

EXELON NUCLEAR

CALVERT CLIFFS

NUCLEAR POWER PLANT

EMERGENCY ACTION LEVELS

Section 1: Classification of Emergencies

1.1 General

Section D of the Exelon Nuclear Standardized Emergency Plan divides the types of emergencies into four EMERGENCY CLASSIFICATION LEVELS (ECLs). The four levels are Unusual Event (UE), Alert, Site Area Emergency (SAE), and General Emergency (GE). These ECLs are entered by satisfying the Initiating Condition (IC) through meeting an Emergency Action Level (EAL) of the IC provided in this section of the Annex. The ECLs are escalated from least severe to most severe according to relative threat to the health and safety of the public and emergency workers. Depending on the severity of an event, prior to returning to a standard day-to-day organization, a state or phase called Recovery may be entered to provide dedicated resources and organization in support of restoration and communication activities following the termination of the emergency.

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

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

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

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

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

Emergency Classification Level (ECL): One of a set of names or titles

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

- Unusual Event (UE)
- Alert
- Site Area Emergency (SAE)
- General Emergency (GE)

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

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

An emergency is classified by assessing plant conditions and comparing abnormal conditions to ICs and EALs.

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

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

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

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

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

- EAL
- Mode Applicability
- Basis

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

A list of definitions is provided as part of this document for terms having specific meaning to the EALs. Site specific definitions are provided for terms with the intent to be used for a particular IC/EAL and may not be applicable to other uses of that term at other sites, the Emergency Plan or procedures.

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

References to the Emergency Director means the person in Command and Control as defined in the Emergency Plan. Classification of emergencies is a non-delegable responsibility of Command and Control for the onsite facilities with responsibility assigned to the Shift Emergency Director (Control Room Shift Manager) or the Station Emergency Director (Technical Support Center). Classification of emergencies remains the responsibility of the applicable onsite facility even after Command and Control is transferred to the Corporate Emergency Director (Emergency Operations Facility).

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

1.2 Classification, Instrumentation and Transient Events

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

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

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

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

Planned evolutions involve preplanning to address the limitations imposed by the condition, the performance of required surveillance testing, and the implementation of specific controls prior to knowingly entering the condition in accordance with the specific requirements of the site's Technical Specifications. Activities which cause the site to operate beyond that allowed by the site's Technical Specifications, planned or unplanned, may result in an EAL being met or exceeded. Planned evolutions to test, manipulate, repair, perform maintenance or modifications to systems and equipment that result in an EAL being met or exceeded are not subject to classification and activation requirements as long as the evolution proceeds as planned and is within the operational limitations imposed by the specific operating license. However, these conditions may be subject to the reporting requirements of 10 CFR 50.72.

When two or more EALs are determined, declaration will be made on the highest classification level for the Unit. When both units are affected, the highest

classification for the Station will be used for notification purposes and both Units' ECLs will be noted.

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

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

1.3 Mode Applicability

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

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

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

1.4 Emergency Director Judgment

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

The Hazards Section ED Judgment EALs are intended to address unanticipated conditions which are not addressed explicitly by other EALs but warrant declaration of an emergency because conditions exist which are believed by the ED to fall under specific emergency classifications (UE, Alert, SAE or GE).

The FPB Matrix ED Judgment EALs are intended to include unanticipated conditions, which are not addressed explicitly by any of the other FPB threshold

values, but warrant determination because conditions exist that fall under the broader definition for a significant Loss or Potential Loss of the barrier (equal to or greater than the defined FPB threshold values).

1.5 Fission Product Barrier (FPB) Threshold

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

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

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

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

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

1.6 Fission Product Barrier Restoration

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

The reestablishment of a FPB does not alter or lower the existing classification. Termination and entry into RECOVERY phase is still required for exiting the present classification. However the reestablishment of the barrier should be

considered in determining future classifications should plant conditions or events change.

1.7 Definitions

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

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

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

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

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

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

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

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

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

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

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

OPERATING MODES:

1 Power Operations

Reactor shutdown margin is less than Technical Specification minimum required ($k_{\text{eff}} \geq 0.99$) and greater than 5% rated thermal power.

2 Startup

Reactor shutdown margin is less than Technical Specification minimum required ($k_{\text{eff}} \geq 0.99$) and less than or equal to 5% rated thermal power.

3 Hot Standby

Reactor shutdown margin greater than Technical Specification minimum required ($k_{\text{eff}} < 0.99$) with coolant temperature (T_{avg}) greater than or equal to 300°F.

4 Hot Shutdown

Reactor shutdown margin greater than Technical Specification minimum required ($k_{\text{eff}} < 0.99$) with coolant temperature (T_{avg}) less than 300°F and greater than 200°F.

5 Cold Shutdown

Reactor shutdown margin greater than Technical Specification minimum required ($k_{\text{eff}} < 0.99$) with coolant temperature (T_{avg}) less than or equal to 200°F.

6 Refuel

Reactor vessel head is unbolted.

D Defueled

All reactor fuel removed from reactor pressure vessel (full core off load during refueling or extended outage).

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

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

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

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

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

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

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

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

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

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

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

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

Emergency Action Level Technical Basis Page Index

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