results in on-site conditions sufficient to prohibit the plant staff from accessing the site via personal vehicles.

~~HU3.5 (Site-specific list of natural or technological hazard events)6~~

Definitions:

PROTECTED AREA: The area under continuous access monitoring and control, and armed protection as described in the site Security Plan.

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

Basis:

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

EAL HU3.1 addresses a tornado striking (touching down) within the Protected Area.

EAL HU3.2 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 HU3.3 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 HU3.4 addresses a hazardous event that causes an on-site impediment to vehicle movement and significant enough to prohibit the plant staff from accessing the site using personal vehicles. Examples of such an event include site flooding caused by a hurricane, heavy rains, up-river water releases, dam failure, etc., or an on-site train derailment blocking the access road.

This EAL is not intended 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 HU3.5 addresses (site specific description).~~

Escalation of the emergency classification level would be based on ICs in Recognition Categories AR, F, S or C.

Developer Notes:

~~The “Site-specific list of natural or technological hazard events” should include other events that may be a precursor to a more significant event or condition, and that are appropriate to the site location and characteristics.~~

~~Notwithstanding the events specifically included as EALs above, a “Site specific list of natural or technological hazard events” need not include short lived events for which the extent of the damage and the resulting consequences can be determined within a relatively short time frame. In these cases, a damage assessment can be performed soon after the event, and the plant staff will be able to identify potential or actual impacts to plant systems and structures. This will enable prompt definition and implementation of compensatory or corrective measures with no appreciable increase in risk to the public.~~

~~To the extent that a short lived event does cause immediate and significant damage to plant systems and structures, it will be classifiable under the Recognition Category F, S and C ICs and EALs. Events of lesser impact would be expected to cause only small and localized damage. The consequences from these types of events are adequately assessed and addressed in accordance with Technical Specifications. In addition, the occurrence or effects of the event may be reportable under the requirements of 10 CFR 50.72.~~

~~ECL Assignment Attributes: 3.1.1.A and 3.1.1.C~~

HU4

ECL: Notification of Unusual Event

Initiating Condition: FIRE potentially degrading the level of safety of the plant.

Operating Mode Applicability: All

Emergency Action Levels:

~~Example Emergency Action Levels: (1 or 2 or 3 or 4)~~

Notes:

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

- HU4.1 a. A FIRE is **NOT** extinguished within 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

AND

- b. The FIRE is located within **ANY** ~~of the following~~ Table H-1 plant rooms or areas:

~~(site-specific list of plant rooms or areas)~~

- HU4.2 a. Receipt of a single fire alarm ~~(i.e., with~~ no other indications of a FIRE).

AND

- b. The FIRE is located within **ANY** ~~of the following~~ Table H-1 plant rooms or areas

~~(site-specific list of plant rooms or areas)~~

AND

- c. The existence of a FIRE is not verified within 30-minutes of alarm receipt.

- HU4.3 A FIRE within the plant or ISFSI ~~[for plants with an ISFSI outside the plant Protected Area]~~ PROTECTED AREA not extinguished within 60-minutes of the initial report, alarm or indication.

- HU4.4 A FIRE within the plant or ISFSI ~~[for plants with an ISFSI outside the plant Protected Area]~~ PROTECTED AREA that requires firefighting support by an offsite fire response agency to extinguish.

Table H-1 Fire Areas
Area

- 1G31 DG and Day Tank Rooms;
- 1G21 DG and Day Tank Rooms;
- Battery Rooms;
- Essential Switchgear Rooms;
- Cable Spreading Room
- Torus Room
- -Intake Structure;
- Pumphouse
- Drywell;
- Torus
- NE, NW, SE Corner Rooms;
- HPCI Room;
- RCIC Room;
- RHR Valve Room;
- North CRD Area;
- South CRD Area;
- CSTs
- Control Building;
- Remote Shutdown Panel 1C388 Area;
- Panel 1C55/56 Area;
- SGBT Room

Definitions:

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: The area under continuous access monitoring and control, and armed protection as described in the site Security Plan.

Basis:

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 HU4.1

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 alarm, indication or report.

EAL HU4.2

This EAL 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 HU4.1 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 HU4.3

In addition to a FIRE addressed by EAL HU4.1 or EAL HU4.2, a FIRE within the plant or ISFSI PROTECTED AREA not extinguished within 60-minutes may also potentially degrade the level of plant safety. This basis extends to a FIRE occurring within the PROTECTED AREA of an ISFSI located outside the plant PROTECTED AREA. ~~{Sentence for plants with an ISFSI outside the plant Protected Area}~~

EAL HU4.4

If a FIRE within the plant or ISFSI ~~{for plants with an ISFSI outside the plant Protected Area}~~ 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 and NFPA-805

Criterion 3 of Appendix A to 10 CFR 50 states in part 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."

The Nuclear Safety Goal ("NSG") in NFPA 805, Section 1.3.1 states, "The nuclear safety goal is to provide reasonable assurance that a fire during any operational mode and plant configuration will not prevent the plant from achieving and maintaining the fuel in a safe and stable condition."

When considering the effects of fire, those systems associated with achieving and maintaining safe shutdown conditions assume major importance because a safe shutdown success path, free of fire damage, must be available to meet the nuclear safety goals, objectives and performance criteria for a fire under any plant operational mode or configuration.

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). Even though DAEC has adopted the alternate approach provided by NFPA-805 in lieu of the deterministic requirements of Appendix R, the 30-minutes to verify a single alarm as used in EAL HU4.2 is considered a reasonable amount of time to determine if an actual FIRE exists without presenting a challenge to the nuclear safety performance criteria.~~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 CA6 or SA9SA8.

~~Developer Notes:~~

~~The "site-specific list of plant rooms or areas" should specify those rooms or areas that contain SAFETY SYSTEM equipment.~~

~~As noted in the EALs and Basis section, include the term ISFSI if the site has an ISFSI outside the plant Protected Area.~~

~~ECL Assignment Attributes: 3.1.1.A~~

HU76

ECL: Notification of Unusual Event

Initiating Condition: Other conditions exist which in the judgment of the Emergency Director warrant declaration of a ~~(NO)~~UE.

Operating Mode Applicability: All

~~Example~~ Emergency Action Levels:

- HU76.1 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 ~~safety systems~~ occurs.

Definitions:

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

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 a NOUE.

HA1

ECL: Alert

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

Operating Mode Applicability: All

Example Emergency Action Levels: ~~(1 or 2)~~

- HA1.1** A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the ~~(site-specific security shift supervision)~~ DAEC Security Shift Supervision.
- HA1.2** A validated notification from NRC of an aircraft attack threat within 30 minutes of the site.

Definitions:

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 DAEC 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 nuclear power plant. 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).

OWNER CONTROLLED AREA: The site property owned by or otherwise under the control of the licensee.

PROJECTILE: An object directed toward a nuclear power plant that could cause concern for its continued operability, reliability, or personnel safety.

Basis:

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 DAEC Security Shift Supervision and the Control Room is essential for proper classification of a security-related event.

Security plans and terminology are based on the guidance provided by NEI 03-12, *Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan [and Independent Spent Fuel Storage Installation Security Program]*.

As time and conditions allow, these events require a heightened state of readiness by the plant staff and implementation of onsite protective measures (e.g., evacuation, dispersal or sheltering). The Alert declaration will also heighten the awareness of Offsite Response Organizations, allowing them to be better prepared should it be necessary to consider further actions.

This IC does not apply to incidents that are accidental events, acts of civil disobedience, or otherwise are not a HOSTILE ACTION perpetrated by a HOSTILE FORCE. Examples include the crash of a small aircraft, shots from hunters, physical disputes between employees, etc. Reporting of these types of events is adequately addressed by other EALs, or the requirements of 10 CFR § 73.71 or 10 CFR § 50.72.

EAL HA1.1 is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA. This includes any action directed against ~~an~~ the ISFSI ~~that~~ which is located outside the plant PROTECTED AREA.

EAL HA1.2 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 ~~OR~~ Offsite response organizations are in a heightened state of readiness. This EAL is met when the threat-related information has been validated in accordance with ~~(Abnormal Operating Procedure (AOP) 914, Security Events site-specific procedure)s.~~

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.

Emergency plans and implementing procedures are public documents; therefore, EALs ~~should do~~ not incorporate Security-sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security-sensitive information ~~should be is~~ contained in ~~non-public documents such as~~ the Security Plan.

Escalation of the emergency classification level would be via IC HS1.

Developer Notes:

~~The (site-specific security shift supervision) is the title of the on-shift individual responsible for supervision of the on-shift security force.~~

~~————Emergency plans and implementing procedures are public documents; therefore, EALs should not incorporate Security-sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security-sensitive information should be contained in non-public documents such as the Security Plan.~~

~~———— With due consideration given to the above developer note, EALs may contain alpha or numbered references to selected events described in the Security Plan and associated implementing procedures. Such references should not contain a recognizable description of the event. For example, an EAL may be worded as “Security event #2, #5 or #9 is reported by the (site-specific security shift supervision).”~~

~~———— See the related Developer Note in Appendix B, Definitions, for guidance on the development of a scheme definition for the OWNER CONTROLLED AREA.~~

~~ECL Assignment Attributes: 3.1.2.D~~

HA5

~~ECL: Alert~~

~~Initiating Condition: Gaseous release impeding access to equipment necessary for normal plant operations, cooldown, or shutdown.~~

~~Operating Mode Applicability: All~~

~~Example Emergency Action Levels:~~

~~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 a. Release of a toxic, corrosive, asphyxiant or flammable gas into any of the following plant rooms or areas:~~

~~(site specific list of plant rooms or areas with entry related mode applicability identified)~~

~~—AND~~

- ~~b. Entry into the room or area is prohibited or impeded.~~

Basis:

~~This IC addresses an event involving a release of a hazardous gas that precludes or impedes access to equipment necessary to maintain normal plant operation, or required for a normal plant cooldown and shutdown. This condition represents an actual or potential substantial degradation of the level of safety of the plant.~~

~~An Alert declaration is warranted if entry into the affected room/area is, or may be, procedurally required during the plant operating mode in effect at the time of the gaseous release. The emergency classification is not contingent upon whether entry is actually necessary at the time of the release.~~

~~Evaluation of the IC and EAL do not require atmospheric sampling; it only requires the Emergency Director's judgment that the gas concentration in the affected room/area is sufficient to preclude or significantly impede procedurally required access. This judgment may be based on a variety of factors including an existing job hazard analysis, report of ill effects on personnel, advice from a subject matter expert or operating experience with the same or similar hazards. Access should be considered as impeded if extraordinary measures are necessary to facilitate entry of personnel into the affected room/area (e.g., requiring use of protective equipment, such as SCBAs, that is not routinely employed).~~

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

- ~~• The plant is in an operating mode different than the mode specified for the affected room/area (i.e., entry is not required during the operating mode in effect at the time of the gaseous release). For example, the plant is in Mode 1 when the gaseous release occurs, and the procedures used for normal operation, cooldown and shutdown do not require entry into the affected room until Mode 4.~~

- ~~The gas release is a planned activity that includes compensatory measures which address the temporary inaccessibility of a room or area (e.g., fire suppression system testing).~~
- ~~The action for which room/area entry is required is of an administrative or record keeping nature (e.g., normal rounds or routine inspections).~~
- ~~The access control measures are of a conservative or precautionary nature, and would not actually prevent or impede a required action.~~

~~An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of around 19%, which can lead to breathing difficulties, unconsciousness, or even death.~~

~~This EAL does not apply to firefighting activities that automatically or manually activate a fire suppression system in an area, or to intentional inerting of containment (BWR only).~~

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

Developer Notes:

~~The “site specific list of plant rooms or areas with entry related mode applicability identified” should specify those rooms or areas that contain equipment which require a manual/local action as specified in operating procedures used for normal plant operation, cooldown and shutdown. Do not include rooms or areas in which actions of a contingent or emergency nature would be performed (e.g., an action to address an off normal or emergency condition such as emergency repairs, corrective measures or emergency operations). In addition, the list should specify the plant mode(s) during which entry would be required for each room or area.~~

~~The list should 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).~~

~~The list need not include the Control Room if adequate engineered safety/design features are in place to preclude a Control Room evacuation due to the release of a hazardous gas. Such features may include, but are not limited to, capability to draw air from multiple air intakes at different and separate locations, inner and outer atmospheric boundaries, or the capability to acquire and maintain positive pressure within the Control Room envelope.~~

~~If the equipment in the listed room or area was already inoperable, or out of service, before the event occurred, then no emergency should be declared since the event will have no adverse impact beyond that already allowed by Technical Specifications at the time of the event.~~

~~ECL Assignment Attributes: 3.1.2.B~~

HA6HA5

ECL: Alert

Initiating Condition: Control Room evacuation resulting in transfer of plant control to alternate locations.

Operating Mode Applicability: All

Example Emergency Action Levels:

HA65.1 An event has resulted in plant control being transferred from the Control Room to ~~(site-specific remote shutdown panels and local control stations)~~ the Remote Shutdown Panel (IC388).

Definitions:

None

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 HS65.

Developer Notes:

~~The “site-specific remote shutdown panels and local control stations” are the panels and control stations referenced in plant procedures used to cooldown and shutdown the plant from a location(s) outside the Control Room.~~

~~ECL Assignment Attributes: 3.1.2.B~~

HA7HA6

ECL: Alert

Initiating Condition: Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert.

Operating Mode Applicability: All

Example Emergency Emergency Action Levels:

- HA76.1** 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.

Definitions:

HOSTILE ACTION: An act toward DAEC 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 nuclear power plant. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

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

PROJECTILE: An object directed toward a nuclear power plant that could cause concern for its continued operability, reliability, or personnel safety.

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 Alert.

HS1

ECL: Site Area Emergency

Initiating Condition: HOSTILE ACTION within the PROTECTED AREA.

Operating Mode Applicability: All

Example EmergencyEmergency Action Levels:

HS1.1 A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the ~~(site-specific security shift supervision)~~ DAEC Security Shift Supervision.

Definitions:

HOSTILE ACTION: An act toward DAEC 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 nuclear power plant. 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.

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

PROJECTILE: An object directed toward a nuclear power plant that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: The area under continuous access monitoring and control, and armed protection as described in the site Security Plan.

Basis:

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 DAEC 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 ~~OR~~ offsite response organization resources and have them available to develop and implement public protective actions in the unlikely event that the attack is successful in impairing multiple safety functions.

This IC does not apply to a HOSTILE ACTION directed at ~~an~~ the ISFSI PROTECTED AREA which is 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.

Emergency plans and implementing procedures are public documents; therefore, EALs should do not incorporate Security-sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security-sensitive information should be ~~is~~ contained in ~~non-public documents~~ such as the Security Plan.

Escalation of the emergency classification level would be via IC HG1.

Developer Notes:

~~The (site specific security shift supervision) is the title of the on-shift individual responsible for supervision of the on-shift security force.~~

~~Emergency plans and implementing procedures are public documents; therefore, EALs should not incorporate Security-sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security-sensitive information should be contained in non-public documents such as the Security Plan.~~

~~With due consideration given to the above developer note, EALs may contain alpha or numbered references to selected events described in the Security Plan and associated implementing procedures. Such references should not contain a recognizable description of the event. For example, an EAL may be worded as "Security event #2, #5 or #9 is reported by the (site specific security shift supervision)."~~

~~See the related Developer Note in Appendix B, Definitions, for guidance on the development of a scheme definition for the PROTECTED AREA.~~

~~ECL Assignment Attributes: 3.1.3.D~~

HS6HS5

ECL: Site Area Emergency

Initiating Condition: Inability to control a key safety function from outside the Control Room.

Operating Mode Applicability: All

Example Emergency Action Levels:

Note: The Emergency Director should declare the Site Area Emergency event promptly upon determining that ~~(site-specific number the applicable time of 20 minutes)~~ has been exceeded, or will likely be exceeded.

HS56.1 a. An event has resulted in plant control being transferred from the Control Room to ~~(site-specific remote shutdown panels and control stations)~~ the Remote Shutdown Panel (1C388).

AND

b. Control of ANY of the following key safety functions is not reestablished within ~~(site-specific number of 20 minutes)~~.

- Reactivity control
- ~~Core cooling [PWR]~~ / RPV water level ~~[BWR]~~
- RCS heat removal

Definitions:

None

Basis:

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 plant control to alternate locations is a precursor to a challenge to one or more 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)~~ Remote Shutdown Panel (1C388-is) is based on Emergency Director judgment. The Emergency Director is expected to make a reasonable, informed judgment within ~~(the site-specific time for transfer)~~ 320 minutes whether or not the operating staff has control of key safety functions from the remote safe shutdown location(s).

AOP 915, “Shutdown Outside Control Room” provides the following CAUTION – “For Control Room evacuation as the result of a fire, transfer of control at panels 1C388, 1C389, 1C390, 1C391, ~~1C392~~ and 1C392 is required to be completed within 20 minutes.”

Escalation of the emergency classification level would be via IC FG1 or CG1.

Developer Notes:

~~The “site-specific remote shutdown panels and local control stations” are the panels and control stations referenced in plant procedures used to cooldown and shutdown the plant from a location(s) outside the Control Room.~~

~~The “site-specific number of minutes” is the time in which plant control must be (or is expected to be) reestablished at an alternate location as described in the site-specific fire response analyses. Absent a basis in the site-specific analyses, 15 minutes should be used. Another time period may be used with appropriate basis/justification.~~

~~ECL Assignment Attributes: 3.1.3.B~~

HS7HS6

ECL: Site Area Emergency

Initiating Condition: Other conditions exist which in the judgment of the Emergency Director warrant declaration of a Site Area Emergency.

Operating Mode Applicability: All

Example Emergency Action Levels:

- HS76.1** 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.

Definitions:

HOSTILE ACTION: An act toward DAEC 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 nuclear power plant. Non—terrorism—based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

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

PROJECTILE: An object directed toward a nuclear power plant that could cause concern for its continued operability, reliability, or personnel safety.

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 a Site Area Emergency.

HG1

ECL: General Emergency

Initiating Condition: HOSTILE ACTION resulting in loss of physical control of the facility.

Operating Mode Applicability: All

Example Emergency Action Levels:

- HG1.1 a. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the ~~(site-specific security shift supervision)~~ DAEC Security Shift Supervision.
- AND
- b. **EITHER** of the following has occurred:
1. **ANY** of the following safety functions cannot be controlled or maintained.
 - Reactivity control
 - ~~Core cooling [PWR]~~ / RPV water level ~~[BWR]~~
 - RCS heat removal
- OR
2. Damage to spent fuel has occurred or is IMMINENT.

Definitions:

HOSTILE ACTION: An act toward DAEC 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 nuclear power plant. 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.

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

IMMINENT: 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.

PROJECTILE: An object directed toward a nuclear power plant that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: The area under continuous access monitoring and control, and armed protection as described in the site Security Plan.

Basis:

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 the DAEC 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]*.

Emergency plans and implementing procedures are public documents; therefore, EALs ~~should do~~ not incorporate Security-sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security-sensitive information ~~should be~~ contained in ~~non-public documents such as~~ the Security Plan.

Developer Notes:

~~The (site-specific security shift supervision) is the title of the on-shift individual responsible for supervision of the on-shift security force.~~

~~Emergency plans and implementing procedures are public documents; therefore, EALs should not incorporate Security-sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security-sensitive information should be contained in non-public documents such as the Security Plan.~~

~~With due consideration given to the above developer note, EALs may contain alpha or numbered references to selected events described in the Security Plan and associated implementing procedures. Such references should not contain a recognizable description of the event. For example, an EAL may be worded as "Security event #2, #5 or #9 is reported by the (site-specific security shift supervision)."~~

~~See the related Developer Note in Appendix B, Definitions, for guidance on the development of a scheme definition for the PROTECTED AREA.~~

~~ECL Assignment Attributes: 3.1.4.D~~

HG7HG6

ECL: General Emergency

Initiating Condition: Other conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency.

Operating Mode Applicability: All

Example Emergency Action Levels:

- HG76.1 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.

Definitions:

HOSTILE ACTION: An act toward DAEC 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 nuclear power plant. 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.

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.

PROJECTILE: An object directed toward a nuclear power plant that could cause concern for its continued operability, reliability, or personnel safety.

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 a General Emergency.

11 SYSTEM MALFUNCTION ICS/EALS

Table S-1: Recognition Category "S" Initiating Condition Matrix

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
<p>SU1—Loss of all offsite AC power capability to emergency buses for 15 minutes or longer. <i>Op. Modes: 1, 2, 3, 4</i> Power Operation, Startup, Hot Standby, Hot Shutdown</p> <p>SU2—UNPLANNED loss of Control Room indications for 15 minutes or longer. <i>Op. Modes: Power Operation, Startup, Hot Standby, Hot Shutdown</i> <u>1, 2, 3, 4</u></p> <p>SU3—Reactor coolant activity greater than Technical Specification allowable limits. <i>Op. Modes: 1, 2, 3, 4</i> Power Operation, Startup, Hot Standby, Hot Shutdown</p> <p>SU4—RCS leakage for 15 minutes or longer. <i>Op. Modes: 1, 2, 3, 4</i> Power Operation, Startup, Hot Standby, Hot Shutdown</p> <p>SU5—Automatic or manual (trip [PWR]/seram [BWR]) fails to shutdown the reactor. <i>Op. Modes: Power Operation</i> <u>1</u></p>	<p>SA1—Loss of all but one AC power source to emergency buses for 15 minutes or longer. <i>Op. Modes: 1, 2, 3, 4</i> Power Operation, Startup, Hot Standby, Hot Shutdown</p> <p>SA2—UNPLANNED loss of Control Room indications for 15 minutes or longer with a significant transient in progress. <i>Op. Modes: 1, 2, 3, 4</i> Power Operation, Startup, Hot Standby, Hot Shutdown</p> <p>SA5—Automatic or manual (trip [PWR]/seram [BWR]) fails to shutdown the reactor, and subsequent manual actions taken at the reactor control consoles are not successful in shutting down the reactor. <i>Op. Modes: Power Operation</i> <u>1</u></p>	<p>SS1—Loss of all offsite and all onsite AC power to emergency buses for 15 minutes or longer. <i>Op. Modes: 1, 2, 3, 4</i> Power Operation, Startup, Hot Standby, Hot Shutdown</p> <p>SS5—Inability to shutdown the reactor causing a challenge to (core cooling [PWR]/RPV water level [BWR]) or RCS heat removal. <i>Op. Modes: Power Operation</i> <u>1</u></p>	<p>SG1—Prolonged loss of all offsite and all onsite AC power to emergency buses. <i>Op. Modes: 1, 2, 3, 4</i> Power Operation, Startup, Hot Standby, Hot Shutdown</p>

Table intended for use by EAL developers. Inclusion in licensee documents is not required.

**UNUSUAL
EVENT**

SU6— Loss of all onsite or
offsite communications
capabilities.

*Op. Modes: 1, 2, 3, 4Power
Operation, Startup, Hot
Standby, Hot Shutdown*

SU7— Failure to
isolate containment or loss
of containment pressure
control. [PWR]

*Op. Modes: 1, 2, 3,
4Power Operation,
Startup, Hot Standby, Hot
Shutdown*

ALERT

**SITE AREA
EMERGENCY**

**GENERAL
EMERGENCY**

SS8— Loss of all Vital DC
power for 15 minutes or
longer.

*Op. Modes: 1, 2, 3, 4Power
Operation, Startup, Hot
Standby, Hot Shutdown*

SG8— Loss of all AC and
Vital DC power sources for
15 minutes or longer.

*Op. Modes: 1, 2, 3, 4Power
Operation, Startup, Hot
Standby, Hot Shutdown*

SA9— Hazardous event
affecting a SAFETY
SYSTEM needed for the
current operating mode.
*Op. Modes: 1, 2, 3, 4Power
Operation, Startup, Hot
Standby, Hot Shutdown*

Table intended for use by
EAL developers.
Inclusion in licensee
documents is not required.

SU1

ECL: Notification of Unusual Event

Initiating Condition: Loss of ~~all~~ ALL offsite AC power capability to ~~emergency-essential~~ buses for 15 ~~-~~ minutes or longer.

Operating Mode Applicability: ~~Power Operation, Startup, Hot Standby, Hot Shutdown~~ 1, 2, 3

Example Emergency Action Levels:

Note: The Emergency Director should declare the ~~Unusual E~~vent promptly upon determining that the applicable time 15 minutes has been exceeded, or will likely be exceeded.

SU1.1 Loss of **ALL** offsite AC power capability to ~~(site-specific emergency buses)~~ 1A3 AND 1A4 buses for 15 minutes or longer.

Definitions:

None

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-essential~~ buses. ~~—~~. This condition represents a potential reduction in the level of safety of the plant.

The intent of this EAL is to declare an Notification of Unusual Event when offsite power has been lost and both of the emergency diesel generators have successfully started and energized their respective 4kv essential bus.

For emergency classification purposes, “capability” means that an offsite AC power source(s) is available to the ~~emergency-essential~~ buses, whether or not the buses are powered from it.

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

Escalation of the emergency classification level would be via IC SA1.

Developer Notes:

~~The “site-specific emergency buses” are the buses fed by offsite or emergency AC power sources that supply power to the electrical distribution system that powers SAFETY SYSTEMS. There is typically 1 emergency bus per train of SAFETY SYSTEMS.~~

~~At multi-unit stations, the EALs may credit compensatory measures that are proceduralized and can be implemented within 15 minutes. Consider capabilities such as power source cross-ties, “swing” generators, other power sources described in abnormal or emergency operating procedures, etc. Plants that have a proceduralized capability to supply offsite AC power to an~~

affected unit via a cross-tie to a companion unit may credit this power source in the EAL provided that the planned cross-tie strategy meets the requirements of 10 CFR 50.63.

ECL Assignment Attributes: 3.1.1.A

SU2SU3

ECL: Notification of Unusual Event

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

Operating Mode Applicability: ~~Power Operation, Startup, Hot Standby, Hot Shutdown~~ 1, 2, 3

Example Emergency Action Levels:

Note: The Emergency Director should declare the ~~Unusual Event~~ promptly upon determining that the applicable time 15 minutes has been exceeded, or will likely be exceeded.

- SU3.1 a. ~~An UNPLANNED event results in the inability to monitor one or more of the~~
~~Table S-1 parameters from within the Control Room for 15 minutes or longer. An~~
~~UNPLANNED event results in the inability to monitor one or more of the~~
~~following parameters from within the Control Room for 15 minutes or longer.~~

~~Reactor Power~~
~~RPV Water Level~~
~~RPV Pressure~~
~~Primary Containment Pressure~~
~~Suppression Pool Level~~
~~• Suppression Pool Temperature~~

{BWR parameter list}	{PWR parameter list}
Reactor Power	Reactor Power
RPV Water Level	RCS Level
RPV Pressure	RCS Pressure
Primary Containment Pressure	In-Core/Core Exit Temperature
Suppression Pool Level	Levels in at least (site-specific number) steam generators
Suppression Pool Temperature	Steam Generator Auxiliary or Emergency Feed Water Flow

Table S-1 Safety System Parameters

- Reactor power
- RPV Water Level
- RPV Pressure
- Primary Containment Pressure
- Suppression Pool Level
- Suppression Pool Temperature

Definitions:

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 systems are

classified as safety-related. A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. Systems classified as safety-related.

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.

Basis:

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 one or more 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.

This EAL is focused on a selected subset of plant parameters associated with the key safety functions of reactivity control, ~~core cooling [PWR]~~/RPV level ~~[BWR]~~ and RCS heat removal. The loss of the ability to determine one or more 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 one or more 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 [PWR]~~/RPV water level ~~[BWR]~~ cannot be determined from the indications and records 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 SA 23.

Developer Notes:

~~In the PWR parameter list column, the "site specific number" should reflect the minimum number of steam generators necessary for plant cooldown and shutdown. This criterion may also specify whether the level value should be wide range, narrow range or both, depending upon the monitoring requirements in emergency operating procedures.~~

~~Developers may specify either pressurizer or reactor vessel level in the PWR parameter column entry for RCS Level.~~

~~The number, type, location and layout of Control Room indications, and the range of possible failure modes, can challenge the ability of an operator to accurately determine, within the time period available for emergency classification assessments, if a specific percentage of indications have been lost. The approach used in this EAL facilitates prompt and accurate emergency classification assessments by focusing on the indications for a selected subset of parameters.~~

~~By focusing on the availability of the specified parameter values, instead of the sources of those values, the EAL recognizes and accommodates the wide variety of indications in nuclear power plant Control Rooms. Indication types and sources may be analog or digital, safety-related or not, primary or alternate, individual meter value or computer group display, etc.~~

~~A loss of plant annunciators will be evaluated for reportability in accordance with 10 CFR 50.72 (and the associated guidance in NUREG-1022), and reported if it significantly impairs the capability to perform emergency assessments. Compensatory measures for a loss of annunciation can be readily implemented and may include increased monitoring of main control boards and more frequent plant rounds by non-licensed operators. Their alerting function notwithstanding, annunciators do not provide the parameter values or specific component status information used to operate the plant, or process through AOPs or EOPs. Based on these considerations, a loss of annunciation is considered to be adequately addressed by reportability criteria, and therefore not included in this IC and EAL.~~

~~With respect to establishing event severity, the response to a loss of radiation monitoring data (e.g., process or effluent monitor values) is considered to be adequately bounded by the requirements of 10 CFR 50.72 (and associated guidance in NUREG-1022). The reporting of this event will ensure adequate plant staff and NRC awareness, and drive the establishment of appropriate compensatory measures and corrective actions. In addition, a loss of radiation monitoring data, by itself, is not a precursor to a more significant event.~~

~~Personnel at sites that have a Failure Modes and Effects Analysis (FMEA) included within the design basis of a digital I&C system should consider the FMEA information when developing their site-specific EALs.~~

~~Due to changes in the configurations of SAFETY SYSTEMS, including associated instrumentation and indications, during the cold shutdown, refueling, and defueled modes, no analogous IC is included for these modes of operation.~~

~~ECL Assignment Attributes: 3.1.1.A~~

SU3SU4

ECL: Notification of Unusual Event

Initiating Condition: Reactor coolant activity greater than Technical Specification allowable limits.

Operating Mode Applicability: ~~Power Operation, Startup, Hot Standby, Hot Shutdown~~ 1, 2, 3

Example Emergency Action Levels: ~~(1 or 2)~~

SU4.1 (Site-specific radiation monitor) reading greater than (site-specific value). Pretreatment Offgas System (RM-4104) Hi-Hi Radiation Alarm.

SU4.

2 Sample analysis indicates that reactor coolant specific activity is greater than 2.0 $\mu\text{Ci/gm}$ dose equivalent I-131 for 12 hours or longer. Sample analysis indicates that a reactor coolant activity value is greater than an allowable limit specified in Technical Specifications.

Definitions:

None

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.

For EAL SU4.1, RM-4104 Hi-Hi Radiation Alarm has been chosen because it is operationally significant, is readily recognizable by the Control Room Operations Staff, and is set at a level corresponding to noble gas release rate, after 30-minute delay and decay of 1 Ci/sec.

For EAL SU4.2, coolant samples exceeding the 2.0 $\mu\text{Ci/gm}$ dose equivalent I-131 concentration require prompt action by DAEC Technical Specifications and are representative of minor fuel cladding degradation.

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

Developer Notes:

~~For EAL #1—Enter the radiation monitor(s) that may be used to readily identify when RCS activity levels exceed Technical Specification allowable limits. This EAL may be developed using different methods and sites should use existing capabilities to address it (e.g., development of new capabilities is not required). Examples of existing methods/capabilities include:~~

- ~~• An installed radiation monitor on the letdown system or air ejector.~~
- ~~• A hand-held monitor or deployed detector reading with pre-calculated conversion values or readily implementable conversion calculation capability.~~

~~The monitor reading values should correspond to an RCS activity level approximately at Technical Specification allowable limits.~~

~~If there is no existing method/capability for determining this EAL, then it should not be included. IC evaluation will be based on EAL #2.~~

~~For EAL #2—Developers may reword the EAL to include the reactor coolant activity parameter(s) specified in Technical Specifications and the associated allowable limit(s) (e.g., values for dose equivalent I-131 and gross activity, time dependent or transient values, etc.). If this approach is selected, all RCS activity allowable limits should be included.~~

~~ECL Assignment Attributes: 3.1.1.A and 3.1.1.B~~

SU4SU5

ECL: Notification of Unusual Event

Initiating Condition: RCS leakage for 15 minutes or longer.

Operating Mode Applicability: ~~Power Operation, Startup, Hot Standby, Hot Shutdown~~ 1, 2, 3

Example Emergency Action Levels: ~~(1 or 2 or 3)~~

Note: The Emergency Director should declare the ~~Unusual Event~~ promptly upon determining that the applicable time 15 minutes has been exceeded, or will likely be exceeded.

- SU5.1 RCS unidentified or pressure boundary leakage greater than ~~(site-specific value)~~ 10 gpm for 15 minutes or longer.
- SU5.2 RCS identified leakage greater than ~~(site-specific value)~~ 25 gpm for 15 minutes or longer.
- SU5.3 Leakage from the RCS to a location outside containment greater than 25 gpm for 15 minutes or longer.

Definitions:

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

Basis:

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 SU5.1 and EAL SU5.2 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 SU5.3 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 in a PWR)~~ 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 SU5.1 uses a lower value that reflects the greater significance of unidentified or pressure boundary leakage.

The release of mass from the RCS due to the as-designed/expected operation of a relief valve does not warrant an emergency classification. ~~For PWRs, 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).~~ For BWRs, a stuck-open Safety Relief Valve (SRV) or SRV leakage is not considered either identified or unidentified leakage by Technical Specifications and, therefore, is not applicable to this EAL.

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 ~~A~~R or F.

~~Developer Notes:~~

~~EAL #1 — For the site-specific leak rate value, enter the higher of 10 gpm or the value specified in the site's Technical Specifications for this type of leakage.~~

~~EAL #2 — For the site-specific leak rate value, enter the higher of 25 gpm or the value specified in the site's Technical Specifications for this type of leakage.~~

~~For sites that have Technical Specifications that do not specify a leakage type for steam generator tube leakage, developers should include an EAL for tube leakage greater than 25 gpm for 15 minutes or longer.~~

~~—— ECL Assignment Attributes: 3.1.1.A~~

SU5SU6

ECL: Notification of Unusual Event

Initiating Condition: Automatic or manual ~~(trip [PWR] /scram [BWR])~~ fails to shutdown the reactor.

Operating Mode Applicability: ~~Power Operation~~ 1, 2

~~**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.~~

~~**Example**~~ Emergency Action Levels: ~~(1 or 2)~~

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.

SU6.1

- a. An automatic ~~(trip [PWR] /scram [BWR])~~ did not shutdown the reactor.

AND

- b. ANY of the following manual actions taken at 1C05 are successful in lowering reactor power below 5% power
- Manual Scram Pushbuttons
 - Mode Switch to Shutdown
 - Alternate Rod Insertion (ARI) ~~A subsequent manual action taken at the reactor control consoles (1C05) is successful in shutting down the reactor.~~

- SU6.2 a. A manual ~~trip ([PWR] /scram [BWR])~~ did not shutdown the reactor.

AND

- b. **EITHER** of the following:
1. —ANY of the following subsequent manual actions taken at 1C05 are successful in lowering reactor power below 5% power
 - Manual Scram Pushbuttons
 - Mode Switch to Shutdown
 - Alternate Rod Insertion (ARI) ~~A subsequent manual action taken at the reactor control console (1C05)s is successful in shutting down the reactor.~~

 OR

2. —A subsequent automatic ~~(trip [PWR] /scram [BWR])~~ is successful in shutting down the reactor.

Definitions:

None

Basis:

This IC addresses a failure of the RPS to initiate or complete an automatic or manual reactor ~~(trip [PWR] /scram [BWR])~~ that results in a reactor shutdown, and either a subsequent operator manual action taken at the reactor control consoles or an automatic ~~(trip [PWR] /scram [BWR])~~ 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.

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

If an initial manual reactor ~~(trip [PWR]/scram [BWR])~~ is unsuccessful, operators will promptly take manual action at another location(s) on the reactor control consoles to shutdown the reactor (e.g., initiate a manual reactor ~~(trip [PWR]/scram [BWR])~~ using a different switch). Depending upon several factors, the initial or subsequent effort to manually ~~(trip [PWR]/scram [BWR])~~ the reactor, or a concurrent plant condition, may lead to the generation of an automatic reactor ~~(trip [PWR]/scram [BWR])~~ signal. If a subsequent manual or automatic ~~(trip [PWR]/scram [BWR])~~ is successful in shutting down the reactor, core heat generation will quickly fall to a level within the capabilities of the plant's decay heat removal systems.

A manual action at the reactor control consoles 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 [PWR]/scram [BWR])~~). 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 reactor control consoles".

Taking the Reactor Mode Switch to SHUTDOWN is considered to be a manual scram action. ~~[BWR]~~

The plant response to the failure of an automatic or manual reactor ~~(trip [PWR]/scram [BWR])~~ will vary based upon several factors including the reactor power level prior to the event, availability of the condenser, performance of mitigation equipment and actions, other concurrent plant conditions, etc. If subsequent operator manual actions taken at the reactor control consoles are also unsuccessful in shutting down the reactor, then the emergency classification level will escalate to an Alert via IC SA56. Depending upon the plant response, escalation is also possible via IC FA1. Absent the plant conditions needed to meet either IC SA56 or FA1, an Unusual Event declaration is appropriate for this event.

~~The reactor should be considered shutdown when it is producing less heat than the maximum decay heat load for which the SAFETY SYSTEMS are designed (typically 3 to 5% power). A reactor shutdown is determined in accordance with applicable Emergency Operating Procedure criteria.~~

Should a reactor ~~(trip [PWR]/scram [BWR])~~ signal be generated as a result of plant work (e.g., RPS setpoint testing), the following classification guidance should be applied.

- If the signal causes a plant transient that should have included an automatic reactor ~~(trip [PWR]/scram [BWR])~~ and the RPS fails to automatically shutdown the reactor, then this IC and the EALs are applicable, and should be evaluated.
- If the signal does not cause a plant transient and the ~~(trip [PWR]/scram [BWR])~~ 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.

Developer Notes:

~~This IC is applicable in any Mode in which the actual reactor power level could exceed the power level at which the reactor is considered shutdown. A PWR with a shutdown reactor power level that is less than or equal to the reactor power level which defines the lower bound of Power Operation (Mode 1) will need to include Startup (Mode 2) in the Operating Mode Applicability. For example, if the reactor is considered to be shutdown at 3% and Power Operation starts at >5%, then the IC is also applicable in Startup Mode.~~

~~Developers may include site specific EOP criteria indicative of a successful reactor shutdown in~~

~~an EAL statement, the Basis or both (e.g., a reactor power level).~~

~~—— The term “reactor control consoles” may be replaced with the appropriate site-specific term (e.g., main control boards).~~

~~ECL Assignment Attributes: 3.1.1.A~~

SU6SU7

ECL: Notification of Unusual Event

Initiating Condition: Loss of ~~all~~ ALL onsite or offsite communications capabilities.

Operating Mode Applicability: ~~Power Operation, Startup, Hot Standby, Hot Shutdown~~ 1, 2, 3

Example Emergency Action Levels: ~~(1 or 2 or 3)~~

SU7.1 Loss of **ALL** of the following onsite communication methods:

- ~~(site-specific list of communications methods)~~ Plant Operations Radio System
- In-Plant Phone System
- Plant Paging System (Gaitronics)

SU7.2 Loss of **ALL** of the following ~~OR~~ offsite response organization communications methods:

- ~~(site-specific list of communications methods)~~ DAEC All-Call phone
- All telephone lines (PBX and commercial)
- Cell Phones (including fixed cell phone system)
- Control Room fixed satellite phone system
- FTS Phone system

SU7.3 Loss of **ALL** of the following NRC communications methods:

- ~~(site-specific list of communications methods)~~ FTS Phone system
- All telephone lines (PBX and commercial)
- Cell Phones (including fixed cell phone system)
- Control Room fixed satellite phone system

Basis:

This IC addresses a significant loss of on-site or offsite communications capabilities. While not a direct challenge to plant or personnel safety, this event warrants prompt notifications to ~~OR~~ offsite response organizations and the NRC.

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

EAL SU7.1 addresses a total loss of the communications methods used in support of routine plant operations.

EAL SU7.2 addresses a total loss of the communications methods used to notify all ~~ORO~~offsite response organizations of an emergency declaration. The ~~ORO~~offsite response organizations referred to here are the State of Iowa, Linn County, and Benton County (see Developer Notes).

———EAL SU7.3 addresses a total loss of the communications methods used to notify the NRC of an emergency declaration.

Developer Notes:

———EAL #1 — The “site-specific list of communications methods” should include all communications methods used for routine plant communications (e.g., commercial or site telephones, page-party systems, radios, etc.). This listing should include installed plant equipment and components, and not items owned and maintained by individuals.

EAL #2 — The “site-specific list of communications methods” should include all communications methods used to perform initial emergency notifications to OROs as described in the site Emergency Plan. The listing should include installed plant equipment and components, and not items owned and maintained by individuals. Example methods are ring-down/dedicated telephone lines, commercial telephone lines, radios, satellite telephones and internet-based communications technology.

In the Basis section, insert the site-specific listing of the OROs requiring notification of an emergency declaration from the Control Room in accordance with the site Emergency Plan, and typically within 15 minutes.

EAL #3 — The “site-specific list of communications methods” should include all communications methods used to perform initial emergency notifications to the NRC as described in the site Emergency Plan. The listing should include installed plant equipment and components, and not items owned and maintained by individuals. These methods are typically the dedicated Emergency Notification System (ENS) telephone line and commercial telephone lines.

———ECL Assignment Attributes: 3.1.1.C

~~SU7~~

~~ECL: Notification of
Unusual Event~~

~~Initiating Condition:~~

~~Failure to isolate containment or loss of containment
pressure control. [PWR]~~

~~Operating Mode~~

~~Applicability: Power Operation, Startup, Hot Standby,
Hot Shutdown~~

~~Example Emergency~~

~~Action Levels: (1 or 2)~~

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

~~AND~~

~~b. ALL required
penetrations are not closed within 15 minutes of the
actuation signal.~~

~~2 a. Containment
pressure greater than (site-specific pressure).~~

~~AND~~

~~b. Less than one full
train of (site-specific system or equipment) is
operating per design for 15 minutes or longer.~~

~~Basis:~~

~~This IC addresses a
failure of one or more 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.~~

~~For EAL 1, 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 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.~~

~~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.~~

~~Developer Notes:~~

~~Enter the "site-specific pressure" value that actuates containment pressure control systems (e.g., containment spray). Also enter the site-specific containment pressure control system/equipment that should be operating per design if the containment pressure actuation setpoint is reached. If desired, specific condition indications such as parameter values can also be entered (e.g., a containment spray flow rate less than a certain value).~~

~~EAL #2 is not applicable to the U.S. Evolutionary Power Reactor (EPR) design.~~

~~ECL Assignment~~

~~Attributes: 3.1.1.A~~

SA1

ECL: Alert

Initiating Condition: Loss of ~~all~~ ALL but one AC power source to emergency essential buses for 15 minutes or longer.

Operating Mode Applicability: ~~Power Operation, Startup, Hot Standby, Hot Shutdown~~ 1, 2, 3

Example Emergency Action Levels:

Note: The Emergency Director should declare the Alert event promptly upon determining that the applicable time 15 minutes has been exceeded, or will likely be exceeded.

- SA1.1 a. AC power capability to ~~(site-specific emergency buses)~~ 1A3 and 1A4 buses is reduced to a single power source for 15 minutes or longer.

AND

- b. ~~Any~~ ANYANY additional single power source failure will result in a loss of ~~all~~ ALL AC power to SAFETY SYSTEMS.

Definitions:

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

Basis:

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 SU1.

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 essential ~~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 SS1.

Developer Notes:

~~For a power source that has multiple generators, the EAL and/or Basis section should reflect the minimum number of operating generators necessary for that source to provide required power to~~

~~an AC emergency bus. For example, if a backup power source is comprised of two generators (i.e., two 50% capacity generators sized to feed 1 AC emergency bus), the EAL and Basis section must specify that both generators for that source are operating.~~

~~The “site specific emergency buses” are the buses fed by offsite or emergency AC power sources that supply power to the electrical distribution system that powers SAFETY SYSTEMS. There is typically 1 emergency bus per train of SAFETY SYSTEMS.~~

~~Developers should modify the bulleted examples provided in the basis section, above, as needed to reflect their site specific plant designs and capabilities.~~

~~The EALs and Basis should reflect that each independent offsite power circuit constitutes a single power source. For example, three independent 345kV offsite power circuits (i.e., incoming power lines) comprise three separate power sources. Independence may be determined from a review of the site specific UFSAR, SBO analysis or related loss of electrical power studies.~~

~~The EAL and/or Basis section may specify use of a non-safety related power source provided that operation of this source is recognized in AOPs and EOPs, or beyond design basis accident response guidelines (e.g., FLEX support guidelines). Such power sources should generally meet the “Alternate ac source” definition provided in 10 CFR 50.2.~~

~~At multi-unit stations, the EALs may credit compensatory measures that are proceduralized and can be implemented within 15 minutes. Consider capabilities such as power source cross ties, “swing” generators, other power sources described in abnormal or emergency operating procedures, etc. Plants that have a proceduralized capability to supply offsite AC power to an affected unit via a cross tie to a companion unit may credit this power source in the EAL provided that the planned cross tie strategy meets the requirements of 10 CFR 50.63.~~

~~ECL Assignment Attributes: 3.1.2.B~~

SA2SA3

ECL: Alert

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

Operating Mode Applicability: ~~Power Operation, Startup, Hot Standby, Hot Shutdown~~ 1, 2, 3

Example Emergency Action Levels:

Note: The Emergency Director should declare the Alert event promptly upon determining that the applicable time 15 minutes has been exceeded, or will likely be exceeded.

- SA3.1 a. An UNPLANNED event results in the inability to monitor one or more Table S-1 parameters from within the Control Room for 15 minutes or longer
~~An UNPLANNED event results in the inability to monitor one or more of the following parameters from within the Control Room for 15 minutes or longer.~~

Table S-1 Safety System Parameters

- Reactor power
- RPV Water Level
- RPV Pressure
- Primary Containment Pressure
- Suppression Pool Level
- Suppression Pool Temperature

Reactor

Power
RPV Water Level
RPV Pressure
Primary Containment Pressure
Suppression Pool Level
Suppression Pool Temperature

<u>{BWR parameter list}</u>	<u>{PWR parameter list}</u>
<u>Reactor Power</u>	<u>Reactor Power</u>
<u>RPV Water Level</u>	<u>RCS Level</u>
<u>RPV Pressure</u>	<u>RCS Pressure</u>
<u>Primary Containment Pressure</u>	<u>In-Core/Core Exit Temperature</u>
<u>Suppression Pool Level</u>	<u>Levels in at least (site-specific number) steam generators</u>
<u>Suppression Pool Temperature</u>	<u>Steam Generator Auxiliary or Emergency Feed Water Flow</u>

AND

- b. ANY of the Table S-2 transient events are in progress.

Table S-2 Significant Transients

- Automatic or manual runback greater than 25% thermal reactor power
- Electrical load rejection greater than 25% full electrical load
- Reactor scram
- ECCS actuation
- Thermal power oscillations greater than 10%

~~transient events in progress.~~ of the following

~~Automatic or manual runback greater than 25% thermal reactor power~~

~~Electrical load rejection greater than 25% full electrical load~~

~~Reactor scram [BWR] / trip [PWR]~~

~~ECCS (SI) actuation~~

~~Thermal power oscillations greater than 10% [BWR]~~

Definitions:

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

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.

Basis:

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

As used in this EAL, an “inability to monitor” means that values for one or more 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.

This EAL is focused on a selected subset of plant parameters associated with the key safety functions of reactivity control, ~~core cooling [PWR]~~ /RPV level ~~[BWR]~~ and RCS heat removal. The loss of the ability to determine one or more 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 one or more 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 [PWR]~~ /RPV water level ~~[BWR]~~ 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 ~~AS1~~RS1.

Developer Notes:

~~In the PWR parameter list column, the “site specific number” should reflect the minimum number of steam generators necessary for plant cooldown and shutdown. This criterion may also specify whether the level value should be wide range, narrow range or both, depending upon the monitoring requirements in emergency operating procedures.~~

~~Developers may specify either pressurizer or reactor vessel level in the PWR parameter column entry for RCS Level.~~

~~Developers should consider if the “transient events” list needs to be modified to better reflect site specific plant operating characteristics and expected responses.~~

~~The number, type, location and layout of Control Room indications, and the range of possible failure modes, can challenge the ability of an operator to accurately determine, within the time period available for emergency classification assessments, if a specific percentage of indications have been lost. The approach used in this EAL facilitates prompt and accurate emergency classification assessments by focusing on the indications for a selected subset of parameters.~~

~~By focusing on the availability of the specified parameter values, instead of the sources of those values, the EAL recognizes and accommodates the wide variety of indications in nuclear power plant Control Rooms. Indication types and sources may be analog or digital, safety related or not, primary or alternate, individual meter value or computer group display, etc.~~

~~A loss of plant annunciators will be evaluated for reportability in accordance with 10 CFR 50.72 (and the associated guidance in NUREG-1022), and reported if it significantly impairs the capability to perform emergency assessments. Compensatory measures for a loss of annunciation can be readily implemented and may include increased monitoring of main control boards and more frequent plant rounds by non-licensed operators. Their alerting function notwithstanding, annunciators do not provide the parameter values or specific component status information used to operate the plant, or process through AOPs or EOPs. Based on these considerations, a loss of annunciation is considered to be adequately addressed by reportability criteria, and therefore not included in this IC and EAL.~~

~~With respect to establishing event severity, the response to a loss of radiation monitoring data (e.g., process or effluent monitor values) is considered to be adequately bounded by the requirements of 10 CFR 50.72 (and associated guidance in NUREG-1022). The reporting of this event will ensure adequate plant staff and NRC awareness, and drive the establishment of appropriate compensatory measures and corrective actions. In addition, a loss of radiation monitoring data, by itself, is not a precursor to a more significant event.~~

~~Personnel at sites that have a Failure Modes and Effects Analysis (FMEA) included within the design basis of a digital I&C system should consider the FMEA information when developing their site-specific EALs.~~

~~Due to changes in the configurations of SAFETY SYSTEMS, including associated instrumentation and indications, during the cold shutdown, refueling, and defueled modes, no analogous IC is included for these modes of operation.~~

~~ECL Assignment Attributes: 3.1.2.B~~

SA5SA6

ECL: Alert

Initiating Condition: Automatic or manual (~~trip [PWR]~~/~~scram [BWR]~~) 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: ~~Power Operation~~ 1, 2

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.

Example Emergency ~~Emergency~~ **Action Levels:**

SA6.1 a. An automatic or manual (~~trip [PWR]~~/~~scram [BWR]~~) did not shutdown the reactor.

AND

- b. ALL of the following manual actions taken at 1C05 are not successful in lowering reactor power below 5% power
- Manual Scram Pushbuttons
 - Mode Switch to Shutdown
 - Alternate Rod Insertion (ARI) ~~Manual actions taken at the reactor control consoles (1C05) are not successful in shutting down the reactor.~~

Definitions:

None

Basis:

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

A manual action at the reactor control consoles 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 [PWR]~~/~~scram [BWR]~~)). This action does not include manually driving in control rods or implementation of boron injection strategies. If this action(s) is unsuccessful, operators would immediately pursue additional manual actions at locations away from the reactor control consoles (e.g., locally opening breakers). Actions taken at back-panels or other locations within the Control Room, or any location outside the Control Room, are not considered to be "at the reactor control consoles."

Taking the Reactor Mode Switch to SHUTDOWN is considered to be a manual scram action.
[BWR]

The plant response to the failure of an automatic or manual reactor ~~(trip [PWR]/scram [BWR])~~ 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 [PWR]~~/RPV water level [BWR] or RCS heat removal safety functions, the emergency classification level will escalate to a Site Area Emergency via IC SS56. Depending upon plant responses and symptoms, escalation is also possible via IC FS1. Absent the plant conditions needed to meet either IC SS56 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.

The reactor should be considered shutdown when it is producing less heat than the maximum decay heat load for which the SAFETY SYSTEMS are designed (typically 3 to 5% power). A reactor shutdown is determined in accordance with applicable Emergency Operating Procedure criteria.

Developer Notes:

~~———— This IC is applicable in any Mode in which the actual reactor power level could exceed the power level at which the reactor is considered shutdown. A PWR with a shutdown reactor power level that is less than or equal to the reactor power level which defines the lower bound of Power Operation (Mode 1) will need to include Startup (Mode 2) in the Operating Mode Applicability. For example, if the reactor is considered to be shutdown at 3% and Power Operation starts at >5%, then the IC is also applicable in Startup Mode.~~

~~———— Developers may include site specific EOP criteria indicative of a successful reactor shutdown in an EAL statement, the Basis or both (e.g., a reactor power level).~~

~~———— The term “reactor control consoles” may be replaced with the appropriate site specific term (e.g., main control boards).~~

~~ECL Assignment Attributes: 3.1.2.B~~

SA9SA8

ECL: Alert

Initiating Condition: Hazardous event affecting a SAFETY SYSTEM needed for the current operating mode.

Operating Mode Applicability: ~~Power Operation, Startup, Hot Standby, Hot Shutdown~~ 1, 2, 3

Example Emergency Action Levels:

Notes:

- If the affected SAFETY SYSTEM train was already inoperable or out of service before the hazardous event occurred, then this emergency classification is not warranted.
- If the hazardous event only resulted in VISIBLE DAMAGE, with no indications of degraded performance to at least one train of the SAFETY SYSTEM, then this emergency classification is not warranted.

SA8.1 a. The occurrence of ANY of the Table S-3 hazardous events:

Table S-3 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 or Emergency Director

~~The occurrence of ANY of the following hazardous events:~~

~~Seismic event (earthquake)~~

~~Internal or external flooding event~~

~~High winds or tornado strike~~

~~FIRE~~

~~EXPLOSION~~

~~(site-specific hazards)~~

~~Other events with similar hazard characteristics as determined by the Shift Manager or Emergency Director~~

AND

- b. 1. Event damage has caused indications of degraded performance in one train of a SAFETY SYSTEM needed for the current operating mode.

AND

2. **EITHER** of the following:

- Event damage has caused indications of degraded performance to a second train of the SAFETY SYSTEM needed for the current operating mode.

OR

- The event has resulted in VISIBLE DAMAGE to the second train of a SAFETY SYSTEM needed for the current operating mode.;

Event damage has caused indications of degraded performance to a second train of the SAFETY SYSTEM needed for the current operating mode, or

The event has resulted in VISIBLE DAMAGE to the second train of the SAFETY SYSTEM needed for the current operating mode.

Loss of the safety function of a single train SAFETY SYSTEM.

Definitions:

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 FIRES. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

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 systems are classified as safety-related. A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. 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. Damage resulting from an equipment failure and limited to the failed component (i.e., the failure did not cause damage to a structure or any other equipment) is not VISIBLE DAMAGE.

— EITHER of the following:

1. — Event damage has caused indications of degraded performance in at least one train of a SAFETY SYSTEM needed for the current operating mode.

— OR

2. — The event has caused VISIBLE DAMAGE to a SAFETY SYSTEM component or structure needed for the current operating mode.

Basis:

This IC addresses a hazardous event that causes damage to SAFETY SYSTEMS needed for the current operating mode. In order to provide the appropriate context for consideration of an ALERT classification, the hazardous event must have caused indications of degraded SAFETY SYSTEM performance in one train, and there must be either indications of performance issues with the second SAFETY SYSTEM train or VISIBLE DAMAGE to the second train such that the potential exists for this second SAFETY SYSTEM train to have performance issues. In other words, in order for this EAL to be classified, the hazardous event must occur, at least one SAFETY SYSTEM train must have indications of degraded performance, and the second SAFETY SYSTEM train must have indications of degraded performance or VISIBLE DAMAGE such that the potential exists for performance issues. Note that this second SAFETY SYSTEM train is from the same SAFETY SYSTEM that has indications of degraded performance for criteria SA98.1.b.1 of this EAL; commercial nuclear power plants are designed to be able to support single system issues without compromising public health and safety from radiological events.

An event affecting a single-train SAFETY SYSTEM (i.e., there are indications of degraded performance and/or VISIBLE DAMAGE affecting the one train) would not be classified under SA8 because the two-train impact criteria that underlie the EALs and Bases would not be met. If

an event affects a single-train SAFETY SYSTEM, then the emergency classification should be made based on plant parameters/symptoms meeting the EALs for another IC. Depending upon the circumstances, classification may also occur based on Shift Manager/Emergency Director judgement.

Indications of degraded performance addresses damage to a SAFETY SYSTEM train that is in service/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.

VISIBLE DAMAGE addresses damage to a SAFETY SYSTEM train that is not in service/operation and that potentially could cause performance issues. 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. This VISIBLE DAMAGE should be significant enough to cause concern regarding the operability or reliability of the SAFETY SYSTEM train.

~~This IC addresses a hazardous event that causes damage to a SAFETY SYSTEM, or a structure containing SAFETY SYSTEM components, needed 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.~~

~~EAL 1.b.1 addresses damage to a SAFETY SYSTEM train that is in service/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 1.b.2 addresses damage to a SAFETY SYSTEM component that is not in service/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 FS1 or **AS+RS1**.

Developer Notes:

~~For (site-specific hazards), developers should consider including other significant, site-specific hazards to the bulleted list contained in EAL 1.a (e.g., a seiche).~~

~~Nuclear power plant SAFETY SYSTEMS are comprised of two or more separate and redundant trains of equipment in accordance with site-specific design criteria.~~

~~ECL Assignment Attributes: 3.1.2.B~~

SS1

ECL: Site Area Emergency

Initiating Condition: Loss of ~~ALL~~~~all~~ offsite and ~~all~~~~ALL~~ onsite AC power to ~~emergency essential~~ buses for 15 minutes or longer.

Operating Mode Applicability: ~~Power Operation, Startup, Hot Standby, Hot Shutdown~~ 1, 2, 3

Example Emergency Action Levels:

Note: The Emergency Director should declare the ~~Site Area Emergency event~~ promptly upon determining that ~~the applicable time~~ ~~15 minutes~~ has been exceeded, or will likely be exceeded.

SS1.1 Loss of **ALL** offsite and **ALL** onsite AC power to ~~(site-specific emergency buses)~~ **1A3 and 1A4 buses** for 15 minutes or longer.

Definitions:

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

Basis:

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 ~~AG1~~~~RG1~~, FG1 or SG1.

Developer Notes:

~~For a power source that has multiple generators, the EAL and/or Basis section should reflect the minimum number of operating generators necessary for that source to provide adequate power to an AC emergency bus. For example, if a backup power source is comprised of two generators (i.e., two 50% capacity generators sized to feed 1 AC emergency bus), the EAL and Basis section must specify that both generators for that source are operating.~~

~~The "site-specific emergency buses" are the buses fed by offsite or emergency AC power sources that supply power to the electrical distribution system that powers SAFETY SYSTEMS. There is typically 1 emergency bus per train of SAFETY SYSTEMS.~~

~~The EAL and/or Basis section may specify use of a non-safety-related power source provided that operation of this source is controlled in accordance with abnormal or emergency operating procedures, or beyond design basis accident response guidelines (e.g., FLEX support guidelines). Such power sources should generally meet the "Alternate ac source" definition provided in 10 CFR 50.2.~~

~~At multi-unit stations, the EALs may credit compensatory measures that are proceduralized and can be implemented within 15 minutes. Consider capabilities such as power source cross-ties, "swing" generators, other power sources described in abnormal or emergency operating procedures, etc. Plants that have a proceduralized capability to supply offsite AC power to an affected unit via a cross-tie to a companion unit may credit this power source in the EAL provided that the planned cross-tie strategy meets the requirements of 10 CFR 50.63.~~

~~ECL Assignment Attributes: 3.1.3.B~~

SS8SS2

ECL: Site Area Emergency

Initiating Condition: Loss of ALL Vital DC power for 15 minutes or longer.

Operating Mode Applicability: 1, 2, 3

Emergency Action Levels:

Note: The Emergency Director should declare the Site Area Emergency event promptly upon determining that the applicable time 15 minutes has been exceeded, or will likely be exceeded.

SS2.1 Indicated voltage is less than ~~(site-specific bus voltage value)~~ 105 VDC on ~~ALL (site-specific Vital DC busses)~~ **BOTH Div 1 and Div 2 125 VDC buses** for 15 minutes or longer.

Definitions:

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

Basis:

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 ~~AG1RG1~~, FG1 or SG2.

SS5SS6

ECL: Site Area Emergency

Initiating Condition: Inability to shutdown the reactor causing a challenge to ~~(core-cooling~~
~~[PWR]/RPV~~ water level ~~[BWR])~~ or RCS heat removal.

Operating Mode Applicability: ~~Power Operation~~ 1, 2

Example Emergency Action Levels:

- SS6.1 a. An automatic or manual ~~(trip [PWR]/scram [BWR])~~ did not shutdown the reactor.
- _____ **AND**
- b. ALL of the following manual actions taken at IC05 are not successful in lowering reactor power below 5% power:
- Manual Scram Pushbuttons
 - Mode Switch to Shutdown
 - Alternate Rod Insertion (ARI) ~~All manual actions to shutdown the reactor have been unsuccessful.~~
- AND**
- c. **EITHER** of the following conditions exist:
- (Site-specific indication of an inability to adequately remove heat from the core) Reactor vessel water/RPV level cannot be restored and maintained above -25 inches.
 - OR**
 - (Site-specific indication of an inability to adequately remove heat from the RCS) HCL (Graph 4 of EOP 2) exceeded.

Definitions:

None

Basis:

This IC addresses a failure of the RPS to initiate or complete an automatic or manual reactor ~~(trip [PWR]/scram [BWR])~~ that results in a reactor shutdown, all subsequent operator actions to manually shutdown the reactor 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.

The reactor should be considered shutdown when it is producing less heat than the maximum decay heat load for which the SAFETY SYSTEMS are designed (typically 3 to 5% power).

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

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

Developer Notes:

~~This IC is applicable in any Mode in which the actual reactor power level could exceed the power level at which the reactor is considered shutdown. A PWR with a shutdown reactor power level that is less than or equal to the reactor power level which defines the lower bound of Power Operation (Mode 1) will need to include Startup (Mode 2) in the Operating Mode Applicability. For example, if the reactor is considered to be shutdown at 3% and Power Operation starts at >5%, then the IC is also applicable in Startup Mode.~~

~~Developers may include site-specific EOP criteria indicative of a successful reactor shutdown in an EAL statement, the Basis or both (e.g., a reactor power level).~~

~~Site-specific indication of an inability to adequately remove heat from the core:~~

~~[BWR]—Reactor vessel water level cannot be restored and maintained above Minimum Steam Cooling RPV Water Level (as described in the EOP bases).~~

~~[PWR]—Insert site-specific values for an incore/core exit thermocouple temperature and/or reactor vessel water level that drives entry into a core cooling restoration procedure (or otherwise requires implementation of prompt restoration actions). Alternately, a site may use incore/core exit thermocouple temperatures greater than 1,200°F and/or a reactor vessel water level that corresponds to approximately the middle of active fuel. Plants with reactor vessel level instrumentation that cannot measure down to approximately the middle of active fuel should use the lowest on-scale reading that is not above the top of active fuel. If the lowest on-scale reading is above the top of active fuel, then a reactor vessel level value should not be included.~~

~~For plants that have implemented Westinghouse Owners Group Emergency Response Guidelines, enter the parameters used in the Core Cooling Red Path.~~

~~Site-specific indication of an inability to adequately remove heat from the RCS:~~

~~[BWR]—Use the Heat Capacity Temperature Limit. This addresses the inability to remove heat via the main condenser and the suppression pool due to high pool water temperature.~~

~~[PWR]—Insert site-specific parameters associated with inadequate RCS heat removal via the steam generators. These parameters should be identical to those used for the Inadequate Heat Removal threshold Fuel Clad Barrier Potential Loss 2.B and threshold RCS Barrier Potential Loss 2.A in the PWR EAL Fission Product Barrier Table.~~

ECL Assignment Attributes: 3.1.3.B

SS8

ECL: Site Area Emergency

Initiating Condition: Loss of all Vital DC power for 15 minutes or longer.

Operating Mode Applicability: Power Operation, Startup, Hot Standby, Hot Shutdown 1, 2, 3, 4

Example Emergency Action Levels:

Note: The Emergency Director should declare the Site Area Emergency promptly upon determining that 15 minutes has been exceeded, or will likely be exceeded.

1 ——— Indicated voltage is less than (site-specific bus voltage value) 115 VDC on ALL (site-specific Vital DC busses) 1(2) D-01, D-02, D-03, and D-04 for 15 minutes or longer.

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. 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 AG1RG1, FG1 or SG8.

Developer Notes:

The “site-specific bus voltage value” should be based on the minimum bus voltage necessary for adequate operation of SAFETY SYSTEM equipment. This voltage value should incorporate a margin of at least 15 minutes of operation before the onset of inability to operate those loads. This voltage is usually near the minimum voltage selected when battery sizing is performed. The typical value for an entire battery set is approximately 105 VDC. For a 60-cell string of batteries, the cell voltage is approximately 1.75 Volts per cell. For a 58 string battery set, the minimum voltage is approximately 1.81 Volts per cell.

The “site-specific Vital DC busses” are the DC busses that provide monitoring and control capabilities for SAFETY SYSTEMS.

ECL Assignment Attributes: 3.1.3.B

SG1

ECL: General Emergency

Initiating Condition: Prolonged loss of ~~all~~ALL offsite and ALL~~all~~ onsite AC power to emergency-essential buses.

Operating Mode Applicability: ~~Power Operation, Startup, Hot Standby, Hot Shutdown~~1, 2, 3

Example Emergency Action Levels:

Note: The Emergency Director should declare the ~~General Emergency event~~ promptly upon determining that ~~(site-specific-hours)~~ the applicable time 4 hours has been exceeded, or will likely be exceeded.

- SG1.1
- a. Loss of ALL offsite and ALL onsite AC power to 1A3 and 1A4 buses~~(site-specific-emergency-buses)~~.
 - AND
 - b. EITHER of the following:
 - Restoration of at least one AC emergency-essential bus in less than (site-specific-hours)4 hours is not likely.
 - OR
 - ~~(Site-specific indication of an inability to adequately remove heat from the core)~~RPV level cannot be restored and maintained above -25 inches.

Definitions:

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

Basis:

This IC addresses a prolonged loss of all power sources to AC emergency-essential 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 one or more 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-essential bus by the end of the analyzed 4 hour 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 ~~essential~~emergency bus should be based on a realistic appraisal of the situation. Mitigation actions with a low probability of success should not be used as a basis for delaying a classification upgrade. The goal is to maximize the time available to prepare for, and implement, protective actions for the public.

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

Developer Notes:

~~Although this IC and EAL may be viewed as redundant to the Fission Product Barrier ICs, it is included to provide for a more timely escalation of the emergency classification level.~~

~~The “site-specific emergency buses” are the buses fed by offsite or emergency AC power sources that supply power to the electrical distribution system that powers SAFETY SYSTEMS. There is typically 1 emergency bus per train of SAFETY SYSTEMS.~~

~~The “site-specific hours” to restore AC power to an emergency bus should be based on the station blackout coping analysis performed in accordance with 10 CFR § 50.63 and Regulatory Guide 1.155, *Station Blackout*.~~

~~Site-specific indication of an inability to adequately remove heat from the core:~~

~~[BWR]—Reactor vessel water level cannot be restored and maintained above Minimum Steam Cooling RPV Water Level (as described in the EOP bases).~~

~~[PWR]—Insert site-specific values for an incore/core exit thermocouple temperature and/or reactor vessel water level that drive entry into a core cooling restoration procedure (or otherwise requires implementation of prompt restoration actions). Alternately, a site may use incore/core exit thermocouple temperatures greater than 1,200°F and/or a reactor vessel water level that corresponds to approximately the middle of active fuel. Plants with reactor vessel level instrumentation that cannot measure down to approximately the middle of active fuel should use the lowest on-scale reading that is not above the top of active fuel. If the lowest on-scale reading is above the top of active fuel, then a reactor vessel level value should not be included.~~

~~———For plants that have implemented Westinghouse Owners Group Emergency Response Guidelines, enter the parameters used in the Core Cooling Red Path.~~

~~———ECL Assignment Attributes: 3.1.4.B~~

SG8SG2

ECL: General Emergency

Initiating Condition: Loss of ~~all~~ ALL AC and Vital DC power sources for 15 minutes or longer.

Operating Mode Applicability: ~~Power Operation, Startup, Hot Standby, Hot Shutdown~~ 1, 2, 3

Example Emergency Action Levels:

Note: The Emergency Director should declare the ~~General Emergency event~~ promptly upon determining that the applicable time 15 minutes has been exceeded, or will likely be exceeded.

- SG2.1
- a. Loss of **ALL** offsite and **ALL** onsite AC power to ~~(site-specific-emergency buses)~~ 1A3 and 1A4 buses for 15 ~~minutes~~ or longer.
- AND
- b. Indicated voltage is less than ~~(site-specific-bus-voltage-value)~~ 105 VDC on ~~ALL (site-specific-Vital-DC-busses)~~ BOTH Div 1 and Div 2 125 VDC buses for 15 minutes or longer.

Definitions:

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

Basis:

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 both EAL thresholds are met.

Developer Notes:

~~The “site-specific-emergency buses” are the buses fed by offsite or emergency AC power sources that supply power to the electrical distribution system that powers SAFETY SYSTEMS. There is typically 1 emergency bus per train of SAFETY SYSTEMS.~~

~~—The “site-specific-bus-voltage-value” should be based on the minimum bus voltage necessary for adequate operation of SAFETY SYSTEM equipment. This voltage value should incorporate a margin of at least 15 minutes of operation before the onset of inability to operate those loads. This voltage is usually near the minimum voltage selected when battery sizing is performed.~~

~~The typical value for an entire battery set is approximately 105 VDC. For a 60-cell string of batteries, the cell voltage is approximately 1.75 Volts per cell. For a 58-string battery set, the minimum voltage is approximately 1.81 Volts per cell.~~

~~The “site-specific Vital DC busses” are the DC busses that provide monitoring and control capabilities for SAFETY SYSTEMS.~~

~~This IC and EAL were added to Revision 6 to address operating experience from the March, 2011 accident at Fukushima Daiichi.~~

~~ECL Assignment Attributes: 3.1.4.B~~

APPENDIX A – ACRONYMS AND ABBREVIATIONS

AC	Alternating Current	
AOP	Abnormal Operating Procedure	
PRM	Average Power Range Meter	A
ATWS	Anticipated Transient Without Scram	
&W	Babcock and Wilcox	B
HT	Boron Injection Initiation Temperature	B
BWR	Boiling Water Reactor	
CDE	Committed Dose Equivalent	
CFR	Code of Federal Regulations	
CTMT /CNMT	Containment	C
SF	Critical Safety Function	C
SFST	Critical Safety Function Status Tree	D
BA	Design Basis Accident	
DC	Direct Current	
EAL	Emergency Action Level	
ECCS	Emergency Core Cooling System	
ECL	Emergency Classification Level	
EOF	Emergency Operations Facility	
EOP	Emergency Operating Procedure	
EPA	Environmental Protection Agency	
EPG	Emergency Procedure Guideline	
PIP	Emergency Plan Implementing Procedure	E
PR	Evolutionary Power Reactor	E
PRI	Electric Power Research Institute	E
RG	Emergency Response Guideline	F
EMA	Federal Emergency Management Agency	
FSAR	Final Safety Analysis Report	
GE	General Emergency	
HCTL	Heat Capacity Temperature Limit	
HPCI	High Pressure Coolant Injection	
SI	Human System Interface	H
IC	Initiating Condition	

D.....	Inside Diameter	I
IPEEE	Individual Plant Examination of External Events (Generic Letter 88-20)	
ISFSI	Independent Spent Fuel Storage Installation	
Keff	Effective Neutron Multiplication Factor	
LCO.....	Limiting Condition of Operation	
<hr/>		
OCA	Loss of Coolant Accident	L
<hr/>		
CR	Main Control Room	M
<hr/>		
SIV	Main Steam Isolation Valve	M
MSL	Main Steam Line	
mR, mRem, mrem, mREM	milli-Roentgen Equivalent Man	
MW	Megawatt	
NEI.....	Nuclear Energy Institute	
<hr/>		
PP	Nuclear Power Plant	N
<hr/>		
RC	Nuclear Regulatory Commission	N
NSSS	Nuclear Steam Supply System	
NORAD	North American Aerospace Defense Command	
(NO)UE	(Notification Of) Unusual Event	
NUMARC ¹	Nuclear Management and Resources Council	
OBE.....	Operating Basis Earthquake	
OCA	Owner Controlled Area	
<hr/>		
DCM/ODAM	Offsite Dose Calculation (Assessment) Manual	O
ORO	Off-site Response Organization	
PA	Protected Area	
<hr/>		
ACS	Priority Actuation and Control System	P
PAG.....	Protective Action Guideline	
<hr/>		
ICS	Process Information and Control System	P
PRA/PSA	Probabilistic Risk Assessment / Probabilistic Safety Assessment	
PWR.....	Pressurized Water Reactor	
<hr/>		
S	Protection System	P
PSIG	Pounds per Square Inch Gauge	
R.....	Roentgen	
<hr/>		
CC	Reactor Control Console	R
RCIC	Reactor Core Isolation Cooling	

¹ NUMARC was a predecessor organization of the Nuclear Energy Institute (NEI).

RCS	Reactor Coolant System	
Rem, rem, REM	Roentgen Equivalent Man	
ETS	Radiological Effluent Technical Specifications	R
RPS	Reactor Protection System	
RPV	Reactor Pressure Vessel	
VLIS	Reactor Vessel Level Instrumentation System	R
RWCU	Reactor Water Cleanup	
AR	Safety Analysis Report	S
AS	Safety Automation System	S
BO	Station Blackout	S
SCBA	Self-Contained Breathing Apparatus	
G	Steam Generator	S
I	Safety Injection	S
ICS	Safety Information and Control System	S
PDS	Safety Parameter Display System	
SRO	Senior Reactor Operator	
TEDE	Total Effective Dose Equivalent	
TOAF	Top of Active Fuel	
TSC	Technical Support Center	
FSAR	Updated Final Safety Analysis Report	U
WOG	Westinghouse Owners Group	

APPENDIX B – DEFINITIONS

The following definitions are taken from Title 10, Code of Federal Regulations, and related regulatory guidance documents.

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 PAG exposure levels.

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

Notification of Unusual Event (NOUE)⁺: 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~~ SAFETY SYSTEMS occurs.

Site Area Emergency: 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 PAG exposure levels beyond the site boundary.

The following are key terms necessary for overall understanding the ~~NEI-99-01~~ DAEC emergency classification scheme.

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.

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:

Notification of Unusual Event (NOUE)
Alert
Site Area Emergency (SAE)
General Emergency (GE)

⁺ ~~This term is sometimes shortened to Unusual Event (UE) or other similar site specific terminology.~~

Fission Product Barrier Threshold: A pre-determined, site-specific, observable threshold indicating the loss or potential loss of a fission product barrier.

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.

Selected terms used in Initiating Condition and Emergency Action Level statements are set in all capital letters (e.g., ALL CAPS). These words are defined terms that have specific meanings as used in this document. The definitions of these terms are provided below.

CONFINEMENT BOUNDARY: ~~(Insert a site-specific definition for this term.)~~ **Developer Note** – The barrier(s) between spent fuel and the environment once the spent fuel is processed for dry storage. This corresponds to the pressure boundary for the Dry Shielded Canister (DSC) shell (including the inner bottom cover plate) base metal and associated confinement boundary welds.

CONTAINMENT CLOSURE: 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. For DAEC, this is considered to be Secondary Containment as required by Technical Specifications.

~~CONTAINMENT CLOSURE: (Insert a site-specific definition for this term.)~~ **Developer Note** Site specific 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. For DAECs, this is considered to be Secondary Containment as required by Technical Specifications. The procedurally defined conditions or actions taken to secure containment (primary or secondary for BWR) and its associated structures, systems, and components as a functional barrier to fission product release under shutdown conditions.

DESIGN BASIS EARTHQUAKE (DBE): A DBE is vibratory ground motion for which certain (generally, safety-related) structures, systems, and components must be designed to remain functional.

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

~~FAULTED: The term applied to a steam generator that has a steam leak on the secondary side of sufficient size to cause an uncontrolled drop in steam generator pressure or the steam generator to become completely depressurized.~~ **Developer Note** ~~This term is applicable to PWRs only.~~

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

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

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

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

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

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

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

OPERATING BASIS EARTHQUAKE (OBE): 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.

OWNER CONTROLLED AREA: ~~(Insert a site-specific definition for this term.) Developer Note—~~ This term is typically taken to mean the site property owned by, or otherwise under the control of, the licensee. ~~In some cases, it may be appropriate for a licensee to define a smaller area with a perimeter closer to the plant Protected Area perimeter (e.g., a site with a large OCA where some portions of the boundary may be a significant distance from the Protected Area). In these cases, developers should consider using the boundary defined by the Restricted or Secured Owner Controlled Area (ROCA/SOCA). The area and boundary selected for scheme use must be consistent with the description of the same area and boundary contained in the Security Plan.~~

PROJECTILE: An object directed toward a ~~NPP~~**nuclear power plant** that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: ~~_(Insert a site specific definition for this term.) Developer Note— This term is typically taken to mean t~~The area under continuous access monitoring and control, and armed protection as described in the site Security Plan.

REFUELING PATHWAY: ~~_(Insert a site specific definition for this term.) Developer Note— This description should include all the cavities, tubes, canals and pools through which irradiated fuel may be moved, but not including the reactor vessel. Includes all the cavities, tubes, canals and pools through which irradiated fuel may be moved, but not including the reactor vessel.~~

~~———— RUPTURE(D): The condition of a steam generator in which primary to secondary leakage is of sufficient magnitude to require a safety injection. Developer Note— This term is applicable to PWRs only.~~

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 are classified as safety-related. ~~Developer Note— This term may be modified to include the attributes of “safety-related” in accordance with 10 CFR 50.2 or other site specific terminology, if desired.~~

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.

SITE BOUNDARY: That line beyond which the land is neither owned, nor leased, nor otherwise controlled by the Company. UFSAR Figure 1.2-1 identifies the DAEC SITE BOUNDARY.:

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. Damage resulting from an equipment failure and limited to the failed component (i.e., the failure did not cause damage to a structure or any other equipment) is not VISIBLE DAMAGE.

APPENDIX C — PERMANENTLY DEFUELED STATION ICs/EALs

Recognition Category PD provides a stand-alone set of ICs/EALs for a Permanently Defueled nuclear power plant to consider for use in developing a site-specific emergency classification scheme. For development, it was assumed that the plant had operated under a 10 CFR § 50 license and that the operating company has permanently ceased plant operations. Further, the company intends to store the spent fuel within the plant for some period of time.

When in a permanently defueled condition, the plant licensee typically receives approval from the NRC for exemption from specific emergency planning requirements. These exemptions reflect the lowered radiological source term and risks associated with spent fuel pool storage relative to reactor at-power operation. Source terms and accident analyses associated with plausible accidents are documented in the station's Final Safety Analysis Report (FSAR), as updated. As a result, each licensee will need to develop a site-specific emergency classification scheme using the NRC-approved exemptions, revised source terms, and revised accident analyses as documented in the station's FSAR.

Recognition Category PD uses the same ECLs as operating reactors; however, the source term and accident analyses typically limit the ECLs to an Unusual Event and Alert. The Unusual Event ICs provide for an increased awareness of abnormal conditions while the Alert ICs are specific to actual or potential impacts to spent fuel. The source terms and release motive forces associated with a permanently defueled plant would not be sufficient to require declaration of a Site Area Emergency or General Emergency.

A permanently defueled station is essentially a spent fuel storage facility with the spent fuel is stored in a pool of water that serves as both a cooling medium (i.e., removal of decay heat) and shield from direct radiation. These primary functions of the spent fuel storage pool are the focus of the Recognition Category PD ICs and EALs. Radiological effluent IC and EALs were included to provide a basis for classifying events that cannot be readily classified based on an observable events or plant conditions alone.

Appropriate ICs and EALs from Recognition Categories A, C, F, H, and S were modified and included in Recognition Category PD to address a spectrum of the events that may affect a spent fuel pool. The Recognition Category PD ICs and EALs reflect the relevant guidance in Section 3 of this document (e.g., the importance of avoiding both over-classification and under-classification). Nonetheless, each licensee will need to develop their emergency classification scheme using the NRC-approved exemptions, and the source terms and accident analyses specific to the licensee. Security-related events will also need to be considered.

Table PD-1: Recognition Category "PD" Initiating Condition Matrix

UNUSUAL EVENT

ALERT

PD-AU1 Release of gaseous or liquid radioactivity greater than 2 times the (site-specific effluent release controlling document) limits for 60 minutes or longer.

Op. Modes: Not Applicable

PD-AU2 UNPLANNED rise in plant radiation levels.

Op. Modes: Not Applicable

PD-SU1 UNPLANNED spent fuel pool temperature rise.

Op. Modes: Not Applicable

PD-HU1 Confirmed SECURITY CONDITION or threat.

Op. Modes: Not Applicable

PD-HU2 Hazardous event affecting SAFETY SYSTEM equipment necessary for spent fuel cooling.

Op. Modes: Not Applicable

PD-HU3 Other conditions exist which in the judgment of the Emergency Director warrant declaration of a (NO)UE.

Op. Modes: Not Applicable

PD-AA1 Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mrem TEDE or 50 mrem thyroid CDE.

Op. Modes: Not Applicable

PD-AA2 UNPLANNED rise in plant radiation levels that impedes plant access required to maintain spent fuel integrity.

Op. Modes: Not Applicable

PD-HA1 HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes.

Op. Modes: Not Applicable

PD-HA3 Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert.

Op. Modes: Not Applicable

Table intended for use by
EAL developers.
Inclusion in licensee
documents is not required.

PD-AU1

~~ECL: Notification of Unusual Event~~

~~Initiating Condition: Release of gaseous or liquid radioactivity greater than 2 times the (site-specific effluent release-controlling document) limits for 60 minutes or longer.~~

~~Operating Mode Applicability: Not Applicable~~

~~Example Emergency Action Levels: (1 or 2)~~

Notes:

- ~~The Emergency Director should declare the Unusual Event promptly upon determining that 60 minutes 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.~~
 - ~~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 effluent radiation monitor greater than 2 times the alarm setpoint established by a current radioactivity discharge permit for 60 minutes or longer.~~
- (2) ~~Sample analysis for a gaseous or liquid release indicates a concentration or release rate greater than 2 times the (site-specific effluent release-controlling document) limits for 60 minutes or longer.~~

~~Basis:~~

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

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

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

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.

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 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).

EAL #2 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 PD-AA1.

Developer Notes:

The "site-specific effluent release controlling document" is the Radiological Effluent Technical Specifications (RETS) or, for plants that have implemented Generic Letter 89-01¹⁴, the Offsite Dose Calculation Manual (ODCM). These documents implement regulations related to effluent controls (e.g., 10 CFR Part 20 and 10 CFR Part 50, Appendix I). As appropriate, the RETS or ODCM methodology should be used for establishing the monitor thresholds for this IC.

Listed monitors should include the effluent monitors described in the RETS or ODCM.

Developers may also consider including installed monitors associated with other potential effluent pathways that are not described in the RETS or ODCM^{12,13}. If included, EAL values for these monitors should be determined using the most applicable dose/release limits presented in the RETS or ODCM. It is recognized that a calculated EAL value may be below what the monitor can read; in that case, the monitor does not need to be included in the list. Also, some monitors may not be governed by Technical Specifications or other license-related requirements; therefore, it is important that the associated EAL and basis section clearly identify any limitations on the use or availability of these monitors.

Some sites may find it advantageous to address gaseous and liquid releases with separate EALs.

¹⁴ Implementation of Programmatic Controls for Radiological Effluent Technical Specifications in the Administrative Controls Section of the Technical Specifications and the Relocation of Procedural Details of RETS to the Offsite Dose Calculation Manual or to the Process Control Program

¹² This includes consideration of the effluent monitors described in the site emergency plan section(s) which address the requirements of 10 CFR 50.47(b)(8) and (9).

¹³ Developers should keep in mind the requirements of 10 CFR 50.54(q) and the guidance provided by INPO related to emergency response equipment when considering the addition of other effluent monitors.

~~Radiation monitor readings should reflect values that correspond to a radiological release exceeding 2 times a release control limit. The controlling document typically describes methodologies for determining effluent radiation monitor setpoints; these methodologies should be used to determine EAL values. In cases where a methodology is not adequately defined, developers should determine values consistent with effluent control regulations (e.g., 10 CFR Part 20 and 10 CFR Part 50 Appendix I) and related guidance.~~

~~—— For EAL #1 — Values in this EAL should be 2 times the setpoint established by the radioactivity discharge permit to warn of a release that is not in compliance with the specified limits. Indexing the value in this manner ensures consistency between the EAL and the setpoint established by a specific discharge permit.~~

~~—— Developers should research radiation monitor design documents or other information sources to ensure that 1) the EAL value being considered is within the usable response and display range of the instrument, and 2) there are no automatic features that may render the monitor reading invalid (e.g., an auto-purge feature triggered at a particular indication level).~~

~~—— It is recognized that the condition described by this IC may result in a radiological effluent value beyond the operating or display range of the installed effluent monitor. In those cases, EAL values should be determined with a margin sufficient to ensure that an accurate monitor reading is available. For example, an EAL monitor reading might be set at 90% to 95% of the highest accurate monitor reading. This provision notwithstanding, if the estimated/calculated monitor reading is greater than approximately 110% of the highest accurate monitor reading, then developers may choose not to include the monitor as an indication and identify an alternate EAL threshold.~~

~~—— Indications from a real-time dose projection system are not included in the generic EALs. Many licensees do not have this capability. For those that do, the capability may not be within the scope of the plant Technical Specifications. A licensee may request to include an EAL using real-time dose projection system results; approval will be considered on a case-by-case basis.~~

~~—— Indications from a perimeter monitoring system are not included in the generic EALs. Many licensees do not have this capability. For those that do, these monitors may not be controlled and maintained to the same level as plant equipment, or within the scope of the plant Technical Specifications. In addition, readings may be influenced by environmental or other factors. A licensee may request to include an EAL using a perimeter monitoring system; approval will be considered on a case-by-case basis.~~

~~—— ECL Assignment Attributes: ——— 3.1.1.B~~

PD-AU2

~~ECL: Notification of Unusual Event~~

~~Initiating Condition: UNPLANNED rise in plant radiation levels.~~

~~Operating Mode Applicability: Not Applicable~~

~~Example Emergency Action Levels: (1 or 2)~~

~~(1) a. UNPLANNED water level drop in the spent fuel pool as indicated by ANY of the following:~~

~~(site-specific level indications).~~

~~AND~~

~~b. UNPLANNED rise in area radiation levels as indicated by ANY of the following radiation monitors.~~

~~(site-specific list of area radiation monitors).~~

~~(2) Area radiation monitor reading or survey result indicates an UNPLANNED rise of 25 mR/hr over NORMAL LEVELS.~~

~~Basis:~~

~~—— This IC addresses elevated plant radiation levels caused by a decrease in water level above irradiated (spent) fuel or other UNPLANNED events. The increased radiation levels are indicative of a minor loss in the ability to control radiation levels within the plant or radioactive materials. Either condition is a potential degradation in the level of safety of the plant.~~

~~—— A water level decrease will be primarily determined by indications from available level instrumentation. Other sources of level indications may include reports from plant personnel or video camera observations (if available). A significant drop in the water level may also cause an increase in the radiation levels of adjacent areas that can be detected by monitors in those locations.~~

~~—— The effects of planned evolutions should be considered. Note that EAL #1 is applicable only in cases where the elevated reading is due to an UNPLANNED water level drop. EAL #2 excludes radiation level increases that result from planned activities such as use of radiographic sources and movement of radioactive waste materials.~~

~~—— Escalation of the emergency classification level would be via IC PD-AA1 or PD-AA2.~~

Developer Notes:

—— For EAL #1 — Site specific indications may include instrumentation values such as water level and area radiation monitor readings, and personnel reports. If available, video cameras may allow for remote observation. Depending on available instrumentation, the declaration may also be based on indications of water makeup rate and/or decreases in the level of a water storage tank.

—— For EAL #2 — The specified value of 25 mR/hr may be set to another value for a specific application with appropriate justification.

—— ECL Assignment Attributes: 3.1.1.B

PD-SU1

ECL: Notification of Unusual Event

Initiating Condition: ~~UNPLANNED spent fuel pool temperature rise.~~

Operating Mode Applicability: ~~Not Applicable~~

~~Example Emergency Action Levels:~~

~~(1) UNPLANNED spent fuel pool temperature rise to greater than (site-specific °F).~~

Basis:

~~This IC addresses a condition that is a precursor to a more serious event and represents a potential degradation in the level of safety of the plant. If uncorrected, boiling in the pool will occur, and result in a loss of pool level and increased radiation levels.~~

~~Escalation of the emergency classification level would be via IC PD-AA1 or PD-AA2.~~

Developer Notes:

~~The site-specific temperature should be chosen based on the starting point for fuel damage calculations in the SAR. Typically, this temperature is 125° to 150°F. Spent Fuel Pool temperature is normally maintained well below this point thus allowing time to correct the cooling system malfunction prior to classification.~~

~~ECL Assignment Attributes: 3.1.1.A~~

PD-HU1

~~ECL: Notification of Unusual Event~~

~~Initiating Condition: Confirmed SECURITY CONDITION or threat.~~

~~Operating Mode Applicability: Not Applicable~~

~~Example Emergency Action Levels: (1 or 2 or 3)~~

- ~~(1) A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by the (site-specific security shift supervision).~~
- ~~(2) Notification of a credible security threat directed at the site.~~
- ~~(3) A validated notification from the NRC providing information of an aircraft threat.~~

Basis:

~~This IC addresses events that pose a threat to plant personnel or the equipment necessary to maintain cooling of spent fuel, 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 IC PD-HA1.~~

~~Timely and accurate communications between Security Shift Supervision and the Control Room is essential for proper classification of a security-related event. Classification of these events will initiate appropriate threat-related notifications to plant personnel and OROs.~~

~~Security plans and terminology are based on the guidance provided by NEI 03-12, *Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan [and Independent Spent Fuel Storage Installation Security Program]*.~~

~~EAL #1 references (site-specific security shift supervision) 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.~~

~~EAL #2 addresses the receipt of a credible security threat. The credibility of the threat is assessed in accordance with (site-specific procedure).~~

~~EAL #3 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 (site-specific procedure).~~

~~Emergency plans and implementing procedures are public documents; therefore, EALs should not incorporate Security sensitive information. This includes information that may be~~

~~advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security sensitive information should be contained in non-public documents such as the Security Plan.~~

~~Escalation of the emergency classification level would be via IC PD-HA1.~~

Developer Notes:

~~The (site specific security shift supervision) is the title of the on-shift individual responsible for supervision of the on-shift security force.~~

~~The (site specific procedure) is the procedure(s) used by Control Room and/or Security personnel to determine if a security threat is credible, and to validate receipt of aircraft threat information.~~

~~Emergency plans and implementing procedures are public documents; therefore, EALs should not incorporate Security sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security sensitive information should be contained in non-public documents such as the Security Plan.~~

~~With due consideration given to the above developer note, EALs may contain alpha or numbered references to selected events described in the Security Plan and associated implementing procedures. Such references should not contain a recognizable description of the event. For example, an EAL may be worded as "Security event #2, #5 or #9 is reported by the (site specific security shift supervision)."~~

~~———— ECL Assignment Attributes: 3.1.1.A~~

PD-HU2

~~ECL: Notification of Unusual Event~~

~~Initiating Condition: Hazardous event affecting SAFETY SYSTEM equipment necessary for spent fuel cooling.~~

~~Operating Mode Applicability: Not Applicable~~

~~Example Emergency Action Levels:~~

~~(1) a. The occurrence of ANY of the following hazardous events:~~

- ~~• Seismic event (earthquake)~~
- ~~• Internal or external flooding event~~
- ~~• High winds or tornado strike~~
- ~~• FIRE~~
- ~~• EXPLOSION~~
- ~~• (site specific hazards)~~
- ~~• Other events with similar hazard characteristics as determined by the Shift Manager~~

~~AND~~

~~b. The event has damaged at least one train of a SAFETY SYSTEM needed for spent fuel cooling.~~

~~AND~~

~~c. The damaged SAFETY SYSTEM train(s) cannot, or potentially cannot, perform its design function based on EITHER:~~

- ~~• Indications of degraded performance~~
- ~~• VISIBLE DAMAGE~~

~~Basis:~~

~~This IC addresses a hazardous event that causes damage to at least one train of a SAFETY SYSTEM needed for spent fuel cooling. The damage must be of sufficient magnitude that the system(s) train cannot, or potentially cannot, perform its design function. This condition reduces the margin to a loss or potential loss of the fuel clad barrier, and therefore represents a potential degradation of the level of safety of the plant.~~

~~For EAL 1.c, the first bullet addresses damage to a SAFETY SYSTEM train that is in service/operation since indications for it will be readily available.—~~

~~For EAL 1.c, the second bullet addresses damage to a SAFETY SYSTEM train that is not in service/operation or readily apparent through indications alone. 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 could, depending upon the event, be based on any of the Alert ICs; PD-AA1, PD-AA2, PD-HA1 or PD-HA3.

Developer Notes:

For (site specific hazards), developers should consider including other significant, site specific hazards to the bulleted list contained in EAL 1.a (e.g., a seiche).

Nuclear power plant SAFETY SYSTEMS are comprised of two or more separate and redundant trains of equipment in accordance with site specific design criteria.

———— ECL Assignment Attributes: 3.1.1.A and 3.1.1.C

PD-HU3

~~ECL: Notification of Unusual Event~~

~~Initiating Condition:~~ Other conditions exist which in the judgment of the Emergency Director warrant declaration of a (NO)UE.

~~Operating Mode Applicability:~~ Not Applicable

~~Example Emergency Action Levels:~~

- ~~(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 a NOUE.~~

PD-AA1~~ECL: Alert~~

~~**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:** Not Applicable~~

Example Emergency Action

~~**Levels:** (1 or 2 or 3 or 4)~~

~~**Notes:**~~

- ~~The Emergency Director should declare the Alert 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.~~
- ~~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) Reading on ANY of the following radiation monitors greater than the reading shown for 15 minutes or longer:~~

~~(site specific monitor list and threshold values)~~

~~(2) Dose assessment using actual meteorology indicates doses greater than 10 mrem TEDE or 50 mrem thyroid CDE at or beyond (site specific dose receptor point).~~

~~(3) Analysis of a liquid effluent sample indicates a concentration or release rate that would result in doses greater than 10 mrem TEDE or 50 mrem thyroid CDE at or beyond (site specific dose receptor point) for one hour of exposure.~~

~~(4) Field survey results indicate **EITHER** of the following at or beyond (site specific dose receptor point):~~

- ~~Closed window dose rates greater than 10 mR/hr expected to continue for 60 minutes or longer.~~
- ~~Analyses of field survey samples indicate thyroid CDE greater than 50 mrem for one hour of inhalation.~~

~~**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 1,000 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.~~

~~—— 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.~~

Developer Notes:

~~—— While this IC may not be met absent challenges to the cooling of spent fuel, it provides classification diversity and may be used to classify events that would not reach the same ECL based on plant conditions alone.~~

~~—— The EPA PAGs are expressed in terms of the sum of the effective dose equivalent (EDE) and the committed effective dose equivalent (CEDE), or as the thyroid committed dose equivalent (CDE). For the purpose of these IC/EALs, the dose quantity total effective dose equivalent (TEDE), as defined in 10 CFR § 20, is used in lieu of "...sum of EDE and CEDE...".~~

~~—— The EPA PAG guidance provides for the use adult thyroid dose conversion factors; however, some states have decided to base protective actions on child thyroid CDE. Nuclear power plant ICs/EALs need to be consistent with the protective action methodologies employed by the States within their EPZs. The thyroid CDE dose used in the IC and EALs should be adjusted as necessary to align with State protective action decision-making criteria.~~

~~—— The "site-specific monitor list and threshold values" should be determined with consideration of the following:~~

- ~~● Selection of the appropriate installed gaseous and liquid effluent monitors.~~
- ~~● The effluent monitor readings should correspond to a dose of 10 mrem TEDE or 50 mrem thyroid CDE at the "site-specific dose receptor point" (consistent with the calculation methodology employed) for one hour of exposure.~~
- ~~● Monitor readings will be calculated using a set of assumed meteorological data or atmospheric dispersion factors; the data or factors selected for use should be the same as those employed to calculate the monitor readings for IC PD AUI.~~

- ~~The calculation of monitor readings will also require use of an assumed release isotopic mix; the selected mix should be the same as that employed to calculate monitor readings for IC PD-AU1.~~
- ~~Depending upon the methodology used to calculate the EAL values, there may be overlap of some values between different ICs. Developers will need to address this overlap by adjusting these values in a manner that ensures a logical escalation in the ECL.~~

~~—— The “site specific dose receptor point” is the distance(s) and/or locations used by the licensee to distinguish between on-site and offsite doses. The selected distance(s) and/or locations should reflect the content of the emergency plan, and the procedural methodology used to determine offsite doses and Protective Action Recommendations. The variation in selected dose receptor points means there may be some differences in the distance from the release point to the calculated dose point from site to site.~~

~~—— Developers should research radiation monitor design documents or other information sources to ensure that 1) the EAL value being considered is within the usable response and display range of the instrument, and 2) there are no automatic features that may render the monitor reading invalid (e.g., an auto-purge feature triggered at a particular indication level).~~

~~—— It is recognized that the condition described by this IC may result in a radiological effluent value beyond the operating or display range of the installed effluent monitor. In those cases, EAL values should be determined with a margin sufficient to ensure that an accurate monitor reading is available. For example, an EAL monitor reading might be set at 90% to 95% of the highest accurate monitor reading. This provision notwithstanding, if the estimated/calculated monitor reading is greater than approximately 110% of the highest accurate monitor reading, then developers may choose not to include the monitor as an indication and identify an alternate EAL threshold.~~

~~—— Although the IC references TEDE, field survey results are generally available only as a “whole body” dose rate. For this reason, the field survey EAL specifies a “closed window” survey reading.~~

~~—— Indications from a real-time dose projection system are not included in the generic EALs. Many licensees do not have this capability. For those that do, the capability may not be within the scope of the plant Technical Specifications. A licensee may request to include an EAL using real-time dose projection system results; approval will be considered on a case-by-case basis.~~

~~—— Indications from a perimeter monitoring system are not included in the generic EALs. Many licensees do not have this capability. For those that do, these monitors may not be controlled and maintained to the same level as plant equipment, or within the scope of the plant Technical Specifications. In addition, readings may be influenced by environmental or other factors. A licensee may request to include an EAL using a perimeter monitoring system; approval will be considered on a case-by-case basis.~~

~~—— ECL Assignment Attributes: 3.1.2.C~~

PD-AA2

~~ECL: Alert~~

~~Initiating Condition: UNPLANNED rise in plant radiation levels that impedes plant access required to maintain spent fuel integrity.~~

~~Operating Mode Applicability: Not Applicable~~

~~Example Emergency Action Levels: (1 or 2)~~

~~(1) UNPLANNED dose rate greater than 15 mR/hr in ANY of the following areas requiring continuous occupancy to maintain control of radioactive material or operation of systems needed to maintain spent fuel integrity:~~

~~(site specific area list)~~

~~(2) UNPLANNED Area Radiation Monitor readings or survey results indicate a rise by 100 mR/hr over NORMAL LEVELS that impedes access to ANY of the following areas needed to maintain control of radioactive material or operation of systems needed to maintain spent fuel integrity.~~

~~(site specific area list)~~

~~Basis:~~

~~—— This IC addresses increased radiation levels that impede necessary access to areas containing equipment that must be operated manually or that requires local monitoring, in order to maintain systems needed to maintain spent fuel integrity. As used here, 'impede' includes hindering or interfering, provided that the interference or delay is sufficient to significantly threaten necessary plant access. It is this impaired access that results in the actual or potential substantial degradation of the level of safety of the plant.~~

~~—— This IC does not apply to anticipated temporary increases due to planned events.~~

~~Developer Notes:~~

~~—— The value of 15mR/hr is derived from the GDC 19 value of 5 rem in 30 days with adjustment for expected occupancy times. Although Section III.D.3 of NUREG-0737, *Clarification of TMI Action Plan Requirements*, provides that the 15 mR/hr value can be averaged over the 30 days, the value is used here without averaging, as a 30 day duration implies an event potentially more significant than an Alert.~~

~~—— The specified value of 100 mR/hr may be set to another value for a specific application with appropriate justification.~~

~~—— ECL Assignment Attributes: 3.1.2.C~~

PD-HA1

~~ECL: Alert~~

~~**Initiating Condition:** HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes.~~

~~**Operating Mode Applicability:** Not Applicable~~

~~**Example Emergency Action Levels:** (1 or 2)~~

- ~~(1) A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the (site-specific security shift supervision).~~
- ~~(2) A validated notification from NRC of an aircraft attack threat within 30 minutes of the site.~~

~~**Basis:**~~

~~This IC addresses the occurrence of a HOSTILE ACTION within the OWNER CONTROLLED AREA or notification of an aircraft attack threat. This event will require rapid response and assistance due to the possibility of the attack progressing to the PROTECTED AREA, or the need to prepare the plant and staff for a potential aircraft impact.~~

~~Timely and accurate communications between Security Shift Supervision and the Control Room is essential for proper classification of a security-related event.~~

~~Security plans and terminology are based on the guidance provided by NEI 03-12, *Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan [and Independent Spent Fuel Storage Installation Security Program]*.~~

~~As time and conditions allow, these events require a heightened state of readiness by the plant staff and implementation of onsite protective measures (e.g., evacuation, dispersal or sheltering). The Alert declaration will also heighten the awareness of Offsite Response Organizations, allowing them to be better prepared should it be necessary to consider further actions.~~

~~This IC does not apply to incidents that are accidental events, acts of civil disobedience, or otherwise are not a HOSTILE ACTION perpetrated by a HOSTILE FORCE. Examples include the crash of a small aircraft, shots from hunters, physical disputes between employees, etc. Reporting of these types of events is adequately addressed by other EALs, or the requirements of 10 CFR § 73.71 or 10 CFR § 50.72.~~

~~EAL #1 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 within the OWNER CONTROLLED AREA.~~

~~EAL #2 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 (site specific procedure).~~

~~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.~~

~~Emergency plans and implementing procedures are public documents; therefore, EALs should not incorporate Security sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security sensitive information should be contained in non-public documents such as the Security Plan.~~

~~Developer Notes:~~

~~The (site specific security shift supervision) is the title of the on-shift individual responsible for supervision of the on-shift security force.~~

~~———— Emergency plans and implementing procedures are public documents; therefore, EALs should not incorporate Security sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security sensitive information should be contained in non-public documents such as the Security Plan.~~

~~———— With due consideration given to the above developer note, EALs may contain alpha or numbered references to selected events described in the Security Plan and associated implementing procedures. Such references should not contain a recognizable description of the event. For example, an EAL may be worded as "Security event #2, #5 or #9 is reported by the (site specific security shift supervision)."~~

~~See the related Developer Note in Appendix B, Definitions, for guidance on the development of a scheme definition for the OWNER CONTROLLED AREA.~~

~~———— ECL Assignment Attributes: 3.1.2.D~~

PD-HA3

ECL: Alert

Initiating Condition: Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert.

Operating Mode Applicability: Not Applicable

Example Emergency Action Levels:

- (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:

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.