

**ATTACHMENT 1 TO**

**OCAN101801**

**SUMMARY OF CHANGES TO ANO EMERGENCY PLAN IMPLEMENTING DOCUMENT**

**SUMMARY OF CHANGES TO ANO EMERGENCY PLAN IMPLEMENTING DOCUMENT**

The following table provides a brief description or summary of changes made to an Arkansas Nuclear One (ANO) Emergency Plan implementing document included in Attachment 2 of this submittal.

<b>Procedure OP-1903.010, Revision 57, "Emergency Action Level Classification"</b>	
<b>Section Revised</b>	<b>Description of Change</b>
AU-1, AA-1, AS-1, AG-1, CNB6 (Pages 24, 25, 41, 74, 76, 80, 86, 88, 128)	<p>Where referenced, removed reference to the Post Accident Sampling System (PASS) Super Particulate Iodine and Noble Gas (SPING) monitor (2RX-9840) and the Low Level Radwaste (LLRW) Building SPING monitor (2RX-9850), including indicated readings.</p> <p>In 2000, an amendment to the ANO-1 and ANO-2 Technical Specifications approved elimination of the PASS. The PASS was subsequently abandoned in place with all sources of Reactor Coolant System and containment system sample lines being isolated from the plant systems. Isolation of the PASS has eliminated any source of radioactive material from entering the PASS building. Therefore, the continuous monitoring of the PASS building effluent is no longer required. The primary function of the SPING is to monitor the vent effluent, actuate alarms within the Control Room when predetermined release limits are met, and to be a source of release data when performing dose assessment. With the elimination of any source term from the PASS building, the utilization of an effluent monitor is no longer needed for this pathway.</p> <p>The ANO-2 Safety Analysis Report (SAR), Section 11.5.6.1, states that the calculated dose rates and radioactive energies conservatively assumed the High Specific Activity Waste area of the LLRW Building is full of resin containers. The Curie content was calculated using the isotopic content in order to determine expected dose rates. An estimation of facility dose rates is provided in SAR Figure 12.1-13 for informational purposes. The total estimated Curie content in the facility is 1.96E3 Ci. The dose rate at the Exclusion Area Boundary (EAB) per Curie of stored material is estimated at 8.8E-10 mR/hr per Curie. Thus if all contents of the building were released to the environment simultaneously, the resulting EAB dose rate would be 1.72E-6 mR/hr, much less than an approximate 1.14E-1 mR/hr value for 2 times the Offsite Dose Calculation Manual (ODCM) limit. The ANO-2 SAR also states in the same section that "The only potential release of radioactivity would occur during compacting operations; however, this process is not currently used." There are no plans to ever use the compaction system.</p> <p>Radiation Protection performs a Category 1 and 2 inventory of the LLRW Building radioactivity once per week to ensure associated information contained in the SAR remains valid. The inventory is performed in accordance with procedure EN-RP-121, "Radioactive Material Control". ANO-2 SAR, Table 11.5-1, lists the radioactive isotope inventory of the LLRW Building based on capacity. This table shows that the majority of the isotopes are particulates with one iodine isotope (I-129) and no gaseous activity other than H-3 (tritium).</p> <p>The most probable event for a significant release would be fire in the building which would most likely bypass the monitoring system. With the radioisotope content consisting of particulate isotopes, the use of a gas channel set point would not be the ideal detector for monitoring the pathway. The pathway is sampled on a weekly basis for particulate, iodine, and noble gases. The removal of the LLRW SPING set points is acceptable because the potential for a release requiring an emergency declaration cannot be exceeded based on the radio-isotopic makeup of the contents of the building.</p> <p>The elimination of the PASS and LLRW Building SPINGs continue to meet the NEI 99-01, "Methodology for Development of Emergency Action Levels," Revision 5, guidance because these areas do not constitute release pathways (either routine or non-routine) relevant to the EAL condition. These changes do not eliminate an Initiating Condition or EAL, but eliminate two thresholds that are not potential sources of a relevant offsite radiological release.</p>

<b>Procedure OP-1903.010, Revision 57, "Emergency Action Level Classification"</b>	
<b>Section Revised</b>	<b>Description of Change</b>
<p>AU-1, AA-1, AA-2, AS-1, AG-1 (Pages 24, 25, 26, 76, 80, 81, 83, 86, 88)</p>	<p>Where referenced, deleted and/or replaced reference to ANO-2 SPING Channels 7 and 9 to reference the SPING "gas" channel.</p> <p>The existing Eberline SPING radiation monitoring systems are being replaced with new equivalent models provided by Mirion Technologies. The Eberline SPING monitoring system is an obsolete system that is no longer supported by the vendor. The Mirion Technology replacements monitors are Regulatory Guide (RG) 1.97, Revision 3, compliant.</p> <p>The replacement high range monitor is similar to the Eberline SPING in that the replacement high range gas detector high range limit is the same as the high range detector of the Eberline SPING (1E5 <math>\mu\text{Ci/cc}</math>). The overall gas activity range for the combination of the Eberline low range monitor and the high range monitor is 1E-7 <math>\mu\text{Ci/cc}</math> to 1E5 <math>\mu\text{Ci/cc}</math> with the low range being 1E-7 <math>\mu\text{Ci/cc}</math> to 1E-1 <math>\mu\text{Ci/cc}</math> and the high range monitor being 1E-4 <math>\mu\text{Ci/cc}</math> to 1E5 <math>\mu\text{Ci/cc}</math>. The replacement high range monitor does not have a detector for the iodine or particulate channel as does the Eberline SPING. This requires obtaining iodine and particulate samples from the inline sample assemblies to determine actual iodine and particulate <math>\mu\text{Ci/cc}</math> data.</p> <p>For dose assessment purposes, the current practice is to input the iodine and particulate channel data into the dose assessment software if the data is available. With the implementation of the replacement SPINGS, the iodine and particulate channel are not available on the high range monitor and, therefore, this data is not available via a detector. To complete the dose projection without these channels, the input to the dose assessment software consists of only the gas channel data and the use of a standard source term for the current core/plant conditions for the remainder of the isotopes. This is a current option in the dose assessment software. To maintain the accuracy of dose assessment, procedures are in place for the Emergency Response Organization staff to determine the core status and to communicate this data to the Dose Assessor for determination of the appropriate source term. Therefore, the use of the standard source term will not affect the projections of the dose assessment software. The high range monitor does contain an iodine and particulate sample apparatus that permits sampling of the effluent stream and radio-isotopic analysis for verification of the dose assessment inputs as does the current SPINGS.</p> <p>The Emergency Plan does not specify that an iodine and particulate online monitoring system is required for dose assessment. RG 1.97 specifies in Table 2, Note 12, that grab sample capability, associated with personnel protection conditions, is required for iodine and particulate along with analysis capability. Both the low range monitor and high range monitor have the capability to sample iodine and particulates in a sample assembly. Therefore, the replacement system continues to meet the criteria for the EALs and the determination of all Emergency Classes.</p>
<p>AU-1, AA-1 (Pages 75, 76, 81)</p>	<p>Added reference to the ANO-1 Emergency Penetration Room Ventilation SPING monitor (RX-9835).</p> <p>This change aligns the procedure with correct equipment designation, including the addition of equipment that was listed in other sections of the procedure. This change does not add new equipment. This change does not change the intent of the EAL.</p>
<p>AU-1, AA-1, AS-1, AG-1 (Pages 76, 77, 81, 82, 87, 88)</p>	<p>Change Regenerative Waste Discharge Monitor System reference to LRW Discharge Monitor and changed procedure title from Eberline Radiation Monitoring System to Ventilation Radiation Monitoring System.</p> <p>This change aligns the procedure with correct equipment designation. This change does not add new equipment or remove/replace old equipment, but only corrects nomenclature. This change does not change the intent of the EAL.</p>

<b>Procedure OP-1903.010, Revision 57, "Emergency Action Level Classification"</b>	
<b>Section Revised</b>	<b>Description of Change</b>
Pages 25, 38, 112, 126, 180	<p>Administrative / human factor changes:</p> <ul style="list-style-type: none"> <li>• Corrected nomenclature of process radiation monitors from "RX" to "RE" in AU-1 and AA-1</li> <li>• Changed MR/hr to mR/hr in FCB1</li> <li>• Added "&gt;" sign after Containment pressure in CNB1, 3.a (ANO-2).</li> <li>• Added "(8.6 psig)" to CNB1</li> <li>• Changed "Control Room and open release path" to "Control Room with an open release path" in CNB4 basis</li> <li>• Replaced "through" with "into" and added "alone" in CNB4 basis</li> <li>• Updated Wall Charts to accommodate the Revision 57 changes.</li> </ul> <p>The above changes are associated with the display of engineering units or component nomenclature, a reference to the "psig" equivalent of the stated "psia" indication, enhancing/clarifying limits and wording, and updating the Wall Charts consistent with the changes made in Revision 57 of the procedure. The changes do not result in a change to the current application of the affected EALs.</p>
CNB4 Basis (Page 126)	<p>Added "As used here the term "environment" includes the atmosphere of a room or area, outside the containment, that may in turn communicate with the outside-the-plant atmosphere (e.g., through discharge of a ventilation system or atmospheric leakage)."</p> <p>Also added "The subsequent leak of the interfacing liquid system to the environment would constitute a direct release."</p> <p>These changes provide clarification to permit the user to better understand/interpret a "direct path" release. These changes do not change the intent of the EAL.</p>
<p><u>Bases for Acceptability of Changes</u></p> <p>The described changes do not change a meaning or the intent of a description, do not change emergency response facilities or equipment, and do not change a process. The above changes have been screened and/or evaluated in accordance with 10 CFR 50.54(q). The changes continue to meet the applicable planning standards outlined in 10 CFR 50.47(b)(4), 10 CFR 50.47(b)(8), and 10 CFR 50.47(b)(9). This revision does not require a change to the Emergency Plan or represent a reduction in the effectiveness to the Emergency Plan.</p>	

List of Acronyms

LRW      Liquid Radwaste

**ATTACHMENT 2 TO**  
**OCAN101801**  
**OP-1903.010, REVISION 57**  
**EMERGENCY ACTION LEVEL CLASSIFICATION**

<b>PROC./WORK PLAN NO.</b> <b>1903.010</b>	<b>PROCEDURE/WORK PLAN TITLE:</b> <b>EMERGENCY ACTION LEVEL CLASSIFICATION</b>	<b>PAGE: 1 of 181</b> <b>CHANGE: 057</b>
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1.0 PURPOSE

This procedure establishes criteria for detection and classification of plant events into the four standard Emergency Classes.

2.0 SCOPE

This procedure is applicable to Units 1 and 2 in all modes; it does not include specific plant casualty procedures or systems operations requirements, but rather provides administrative processes only.

3.0 REFERENCES

3.1 REFERENCES USED IN PROCEDURE PREPARATION:

- 3.1.1 ANO Emergency Plan
- 3.1.2 NUREG-0654/FEMA-REP-1, Rev. 1
- 3.1.3 10 CFR 50
- 3.1.4 NRC Branch Position on Acceptable Deviations to Appendix 1 to NUREG-0654/FEMA-REP-1, July 11, 1994
- 3.1.5 NEI 99-01 - Methodology for Development of Emergency Action Levels
- 3.1.6 NEI Industry White Paper - "Enhancements to Emergency Preparedness Programs for Hostile Action," dated November 18, 2005
- 3.1.7 NRC Bulletin 2005-02, "Emergency Preparedness and Response Actions for Security-Based Events"
- 3.1.8 NRC Information Notice No. 97-45, Supp. 1 - Environmental Qualification Deficiency for Cables and Containment Penetration Pigtailes

3.2 References Used in Conjunction with this Procedure:

- 3.2.1 EN-LI-102, "Corrective Action Process"
- 3.2.2 1903.011, "Emergency Response/Notifications"
- 3.2.3 1903.064, "Emergency Response Facility - Control Room"
- 3.2.4 1903.081, "Technical Support Center (TSC) Activation"
- 3.2.5 1903.082, "Operational Support Center (OSC) Activation"
- 3.2.6 1903.080, "Emergency Operations Facility (EOF) Activation"
- 3.2.7 1203.025, "Natural Emergencies"
- 3.2.8 2203.008, "Natural Emergencies"

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- 3.2.9 1202.XXX, "Emergency Operating Procedures"
- 3.2.10 2202.XXX, "Emergency Operating Procedures"
- 3.2.11 1404.052, "Post Earthquake Seismic Data Retrieval"
- 3.2.12 1904.002, "Offsite Dose Projections"
- 3.2.13 NRC Position Paper on "Timeliness of Classification of Emergency Conditions" dated August 17, 1995
- 3.2.14 1607.001, "Reactor Coolant System Sampling"
- 3.2.15 2607.001, "Unit 2 Reactor Coolant System Sampling"
- 3.2.16 1203.048, "Security Event"
- 3.2.17 1903.069, "Equipment Important to Emergency Preparedness"
- 3.2.18 EN-EP-609, "Emergency Operations Facility (EOF) Operations"
- 3.2.19 EN-EP-610, "Technical Support Center (TSC) Operations"
- 3.2.20 EN-EP-611, "Operations Support Center (OSC) Operations"

3.3 Related ANO Procedures:

- 3.3.1 1043.042, "Response to Security Contingencies"
- 3.3.2 1502.004, Attachment H
- 3.3.3 1903.023, "Personnel Emergency"
- 3.3.4 ANO Security Plan/Security Procedures
- 3.3.5 1015.007, "Fire Brigade Organization and Responsibilities"
- 3.3.6 1903.042, "Duties of the Emergency Medical Team"
- 3.3.7 1903.043, "Duties of the Emergency Radiation Team"
- 3.3.8 1302.022, "Core Damage Assessment"

3.4 Regulatory correspondence containing NRC commitments which are implemented in this procedure are DENOTED in left hand margin:

- 3.4.1 CNRO-2005-044 (NRC Bulletin 2005-02) - Definition Section of EAL Basis Document associated with EAL classifications, Hostile Action, Hostile Force and applicable security related EAL's.



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4.0 DEFINITIONS

4.1 AFFECTING SAFE SHUTDOWN:

Event in progress has adversely affected functions that are necessary to bring the plant to and maintain it in the applicable HOT or COLD SHUTDOWN condition. Plant condition applicability is determined by Technical Specification LCOs in effect.

Example 1: Event causes damage that results in entry into an LCO that requires the plant to be placed in HOT SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is not "AFFECTING SAFE SHUTDOWN."

Example 2: Event causes damage that results in entry into an LCO that requires the plant to be placed in COLD SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is "AFFECTING SAFE SHUTDOWN."

4.2 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 (PAG) exposure levels.

4.3 BOMB:

Refers to an explosive device suspected of having sufficient force to damage plant systems or structures.

4.4 CIVIL DISTURBANCE:

A group of persons violently protesting station operations or activities at the site

4.5 CONFINEMENT BOUNDARY:

The barrier(s) between areas containing radioactive substances and the environment

4.6 CONTAINMENT CLOSURE:

The actions to secure primary containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions. Containment closure must be capable of being set within 30 minutes. Containment Closure is set when the penetrations are isolated by manual or automatic isolation valve, blind flange, or equivalent.

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4.7 CORE DAMAGE:

A failure of fuel cladding integrity to the extent that any of the following happen:

- 4.7.1 Fission product activity in the coolant exceeds the limits in the technical specifications.
- 4.7.2 Fuel is no longer in the original geometry.
- 4.7.3 A major portion of the core cannot be operated for its design cycle length.

4.8 COURTESY CALL:

A notification to the Arkansas Department of Health and follow-up notification to the NRC for conditions/events other than those constituting an Emergency Class as listed in procedure 1903.11, "Emergency Response/Notifications", Section 6.3.

4.9 EMERGENCY ACTION LEVEL (EAL):

A pre-determined, site specific, observable threshold for a plant IC that places the plant in a given emergency classification level. An EAL can be: an instrument reading; an equipment status indicator; a measurable parameter (on-site or off-site); a discrete, observable event; results of analyses; entry into specific emergency operating procedures; or another phenomenon which, if it occurs, indicates entry into a particular emergency classification level.

4.10 EMERGENCY CLASSIFICATION LEVEL:

One of a minimum set of names or titles established by the NRC for grouping off normal nuclear power plant conditions according to (1) their relative radiological seriousness, and (2) the time sensitive on-site and off-site radiological emergency preparedness actions necessary to respond to such conditions. The existing radiological emergency classification levels, in ascending order of seriousness, are called:

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

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4.11 EMERGENCY DIRECTION AND CONTROL:

Overall direction of facility response which must include the non-delegable responsibilities for the decision to notify and to recommend protective actions to Arkansas Department of Health personnel and other authorities responsible for offsite emergency measures. With activation of the EOF, the Emergency Director (ED) typically assumes the responsibility for Emergency Direction and Control. The management of on-site facility activities to mitigate accident consequences remains with the Emergency Plant Manager (EPM) in the Technical Support Center. The Shift Manager retains responsibility for the Control Room and plant systems operation.

4.12 EMERGENCY OPERATIONS FACILITY (EOF):

A near-site emergency response facility located approximately 0.65 miles northeast of the reactor buildings (the ANO Training Center).

4.13 EMERGENCY PLANNING ZONE (EPZ):

The EPZ considered by this procedure is the inhalation zone and is that area within approximately a 10 mile radius of ANO.

4.14 EMERGENCY RESPONSE ORGANIZATION (ERO):

The organization which is composed of the Initial Response Staff (IRS), the EOF staff, the TSC staff, the OSC staff, and the Emergency Team members. It has the capability to provide manpower and other resources necessary for immediate and long-term response to an emergency situation.

4.15 EPA PROTECTIVE ACTION GUIDELINE (PAG) Exposure Levels:

The projected dose to reference man, or other defined individual, from an unplanned release of radioactive material at which a specific protective action to reduce or avoid that dose is recommended (i.e., 1 Rem TEDE or 5 Rem Child Thyroid (CDE)).

4.16 EXCLUSION AREA:

That area surrounding ANO within a minimum radius of 0.65 miles of the reactor buildings, but outside the protected area and controlled to the extent necessary by ANO during periods of emergency.

4.17 EXPLOSION:

A rapid, violent, unconfined combustion or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

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4.18 EXTORTION:

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

4.19 FAULTED:

In a steam generator, the existence of secondary side leakage that results in an uncontrolled drop in steam generator pressure or the steam generator being completely depressurized.

4.20 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.

4.21 FUEL OVERHEAT:

Condition in which fission products trapped within the fuel pellet are released at an accelerated rate due to increasing temperature. Fuel overheating temperatures typically range from 1600 °F to 3600 °F cladding temperature.

4.22 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 PAG exposure levels off-site for more than the immediate site area.

4.23 HOSTAGE:

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

4.24 HOSTILE ACTION:

An act toward a 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. 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).

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4.25 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.

4.26 IMMINENT:

Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

4.27 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.

4.28 INITIAL RESPONSE STAFF (IRS): The emergency organization composed of plant personnel which must be able to respond to the site in accordance with Table B-1 of the Emergency Plan.

4.29 INITIATING CONDITION (IC):

One of a predetermined subset of nuclear power plant conditions where either the potential exists for a radiological emergency, or such an emergency has occurred.

4.30 INTRUSION:

A person(s) present in a specified area without authorization. Discovery of a BOMB in a specified area is indication of INTRUSION into that area by a HOSTILE FORCE.

4.31 LOSS OF PHYSICAL CONTROL OF THE PLANT:

Plant personnel are unable to operate equipment required to maintain safety functions to:

- Shutdown the reactor and maintain it in a safe shutdown condition
- Remove residual heat
- Control the release of radioactive material
- Mitigate the consequences of an accident; or
- Cool irradiated fuel assemblies in the Spent Fuel Pool.

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4.32 NORMAL MAKEUP (MU) CAPACITY:

Unit 1: Normal makeup capacity is defined as 50 gpm. 50 gpm approximates a leak size for which the ability to make additions to the makeup tank is no longer adequate to maintain makeup tank level.

Unit 2: Normal makeup capacity is defined as 44 gpm. 44 gpm is the capacity of a single charging pump.

4.33 NORMAL PLANT OPERATIONS:

Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into off-normal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

4.34 NOTIFICATION OF UNUSUAL EVENT (NUE):

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 off-site response or monitoring are expected unless further degradation of safety systems occurs.

4.35 OFFSITE:

Those areas not covered by Section 4.36.

4.36 ONSITE:

The area within the Exclusion Area Boundary

4.37 OPERATIONAL SUPPORT CENTER (OSC):

Emergency response center within the ANO Maintenance Facility where support is coordinated for the following functions:

- Onsite Radiological Monitoring
- Maintenance
- Chemistry
- Emergency Medical Support
- Fire Fighting Support
- The OSC also serves as the briefing area for repair and damage control teams and is located in the Maintenance Facility.

4.38 OWNER CONTROLLED AREA (OCA):

The external area contiguous to the designated reactor site Protected Area over which site Security exercises control. The OCA extends outward to the Entergy site property lines.

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- 4.39 PLANT TRANSIENT:
- 4.39.1 Any unplanned reactor trip from criticality.
- 4.39.2 A planned reactor trip in which the expected post-trip response did not occur.
- 4.39.3 Any event resulting in an automatic ESAS (Unit 1) or ESF (Unit 2) actuation or any event requiring manual initiation of these systems where automatic initiation would likely have occurred
- 4.39.4 Any turbine-generator power change in excess of 100 MWe in less than one (1) minute other than a momentary spike due to a grid disturbance or a manually initiated runback.
- 4.39.5 Any unplanned main turbine or main feedwater pump turbine trip which results in a significant plant transient (change in excess of 100 MWe).
- 4.40 PROJECTILE:
- An object directed toward a Nuclear Power Plant that could cause concern for its continued operability, reliability, or personnel safety.
- 4.41 PROTECTED AREA:
- An area encompassed by physical barriers (i.e., the security fence) and to which access is controlled.
- 4.42 REACTOR COOLANT SYSTEM (RCS) LEAKAGE:
- Loss of RCS inventory due to a leak in the RCS or a supporting system that is not or cannot be isolated within 10 minutes
- 4.43 RUPTURED:
- In a steam generator, existence of primary-to-secondary leakage of a magnitude sufficient to require or cause a reactor trip and safety injection
- 4.44 SABOTAGE:
- Deliberate damage, mis-alignment, or mis-operation of plant equipment with the intent to render the equipment inoperable. Equipment found tampered with or damaged due to malicious mischief may not meet the definition of SABOTAGE until this determination is made by security supervision.

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4.45 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.

4.46 SIGNIFICANT TRANSIENT:

An UNPLANNED event involving one or more of the following: (1) automatic turbine runback > 25% thermal reactor power, (2) electrical load rejection > 25% full electrical load, (3) Reactor Trip, (4) Safety Injection Activation, or (5) thermal power oscillations > 10%.

4.47 SITE AREA EMERGENCY (SAE):

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.

4.48 STRIKE ACTION:

A work stoppage within the PROTECTED AREA by a body of workers to enforce compliance with demands made on Entergy or its affiliates. The STRIKE ACTION must threaten to interrupt NORMAL PLANT OPERATIONS.

4.49 TECHNICAL SUPPORT CENTER (TSC):

The location within the ANO Administration Building equipped with instrumentation and communication systems and facilities useful in monitoring the course of an accident; this center is located in the 3rd Floor of the ANO Administration Building.

4.50 UNISOLABLE:

A breach or leak that cannot be promptly isolated

4.51 UNPLANNED:

A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions



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4.52 VALID:

An indication, report, or condition, is considered to be VALID when it is verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel, such that doubt related to the indicator's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

4.53 VISIBLE DAMAGE:

Damage to equipment or structures that is readily observable without measurement, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of the affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

4.54 VITAL AREAS:

Any area within a protected area containing any equipment, system or device which, by result of failure, destruction or associated release, could directly or indirectly endanger the health and safety of the public.

5.0 RESPONSIBILITY AND AUTHORITY

5.1 The responsibility for event classification is assigned to the individual with responsibility for Emergency Direction and Control (i.e., The Shift Manager or Emergency Director).

5.2 The Control Room Supervisor (CRS) will assume Emergency Direction and Control responsibilities whenever the SM is not available to assume this responsibility (e.g. the SM becomes incapacitated and a replacement has not yet arrived).

5.3 Any individual who observes an initiating condition which warrants an emergency class declaration, as described in Attachment 1, shall immediately notify the person with current responsibility for Emergency Direction and Control (i.e. SM/ED).

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6.0 INSTRUCTIONS

**NOTE**

On emergencies that affect both units such as earthquakes, tornadoes, etc., the unit with the highest Emergency Action Level Classification should declare the emergency. **IF** the Emergency Action Level Classification is the same, **THEN** the Shift Managers should determine which unit has Emergency Direction and Control based on plant conditions, manpower, etc.

6.1 CLASSIFYING EMERGENCIES:

**NOTE**

NRC 10CFR50 Appendix E IV. C.2 requires the capability to assess, classify, and declare an emergency condition within **15 minutes** after the availability of indications to plant operators that an emergency action level has been exceeded and SHALL PROMPTLY declare the emergency condition as soon as possible following identification of the appropriate emergency classification level.

**NOTE**

The emergency action levels described in this procedure are not intended to be used during maintenance and/or testing situations where abnormal temperature, pressure, equipment status, etc., is expected. In addition, each EAL contains information on the mode(s) of operation during which it is applicable.

**NOTE**

When determining EAL classifications the EAL bases should be referred to if needed.

6.1.1 When indications of abnormal occurrences are received by the Control Room staff, the SM/ED shall:

- A. Verify the indications of the off-normal event or reported sighting.
- B. Ensure that the immediate actions (e.g., use of Emergency and Abnormal Operating Procedures) are taken for the safe and proper operation of the plant.

**NOTE**

When plant conditions satisfy multiple EAL classifications then declare the HIGHEST level classification.

- C. **IF** EAL classification is known, **THEN** proceed to appropriate tab.
- D. **IF** EAL classification is NOT known, **THEN** compare the abnormal conditions with those listed in Attachment 1 "Index of Emergency Action Levels".

- 1. Turn to the appropriate tab which corresponds to the condition picked from the Index of EALs.

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(Step 6.1.1.D cont.)

2. Assess the information available from valid indications or reports, then:

- Compare information to criteria given for EAL.
- Review related EALs to determine if plant conditions meet their criteria.
- Declare the emergency classification that is indicated.

E. **IF** the indications or reports do not match the given EALs, **THEN** refer to Tab H "Hazards and Other Conditions Affecting Plant Safety" and using appropriate judgment, determine if the plant status warrants an emergency declaration.

**NOTE**

NRC Emergency Preparedness Position (EPPOS) 2 states that, "The staff position is that 15-minutes is a reasonable period of time for assessing and classifying an emergency once indications are available to control room operators that an EAL has been exceeded."

EPPOS 2 goes on to state that the 15-minute period should not be interpreted as providing a grace period in which corrective actions can be taken to avoid classifying the emergency. Classification is expected to be made upon completion of the assessment without delay.

This 15-minute period is the "assessment period" referred to below.

6.1.2 In some cases, the conditions requiring an Emergency Class declaration are discovered and recognized after the conditions requiring such a declaration no longer exist. The discovery could come in a matter of minutes (in the case of a rapidly concluded event), days, or even weeks (as might occur during the review of the response to an abnormal plant condition).

The following guidance should be used to determine the proper notification method for a transient event:

A. Situation 1

It is discovered that plant conditions previously existed that would have warranted the declaration of an Emergency Class. However, at the time of discovery, those conditions were no longer present and there is no current basis for an Emergency Class declaration.

In this case, an actual Emergency Class declaration is not necessary; however, an ENS notification must be made to the NRC within one hour of the discovery reporting that an undeclared Emergency Class previously existed. A Courtesy Call must also be performed in accordance with procedure 1903.011, "Emergency Response/Notifications".

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(Step 6.1.2 cont.)

B. Situation 2

An event occurs in the plant during which conditions are present that would result in an Emergency Class declaration. The conditions are discovered while they still exist. However, before the completion of the allowed assessment period and before an Emergency Class is declared, the conditions clear.

In this case, the conditions cleared before completion of the assessment and prior to an Emergency Class declaration. Therefore, an actual Emergency Class declaration is not necessary; however, an ENS notification must be made to the NRC within one hour of the discovery reporting that an undeclared Emergency Class previously existed. A Courtesy Call must also be performed in accordance with procedure 1903.011, "Emergency Response/Notifications".

C. Situation 3

An event occurs in the plant during which the conditions are present that would result in an Emergency Class declaration. At the time of discovery, these conditions still exist. Upon the completion of the allowed assessment period, the appropriate Emergency Class is declared. However, before offsite notifications are performed, the conditions requiring the Emergency Class declaration clear.

In this case, an Initial Notification (within 15 minutes) to State and local authorities shall be performed in accordance with procedure 1903.011, "Emergency Response/Notifications". This notification is to inform State and local authorities that the station was briefly in a declared Emergency Class but the conditions meeting the criteria for that Emergency Class no longer exist.

Notification to the NRC should follow immediately after notification of State and local authorities and not later than one hour of the event.

Activation of the Emergency Response Organization should be based on current plant conditions. Offsite organizations should be informed that the conditions requiring an emergency class declaration no longer exist and State and local authorities should activate their emergency response organizations based on the current plant conditions.

6.1.3 **IF** NO emergency declaration is required, **THEN** refer to procedure 1903.011, "Emergency Response / Notifications", Section 6.4 to determine if the event warrants a "For Information Only" notification to Entergy Management, NRC Resident Inspector and/or the Arkansas Department of Health.

6.1.4 Upon declaration of an emergency classification implement procedure, 1903.011, "Emergency Response / Notifications", to ensure that immediate notification requirements are met and the proper Emergency Plan response is taken.

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6.1.5 Upgrade the emergency classification if plant conditions degrade per steps 6.1.1.A through E.

6.1.6 Downgrade the emergency classification when plant conditions have improved and step 6.2 is applicable.

6.2 DOWNGRADING THE EMERGENCY CLASSIFICATION:

6.2.1 Assess the current plant conditions, then perform the following:

- A. Compare the abnormal conditions with those listed in the "Index Of Emergency Action Levels".
- B. Turn to the appropriate tab which corresponds to the condition picked from the Index of EALs.
- C. Assess the information available from valid indications or reports, compare it to the given EALs. Obtain concurrence from NRC and State officials that downgrading is appropriate (if their emergency response organizations have been activated as a result of this event). Downgrade to the emergency classification that is indicated.
- D. If the indications or reports do not match the given EALs, then refer to Tab H "Hazards and Other Conditions Affecting Plant Safety" and using appropriate judgment, determine if the plant status warrants downgrading the emergency classification.

6.2.2 Perform notifications to downgrade the emergency classification if appropriate per procedure 1903.011, "Emergency Response/Notifications".

6.2.3 **IF** NO emergency classification appears necessary, **THEN** TERMINATE the emergency per step 6.3.

6.2.4 **IF** the emergency classification is still REQUIRED, **THEN** repeat steps 6.2.1 through 6.2.3 whenever plant conditions again appear to have improved.

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6.3 TERMINATING THE EMERGENCY:

6.3.1 Compare the existing plant conditions with the following:

- A. Plant conditions no longer meet the emergency action level criteria AND it appears unlikely that current conditions will degrade further requiring reinstatement of an emergency classification.
- B. Non-routine releases of radioactive material to the environment are under control or terminated.
- C. Any fire, flood, earthquake, or similar emergency condition is controlled or has ceased.
- D. All specified corrective actions have occurred OR the plant has been placed in the appropriate operational mode.
- E. All required notifications have been completed.
- F. NRC and State officials are in agreement that termination or transition to the recovery phase is appropriate (if their emergency response organizations have been activated as a result of this event).

6.3.2 **IF** the conditions of 6.3.1 A-F are met,  
**THEN** TERMINATE the emergency or proceed to the recovery phase.

7.0 ATTACHMENTS / TABS AND FORMS

7.1 Attachment 1 - Index of Emergency Action Levels

7.1.1 TAB A: Abnormal Radiation Levels / Radiological Effluents

7.1.2 TAB C: Cold Shutdown / Refueling System Malfunction

7.1.3 TAB E: Independent Spent Fuel Storage Installation (ISFSI) Malfunction

7.1.4 TAB F: Fission Product Barrier Degradation

7.1.5 TAB H: Hazards and Other Conditions Affecting Plant Safety

7.1.6 TAB S: System Malfunction

7.2 Attachment 2 - ANO EAL Basis Document

7.3 Attachment 3 - EAL Matrix Chart

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**ATTACHMENT 1**

**INDEX OF EMERGENCY ACTION LEVELS**

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**TAB A: Abnormal Radiation Levels / Radiological Effluents**

AU1	Any release of gaseous or liquid radioactivity to the environment > 2 times the ODCM limits for ≥60 minutes	24
AA1	Any release of gaseous or liquid radioactivity to the environment > 200 times the ODCM limits for ≥15 minutes	24
AS1	Offsite dose resulting from an actual or IMMEDIATE release of gaseous radioactivity > 100 mR TEDE or 500 mR child thyroid CDE for the actual or projected duration of the release	24
AG1	Offsite dose resulting from an actual or IMMEDIATE release of gaseous radioactivity >1000 mR TEDE or 5000 mR child thyroid CDE for the actual or projected duration of the release using actual meteorology	24
AU2	UNPLANNED rise in plant radiation levels	26
AA2	Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel	26
AA3	Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions	27

**TAB C: Cold Shutdown / Refueling System Malfunction**

CU1	RCS leakage	29
CA1	Loss of RCS / reactor vessel inventory	29
CS1	Loss of RCS / reactor vessel inventory affecting core decay heat removal capability	29
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CU2	UNPLANNED loss of RCS / reactor vessel inventory	29
CU3	UNPLANNED loss of decay heat removal capability with irradiated fuel in the reactor vessel	31
CA3	Inability to maintain plant in Cold Shutdown	31
CU5	AC power capability to Vital 4.16 KV busses reduced to a single power source ≥15 minutes such that any additional single power source failure would result in station blackout	32
CA5	Loss of all offsite and all onsite AC power to Vital 4.16KV busses ≥ 15 minutes	32



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CU7 Inadvertent criticality	33
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RCS Barrier EALs (RCB)	38
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HU1 Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant	43
HA1 HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat	43
HS1 HOSTILE ACTION within the PROTECTED AREA	42
HG1 HOSTILE ACTION resulting in loss of physical control of the facility	43
HU2 Other conditions exist which in the judgment of the SM warrant declaration of an NUE	44
HA2 Other conditions exist which in the judgment of the SM / ED warrant declaration of an Alert	44
HS2 Other conditions exist which in the judgment of the SM / ED warrant declaration of a Site Area Emergency	44
HG2 Other conditions exist which in the judgment of the SM / ED warrant declaration of a General Emergency	44
HA3 Control room evacuation has been initiated	45
HS3 Control Room evacuation has been initiated and plant control cannot be established	45

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HA4	FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown	46
HU5	Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS	49
HA5	Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor.	49
HU6	Natural or destructive phenomena affecting the PROTECTED AREA	51
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SA1	AC power capability to Vital 4.16 KV busses reduced to a single power source $\geq$ 15 minutes such that any additional single power source failure would result in station blackout	56
SS1	Loss of all offsite and all onsite AC power to Vital 4.16 KV busses $\geq$ 15 minutes	56
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SA3	Automatic trip fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor	57
SS3	Automatic trip fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor	55
SG3	Automatic trip and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists	57
SS4	Loss of all vital DC power $\geq$ 15 minutes	58
SU6	UNPLANNED loss of safety system annunciation or indication in the Control Room $\geq$ 15 minutes	59
SA6	UNPLANNED loss of safety system annunciation or indication in the Control Room with either (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable	59
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# **TAB A**

## **Abnormal Radiation Levels / Radiological Effluents**

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT																																																																																																																																				
<b>ABNORMAL RADIOLOGICAL EFFLUENTS</b>																																																																																																																																							
<p><b>AG1</b> <span style="float: right;">1 2 3 4 5 6 D</span></p> <p>Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity &gt; 1000 mR TEDE or 5000 mR child thyroid CDE for the actual or projected duration of the release using actual meteorology</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p><b>NOTE:</b></p> <p><i>The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, the classification should be based on EAL #2 instead of EAL #1. Do not delay declaration awaiting dose assessment results.</i></p> <p>1. VALID reading on SPING Gas Channel on any of the following radiation monitors &gt; the reading shown for ≥ 15 minutes:</p> <table border="1" style="width:100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th colspan="2">MONITORS – Unit 1</th> <th>LIMIT</th> </tr> </thead> <tbody> <tr><td>RX-9820</td><td>Containment Purge</td><td>1.18E+2 μCi/cc</td></tr> <tr><td>RX-9825</td><td>Radwaste Area</td><td>1.07E+2 μCi/cc</td></tr> <tr><td>RX-9830</td><td>Fuel Handling Area</td><td>9.08E+1 μCi/cc</td></tr> <tr><td>RX-9835</td><td>Emerg. Penetration Room</td><td>1.91E+3 μCi/cc</td></tr> <tr> <th colspan="2">MONITORS – Unit 2</th> <th>LIMIT</th> </tr> <tr><td>2RX-9820</td><td>Containment Purge</td><td>8.92E+1 μCi/cc</td></tr> <tr><td>2RX-9825</td><td>Radwaste Area</td><td>6.64E+1 μCi/cc</td></tr> <tr><td>2RX-9830</td><td>Fuel Handling Area</td><td>8.92E+1 μCi/cc</td></tr> <tr><td>2RX-9835</td><td>Emerg. 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**GENERAL EMERGENCY**

**SITE AREA EMERGENCY**

**ALERT**

**UNUSUAL EVENT**

**ABNORMAL RADIATION LEVELS**

**AA2**

1	2	3	4	5	6	D
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Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel

**Emergency Action Level(s):**

1. A water level drop in the refueling canal or spent fuel pool that will result in irradiated fuel becoming uncovered.

**OR**

2. VALID alarm on any of the following radiation monitors due to damage to irradiated fuel or loss of water level:

MONITORS – Unit 1	
RX-9820	Containment Purge (SPING Gas Ch)
RX-9825	Radwaste Area (SPING Gas Ch)
RX-9830	Fuel Handling Area (SPING Gas Ch)
RE-8060	Containment High Range Monitor
RE-8061	Containment High Range Monitor
RE-8009	Spent Fuel Area
RE-8017	Fuel Handling Area
MONITORS – Unit 2	
2RX-9820	Containment Purge (SPING Gas Ch)
2RX-9825	Radwaste Area (SPING Gas Ch)
2RX-9830	Fuel Handling Area (SPING Gas Ch)
2RE-8905	Containment Equipment Hatch Area
2RE-8909	Containment Personnel Hatch Area
2RE-8925-1/2	Containment High Range Monitors
2RE-8914/15/16	Spent Fuel Area Monitors
2RE-8912	Containment Incore Instruments

**AU2**

1	2	3	4	5	6	D
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UNPLANNED rise in plant radiation levels

**Emergency Action Level(s):**

1. a. UNPLANNED lowering of water level in the refueling canal or spent fuel pool as indicated by:
  - Personnel observation, refueling crew report, indication on area security camera, borated water source (BWST or RWT) level drop due to makeup demands.

**AND**

- b. VALID Area Radiation Monitor reading rise on any of the following:

MONITORS – Unit 1	
RE-8009	Spent Fuel Area
RE-8017	Fuel Handling Area
MONITORS – Unit 2	
2RE-8914	Spent Fuel Area
2RE-8915	Spent Fuel Area
2RE-8916	Spent Fuel Area
2RE-8912	Containment Incore Instrumentation

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GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT							
<b>ABNORMAL RADIATION LEVELS</b>										
		<p><b>AA3</b> <table border="1" data-bbox="1304 347 1493 386"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>D</td> </tr> </table></p> <p>Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions.</p> <p><b>Emergency Action Level(s):</b></p> <ol style="list-style-type: none"> <li>Dose rate &gt; 15 mR/hr in any of the following areas requiring continuous occupancy to maintain plant safety functions: <ul style="list-style-type: none"> <li>Unit 1 Control Room</li> <li>Unit 2 Control Room</li> <li>Central Alarm Station</li> </ul> </li> </ol>	1	2	3	4	5	6	D	<p style="text-align: center;"><u>OR</u></p> <p><b>AU2</b> <i>(continued)</i></p> <ol style="list-style-type: none"> <li>UNPLANNED VALID Area Radiation Monitor readings or survey results indicate a rise by a factor of 1000 over normal* levels.</li> </ol> <p><b>NOTE:</b></p> <p><i>For area radiation monitors with ranges incapable of measuring 1000 times normal* levels, classification shall be based on VALID full scale indication unless surveys confirm that area radiation levels are below 1000 times normal* within 15 minutes of the Area Radiation Monitor indications going to full scale indication.</i></p> <p>* Normal can be considered as the highest reading in the past twenty-four hours excluding the current peak value.</p>
1	2	3	4	5	6	D				



PROC./WORK PLAN NO. <b>1903.010</b>	PROCEDURE/WORK PLAN TITLE: <b>EMERGENCY ACTION LEVEL CLASSIFICATION</b>	PAGE: <b>28 of 181</b> CHANGE: <b>057</b>
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# **TAB C**

## **Cold Shutdown / Refueling System Malfunction**

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
<b>COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION – Loss of RCS / Reactor Vessel Inventory</b>			
<p><b>CG1</b> <span style="float: right;">□ □ □ □ 5 6 □</span></p> <p>Loss of RCS / reactor vessel inventory affecting fuel clad integrity with containment challenged</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p><b>NOTE:</b></p> <p><i>The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.</i></p> <p>1. a. Core exit thermocouples indicate superheat for <math>\geq 30</math> minutes.</p> <p><b><u>AND</u></b></p> <p>b. Any of the following containment challenge indications:</p> <ul style="list-style-type: none"> <li>• CONTAINMENT CLOSURE not established</li> <li>• Explosive mixture inside containment</li> <li>• UNPLANNED rise in containment pressure</li> </ul> <p><b><u>OR</u></b></p> <p>2. a. RCS / reactor vessel level cannot be monitored for <math>\geq 30</math> minutes with a loss of RCS/ reactor vessel inventory as indicated by any of the following:</p>	<p><b>CS1</b> <span style="float: right;">□ □ □ □ 5 6 □</span></p> <p>Loss of RCS / reactor vessel inventory affecting core decay heat removal capability</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p><b>NOTE:</b></p> <p><i>The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.</i></p> <p>1. With CONTAINMENT CLOSURE <b><u>not</u></b> established:</p> <p>Loss of RCS / reactor vessel level as indicated by:</p> <p><b>Unit 1:</b> RVLMS Levels 1 through 9 indicate DRY</p> <p><b>Unit 2:</b> RVLMS Levels 1 through 6 indicate DRY</p> <p><b><u>OR</u></b></p> <p>2. With CONTAINMENT CLOSURE established, core exit thermocouples indicate superheat.</p> <p><b><u>OR</u></b></p>	<p><b>CA1</b> <span style="float: right;">□ □ □ □ 5 6 □</span></p> <p>Loss of RCS / reactor vessel inventory</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p><b>NOTE:</b></p> <p><i>The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.</i></p> <p>1. Loss of RCS / reactor vessel inventory as indicated by:</p> <p><b>Unit 1:</b> RVLMS Levels 1 through 8 indicate DRY</p> <p><b>Unit 2:</b> RVLMS Levels 1 through 5 indicate DRY</p> <p><b><u>OR</u></b></p> <p><b>Unit 1:</b> Reactor vessel level &lt;368 ft., 6 in. (bottom of the hot leg)</p> <p><b>Unit 2:</b> Reactor vessel level &lt; 369 ft., 1.5 in. (bottom of the hot leg)</p> <p><b><u>OR</u></b></p>	<p><b>CU1</b> <span style="float: right;">□ □ □ □ 5 □ □</span></p> <p>RCS leakage</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p><b>NOTE:</b></p> <p><i>The SM should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.</i></p> <p>1. RCS leakage results in the inability to maintain or restore level within Pressurizer or RCS level target band for <math>\geq 15</math> minutes.</p> <p><b>CU2</b> <span style="float: right;">□ □ □ □ □ 6 □</span></p> <p>UNPLANNED loss of RCS / reactor vessel Inventory</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p><b>NOTE:</b></p> <p><i>The SM should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.</i></p> <p>1. UNPLANNED RCS / reactor vessel level drop as indicated by either of the following:</p>

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GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
<b>COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION – Loss of RCS / Reactor Vessel Inventory</b>			
<p><b>CG1</b> (continued)</p> <ul style="list-style-type: none"> <li>• Containment High Range Radiation Monitor reading &gt;10 R/hr</li> <li>• Erratic source range monitor indication</li> <li>• Unexplained level rise in Reactor Building Sump, Reactor Drain Tank, Quench Tank, Aux. Building Equipment Drain Tank, or Aux. Building Sump</li> </ul> <p><b>AND</b></p> <p>b. Any of the following containment challenge indications:</p> <ul style="list-style-type: none"> <li>• CONTAINMENT CLOSURE not established</li> <li>• Explosive mixture inside containment</li> <li>• UNPLANNED rise in containment pressure</li> </ul>	<p><b>CS1</b> (continued)</p> <p>3. RCS / reactor vessel level cannot be monitored for ≥ 30 minutes with a loss of RCS / reactor vessel inventory as indicated by any of the following:</p> <ul style="list-style-type: none"> <li>• Containment High Range Radiation Monitor reading &gt; 10 R/hr</li> <li>• Erratic source range monitor indication</li> <li>• Unexplained level rise in Reactor Building Sump, Reactor Drain Tank, Quench Tank, Aux. Building Equipment Drain Tank, or Aux. Building Sump</li> </ul>	<p><b>CA1</b> (continued)</p> <p>2. RCS / reactor vessel level cannot be monitored for ≥ 15 minutes with a loss of RCS / reactor vessel inventory as indicated by an unexplained level rise in the Reactor Building Sump, Reactor Drain Tank, Aux. Building Equipment Drain Tank, Aux. Building Sump, or Quench Tank.</p>	<p><b>CU2</b> (continued)</p> <p>a. RCS / reactor vessel water level drop below the reactor vessel flange for ≥15 minutes when the RCS / reactor vessel level band is established above the reactor vessel flange.</p> <p><b>OR</b></p> <p>b. RCS / reactor vessel water level drop below the RCS / reactor vessel level band for ≥ 15 minutes when the RCS / reactor vessel level band is established below the reactor vessel flange.</p> <p><b>OR</b></p> <p>2. RCS / reactor vessel level cannot be monitored with a loss of RCS / reactor vessel inventory as indicated by an unexplained level rise in (as applicable) the Reactor Building Sump, Reactor Drain Tank, Aux. Building Equipment Drain Tank, Aux. Building Sump, or Quench Tank.</p>

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT														
<b>COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION – Loss of Decay Heat Removal</b>																	
		<p><b>CA3</b> <span style="float: right;">□ □ □ □ 5 6 □</span></p> <p>Inability to maintain plant in Cold Shutdown</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. An UNPLANNED event results in RCS temperature &gt; 200 °F &gt; the specified duration in Table C1.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr> <th colspan="3" style="text-align: center;">Table C1 RCS Reheat Duration Thresholds</th> </tr> <tr> <th style="width: 33%;">RCS</th> <th style="width: 33%;">Containment Closure</th> <th style="width: 33%;">Duration</th> </tr> </thead> <tbody> <tr> <td>Intact (but not RCS lowered inventory)</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">60 minutes*</td> </tr> <tr> <td rowspan="2">Not intact or RCS lowered inventory</td> <td style="text-align: center;">Established</td> <td style="text-align: center;">20 minutes*</td> </tr> <tr> <td style="text-align: center;">Not Established</td> <td style="text-align: center;">0 minutes</td> </tr> </tbody> </table> <p><small>*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, the EAL is not applicable.</small></p> <p><b><u>OR</u></b></p> <p><b>NOTE:</b> <i>EAL #2 does not apply in solid plant conditions.</i></p> <p>2. An UNPLANNED event results in RCS pressure rise &gt; 10 psi due to a loss of RCS cooling.</p>	Table C1 RCS Reheat Duration Thresholds			RCS	Containment Closure	Duration	Intact (but not RCS lowered inventory)	N/A	60 minutes*	Not intact or RCS lowered inventory	Established	20 minutes*	Not Established	0 minutes	<p><b>CU3</b> <span style="float: right;">□ □ □ □ 5 6 □</span></p> <p>UNPLANNED loss of decay heat removal capability with irradiated fuel in the reactor vessel</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p><b>NOTE:</b></p> <p><i>The SM should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.</i></p> <p>1. UNPLANNED event results in RCS temperature exceeding 200 °F.</p> <p><b><u>OR</u></b></p> <p>2. Loss of all RCS temperature and RCS / reactor vessel level indication for ≥ 15 minutes.</p>
Table C1 RCS Reheat Duration Thresholds																	
RCS	Containment Closure	Duration															
Intact (but not RCS lowered inventory)	N/A	60 minutes*															
Not intact or RCS lowered inventory	Established	20 minutes*															
	Not Established	0 minutes															

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
<b>COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION – Loss of AC Power</b>			
		<p><b>CA5</b> <span style="float: right;">□ □ □ □ 5 6 D</span></p> <p>Loss of all offsite and all onsite AC power to Vital 4.16 KV busses ≥ 15 minutes</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p><b>NOTE:</b></p> <p><i>The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.</i></p> <p>1. Loss of all offsite and all onsite AC power to Vital 4.16KV busses ≥ 15 minutes.</p>	<p><b>CU5</b> <span style="float: right;">□ □ □ □ 5 6</span></p> <p>AC power capability to Vital 4.16 KV busses reduced to a single power source ≥ 15 minutes such that any additional single power source failure would result in station blackout</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p><b>NOTE:</b></p> <p><i>The SM should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.</i></p> <p>1. a. AC power capability to Vital 4.16 KV busses reduced to a single power source ≥ 15 minutes.</p> <p style="text-align: center;"><b><u>AND</u></b></p> <p>b. Any additional single power source failure will result in station blackout.</p>

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
<b>COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION – Loss of DC Power</b>			
			<p><b>CU6</b> <span style="float: right;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 5 6 <input type="checkbox"/> </span></p> <p>Loss of required DC power  <math>\geq</math> 15 minutes</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p><b>NOTE:</b></p> <p><i>The SM should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.</i></p> <p>1. <math>&lt;</math> 105 volts on required Vital DC bus <math>\geq</math> 15 minutes.</p>

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
<b>COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION – Inadvertant Criticality</b>			
			<p><b>CU7</b> <span style="float: right;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 5 6 <input type="checkbox"/> </span></p> <p>Inadvertent criticality</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. UNPLANNED sustained positive startup rate observed on nuclear instrumentation.</p>

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT														
<b>COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION – Loss of Communications</b>																	
			<p><b>CU8</b> <span style="float: right;"> <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px; text-align: center;">5</td> <td style="width: 15px; height: 15px; text-align: center;">6</td> <td style="width: 15px; height: 15px; text-align: center;">D</td> </tr> </table> </span></p> <p>Loss of all onsite or offsite communications capabilities</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. Loss of all Table C2 onsite communication methods affecting the ability to perform routine operations.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <tr> <th style="text-align: center;">Table C2 Onsite Communications Equipment</th> </tr> <tr> <td style="text-align: center;">Station radio system</td> </tr> <tr> <td style="text-align: center;">Plant paging system</td> </tr> <tr> <td style="text-align: center;">In-plant telephones</td> </tr> <tr> <td style="text-align: center;">Gaitronics</td> </tr> </table> <p><b><u>OR</u></b></p> <p>2. Loss of all Table C3 offsite communication methods affecting the ability to perform offsite notifications.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <tr> <th style="text-align: center;">Table C3 Offsite Communications Equipment</th> </tr> <tr> <td style="text-align: center;">All telephone lines (commercial and microwave)</td> </tr> <tr> <td style="text-align: center;">ENS</td> </tr> </table>				5	6	D	Table C2 Onsite Communications Equipment	Station radio system	Plant paging system	In-plant telephones	Gaitronics	Table C3 Offsite Communications Equipment	All telephone lines (commercial and microwave)	ENS
			5	6	D												
Table C2 Onsite Communications Equipment																	
Station radio system																	
Plant paging system																	
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ENS																	

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# TAB E

# Independent Spent Fuel Storage Installation (ISFSI) Malfunction



GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
<b>ISFSI MALFUNCTION – Cask Damage</b>			
			<p><b>E-HU1</b> <span style="border: 1px solid black; padding: 2px;">1</span> <span style="border: 1px solid black; padding: 2px;">2</span> <span style="border: 1px solid black; padding: 2px;">3</span> <span style="border: 1px solid black; padding: 2px;">4</span> <span style="border: 1px solid black; padding: 2px;">5</span> <span style="border: 1px solid black; padding: 2px;">6</span> <span style="border: 1px solid black; padding: 2px;">D</span></p> <p><b>Note:</b> Security Events are bounded by the Hazards EALs.</p> <p>Damage to a loaded cask CONFINEMENT BOUNDARY</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. Damage to a loaded cask CONFINEMENT BOUNDARY.</p>

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# TAB F

## Fission Product Barrier Degradation

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT																												
<b>FISSION PRODUCT BARRIER DEGRADATION – Barriers</b>																															
<b>FG1</b> <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td> </td><td> </td><td> </td></tr></table> Loss of ANY two barriers AND loss or potential loss of third barrier	1	2	3	4				<b>FS1</b> <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td> </td><td> </td><td> </td></tr></table> Loss or potential loss of ANY two barriers	1	2	3	4				<b>FA1</b> <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td> </td><td> </td><td> </td></tr></table> ANY loss or ANY potential loss of EITHER fuel clad or RCS	1	2	3	4				<b>FU1</b> <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td> </td><td> </td><td> </td></tr></table> ANY loss or ANY potential loss of containment	1	2	3	4			
1	2	3	4																												
1	2	3	4																												
1	2	3	4																												
1	2	3	4																												

Note: Determine which combination of the three barriers are lost or have a potential loss and use the above key to classify the event. Also, multiple events could occur which result in the conclusion that exceeding the loss or potential loss EALs is IMMIDENT. In this IMMIDENT loss situation use judgment and classify as if the EALs are exceeded.

Fuel Clad Barrier EALs		RCS Barrier EALs		Containment Barrier EALs	
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS
<b>1. Primary Coolant Activity Level (FCB1)</b>		<b>1. RCS Leak Rate (RCB1)</b>		<b>1. Containment Pressure (CNB1)</b>	
1. Coolant activity > 300 µCi/gm dose equivalent I-131 activity by Chemistry sample  <b>OR</b>  2. Radiation levels > 1000 mR/hr  <b>Unit 1:</b> at SA-229  <b>Unit 2:</b> at 2TCD-19	None	RCS leak rate > available makeup capacity as indicated by:  <b>Unit 1:</b> Loss of adequate subcooling margin  <b>Unit 2:</b> RCS subcooling (MTS) can NOT be maintained at least 30 °F	<b>Unit 1:</b> UNISOLABLE RCS leak > 50 gpm with Letdown isolated  <b>Unit 2:</b> UNISOLABLE RCS leak > 44 gpm with Letdown isolated	1. Rapid unexplained drop in containment pressure following an initial rise in containment pressure  <b>OR</b>  2. Containment pressure or sump level response not consistent with LOCA conditions	1. <b>Unit 1:</b> Containment pressure > 73.7 PSIA (59 PSIG) and rising  <b>Unit 2:</b> Containment pressure > 73.7 PSIA and rising  <b>OR</b>  2. Explosive mixture exists inside Containment  <b>OR</b>  3. a. Containment Pressure > containment spray actuation setpoint  <b>Unit 1:</b> 44.7 PSIA (30 PSIG)  <b>Unit 2:</b> 23.3 PSIA (8.6 PSIG)  <b>AND</b>  b. LESS THAN one full train of spray operating

Fuel Clad Barrier EALs		RCS Barrier EALs		Containment Barrier EALs	
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS
<b>2. <u>Core Exit Thermocouple Readings (FCB2)</u></b>		<b>2. <u>SG Tube Rupture (RCB2)</u></b>		<b>2. <u>Core Exit Thermocouple Readings (CNB2)</u></b>	
> 1200 °F CET temperature	<p><b>Unit 1:</b> ICC exists as evidenced by CETs indicating superheated conditions</p> <p><b>Unit 2:</b> Average CETs indicate superheat for current RCS pressure</p>	SGTR that results in an ECCS (SI) actuation	None	None	<p>1. a. CETs indicate &gt; 1200 °F <b>AND</b></p> <p>b. Restoration procedures not effective within 15 minutes <b>OR</b></p> <p>2. a. CETs indicate &gt; 700 °F <b>AND</b></p> <p>b. RVLMS indicates <b>Unit 1:</b> Levels 1 through 9 DRY <b>Unit 2:</b> Levels 1 through 7 DRY <b>AND</b></p> <p>c. Restoration procedures not effective within 15 minutes</p>

Fuel Clad Barrier EALs		RCS Barrier EALs		Containment Barrier EALs	
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS
<b>3. <u>Reactor Vessel Water Level (FCB3)</u></b>		<b>3. <u>Containment Radiation Monitoring (RCB3)</u></b>		<b>3. <u>SG Secondary Side Release With Primary-to-Secondary Leakage (CNB3)</u></b>	
None	<b>Unit 1:</b> RVLMS Levels 1 through 9 indicate DRY  <b>Unit 2:</b> RVLMS Levels 1 through 7 indicate DRY	Containment high range radiation monitor reading > 100 R/hr	None	1. RUPTURED steam generator is also FAULTED outside of containment <b>OR</b> 2. a. Primary to secondary leakrate > 10 gpm <b>AND</b> b. UNISOLABLE steam release from affected steam generator to the environment	None
<b>4. <u>Containment Radiation Monitoring (FCB4)</u></b>		<b>4. <u>Emergency Director Judgment (RCB4)</u></b>		<b>4. <u>Containment Isolation Failure or Bypass (CNB4)</u></b>	
Containment high range radiation monitor reading > 1000 R/hr	None	Any condition in the opinion of the SM / ED that indicates Loss or Potential Loss of the RCS barrier		1. UNISOLABLE breach of containment <b>AND</b> 2. Direct downstream pathway to the environment exists after containment isolation signal	None

Fuel Clad Barrier EALs		RCS Barrier EALs		Containment Barrier EALs																							
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS																						
<b>5. <u>Core Damage Assessment (FCB5)</u></b>				<b>5. <u>Containment Radiation Monitoring (CNB5)</u></b>																							
At least 5% fuel clad damage as determined from core damage assessment	None			None	Containment high range radiation monitor reading > 4000 R/hr																						
<b>6. <u>Emergency Director Judgment (FCB6)</u></b>				<b>6. <u>Other Indications (CNB6)</u></b>																							
Any condition in the opinion of the SM/ED that indicates Loss or Potential Loss of the fuel clad barrier				Elevated readings on the following radiation monitors that indicate loss or potential loss of the Containment barrier:																							
				<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">MONITORS – Unit 1</th> </tr> <tr> <td style="font-size: small;">RX-9820</td> <td>Containment Purge</td> </tr> <tr> <td style="font-size: small;">RX-9825</td> <td>Radwaste Area</td> </tr> <tr> <td style="font-size: small;">RX-9830</td> <td>Fuel Handling Area</td> </tr> <tr> <td style="font-size: small;">RX-9835</td> <td>Emergency Penetration Room</td> </tr> <tr> <th colspan="2">MONITORS – Unit 2</th> </tr> <tr> <td style="font-size: small;">2RX-9820</td> <td>Containment Purge</td> </tr> <tr> <td style="font-size: small;">2RX-9825</td> <td>Radwaste Area</td> </tr> <tr> <td style="font-size: small;">2RX-9830</td> <td>Fuel Handling Area</td> </tr> <tr> <td style="font-size: small;">2RX-9835</td> <td>Emergency Penetration Room</td> </tr> <tr> <td style="font-size: small;">2RX-9845</td> <td>Auxiliary Building Extension</td> </tr> </table>		MONITORS – Unit 1		RX-9820	Containment Purge	RX-9825	Radwaste Area	RX-9830	Fuel Handling Area	RX-9835	Emergency Penetration Room	MONITORS – Unit 2		2RX-9820	Containment Purge	2RX-9825	Radwaste Area	2RX-9830	Fuel Handling Area	2RX-9835	Emergency Penetration Room	2RX-9845	Auxiliary Building Extension
MONITORS – Unit 1																											
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2RX-9830	Fuel Handling Area																										
2RX-9835	Emergency Penetration Room																										
2RX-9845	Auxiliary Building Extension																										
				<b>7. <u>Emergency Director Judgment (CNB7)</u></b>																							
				Any condition in the opinion of the SM / ED that indicates Loss or Potential Loss of the containment barrier																							

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# **TAB H**

# **Hazards and Other Conditions Affecting Plant Safety**

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
<b>HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY – Security</b>			
<p><b>HG1</b> <span style="float: right; border: 1px solid black; padding: 2px;">1 2 3 4 5 6 D</span></p> <p>HOSTILE ACTION resulting in loss of physical control of the facility</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions.</p> <p><b><u>OR</u></b></p> <p>2. A HOSTILE ACTION has caused failure of Spent Fuel Cooling Systems and IMMEDIATE fuel damage is likely for a freshly off-loaded reactor core in pool.</p>	<p><b>HS1</b> <span style="float: right; border: 1px solid black; padding: 2px;">1 2 3 4 5 6 D</span></p> <p>HOSTILE ACTION within the PROTECTED AREA</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by ANO Security Shift Supervision.</p>	<p><b>HA1</b> <span style="float: right; border: 1px solid black; padding: 2px;">1 2 3 4 5 6 D</span></p> <p>HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by ANO Security Shift Supervision.</p> <p><b><u>OR</u></b></p> <p>2. A validated notification from NRC of an airliner attack threat within 30 minutes of the site.</p>	<p><b>HU1</b> <span style="float: right; border: 1px solid black; padding: 2px;">1 2 3 4 5 6 D</span></p> <p>Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by ANO Security Shift Supervision.</p> <p><b><u>OR</u></b></p> <p>2. A credible site specific security threat notification.</p> <p><b><u>OR</u></b></p> <p>3. A validated notification from NRC providing information of an aircraft threat.</p>



GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
<b>HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY – Discretionary</b>			
<p><b>HG2</b> <span style="float: right; border: 1px solid black; padding: 2px;">1 2 3 4 5 6 D</span></p> <p>Other conditions exist which in the judgment of the SM / ED warrant declaration of General Emergency</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. Other conditions exist which in the judgment of the SM / ED indicate that events are in progress or have occurred which involve actual or IMMEDIATE substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.</p>	<p><b>HS2</b> <span style="float: right; border: 1px solid black; padding: 2px;">1 2 3 4 5 6 D</span></p> <p>Other conditions exist which in the judgment of the SM / ED warrant declaration of a Site Area Emergency</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. Other conditions exist which in the judgment of the SM / ED indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; (1) toward site personnel or equipment that could lead to the likely failure of or; (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.</p>	<p><b>HA2</b> <span style="float: right; border: 1px solid black; padding: 2px;">1 2 3 4 5 6 D</span></p> <p>Other conditions exist which in the judgment of the SM / ED warrant declaration of an Alert</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. Other conditions exist which in the judgment of the SM / ED indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.</p>	<p><b>HU2</b> <span style="float: right; border: 1px solid black; padding: 2px;">1 2 3 4 5 6 D</span></p> <p>Other conditions exist which in the judgment of the SM warrant declaration of an NUE</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. Other conditions exist which in the judgment of the SM 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.</p>

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GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
<b>HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY – Control Room Evacuation</b>			
	<p><b>HS3</b> <span style="border: 1px solid black; padding: 2px;">1 2 3 4 5 6 D</span></p> <p>Control Room evacuation has been initiated and plant control cannot be established</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. a. Control Room evacuation has been initiated.</p> <p><b><u>AND</u></b></p> <p>b. Control of the plant cannot be established in accordance with the following procedures within 15 minutes:</p> <p style="padding-left: 40px;"><b>Unit 1:</b> 1203.002, “Alternate Shutdown”</p> <p style="padding-left: 40px;"><b>Unit 2:</b> 2203.014, “Alternate Shutdown”</p>	<p><b>HA3</b> <span style="border: 1px solid black; padding: 2px;">1 2 3 4 5 6 D</span></p> <p>Control Room evacuation has been initiated</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. Alternate Shutdown procedure requires Control Room evacuation:</p> <p><b>Unit 1:</b> 1203.002, “Alternate Shutdown”</p> <p><b>Unit 2:</b> 2203.014, “Alternate Shutdown”</p>	

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT													
<b>HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY</b>																
<b>Fire</b>																
	<sup>1</sup> HA4 <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>D</td> </tr> </table> <p>FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. FIRE or EXPLOSION resulting in <b>VISIBLE DAMAGE</b> to any <b>Table H1</b> structure or area containing safety systems or components <u>or</u> Control Room indication of degraded performance of those safety systems:</p>	1	2	3	4	5	6	D	<sup>1</sup> HU4 <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>D</td> </tr> </table> <p>FIRE within the <b>PROTECTED AREA</b> not extinguished within 15 minutes of detection</p> <p style="text-align: center;"><b><u>OR</u></b></p> <p>EXPLOSION within the <b>PROTECTED AREA</b></p> <p><b><u>Emergency Action Level(s):</u></b></p> <p><b>NOTE:</b></p> <p><i>The SM should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.</i></p> <p>1. FIRE in any <b>Table H1</b> structure or area not extinguished:</p> <p style="margin-left: 20px;">a. within 15 minutes of Control Room notification</p> <p style="text-align: center;"><b><u>OR</u></b></p> <p style="margin-left: 20px;">b. within 15 minutes of <sup>2</sup>verification of a Control Room FIRE alarm (i.e. Alarm valid until disproved)</p> <p style="text-align: center;"><b><u>OR</u></b></p> <p>2. EXPLOSION within the <b>PROTECTED AREA</b>.</p>	1	2	3	4	5	6	D
1	2	3	4	5	6	D										
1	2	3	4	5	6	D										

<sup>1</sup>The HA4 and HU4 EALs apply to any Table H1 structure or area whether in service or tagged out for maintenance.

<sup>2</sup>Verification of a fire detection system alarm/actuation includes actions that can be taken within the Control Room or other nearby site specific location to ensure that it is not spurious.

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**Table H1**

**Unit 1**

Reactor Building

All Elevations

Aux Building

All Elevations Including Penthouse/MSIV Room

Exceptions: Boric Acid Mix Tank Room (Chem Add Area) 404' (157-B)  
EDG Exhaust Fan area on 386' (1-E and 2-E)

Turbine Building

All Elevations

Including:

Pipechase under ICW Coolers

CRD Pump Pit / T-28 Room / Area under ICW Pumps

Outside Areas

Manholes adjacent to Startup #2 XFMR (MH-03/MH-04)

Manholes adjacent to Intake Structure (MH-05/MH-06)

Intake Structure (354' and 366')

Diesel Fuel Vault

Diesel Fuel Vault Pump Manholes MH-09 and MH-10 (Manhole, MH-09, is located approximately 15 feet northeast of the Unit 1 QCST , Manhole, MH-10, is located approximately 5 feet west of Unit 2 Condensate Storage Tank, 2T-41A)

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**Table H1**

**Unit 2**

Reactor Building

All Elevations

Aux Building

All Elevations including Aux Extensions

Turbine Building

All Elevations

Outside Areas

Intake Structure (354' and 366')

Concrete Manhole East, NE of intake

Concrete Manhole East of Turbine building next to train bay

Diesel Fuel Vault

Diesel Fuel Vault Pump Manholes MH-09 and MH-10 (Manhole, MH-09, is located approximately 15 feet northeast of the Unit 1 QCST , Manhole, MH-10, is located approximately 5 feet west of Unit 2 Condensate Storage Tank, 2T-41A)

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GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT														
<b>HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY</b>																	
<b>Toxic Gas</b>																	
		<p><b>HA5</b> <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>D</td></tr></table></p> <p>Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant, or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p><b>NOTE:</b></p> <p><i>If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.</i></p> <p>1. Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant, or flammable gases which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.</p>	1	2	3	4	5	6	D	<p><b>HU5</b> <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>D</td></tr></table></p> <p>Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. Toxic, corrosive, asphyxiant, or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS.</p> <p><b><u>OR</u></b></p> <p>2. Report by Local, County or State officials for evacuation or sheltering of site personnel based on an offsite event.</p>	1	2	3	4	5	6	D
1	2	3	4	5	6	D											
1	2	3	4	5	6	D											

<b>GENERAL EMERGENCY</b>	<b>SITE AREA EMERGENCY</b>	<b>ALERT</b>	<b>UNUSUAL EVENT</b>
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**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY**

	<p><b>Toxic Gas</b></p> <p><b>HA5 (continued)</b>    <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>D</td></tr></table></p> <p style="text-align: center;"><u><b>Unit 1</b></u></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:60%;">VITAL AREA</th> <th style="width:40%;">APPLICABLE MODES</th> </tr> </thead> <tbody> <tr> <td>A-4 Switchgear Room</td> <td style="text-align: center;">3, 4</td> </tr> <tr> <td>Upper North Electrical Penetration Room</td> <td style="text-align: center;">3, 4</td> </tr> <tr> <td>Lower South Electrical Equipment Room</td> <td style="text-align: center;">3, 4</td> </tr> <tr> <td>Control Room</td> <td style="text-align: center;">ALL</td> </tr> </tbody> </table> <p style="text-align: center;"><u><b>Unit 2</b></u></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:60%;">VITAL AREA</th> <th style="width:40%;">APPLICABLE MODES</th> </tr> </thead> <tbody> <tr> <td>Auxiliary Building 317' Emergency Core Cooling Rooms</td> <td style="text-align: center;">3, 4</td> </tr> <tr> <td>Auxiliary Building 317' Tendon Gallery Access</td> <td style="text-align: center;">3, 4</td> </tr> <tr> <td>Auxiliary Building 335' Charging Pumps/ 2B-52</td> <td style="text-align: center;">3, 4</td> </tr> <tr> <td>Auxiliary Building 354' 2B-62 Area</td> <td style="text-align: center;">3, 4</td> </tr> <tr> <td>Emergency Diesel Generator Corridor</td> <td style="text-align: center;">3, 4</td> </tr> <tr> <td>Lower South Piping Penetration Room</td> <td style="text-align: center;">3, 4</td> </tr> <tr> <td>Auxiliary Building 386' Containment Hatch</td> <td style="text-align: center;">3, 4</td> </tr> <tr> <td>Control Room</td> <td style="text-align: center;">ALL</td> </tr> </tbody> </table>	1	2	3	4	5	6	D	VITAL AREA	APPLICABLE MODES	A-4 Switchgear Room	3, 4	Upper North Electrical Penetration Room	3, 4	Lower South Electrical Equipment Room	3, 4	Control Room	ALL	VITAL AREA	APPLICABLE MODES	Auxiliary Building 317' Emergency Core Cooling Rooms	3, 4	Auxiliary Building 317' Tendon Gallery Access	3, 4	Auxiliary Building 335' Charging Pumps/ 2B-52	3, 4	Auxiliary Building 354' 2B-62 Area	3, 4	Emergency Diesel Generator Corridor	3, 4	Lower South Piping Penetration Room	3, 4	Auxiliary Building 386' Containment Hatch	3, 4	Control Room	ALL
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GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
<b>HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY</b>			
<b>Natural or Destructive Phenomena</b>			
	<p><b>HA6</b> <span style="float: right;">1 2 3 4 5 6 D</span></p> <p>Natural or destructive phenomena affecting VITAL AREAS</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. a. Seismic event &gt; Operating Basis Earthquake (OBE) as indicated by annunciation of the 0.1g acceleration alarm.</p> <p style="text-align: center;"><b><u>AND</u></b></p> <p>b. Earthquake confirmed by ANY of the following:</p> <ul style="list-style-type: none"> <li>• Earthquake felt in plant</li> <li>• National Earthquake Center</li> <li>• Control Room indication of degraded performance of systems required for the safe shutdown of the plant</li> </ul> <p style="text-align: center;"><b><u>OR</u></b></p>	<p><b>HU6</b> <span style="float: right;">1 2 3 4 5 6 D</span></p> <p>Natural or destructive phenomena affecting the PROTECTED AREA</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. Seismic event identified by any 2 of the following:</p> <ul style="list-style-type: none"> <li>• Seismic event confirmed by annunciation of the 0.01g acceleration alarm</li> <li>• Earthquake felt in plant</li> <li>• National Earthquake Center</li> </ul> <p style="text-align: center;"><b><u>OR</u></b></p> <p>2. Tornado striking within PROTECTED AREA boundary or high winds &gt; 67 mph. <b>(2 minute average)</b></p> <p style="text-align: center;"><b><u>OR</u></b></p> <p>3. Internal flooding that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode in any of the structures or areas in <b>Table H1. (Page 47)</b></p> <p style="text-align: center;"><b><u>OR</u></b></p> <p>4. Turbine failure resulting in casing penetration or damage to turbine or generator seals.</p> <p style="text-align: center;"><b><u>OR</u></b></p>	



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GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
<b>HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY</b>			
<b>Natural or Destructive Phenomena</b>			
		<p><b>HA6</b> (continued)</p> <p>2. Tornado striking or winds &gt; 67 mph (2 minute average) resulting in <b>VISIBLE DAMAGE</b> to any of the following structures/equipment containing safety systems or components <u>or</u> Control Room indication of degraded performance of those safety systems:</p> <ul style="list-style-type: none"> <li>• Reactor Building</li> <li>• Intake Structure</li> <li>• Ultimate Heat Sink</li> <li>• BWST/RWT</li> <li>• Auxiliary Building</li> <li>• Turbine Building</li> <li>• QCST</li> <li>• Control Room</li> <li>• Startup Transformers</li> <li>• Diesel Fuel Vault</li> </ul> <p><b>OR</b></p> <p>3. Internal flooding in any of the following areas resulting in an electrical shock hazard that precludes access to operate or monitor safety equipment <u>or</u> Control Room indication of degraded performance of those safety systems:</p> <ul style="list-style-type: none"> <li>• Intake Structure</li> <li>• Auxiliary Building</li> <li>• Turbine Building</li> </ul>	<p><b>HU6</b> (continued)</p> <p>5. Lake Dardanelle level &lt; 335 feet.</p> <p><b>OR</b></p> <p>6. Lake Dardanelle level &gt; 345 feet.</p>

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GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
<b>HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY</b>			
<b>Natural or Destructive Phenomena</b>			
<p data-bbox="1050 311 1923 354"><b>HA6 (continued)</b></p> <p data-bbox="1050 354 1923 396"><b><u>OR</u></b></p> <p data-bbox="1050 396 1923 906">           4. Turbine failure-generated PROJECTILES resulting in VISIBLE DAMAGE to or penetration of any of the structures/equipment containing safety systems or components or Control Room indication of degraded performance of those safety systems:           <ul style="list-style-type: none"> <li data-bbox="1092 763 1344 792">• Auxiliary Building</li> <li data-bbox="1092 792 1323 821">• Turbine Building</li> <li data-bbox="1092 821 1302 850">• Control Room</li> <li data-bbox="1092 850 1386 880">• Startup Transformers</li> </ul> </p> <p data-bbox="1050 906 1923 948"><b><u>OR</u></b></p> <p data-bbox="1050 948 1923 1062">5. Lake Dardanelle level &lt; 335 feet and Emergency Cooling Pond inoperable.</p> <p data-bbox="1050 1062 1923 1104"><b><u>OR</u></b></p>			

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GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
<b>HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY</b>			
<b>Natural or Destructive Phenomena</b>			
<p data-bbox="1050 334 1921 380"><b>HA6 (continued)</b></p> <p data-bbox="1050 380 1921 600">6. Vehicle crash resulting in VISIBLE DAMAGE to any of the structures/equipment containing safety systems or components or Control Room indication of degraded performance of those safety systems:</p> <ul data-bbox="1050 600 1921 945" style="list-style-type: none"> <li>• Reactor Building</li> <li>• Intake Structure</li> <li>• Ultimate Heat Sink</li> <li>• BWST/RWT</li> <li>• Auxiliary Building</li> <li>• Turbine Building</li> <li>• QCST</li> <li>• Startup Transformers</li> <li>• Diesel Fuel Vault</li> </ul>			

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# **TAB S**

# **System Malfunction**

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
<b>SYSTEM MALFUNCTION – Loss of AC Power</b>			
<p><b>SG1</b> <span style="float: right;">1 2 3 4</span></p> <p>Prolonged loss of all offsite and all onsite AC power to Vital 4.16 KV busses</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. a. Loss of all offsite and all onsite AC power to Vital 4.16 KV busses.</p> <p style="padding-left: 20px;"><b><u>AND</u></b></p> <p>b. Either of the following:</p> <ul style="list-style-type: none"> <li>• Restoration of at least one Vital 4.16 KV bus in &lt; 4 hours is not likely.</li> </ul> <p style="padding-left: 20px;"><b><u>OR</u></b></p> <ul style="list-style-type: none"> <li>• Continuing degradation of core cooling based on Fission Product Barrier monitoring as indicated by CETs <math>\geq 700</math> °F.</li> </ul>	<p><b>SS1</b> <span style="float: right;">1 2 3 4</span></p> <p>Loss of all offsite and all onsite AC power to Vital 4.16 KV busses <math>\geq 15</math> minutes</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p><b>NOTE:</b></p> <p><i>The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.</i></p> <p>1. Loss of all offsite and all onsite AC power to Vital 4.16 KV busses <math>\geq 15</math> minutes.</p>	<p><b>SA1</b> <span style="float: right;">1 2 3 4</span></p> <p>AC power capability to Vital 4.16 KV busses reduced to a single power source <math>\geq 15</math> minutes such that any additional single power source failure would result in station blackout</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p><b>NOTE:</b></p> <p><i>The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.</i></p> <p>1. a. AC power capability to Vital 4.16 KV busses reduced to a single power source <math>\geq 15</math> minutes.</p> <p style="padding-left: 20px;"><b><u>AND</u></b></p> <p>b. Any additional single power source failure will result in station blackout.</p>	<p><b>SU1</b> <span style="float: right;">1 2 3 4</span></p> <p>Loss of all offsite AC power to Vital 4.16 KV busses <math>\geq 15</math> minutes</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p><b>NOTE:</b></p> <p><i>The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.</i></p> <p>1. Loss of all offsite AC power to Vital 4.16 KV busses <math>\geq 15</math> minutes.</p>

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
<b>SYSTEM MALFUNCTION – Failure of Reactor Protection System</b>			
<p><b>SG3</b> <span style="float: right;">1 2</span></p> <p>Automatic trip and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. a. An automatic trip failed to shutdown the reactor.</p> <p style="padding-left: 20px;"><b><u>AND</u></b></p> <p>b. All manual actions do not shutdown the reactor as indicated by reactor power <math>\geq</math> 5%.</p> <p style="padding-left: 20px;"><b><u>AND</u></b></p> <p>c. Either of the following exist or have occurred due to continued power generation:</p> <ul style="list-style-type: none"> <li>• CET temperatures at or approaching 1200 °F.</li> </ul> <p style="padding-left: 20px;"><b><u>OR</u></b></p> <ul style="list-style-type: none"> <li>• Feedwater flow rate less than:</li> </ul> <p style="padding-left: 40px;"><b>Unit 1:</b> 430 gpm</p> <p style="padding-left: 40px;"><b>Unit 2:</b> 485 gpm</p>	<p><b>SS3</b> <span style="float: right;">1 2</span></p> <p>Automatic trip fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. a. An automatic trip failed to shutdown the reactor.</p> <p style="padding-left: 20px;"><b><u>AND</u></b></p> <p>b. Manual actions taken at panel C03 (Unit 1) or panels 2C03/2C14 (Unit 2) do not shutdown the reactor as indicated by reactor power <math>\geq</math> 5%.</p>	<p><b>SA3</b> <span style="float: right;">1 2</span></p> <p>Automatic trip fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. a. An automatic trip failed to shutdown the reactor as indicated by reactor power <math>\geq</math> 5%.</p> <p style="padding-left: 20px;"><b><u>AND</u></b></p> <p>b. Manual actions taken at panel C03 (Unit 1) or panels 2C03/2C14 (Unit 2) successfully shutdown the reactor as indicated by reactor power <math>&lt;</math> 5%.</p>	

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
<b>SYSTEM MALFUNCTION – Loss of DC Power</b>			
	<p><b>SS4</b> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p>Loss of all Vital DC power            ≥ 15 minutes</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p><b>NOTE:</b></p> <p><i>The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.</i></p> <p>1. &lt; 105 volts on all Vital DC busses ≥ 15 minutes.</p>		

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
<b>SYSTEM MALFUNCTION – Loss of Annunciators</b>			
<p style="margin: 0;"><b>SS6</b> <span style="float: right;">1 2 3 4</span></p> <p style="margin: 0;">Inability to monitor a SIGNIFICANT TRANSIENT in progress</p> <p style="margin: 0;"><b><u>Emergency Action Level(s):</u></b></p> <p style="margin: 0;"><b>NOTE:</b> <i>The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.</i></p> <p style="margin: 0;">1. a. UNPLANNED loss of &gt; approximately 75% of the following ≥ 15 minutes:</p> <ul style="list-style-type: none"> <li>• Control Room annunciators associated with safety systems.</li> </ul> <p style="margin: 0; text-align: center;"><b><u>OR</u></b></p> <ul style="list-style-type: none"> <li>• Control Room safety system indication.</li> </ul> <p style="margin: 0; text-align: center;"><b><u>AND</u></b></p> <p style="margin: 0;">b. A SIGNIFICANT TRANSIENT in progress.</p> <p style="margin: 0; text-align: center;"><b><u>AND</u></b></p> <p style="margin: 0;">c. Compensatory indications are unavailable.</p>	<p style="margin: 0;"><b>SA6</b> <span style="float: right;">1 2 3 4</span></p> <p style="margin: 0;">UNPLANNED loss of safety system annunciation or indication in the Control Room with either (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable</p> <p style="margin: 0;"><b><u>Emergency Action Level(s):</u></b></p> <p style="margin: 0;"><b>NOTE:</b> <i>The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.</i></p> <p style="margin: 0;">1. a. UNPLANNED loss of &gt; approximately 75% of the following ≥ 15 minutes:</p> <ul style="list-style-type: none"> <li>• Control Room annunciators associated with safety systems.</li> </ul> <p style="margin: 0; text-align: center;"><b><u>OR</u></b></p> <ul style="list-style-type: none"> <li>• Control Room safety system indication.</li> </ul> <p style="margin: 0; text-align: center;"><b><u>AND</u></b></p> <p style="margin: 0;">b. Either of the following:</p> <ul style="list-style-type: none"> <li>• A SIGNIFICANT TRANSIENT is in progress</li> </ul> <p style="margin: 0; text-align: center;"><b><u>OR</u></b></p> <ul style="list-style-type: none"> <li>• Compensatory indications are unavailable</li> </ul>	<p style="margin: 0;"><b>SU6</b> <span style="float: right;">1 2 3 4</span></p> <p style="margin: 0;">UNPLANNED loss of safety system annunciation or indication in the Control Room for ≥ 15 minutes</p> <p style="margin: 0;"><b><u>Emergency Action Level(s):</u></b></p> <p style="margin: 0;"><b>NOTE:</b> <i>The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.</i></p> <p style="margin: 0;">1. UNPLANNED loss of &gt; approximately 75% of the following ≥ 15 minutes:</p> <p style="margin: 0;">a. Control Room annunciators associated with safety systems.</p> <p style="margin: 0; text-align: center;"><b><u>OR</u></b></p> <p style="margin: 0;">b. Control Room safety system indication.</p>	



GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
<b>SYSTEM MALFUNCTION – RCS Leakage</b>			
			<p><b>SU7</b> <span style="float: right; border: 1px solid black; padding: 2px;">1 2 3 4</span></p> <p>RCS leakage</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. Unidentified or pressure boundary leakage &gt; 10 gpm.</p> <p style="text-align: center;"><b><u>OR</u></b></p> <p>2. Identified leakage &gt; 25 gpm.</p>

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT								
<b>SYSTEM MALFUNCTION – Loss of Communications</b>											
			<p><b>SU8</b> <span style="float: right; border: 1px solid black; padding: 2px;">1 2 3 4</span></p> <p>Loss of all onsite or offsite communications capabilities</p> <p><b>Emergency Action Level(s):</b></p> <p>1. Loss of all Table M1 onsite communications methods affecting the ability to perform routine operations.</p> <table border="1" style="margin-left: 20px; border-collapse: collapse; width: 80%;"> <tr> <th style="text-align: center;">Table M1 Onsite Communications Methods</th> </tr> <tr> <td style="text-align: center;">Station radio system</td> </tr> <tr> <td style="text-align: center;">Plant paging system</td> </tr> <tr> <td style="text-align: center;">In-plant telephones</td> </tr> <tr> <td style="text-align: center;">Gaitronics</td> </tr> </table> <p style="text-align: center; margin: 10px 0;"><b><u>OR</u></b></p> <p>2. Loss of all Table M2 offsite communications methods affecting the ability to perform offsite notifications.</p> <table border="1" style="margin-left: 20px; border-collapse: collapse; width: 80%;"> <tr> <th style="text-align: center;">Table M2 Offsite Communications Methods</th> </tr> <tr> <td style="text-align: center;">All telephone lines (commercial and microwave)</td> </tr> <tr> <td style="text-align: center;">ENS</td> </tr> </table>	Table M1 Onsite Communications Methods	Station radio system	Plant paging system	In-plant telephones	Gaitronics	Table M2 Offsite Communications Methods	All telephone lines (commercial and microwave)	ENS
Table M1 Onsite Communications Methods											
Station radio system											
Plant paging system											
In-plant telephones											
Gaitronics											
Table M2 Offsite Communications Methods											
All telephone lines (commercial and microwave)											
ENS											

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
<b>SYSTEM MALFUNCTION – Fuel Clad Degradation</b>			
			<p><b>SU9</b> <span style="float: right; border: 1px solid black; padding: 2px;">1 2 3 4</span></p> <p>Fuel clad degradation</p> <p><b><u>Emergency Action Level(s):</u></b></p> <p>1. Failed Fuel Iodine radiation monitor reading indicates fuel clad degradation &gt; Technical Specification allowable limits:</p> <p style="margin-left: 20px;"><b>Unit 1:</b> RI-1237S reads &gt; <math>1.3 \times 10^5</math> cpm</p> <p style="margin-left: 20px;"><b>Unit 2:</b> 2RITS-4806B reads &gt; <math>.65 \times 10^5</math> cpm</p> <p style="text-align: center;"><b><u>OR</u></b></p> <p>2. RCS sample activity value indicating fuel clad degradation &gt; Technical Specification allowable limits:</p> <ul style="list-style-type: none"> <li>• &gt; 1.0 uCi/gm Dose Equivalent I-131 for more than 48 hours</li> </ul> <p style="text-align: center;"><b><u>OR</u></b></p> <ul style="list-style-type: none"> <li>• <b>Unit 1:</b> <math>\geq 60</math> uCi/gm Dose Equivalent I-131</li> <li><b>Unit 2:</b> &gt; 60 uCi/gm Dose Equivalent I-131</li> </ul> <p style="text-align: center;"><b><u>OR</u></b></p>

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
<b>SYSTEM MALFUNCTION – Fuel Clad Degradation</b>			
			<b>SU9 (continued)</b> <ul style="list-style-type: none"> <li>• <b>Unit 1:</b> &gt; 2200 µCi/gm Dose Equivalent Xe-133 for more than 48 hours</li> <li>• <b>Unit 2:</b> &gt; 3100 µCi/gm Dose Equivalent Xe-133 for more than 48 hours</li> </ul>
<b>SYSTEM MALFUNCTION – Inadvertant Criticality</b>			
			<b>SU10</b> <span style="float: right;"> <input type="checkbox"/> <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> <input type="checkbox"/> </span> Inadvertent criticality <u><b>Emergency Action Level(s):</b></u> 1. An UNPLANNED sustained positive startup rate observed on nuclear instrumentation.
<b>SYSTEM MALFUNCTION – Failure to Shutdown</b>			
			<b>SU11</b> <span style="float: right;"> <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> <input type="checkbox"/> </span> Inability to reach required operating mode within Technical Specification limits <u><b>Emergency Action Level(s):</b></u> 1. A Plant is not brought to required operating mode within Technical Specifications LCO action statement time.

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# Attachment 2

## Arkansas Nuclear One

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GENERAL NOTES ON BASIS DOCUMENT USE

Plant Operating Mode Usage for ANO EALs:

**UNIT 1:**

Mode 1 = Power Operation –  $K_{eff} \geq 0.99$ , Reactor Power > 5%

Mode 2 = Startup –  $K_{eff} \geq .99$ , Reactor Power  $\leq 5\%$

Mode 3 = Hot Standby –  $K_{eff} < .99$ , RCS  $\geq 280$  °F

Mode 4 = Hot Shutdown –  $K_{eff} < .99$ ,  $280$  °F > RCS >  $200$  °F

Mode 5 = Cold Shutdown –  $K_{eff} < .99$ , RCS  $\leq 200$  °F

Mode 6 = Refueling – One or more reactor vessel head closure bolts less than fully tensioned

Defueled (D) – All reactor fuel removed from reactor pressure vessel (full core offload during refueling or extended outage). This is not an operating mode designation by Technical Specifications.

**UNIT 2:**

Mode 1 = Power Operation –  $K_{eff} \geq 0.99$ , Reactor Power > 5%, RCS  $\geq 300$  °F

Mode 2 = Startup –  $K_{eff} \geq .99$ , Reactor Power  $\leq 5\%$ , RCS  $\geq 300$  °F

Mode 3 = Hot Standby –  $K_{eff} < .99$ , Reactor Power 0, RCS  $\geq 300$  °F

Mode 4 = Hot Shutdown –  $K_{eff} < .99$ , Reactor Power 0,  $300$  °F > RCS >  $200$  °F

Mode 5 = Cold Shutdown –  $K_{eff} < .99$ , Reactor Power 0, RCS  $\leq 200$  °F

Mode 6 = Refueling –  $K_{eff} \leq .95$ , Reactor Power 0, RCS  $\leq 140$  °F Reactor vessel head unbolted or removed and fuel in the vessel

Defueled (D) – All reactor fuel removed from reactor pressure vessel (full core offload during refueling or extended outage). This is not an operating mode designation by Technical Specifications.

This basis document serves two basic functions:

- It provides background and explanatory information based on NEI 99-01 to present a basis for the origination of the ANO EALs for reviewers and users.
- The second function this basis document may provide is an aid to decision makers when making a determination to classify an emergency event. It is intended that decision makers have all the information in Attachment 7.1 of this procedure that they need to make a sound classification decision. Information that may be useful to a decision maker in classifying emergency events is also contained in the Basis section for each IC in the Basis Document.

The expectation is that emergency classifications are to be made as soon as conditions are present and recognizable for the classification, but within 15 minutes or less in all cases of conditions present. A decision maker's use of this Basis Document for assistance is not intended to delay the classification.

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## OVERVIEW

### **Emergency Action Levels**

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 ANO Technical Specifications (TSs). Activities which cause the site to operate beyond that allowed by the TSs, planned or unplanned, may result in an EAL threshold being met or exceeded. Planned evolutions to test, manipulate, repair, perform maintenance or modifications to systems and equipment that result in an EAL value 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 ANO operating license. However, these conditions may be subject to the reporting requirements of 10 CFR 50.72.

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

With the emergency classification levels defined, the thresholds that must be met for each EAL to be placed under the EAL can be determined. There are two basic approaches to determining these EALs. EALs and emergency classification level boundaries coincide for those continuously measurable, instrumented ICs, such as radioactivity, core temperature, coolant levels, etc. For these ICs, the EAL will be the threshold reading that most closely corresponds to the EAL description using the best available information.

For discrete (discontinuous) events, the approach will have to be somewhat different. Typically, in this category are internal and external hazards such as fire or earthquake. The purpose for including hazards in EALs is to assure that station personnel and off-site emergency response organizations are prepared to deal with consequential damage these hazards may cause. If, indeed, hazards have caused damage to safety functions or fission product barriers, this should be confirmed by symptoms or by observation of such failures. Therefore, it may be appropriate to enter an Alert status for events approaching or exceeding design basis limits such as Operating Basis Earthquake (OBE), design basis wind loads, Fire within Vital Areas, etc. This would give the operating staff additional support and improved ability to determine the extent of plant damage. If damage to barriers or challenges to Safety Functions (SFs) have occurred or are identified, then the additional support can be used to escalate or terminate the emergency classification level based on what has been found. Of course, security events must reflect potential for increasing security threat levels.

Plant emergency operating procedures (EOPs) are designed to maintain and/or restore a set of SFs which are listed in the order of priority for restoration efforts during accident conditions.

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The PWR CSF set includes:

- Subcriticality
- Core cooling
- Heat sink
- Pressure-temperature-stress (RCS integrity)
- Containment

### RCS inventory

There are diverse and redundant plant systems to support each SF. By monitoring the SFs instead of the individual system component status, the impact of multiple events is inherently addressed, e.g., the number of operable components available to maintain the SF.

The EOPs contain detailed instructions regarding the monitoring of these functions and provides a scheme for classifying the significance of the challenge to the functions. In providing EALs based on these schemes, the emergency classification level can flow from the EOP assessment rather than being based on a separate EAL assessment. This is desirable as it reduces ambiguity and the time necessary to classify the event.

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

### **Treatment of Multiple Events and Classification Level Upgrading**

The above discussion deals primarily with simpler emergencies and events that may not escalate rapidly. However, usable EAL guidance must also consider rapidly evolving and complex events. Hence, emergency classification level upgrading and consideration of multiple events must be addressed.

When multiple simultaneous events occur, the emergency classification level is based on the highest EAL reached. For example, two Alerts remain in the Alert category. Or, an Alert and a SAE is a SAE. Further guidance is provided in RIS 2007-02, Clarification of NRC Guidance for Emergency Notifications During Quickly Changing Events.

Emergency classification level upgrading must also consider the effects of a loss of a common system on more than one unit (e.g. potential for radioactive release from more than one core at the same site). This must be considered in the emergency classification level declaration and in the development of appropriate site specific ICs and EALs based on the generic EAL guidance.

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

**Emergency Classification Level Downgrading**

Another important aspect of usable EAL guidance is the consideration of what to do when the risk posed by an emergency is clearly decreasing. A combination approach involving recovery from GEs and some SAEs, and termination from NUEs, Alerts, and certain SAEs causing no long term plant damage appears to be the best choice. Downgrading to lower emergency classification levels adds notifications, but may have merit under certain circumstances.

**Classifying Transient Events**

For some events, the condition may be corrected before a declaration has been made. The key consideration in this situation is to determine whether or not further plant damage occurred while the corrective actions were being taken. In some situations, this can be readily determined, in other situations, further analyses (e.g., coolant radiochemistry sampling, may be necessary). Classify the event as indicated and terminate the emergency once assessment shows that there were no consequences from the event and other termination criteria are met.

Existing guidance for classifying transient events addresses the period of time of event recognition and classification (15 minutes). However, in cases when EAL declaration criteria may be met momentarily during the normal expected response of the plant, declaration requirements should not be considered to be met when the conditions are a part of the designed plant response, or result from appropriate Operator actions.

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 and the guidance of NUREG-1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73, should be applied.

**Operating 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 level can be declared, the emergency classification level shall be based on the mode that existed at the time the event occurred.

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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 EALs are applicable only to events that initiate in Hot Shutdown or higher.

*Summary*

ANO has established an EAL Basis Document including basis information with the IC/EALs. This information may assist the Emergency Director in making classifications, particularly those involving judgment or multiple events. The basis information may also be useful in training, for explaining event classifications to off-site officials, and for facilitating regulatory review and approval of the classification scheme.

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# **ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENTS**

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**ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENTS  
AU1**

**Initiating Condition – NOTIFICATION OF UNUSUAL EVENT**

Any release of gaseous or liquid radioactivity to the environment >2 times the ODCM limits for ≥60 minutes

**Operating Mode Applicability:** All

**Example Emergency Action Level(s):** (1 or 2 or 3)

**Note:** *The SM should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.*

1. VALID reading on SPING Gas Channel on any of the following radiation monitors > the reading shown for ≥ 60 minutes:

<b>MONITORS – UNIT 1</b>		<b>LIMIT</b>
RX-9820	Containment Purge	1.18E-02 µCi/cc
RX-9825	Radwaste Area	1.07E-02 µCi/cc
RX-9830	Fuel Handling Area	9.08E-03 µCi/cc
RX-9835	Emergency Penetration Room	1.91E-01 µCi/cc
<b>MONITORS – UNIT 2</b>		<b>LIMIT</b>
2RX-9820	Containment Purge	8.92E-03 µCi/cc
2RX-9825	Radwaste Area	6.64E-03 µCi/cc
2RX-9830	Fuel Handling Area	8.92E-03 µCi/cc
2RX-9835	Emergency Penetration Room	1.77E-01 µCi/cc
2RX-9845	Aux. Building Extension	2.53E-02 µCi/cc

**OR**



**ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENTS  
AU1**

2. VALID reading on any of the following radiation monitors >2 times the alarm setpoint established by a current release permit for ≥60 minutes.

<b>EFFLUENT MONITORS – Unit 1</b>	
RX-9820	Containment Purge (SPING Gas Channel)
RE-4830	Waste Gas Radiation Monitor
RE-4642	Liquid Radwaste Monitor
RX-9835	Emerg Penetration Room
<b>EFFLUENT MONITORS – Unit 2</b>	
2RX-9820	Containment Purge (SPING Gas Channel)
2RE-2429	Waste Gas Decay Tank Vent Line Radiation Monitor
2RE-2330	BMS Liquid Discharge Monitor
2RE-4423	LRW Discharge Monitor
2RE-4425	SG Blowdown to Flume Radiation Monitor

**OR**

3. Confirmed grab sample analyses for gaseous or liquid releases indicates concentrations or release rates >2 times the applicable values of the ODCM for ≥60 minutes.

**Basis:** The SM should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

This IC addresses a potential reduction in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

ANO incorporates features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in AU1 and AA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an offsite dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, NOT the magnitude of the associated dose or dose rate.

Releases should not be prorated or averaged over 60 minutes. For example, a release exceeding 4 times ODCM limits for 30 minutes does not meet the threshold for this IC.

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## **ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENTS AU1**

This Initiating Condition includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

### EAL #1

This EAL addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the EAL.

This EAL is intended for sites that have established effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

### EAL #2

This EAL addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in this Initiating Condition established by the release permit. This value may be associated with a planned batch release, or a continuous release path.

### EAL #3

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

EAL #1 and #2 directly correlate with the IC since annual average meteorology is required to be used in showing compliance with the ODCM and is used in calculating the alarm setpoints.

### Reference Documents:

1. 1604.051, Ventilation Radiation Monitoring System
2. Offsite Dose Calculation Manual

**ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENTS  
AU2**

**Initiating Condition - NOTIFICATION OF UNUSUAL EVENT**

UNPLANNED rise in plant radiation levels

**Operating Mode Applicability:** All

**Example Emergency Action Level(s):** (1 or 2)

1. a. UNPLANNED lowering of water level in the refueling canal or spent fuel pool as indicated by:
  - Personnel observation, refueling crew report, indication on area security camera, borated water source (BWST or RWT) level drop due to makeup demands.

**AND**

- b. VALID Area Radiation Monitor reading rise on any of the following:

<b>Unit 1</b>	
RE-8009	Spent Fuel Area
RE-8017	Fuel Handling Area
<b>Unit 2</b>	
2RE-8914	Spent Fuel Area
2RE-8915	Spent Fuel Area
2RE-8916	Spent Fuel Area
2RE-8912	Containment Incore Instrumentation

**OR**

2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate a rise by a factor of 1000 over normal\* levels.

**Note:** *For area radiation monitors with ranges incapable of measuring 1000 times normal\* levels, classification shall be based on VALID full scale indication unless surveys confirm that area radiation levels are below 1000 times normal\* within 15 minutes of the Area Radiation Monitor indications going to full scale indication.*

\* Normal can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

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## ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENTS AU2

### **Basis:**

This IC addresses elevated radiation levels as a result of lowered water level above irradiated fuel or events that have resulted, or may result, in UNPLANNED rises in radiation dose rates within plant buildings. These radiation rises represent a loss of control over radioactive material and represent a potential degradation in the level of safety of the plant.

### EAL #1

The refueling pathway is a site specific combination of cavities, tubes, canals and pools. While a radiation monitor could detect a rise in dose rate due to a drop in the water level, it might not be a reliable indication of whether or not the fuel is covered. For example, a refueling bridge ARM reading may rise due to planned evolutions such as head lift, or even a fuel assembly being raised in the manipulator mast. Also, a monitor could in fact be properly responding to a known event involving transfer or relocation of a source, stored in or near the fuel pool or responding to a planned evolution such as removal of the reactor head. Generally, elevated radiation monitor indications will need to be combined with another indicator (or personnel report) of water loss.

For refueling events where the water level drops below the RPV flange classification would be via CU2. This event escalates to an Alert per AA2 if irradiated fuel outside the reactor vessel is uncovered. For events involving irradiated fuel in the reactor vessel, escalation would be via the Fission Product Barrier Matrix for events in operating Modes 1-4.

### EAL #2

This EAL addresses rises in plant radiation levels that represent a loss of control of radioactive material resulting in a potential degradation in the level of safety of the plant.

This EAL excludes radiation level rises that result from planned activities such as use of radiographic sources and movement of radioactive waste materials. A specific list of ARMs is not required as it would restrict the applicability of the Threshold. The intent is to identify loss of control of radioactive material in any monitored area.

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**ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENTS  
AA1**

**Initiating Condition - ALERT**

Any release of gaseous or liquid radioactivity to the environment >200 times the ODCM limits for ≥15 minutes

**Operating Mode Applicability:** All

**Example Emergency Action Level(s):** (1 or 2 or 3)

**Note:** *The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.*

1. VALID reading on SPING Gas Channel on any of the following radiation monitors > the reading shown for ≥ 15 minutes:

<b>MONITORS – UNIT 1</b>		<b>LIMIT</b>
RX-9820	Containment Purge	1.18E+00 µCi/cc
RX-9825	Radwaste Area	1.07E+00 µCi/cc
RX-9830	Fuel Handling Area	9.08E-01 µCi/cc
RX-9835	Emergency Penetration Room	1.91E+01 µCi/cc
<b>MONITORS – UNIT 2</b>		<b>LIMIT</b>
2RX-9820	Containment Purge	8.92E-01 µCi/cc
2RX-9825	Radwaste Area	6.64E-01 µCi/cc
2RX-9830	Fuel Handling Area	8.92E-01 µCi/cc
2RX-9835	Emergency Penetration Room	1.77E+01 µCi/cc
2RX-9845	Aux. Building Extension	2.53E+00 µCi/cc

**OR**

**ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENTS  
AA1**

2. **EITHER** VALID reading on any of the following radiation monitors > 200 times the alarm setpoint established by a current release permit for ≥ 15 minutes **OR** VALID reading greater than the value listed for ≥ 15 minutes.

<b>MONITORS – UNIT 1</b>		<b>LIMIT</b>
RX-9820	Containment Purge (SPING Gas Channel)	N/A
RE-4830	Waste Gas Radiation Monitor	9.5E7 cpm
RE-4642	Liquid Radwaste Monitor	9.5E7 cpm
RX-9835	Emerg Penetration Room	
<b>MONITORS – UNIT 2</b>		<b>LIMIT</b>
2RX-9820	Containment Purge (SPING Gas Channel)	N/A
2RE-2429	Waste Gas Monitoring System	9.5E5 cpm
2RE-2330	BMS Liquid Discharge Monitor	9.5E5 cpm
2RE-4423	LRW Discharge Monitor	9.5E5 cpm
2RE-4425	SG Blowdown to Flume Radiation Monitor	9.5E5 cpm

**OR**

3. Confirmed grab sample analyses for gaseous or liquid releases indicates concentrations or release rates > 200 times the applicable values of the ODCM for ≥ 15 minutes.

**Basis:** The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

This IC addresses an actual or substantial potential reduction in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time. ANO incorporates features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in AU1 and AA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an offsite dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, NOT the magnitude of the associated dose or dose rate.

Releases should not be prorated or averaged. For example, a release exceeding 600 times ODCM limits for 5 minutes does not meet the threshold for this IC.

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## ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENTS AA1

This Initiating Condition includes any release for which a release permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

### EAL #1

This EAL addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the Initiating Condition.

This EAL is intended for sites that have established effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

### EAL #2

This EAL addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in this Initiating Condition established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path. The limit values provided are for those cases in which the maximum monitor range is less than the release permit value multiplied by 200.

### EAL #3

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

EAL #1 and #2 directly correlate with the IC since annual average meteorology is required to be used in showing compliance with the ODCM and is used in calculating the alarm setpoints.

### Reference Documents:

1. 1604.051, Ventilation Radiation Monitoring System
2. Offsite Dose Calculation Manual

**ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENTS  
AA2**

**Initiating Condition - ALERT**

Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel

**Operating Mode Applicability:** All

**Example Emergency Action Level(s):** (1 or 2)

1. A water level drop in the refueling canal or spent fuel pool that will result in irradiated fuel becoming uncovered.

**OR**

2. VALID alarm on any of the following radiation monitors due to damage to irradiated fuel or loss of water level.

<b>Unit 1</b>	
RX-9820	Containment Purge (SPING Gas Channel)
RX-9825	Radwaste Area (SPING Gas Channel)
RX-9830	Fuel Handling Area (SPING Gas Channel)
RE-8060	Containment High Range Radiation Monitors
RE-8061	Containment High Range Radiation Monitors
RE-8009	Spent Fuel Area
RE-8017	Fuel Handling Area
<b>Unit 2</b>	
2RX-9820	Containment Purge (SPING Gas Channel)
2RX-9825	Radwaste Area (SPING Gas Channel)
2RX-9830	Fuel Handling Area (SPING Gas Channel)
2RE-8905	Containment Equipment Hatch Area
2RE-8909	Containment Personnel Access Area
2RE-8925-1	Containment High Range Radiation Monitors
2RE-8925-2	Containment High Range Radiation Monitors
2RE-8914	Spent Fuel Area
2RE-8915	Spent Fuel Area
2RE-8916	Spent Fuel Area
2RE-8912	Containment Incore Inst.



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## ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENTS AA2

### **Basis:**

This IC addresses rises in radiation dose rates within plant buildings, and may be a precursor to a radioactivity release to the environment. These events represent a loss of control over radioactive material and represent an actual or substantial potential degradation in the level of safety of the plant.

These events escalate from AU2 in that fuel activity has been released, or is anticipated due to fuel heatup. This IC applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage.

### EAL #1

Indications may include instrumentation such as water level and local area radiation monitors, and personnel (e.g., refueling crew) reports. Depending on available level indication, the declaration may be based on indications of water makeup rate or drop in applicable borated water storage tank level. Video cameras (Security or outage-related) may allow remote observation of level.

### EAL #2

This EAL addresses radiation monitor indications of fuel uncover and/or fuel damage.

Elevated ventilation monitor readings may be indication of a radioactivity release from the fuel, confirming that damage has occurred. Elevated background at the ventilation monitor due to water level drop may mask elevated ventilation exhaust airborne activity and needs to be considered.

While a radiation monitor could detect a rise in dose rate due to a drop in the water level, it might not be a reliable indication of whether or not the fuel is covered.

For example, a refueling bridge ARM reading may rise due to planned evolutions such as head lift, or even a fuel assembly being raised in the manipulator mast. Also, a monitor could in fact be properly responding to a known event involving transfer or relocation of a source, stored in or near the fuel pool or responding to a planned evolution such as removal of the reactor head. Generally, elevated radiation monitor indications will need to be combined with another indicator (or personnel report) of water loss.

Escalation of this emergency classification level, if appropriate, would be based on AS1 or AG1.

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## ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENTS AA3

### Initiating Condition - ALERT

Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions

**Operating Mode Applicability:** All

### Example Emergency Action Level(s):

Dose rate > 15 mR/hr in any of the following areas requiring continuous occupancy to maintain plant safety functions:

- Unit 1 Control Room
- Unit 2 Control Room
- Central Alarm Station

### Basis:

This IC addresses elevated radiation levels that impact continued operation in areas requiring continuous occupancy to maintain safe operation or to perform a safe shutdown.

The cause and/or magnitude of the rise in radiation levels is not a concern of this IC. The SM/ED must consider the source or cause of the elevated radiation levels and determine if any other IC may be involved.

This IC is not meant to apply to rises in the containment dome radiation monitors as these are events which are addressed in the fission product barrier matrix EALs.

Areas requiring continuous occupancy include the Control Rooms and the Central Alarm Station.

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**ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENTS  
AS1**

**Initiating Condition -- SITE AREA EMERGENCY**

Offsite dose resulting from an actual or IMMEDIATE release of gaseous radioactivity >100 mR TEDE or 500 mR child thyroid CDE for the actual or projected duration of the release

**Operating Mode Applicability:** All

**Example Emergency Action Level(s):** (1 or 2 or 3)

**Note:** *The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, the classification should be based on EAL #2 instead of EAL #1. Do not delay declaration awaiting dose assessment results.*

1. VALID reading on SPING Gas Channel on any of the following radiation monitors > the reading shown for ≥ 15 minutes:

<b>MONITORS – UNIT 1</b>		<b>LIMIT</b>
RX-9820	Containment Purge	1.18E+01 µCi/cc
RX-9825	Radwaste Area	1.07E+01 µCi/cc
RX-9830	Fuel Handling Area	9.08E+00 µCi/cc
RX-9835	Emergency Penetration Room	1.91E+02 µCi/cc
<b>MONITORS – UNIT 2</b>		<b>LIMIT</b>
2RX-9820	Containment Purge	8.92E+00 µCi/cc
2RX-9825	Radwaste Area	6.64E+00 µCi/cc
2RX-9830	Fuel Handling Area	8.92E+00 µCi/cc
2RX-9835	Emergency Penetration Room	1.77E+02 µCi/cc
2RX-9845	Aux. Building Extension	2.53E+01 µCi/cc

**OR**

2. Dose assessment using actual meteorology indicates doses > 100 mR TEDE or 500 mR child thyroid CDE at or beyond the site boundary.

**OR**

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## ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENTS AS1

3. Field survey results indicate closed window dose rates >100 mR/hr expected to continue for ≥60 minutes; or analyses of field survey samples indicate child thyroid CDE >500 mR for one hour of inhalation, at or beyond the site boundary.

### **Basis:**

This IC addresses radioactivity releases that result in doses at or beyond the site boundary that exceed 10% of the EPA Protective Action Guides (PAGs). Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

### EAL #1

The monitor list in EAL #1 includes monitors on all potential release pathways (plant stack, primary-secondary leak, fuel handling accident).

### EAL #2

Since dose assessment in EAL #2 is based on actual meteorology, whereas the monitor readings in EAL #1 are not, the results from these assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency implementing procedures should call for the timely performance of dose assessments using actual meteorology and release information. If the results of these dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading EALs.

### EAL #3

Field team surveys in EAL #3 should be performed at or beyond the SITE BOUNDARY and at the most accurate indicator of the condition. Field data are independent of release elevation and meteorology. The assumed release duration is one hour. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Sampling of radioiodine by adsorption on a charcoal cartridge should determine the iodine value.

### Reference Documents:

1. 1604.051, Ventilation Radiation Monitoring System
2. Offsite Dose Calculation Manual

**ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENTS  
AG1**

**Initiating Condition -- GENERAL EMERGENCY**

Offsite dose resulting from an actual or IMMEDIATE release of gaseous radioactivity >1000 mR TEDE or 5000 mR child thyroid CDE for the actual or projected duration of the release using actual meteorology

**Operating Mode Applicability:** All

**Example Emergency Action Level(s):** (1 or 2 or 3)

**Note:** *The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, the classification should be based on EAL #2 instead of EAL #1. Do not delay declaration awaiting dose assessment results.*

1. VALID reading on SPING Gas Channel on any of the following radiation monitors > the reading shown for ≥ 15 minutes:

<b>MONITORS – UNIT 1</b>		<b>LIMIT</b>
RX-9820	Containment Purge	1.18E+02 (μCi/cc)
RX-9825	Radwaste Area	1.07E+02 (μCi/cc)
RX-9830	Fuel Handling Area	9.08E+01 (μCi/cc)
RX-9835	Emergency Penetration Room	1.91E+03 (μCi/cc)
<b>MONITORS – UNIT 2</b>		<b>LIMIT</b>
2RX-9820	Containment Purge	8.92E+01 (μCi/cc)
2RX-9825	Radwaste Area	6.64E+01 (μCi/cc)
2RX-9830	Fuel Handling Area	8.92E+01 (μCi/cc)
2RX-9835	Emergency Penetration Room	1.77E+03 (μCi/cc)
2RX-9845	Aux. Building Extension	2.53E+02 (μCi/cc)

**OR**

2. Dose assessment using actual meteorology indicates doses >1000 mR TEDE or 5000 mR child thyroid CDE at or beyond the site boundary.

**OR**

3. Field survey results indicate closed window dose rates >1000 mR/hr expected to continue for ≥60 minutes; or analyses of field survey samples indicate child thyroid CDE >5000 mR for one hour of inhalation, at or beyond the site boundary.

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## ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENTS AG1

### **Basis:**

This IC addresses radioactivity releases that result in doses at or beyond the site boundary that exceed the EPA Protective Action Guides (PAGs). Public protective actions will be necessary. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public and likely involve fuel damage.

### EAL #1

The monitor list in EAL #1 includes monitors on all potential release pathways (plant stack, primary-secondary leak, fuel handling accident).

### EAL #2

Since dose assessment in EAL #2 is based on actual meteorology, whereas the monitor readings in EAL #1 are not, the results from these assessments may indicate that the classification is not warranted. For this reason, emergency implementing procedures should call for the timely performance of dose assessments using actual meteorology and release information. If the results of these dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading EALs.

### EAL #3

Field team surveys in EAL #3 should be performed at or beyond the SITE BOUNDARY and at the most accurate indicator of the condition. Field data are independent of release elevation and meteorology. The assumed release duration is one hour. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Sampling of radioiodine by adsorption on a charcoal cartridge should determine the iodine value.

### Reference Documents:

1. 1604.051, Ventilation Radiation Monitoring System
2. Offsite Dose Calculation Manual

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# **Cold Shutdown / Refueling System Malfunction**

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**COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION  
CU1**

**Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT**

RCS leakage

**Operating Mode Applicability:** Cold Shutdown (Mode 5)

**Example Emergency Action Level(s):**

**Note:** *The SM should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. RCS leakage results in the inability to maintain or restore level within Pressurizer or RCS level target band for  $\geq 15$  minutes.

**Basis:**

This IC is considered to be a potential degradation of the level of safety of the plant. The inability to maintain or restore level is indicative of loss of RCS inventory.

Relief valve normal operation should be excluded from this IC. However, a relief valve that operates and fails to close per design should be considered applicable to this IC if the relief valve cannot be isolated.

Prolonged loss of RCS Inventory may result in escalation to the Alert emergency classification level via either CA1 or CA3.



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## COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION CU2

### Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

UNPLANNED loss of RCS / reactor vessel inventory

**Operating Mode Applicability:** Refueling (Mode 6)

**Example Emergency Action Level(s):** (1 or 2)

**Note:** *The SM should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. UNPLANNED RCS / reactor vessel level drop as indicated by either of the following:
  - a. RCS / reactor vessel water level drop below the reactor vessel flange for  $\geq 15$  minutes when the RCS / reactor vessel level band is established above the reactor vessel flange

**OR**

  - b. RCS / reactor vessel water level drop below the RCS / reactor vessel level band for  $\geq 15$  minutes or longer when the RCS / reactor vessel level band is established below the reactor vessel flange.

**OR**
2. RCS / reactor vessel level cannot be monitored with a loss of RCS / reactor vessel inventory as indicated by an unexplained level rise in (as applicable) the Reactor Building Sump, Reactor Drain Tank, Aux. Building Equipment Drain Tank, Aux. Building Sump, or Quench Tank.

### **Basis:**

This IC is a precursor of more serious conditions and considered to be a potential degradation of the level of safety of the plant.

Refueling evolutions that lower RCS water level below the reactor vessel flange are carefully planned and procedurally controlled. An UNPLANNED event that results in water level dropping below the reactor vessel flange, or below the planned RCS water level for the given evolution (if the planned RCS water level is already below the reactor vessel flange), warrants declaration of an NUE due to the lowered RCS inventory that is available to keep the core covered.

The allowance of 15 minutes was chosen because it is reasonable to assume that level can be restored within this time frame using one or more of the redundant means of refill that should be available. If level cannot be restored in this time frame then it may indicate a more serious condition exists.

Continued loss of RCS Inventory will result in escalation to the Alert emergency classification level via either CA1 or CA3.

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## **COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION CU2**

### EAL #1

This EAL involves a drop in RCS level below the top of the reactor vessel flange that continues for 15 minutes due to an UNPLANNED event. This EAL is not applicable to drops in flooded reactor cavity level, which is addressed by AU2 EAL1, until such time as the level drops to the level of the vessel flange.

If reactor vessel level continues to drop and reaches the Bottom ID of the RCS Loop then escalation to CA1 would be appropriate.

### EAL #2

This EAL addresses conditions in the refueling mode when normal means of core temperature indication and RCS level indication may not be available. Redundant means of reactor vessel level indication will normally be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that reactor vessel inventory loss was occurring by observing sump and tank level changes. Sump and tank level rises must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

Escalation to the Alert emergency classification level would be via either CA1 or CA3.

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**COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION  
CU3**

**Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT**

UNPLANNED loss of decay heat removal capability with irradiated fuel in the reactor vessel

**Operating Mode Applicability:** Cold Shutdown (Mode 5)  
Refueling (Mode 6)

**Example Emergency Action Level(s):** (1 or 2)

**Note:** *The SM should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. UNPLANNED event results in RCS temperature exceeding 200 °F.

**OR**

2. Loss of all RCS temperature and RCS/reactor vessel level indication for ≥15 minutes.

**Basis:**

This IC is a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant. In cold shutdown the ability to remove decay heat relies primarily on forced cooling flow. Operation of the systems that provide this forced cooling may be jeopardized due to the unlikely loss of electrical power or RCS inventory. Since the RCS usually remains intact in the cold shutdown mode a large inventory of water is available to keep the core covered.

During refueling the level in the reactor vessel will normally be maintained above the reactor vessel flange. Refueling evolutions that lower water level below the reactor vessel flange are carefully planned and procedurally controlled. Loss of forced decay heat removal at lowered inventory may result in more rapid rises in RCS/reactor vessel temperatures depending on the time since shutdown.

Normal means of core temperature indication and RCS level indication may not be available in the refueling mode. Redundant means of reactor vessel level indication are therefore procedurally installed to assure that the ability to monitor level will not be interrupted. However, if all level and temperature indication were to be lost in either the cold shutdown or refueling modes, EAL 2 would result in declaration of an NUE if both temperature and level indication cannot be restored within 15 minutes from the loss of both means of indication.

Escalation to Alert would be via CA1 based on an inventory loss or CA3 based on exceeding its temperature criteria.

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## COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION CU5

### Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

AC power capability to Vital 4.16 KV busses reduced to a single power source  $\geq 15$  minutes such that any additional single power source failure would result in station blackout

**Operating Mode Applicability:** Cold Shutdown (Mode 5)  
Refueling (Mode 6)

### Example Emergency Action Level(s):

**Note:** *The SM should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. a. AC power capability to Vital 4.16 KV busses reduced to a single power source  $\geq 15$  minutes.

**AND**

- b. Any additional single power source failure will result in station blackout.

### Basis:

The condition indicated by this IC is the degradation of the offsite and onsite AC power systems such that any additional single power source failure would result in a station blackout. This condition could occur due to a loss of offsite power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. The subsequent loss of this single power source would escalate the event to an Alert in accordance with CA5.

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

The EAL allows credit for operation of the Alternate AC Diesel Generator.

### Reference Documents:

1. 1202.007, "Degraded Power"
2. 1202.008, "Blackout"
3. 2202.007, "Loss of Off-Site Power"
4. 2202.008, "Station Blackout"
5. 2104.037, "Alternate AC Diesel Generator Operations"

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**COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION  
CU6**

**Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT**

Loss of required DC power  $\geq 15$  minutes

**Operating Mode Applicability:** Cold Shutdown (Mode 5)  
Refueling (Mode 6)

**Example Emergency Action Level(s):**

**Note:** *The SM should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. < 105 volts on required Vital DC bus  $\geq 15$  minutes.

**Basis:**

The purpose of this IC and its associated EALs is to recognize a loss of DC power compromising the ability to monitor and control the removal of decay heat during Cold Shutdown or Refueling operations.

It is intended that the loss of the operating (operable) train is to be considered. If this loss results in the inability to maintain cold shutdown, the escalation to an Alert will be per CA3.

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

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**COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION  
CU7**

**Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT**

Inadvertent criticality

**Operating Mode Applicability:** Cold Shutdown (Mode 5)  
Refueling (Mode 6)

**Example Emergency Action Level(s):**

1. UNPLANNED sustained positive startup rate observed on nuclear instrumentation.

**Basis:**

This IC addresses criticality events that occur in Cold Shutdown or Refueling modes such as fuel mis-loading events and inadvertent dilution events. This IC indicates a potential degradation of the level of safety of the plant, warranting an NUE classification.

This condition can be identified using the startup rate meter. The term "sustained" is used in order to allow exclusion of expected short term positive startup rates from planned fuel bundle or control rod movements during core alteration. These short term positive startup rates are the result of the rise in neutron population due to subcritical multiplication.

Escalation would be by SM judgment.

**COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION  
CU8**

**Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT**

Loss of all onsite or offsite communications capabilities

**Operating Mode Applicability:** Cold Shutdown (Mode 5)  
Refueling (Mode 6)  
Defueled

**Example Emergency Action Level(s):** (1 or 2)

1. Loss of all Table C2 onsite communication methods affecting the ability to perform routine operations.

**OR**

2. Loss of all Table C3 offsite communication methods affecting the ability to perform offsite notifications.

<b>Table C2 Onsite Communications Methods</b>
Station radio system
Plant paging system
In-plant telephones
Gaitronics

<b>Table C3 Offsite Communications Methods</b>
All telephone lines (commercial and microwave)
ENS

**Basis:**

The purpose of this IC and its associated EALs is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with offsite authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary offsite communications is sufficient to inform federal, state, and local authorities of plant issues. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from radio transmissions, individuals being sent to offsite locations, etc.) are being utilized to make communications possible.

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**COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION  
CA1**

**Initiating Condition - ALERT**

Loss of RCS / reactor vessel inventory

**Operating Mode Applicability:** Cold Shutdown (Mode 5)  
Refueling (Mode 6)

**Example Emergency Action Level(s):** (1 or 2)

**Note:** *The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. Loss of RCS / reactor vessel inventory as indicated by:

**Unit 1:** RVLMS Levels 1 through 8 indicate DRY

**Unit 2:** RVLMS Levels 1 through 5 indicate DRY

**OR**

**Unit 1:** Reactor vessel level < 368 ft., 6 in. (bottom of the hot leg)

**Unit 2:** Reactor vessel level < 369 ft., 1.5 in. (bottom of the hot leg)

**OR**

2. RCS / reactor vessel level cannot be monitored for  $\geq 15$  minutes with a loss of RCS / reactor vessel inventory as indicated by an unexplained level rise in (as applicable) the Reactor Building Sump, Reactor Drain Tank, Aux. Building Equipment Drain Tank, Aux. Building Sump, or Quench Tank.

**Basis:**

These EALs serve as precursors to a loss of ability to adequately cool the fuel. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further reactor vessel level lowering and potential core uncover. This condition will result in a minimum emergency classification level of an Alert.

**EAL #1**

The bottom of the RCS hot leg penetration into the reactor vessel is approximately RLVMS Level 8 (Unit 1) or RVLMS Level 5 (Unit 2). However, RVLMS may not be available in mode 6. Redundant means level indication is provided in this mode and included in EAL #1. The bottom of the RCS hot leg penetration into the reactor vessel is 368 ft., 6 in. (Unit 1) or 369 ft., 1.5 in. (Unit 2). Below this level, reactor vessel level indication will be lost and loss of suction to decay heat removal systems will occur. The inability to restore and maintain level after reaching this setpoint would be indicative of a failure of the RCS barrier.



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**COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION  
CA1**

EAL #2

In the cold shutdown mode, normal RCS level and reactor vessel level instrumentation systems will usually be available. In the refueling mode, normal means of reactor vessel level indication may not be available. Redundant means of reactor vessel level indication will usually be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that reactor vessel inventory loss was occurring by observing sump and tank level changes. Sump and tank level rises must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

If reactor vessel level continues to lower then escalation to Site Area Emergency will be via CS1.

**COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION  
CA3**

**Initiating Condition - ALERT**

Inability to maintain plant in Cold Shutdown

**Operating Mode Applicability:** Cold Shutdown (Mode 5)  
Refueling (Mode 6)

**Example Emergency Action Level(s):** (1 or 2)

1. An UNPLANNED event results in RCS temperature >200 °F > the specified duration in Table C1.

<b>Table C1 RCS Reheat Duration Thresholds</b>		
<b>RCS</b>	<b>Containment Closure</b>	<b>Duration</b>
Intact (but not RCS Lowered Inventory)	N/A	60 minutes*
Not intact or RCS Lowered Inventory	Established	20 minutes*
	Not Established	0 minutes
* If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, the EAL is not applicable.		

**OR**

**Note:** *EAL #2 does not apply in solid plant conditions.*

2. An UNPLANNED event results in RCS pressure rise >10 psi due to a loss of RCS cooling.

**Basis:**

**EAL #1**

The RCS Reheat Duration Threshold table addresses complete loss of functions required for core cooling for greater than 60 minutes during refueling and cold shutdown modes when RCS integrity is established. RCS integrity should be considered to be in place when the RCS pressure boundary is in its normal condition for the cold shutdown mode of operation (e.g., no freeze seals or nozzle dams). The 60 minute time frame should allow sufficient time to restore cooling without there being a substantial degradation in plant safety.

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## COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION CA3

The RCS Reheat Duration Threshold table also addresses the complete loss of functions required for core cooling for greater than 20 minutes during refueling and cold shutdown modes when CONTAINMENT CLOSURE is established but RCS integrity is not established or RCS inventory is lowered (e.g., mid-loop operation ). As discussed above, RCS integrity should be assumed to be in place when the RCS pressure boundary is in its normal condition for the cold shutdown mode of operation (e.g., no freeze seals or nozzle dams). The allowed 20 minute time frame was included to allow operator action to restore the heat removal function, if possible.

Finally, the EAL addresses complete loss of functions required for core cooling during refueling and cold shutdown modes when neither CONTAINMENT CLOSURE nor RCS integrity are established.

The (\*) indicates that this EAL is not applicable if actions are successful in restoring an RCS heat removal system to operation and RCS temperature is being reduced within the specified time frame.

### EAL #2

The 10 psi pressure rise addresses situations where, due to high decay heat loads, the time provided to restore temperature control, should be less than 60 minutes. The RCS pressure setpoint chosen should be 10 psi or the lowest pressure that the site can read on installed Control Board instrumentation that is equal to or greater than 10 psi.

Escalation to Site Area Emergency would be via CS1 should boiling result in significant reactor vessel level loss leading to core uncover.

A loss of Technical Specification components alone is not intended to constitute an Alert. The same is true of a momentary UNPLANNED excursion above the Technical Specification cold shutdown temperature limit when the heat removal function is available.

The SM / ED must remain alert to events or conditions that lead to the conclusion that exceeding the EAL is IMMINENT. If, in the judgment of the SM / ED, an IMMINENT situation is at hand, the classification should be made as if the threshold has been exceeded.

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**COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION  
CA5**

**Initiating Condition - ALERT**

Loss of all offsite and all onsite AC power to Vital 4.16KV busses  $\geq$ 15 minutes

**Operating Mode Applicability:** Cold Shutdown (Mode 5)  
 Refueling (Mode 6)  
 Defueled

**Example Emergency Action Level(s):**

**Note:** *The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. Loss of all offsite and all on-site AC power to Vital 4.16KV busses  $\geq$  15 minutes.

**Basis:**

Loss of all AC power compromises all plant safety systems requiring electric power including DHR/shutdown cooling, emergency core cooling, containment cooling, spent fuel pool cooling and the ultimate heat sink.

The event can be classified as an Alert when in cold shutdown, refueling, or defueled mode because of the significantly reduced decay heat and lower temperature and pressure, which allow raising the time to restore one of the emergency busses, relative to that specified for the Site Area Emergency EAL.

Escalating to Site Area Emergency, if appropriate, is by Abnormal Radiation Levels/ Radiological Effluent (TAB A) ICs.

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

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## COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION CS1

### Initiating Condition - SITE AREA EMERGENCY

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

**Operating Mode Applicability:** Cold Shutdown (Mode 5)  
Refueling (Mode 6)

**Example Emergency Action Level(s):** (1 or 2)

**Note:** *The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. With CONTAINMENT CLOSURE **not** established:

**Unit 1:** RVLMS Levels 1 through 9 indicate DRY

**Unit 2:** RVLMS Levels 1 through 6 indicate DRY

**OR**

2. With CONTAINMENT CLOSURE established, core exit thermocouples indicate superheat.

**OR**

3. RCS / reactor vessel level cannot be monitored for  $\geq 30$  minutes with a loss of RCS / reactor vessel inventory as indicated by any of the following:

- Containment High Range Radiation Monitor reading  $> 10$  R/hr
- Erratic source range monitor indication
- Unexplained level rise in Reactor Building Sump, Reactor Drain Tank, Quench Tank, Aux. Building Equipment Drain Tank, or Aux. Building Sump.

### **Basis:**

Under the conditions specified by this IC, continued lowering in RCS / reactor vessel level is indicative of a loss of inventory control. Inventory loss may be due to an RCS breach, pressure boundary leakage, or continued boiling in the RPV. Thus, declaration of a Site Area Emergency is warranted.

Escalation to a General Emergency is via CG1 or AG1.

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## **COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION CS1**

### EAL #3

In the cold shutdown mode, normal RCS level and reactor vessel level instrumentation systems will usually be available. In the refueling mode, normal means of reactor vessel level indication may not be available. Redundant means of reactor vessel level indication will usually be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that reactor vessel inventory loss was occurring by observing sump and tank level changes. Sump and tank level rises must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

The 30-minute duration allows sufficient time for actions to be performed to recover inventory control equipment.

As water level in the reactor vessel lowers, the dose rate above the core will rise. The dose rate due to this core shine should result in site specific monitor indication and possible alarm.

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**COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION  
CG1**

**Initiating Condition - GENERAL EMERGENCY**

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

**Operating Mode Applicability:** Cold Shutdown (Mode 5)  
Refueling (Mode 6)

**Example Emergency Action Level(s):**

**Note:** *The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. a. Core exit thermocouples indicate superheat for  $\geq 30$  minutes.

**AND**

- b. Any of the following containment challenge indications:
  - CONTAINMENT CLOSURE not established
  - Explosive mixture inside containment
  - UNPLANNED rise in containment pressure

**OR**

2. a. RCS / reactor vessel level cannot be monitored for  $\geq 30$  minutes with a loss of RCS / reactor vessel inventory as indicated by any of the following:
  - Containment High Range Radiation Monitor reading  $> 10$  R/hr
  - Erratic source range monitor indication
  - Unexplained level rise in Reactor Building Sump, Reactor Drain Tank, Quench Tank, Aux. Building Equipment Drain Tank, or Aux. Building Sump

**AND**

- b. Any of the following containment challenge indications:
  - CONTAINMENT CLOSURE not established
  - Explosive mixture inside containment
  - UNPLANNED rise in containment pressure

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## **COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION CG1**

### **Basis:**

This IC represents the inability to restore and maintain reactor vessel level to above the top of active fuel with containment challenged. Fuel damage is probable if reactor vessel level cannot be restored, as available decay heat will cause boiling, further reducing the reactor vessel level. With the CONTAINMENT breached or challenged then the potential for unmonitored fission product release to the environment is high. This represents a direct path for radioactive inventory to be released to the environment. This is consistent with the definition of a GE. The GE is declared on the occurrence of the loss or IMMEDIATE loss of function of all three barriers.

A number of variables can have a significant impact on heat removal capability challenging the fuel clad barrier. Examples include mid-loop, reduced level / flange level, head in place, cavity flooded, RCS venting strategy, decay heat removal system design, vortexing pre-disposition, and steam generator U-tube draining.

Analysis indicates that core damage may occur within an hour following continued core uncovering therefore, 30 minutes was conservatively chosen.

If CONTAINMENT CLOSURE is re-established prior to exceeding the 30 minute core uncovering time limit then escalation to GE would not occur.

In the early stages of a core uncovering event, it is unlikely that hydrogen buildup due to a core uncovering could result in an explosive mixture of dissolved gases in Containment. However, Containment monitoring and/or sampling should be performed to verify this assumption and a General Emergency declared if it is determined that an explosive mixture exists.

Sump and tank level rises must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

In the cold shutdown mode, normal RCS level and reactor vessel level instrumentation systems will usually be available. In the refueling mode, normal means of reactor vessel level indication may not be available. Redundant means of reactor vessel level indication will usually be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that reactor vessel inventory loss was occurring by observing sump and tank level changes. Sump and tank level rises must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

As water level in the reactor vessel lowers, the dose rate above the core will rise. The dose rate due to this core shine should result in site specific monitor indication and possible alarm.

### Reference Documents:

1. ULD-1-SYS-24, "Unit 1 Inadequate Core Cooling"
2. ULD-2-SYS-24, "Unit 2 Inadequate Core Cooling"



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# **INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) MALFUNCTION**

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## ISFSI MALFUNCTION E-HU1

### Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

**Note:** *Security Events are bounded by the Hazards EALs.*

Damage to a loaded cask CONFINEMENT BOUNDARY

**Operating Mode Applicability:** All

### Example Emergency Action Level(s):

1. Damage to a loaded cask CONFINEMENT BOUNDARY.

### Basis:

An NUE in this IC is categorized on the basis of the occurrence of an event of sufficient magnitude that a loaded cask CONFINEMENT BOUNDARY is damaged or violated. This includes classification based on a loaded fuel storage cask CONFINEMENT BOUNDARY loss leading to the degradation of the fuel during storage or posing an operational safety problem with respect to its removal from storage.

This EAL addresses a dropped cask, a tipped over cask, EXPLOSION, PROJECTILE damage, FIRE damage or natural phenomena affecting a cask (e.g., seismic event, tornado, etc.).

# FISSION PRODUCT BARRIER DEGRADATION

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### **General Bases**

The logic used for these initiating conditions reflects the following considerations:

- The Fuel Clad Barrier and the RCS Barrier are weighted more heavily than the Containment Barrier (See Sections 3.4 and 3.8). NUE ICs associated with RCS and Fuel Clad Barriers are addressed under System Malfunction (S) ICs.
- At the Site Area Emergency level, there must be some ability to dynamically assess how far present conditions are from the threshold for a General Emergency. For example, if Fuel Clad and RCS Barrier “Loss” EALs existed, that, in addition to off-site dose assessments, would require continual assessments of radioactive inventory and containment integrity. Alternatively, if both Fuel Clad and RCS Barrier “Potential Loss” EALs existed, the SM / ED would have more assurance that there was no immediate need to escalate to a General Emergency.
- The ability to escalate to higher emergency classes as an event deteriorates must be maintained. For example, RCS leakage steadily increasing would represent an increasing risk to public health and safety.
- The Containment Barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment Barrier status is addressed by Technical Specifications.

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**FISSION PRODUCT BARRIER  
FUEL CLAD**

**Fuel Clad Barrier Emergency Action Levels:** FCB1 OR FCB2 OR FCB3 OR FCB4 OR FCB5 OR FCB6

The Fuel Clad barrier consists of the zircalloy or stainless steel fuel bundle tubes that contain the fuel pellets.

**1. Primary Coolant Activity Level (FCB1)**

**Loss:**

1. Coolant activity > 300 µCi/gm dose equivalent I-131 activity by Chemistry sample

**OR**

2. Radiation levels > 1000 mR/hr

**Unit 1:** at SA-229

**Unit 2:** at 2TCD-19

**Potential Loss:** None

**Basis:**

Loss

The site specific value corresponds to 300 µCi/gm I-131 equivalent. Assessment by the EAL Task Force indicates that this amount of coolant activity is well above that expected for iodine spikes and corresponds to less than 5% fuel clad damage. This amount of radioactivity indicates significant clad damage and thus the Fuel Clad Barrier is considered lost.

A reading of greater than 1000 mR/hr within at one foot from the RCS sample lines (SA-229 for Unit 1, 2TCD-19 for Unit 2) has been determined to correspond to fuel clad failure of approximately 2-5%, and thus the fuel clad barrier is considered lost. This reading is well above that expected for iodine spikes and thus indicates significant clad damage and thus the fuel clad barrier is considered lost.

Potential Loss

There is no Potential Loss EAL associated with this item.

Reference Documents

1. ANO Calculation 03-E-0002-01, "Radiation Monitor EAL Setpoints for Fission Product Barrier Degradation"

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## FISSION PRODUCT BARRIER FUEL CLAD

### 2. Core Exit Thermocouple Readings (FCB2)

**Loss:** > 1200 °F CET temperature.

**Potential Loss:**

**Unit 1:** ICC exists as evidenced by CETs indicating superheated conditions

**Unit 2:** Average CETs indicate superheat for current RCS pressure

**Basis:**

Loss

The Loss EAL of > 1200 °F is consistent with NEI 99-01 and corresponds to significant superheating of the coolant.

Potential Loss

The Potential Loss EAL corresponds to a loss of subcooling margin.

Note that the loss or potential loss EAL for this category will occur after a loss of adequate sub-cooling margin, which represents a loss of the RCS barrier in EAL RCB1, and therefore represents the loss of two barriers, resulting in a Site Area Emergency per FS1. Any loss or potential loss of the containment barrier at that point would escalate to a General Emergency.

Reference Documents

1. Unit 1 EOP 1202.005, "Inadequate Core Cooling"
2. Unit 1 EOP 1202.013, "EOP Figures"
3. Unit 2 OP 2202.009, "Functional Recovery"
4. ANO Procedure OP 1302.022, "Core Damage Assessment"
5. CE-NPSD-241, "Development of the Comprehensive Procedure Guideline for Core Damage Assessment," Task 467
6. BWOG EOP Technical Bases Document, Vol. 3, Chapter III.F

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## FISSION PRODUCT BARRIER FUEL CLAD

### 3. Reactor Vessel Water Level (FCB3)

**Loss:** None

**Potential Loss:**

**Unit 1:** RVLMS Levels 1 through 9 indicate DRY

**Unit 2:** RVLMS Levels 1 through 7 indicate DRY

**Basis:**

Loss

There is no Loss EAL associated with this item.

Potential Loss

The Reactor Vessel Level Monitoring Systems at ANO do not provide positive indication of core uncover. The above core level indication provided is used to monitor the approach to and recovery from ICC conditions, but the CETs are used to identify core uncover, and are the only positive indication of core uncover.

Per reference document #1, the reactor vessel level indicators installed in Unit 1 extend from the top of the reactor vessel to the fuel alignment plate, and information in reference document #2 indicates that the lowest sensor is greater than 2 feet above the top of active fuel. If any of the 4 RCPs are running, flow induced turbulence produced by the pumps renders the reactor vessel level indicator readings invalid.

Per reference document #3, only the reactor vessel level indicators above the core are considered part of the ICC monitoring system. Per reference document #4, the lowest sensor above the core, RVLMS LVL 6 on the ICC monitoring panel 2C388, is 47 inches above the top of the core. If any of the 4 RCPs are running, flow induced turbulence produced by the pumps renders the reactor vessel level indicator readings invalid.

For either unit then, should CET indication be unavailable and reactor vessel level indication be unavailable due to RCP operation or any other cause, a degraded ability to monitor the barrier would exist.

Reference Documents:

1. ULD-1-SYS-24, "Unit 1 Inadequate Core Cooling System"
2. Calculation 84-EQ-0080-02, "Loop Error Analysis for Reactor Vessel Level Monitoring System"
3. ULD-2-SYS-24, "Unit 2 Inadequate Core Cooling Monitoring System"
4. Calculation 90-E-0116-01, "Unit 2 EOP Setpoint Document," Setpoint R.3

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## FISSION PRODUCT BARRIER FUEL CLAD

### 4. Containment Radiation Monitoring (FCB4)

**Loss:** Containment high range radiation monitor reading > 1000 R/hr

**Potential Loss:** None

**Basis:**

#### Loss

The 1000 R/hr reading on the containment high range radiation monitors (RE-8060 or RE-8061 for Unit 1, 2RE-8925-1 or 2RE-8925-2 for Unit 2) is a value which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the containment.

Reactor coolant concentrations of this magnitude are several times larger than the maximum concentrations (including iodine spiking) allowed within technical specifications and are therefore indicative of fuel damage.

This radiation monitor value is higher than that specified for RCS barrier Loss EAL RCB3. Thus, this EAL indicates a loss of both the Fuel Clad barrier and RCS barrier that appropriately escalates the emergency classification to a Site Area Emergency per FS1.

NRC Information Notice 97-045 Supplement 1 identifies the potential for erratic indications from the high range radiation monitors (HRRMs) as a result of thermally induced currents (TIC) which may cause the HRRM to read falsely high (for approximately 15 minutes) on a rapid temperature increase, and fail low intermittently on a rapid temperature decrease. Because of this phenomenon, any trends or alarms on the HRRM's should be validated by comparison to the containment low range/area radiation monitors and Air Monitoring Systems trends before actions are taken.

#### Potential Loss

There is no Potential Loss EAL associated with this item.

#### Reference Documents:

1. NUREG 1228, "Source Term Estimation During Incident Response to Severe Nuclear Power Plant Accidents"
2. ANO Calculation 03-E-0002-01, "Radiation Monitor EAL Setpoints for Fission Product Barrier Degradation"



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## FISSION PRODUCT BARRIER FUEL CLAD

### 5. Core Damage Assessment (FCB5)

**Loss:** At least 5% fuel clad damage as determined from core damage assessment

**Potential Loss:** None

**Basis:**

Loss

This level is consistent with other fuel clad barrier loss EALs indicative of significant fuel clad damage, but uses core damage assessment evaluations by Technical Support personnel. The fuel clad barrier is considered lost.

If this determination is made from the high range containment radiation monitor readings, or if accompanied by other indications of a loss or potential loss of the RCS barrier, this EAL condition represents a Site Area Emergency per FS1.

Potential Loss

There is no potential loss EAL associated with this item.

Reference Documents:

1. ANO Procedure OP-1302.022, "Core Damage Assessment"

### 6. Emergency Director Judgment (FCB6)

Any condition in the opinion of the SM / ED that indicates Loss or Potential Loss of the Fuel Clad barrier.

**Basis:**

This EAL addresses any other factors that are to be used by the SM / ED in determining whether the Fuel Clad barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this EAL as a factor in SM / ED judgment that the barrier may be considered lost or potentially lost.

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## FISSION PRODUCT BARRIER RCS

**RCS Barrier EALs:** RCB1 OR RCB2 OR RCB3 OR RCB4

The RCS Barrier includes the RCS primary side and its connections up to and including the pressurizer safety and relief valves, and other connections up to and including the primary isolation valves.

### 1. RCS Leak Rate (RCB1)

**Loss:** RCS leak rate > available makeup capacity as indicated by:

**Unit 1:** Loss of adequate subcooling margin

**Unit 2:** RCS subcooling (MTS) can NOT be maintained at least 30 °F

**Potential Loss:**

**Unit 1:** UNISOLABLE RCS leak > 50 gpm with Letdown isolated

**Unit 2:** UNISOLABLE RCS leak > 44 gpm with Letdown isolated

**Basis:**

Loss

This EAL addresses conditions where leakage from the RCS is greater than available inventory control capacity such that a loss of subcooling has occurred. The loss of subcooling is the fundamental indication that the inventory control systems are inadequate in maintaining RCS pressure and inventory against the mass loss through the leak.

Potential Loss

This EAL is based on the apparent inability to maintain normal liquid inventory within the Reactor Coolant System (RCS) by normal operation of the Makeup and Purification System (Unit 1) or the Chemical and Volume Control System (Unit 2).

Isolating letdown is a standard abnormal operating procedure action and may prevent unnecessary classifications when a non-RCS leakage path such as a Makeup and Purification System or CVCS leak exists. The intent of this condition is met if attempts to isolate Letdown are NOT successful. Additional charging pumps being required is indicative of a substantial RCS leak.

Reference Documents:

1. Unit 1 EOP 1202.013, Figure 1, "*Saturation and Adequate SCM*"
2. Unit 1 EOP Setpoint Document, Calculation 90-E-0116-07, Setpoint B.19
3. Unit 2 EOP 2202.009, "*Functional Recovery*"
4. Unit 2 EOP Setpoint Document, Calculation 90-E-0116-01
5. Unit 2 SAR Table 9.3-14, Charging Pumps Design Data

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## FISSION PRODUCT BARRIER RCS

### 2. SG Tube Rupture (RCB2)

**Loss:** SGTR that results in an ECCS (SI) actuation

**Potential Loss:** None

**Basis:**

#### Loss

This EAL addresses the full spectrum of Steam Generator (SG) tube rupture events in conjunction with Containment barrier Loss EALs. It addresses RUPTURED SG(s) for which the leakage is large enough to cause actuation (either automatic or manual) of ECCS (SI). This is consistent to the RCS leak rate barrier Potential Loss EAL.

By itself, this EAL will result in the declaration of an Alert. However, if the SG is also FAULTED (i.e., two barriers failed), the declaration escalates to a Site Area Emergency per Containment barrier Loss EAL CNB3.

#### Potential Loss

There is no Potential Loss EAL associated with this item.

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## FISSION PRODUCT BARRIER RCS

### 3. Containment Radiation Monitoring (RCB3)

**Loss:** Containment high range radiation monitor reading > 100 R/hr.

**Potential Loss:** None

#### Basis

#### Loss

The 100 R/hr reading on the containment high range radiation monitors (RE-8060 or RE-8061 for Unit 1, 2RE-8925-1 or 2RE-8925-2 for Unit 2) is a value which indicates the release of reactor coolant to the containment.

This reading is less than that specified for Fuel Clad barrier EAL FCB4. Thus, this EAL is indicative of a RCS leak only. If the radiation monitor reading rose to that specified by Fuel Clad barrier EAL, fuel damage would also be indicated.

NRC Information Notice 97-045 Supplement 1 identifies the potential for erratic indications from the high range radiation monitors (HRRMs) as a result of thermally induced currents (TIC) which may cause the HRRM to read falsely high (for approximately 15 minutes) on a rapid temperature increase, and fail low intermittently on a rapid temperature decrease. Because of this phenomenon, any trends or alarms on the HRRM's should be validated by comparison to the containment low range/area radiation monitors and Air Monitoring Systems trends before actions are taken.

#### Potential Loss

There is no Potential Loss EAL associated with this item.

#### Reference Documents:

1. ANO Calculation 03-E-0002-01, "Radiation Monitor EAL Setpoints for Fission Product Barrier Degradation"

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**FISSION PRODUCT BARRIER  
RCS**

**4. Emergency Director Judgment (RCB4)**

Any condition in the opinion of the SM / ED that indicates Loss or Potential Loss of the RCS Barrier.

**Basis:**

This EAL addresses any other factors that are to be used by the SM / ED in determining whether the RCS barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this EAL as a factor in SM / ED judgment that the barrier may be considered lost or potentially lost.

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## FISSION PRODUCT BARRIER CONTAINMENT

**Containment Barrier EALs:** CNB1 OR CNB2 OR CNB3 OR CNB4 OR CNB5 OR CNB6 OR CNB7

The Containment Barrier includes the containment building and connections up to and including the outermost containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outermost secondary side isolation valve.

### 1. Containment Pressure (CNB1)

**Loss:**

1. Rapid unexplained drop in containment pressure following an initial rise in containment pressure  
  
OR
2. Containment pressure or sump level response not consistent with LOCA conditions

**Potential Loss:**

1. **Unit 1:** Containment pressure > 73.7 PSIA (59 PSIG) and rising  
**Unit 2:** Containment pressure > 73.7 PSIA (59 PSIG) and rising  
  
OR
2. Explosive mixture exists inside containment.  
  
OR
3. a. Containment Pressure > containment spray actuation setpoint  
  
**UNIT 1:** 44.7 PSIA (30 PSIG)  
**UNIT 2:** 23.3 PSIA (8.6 PSIG)  
  
AND
- b. LESS THAN one full train of spray operating

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## FISSION PRODUCT BARRIER CONTAINMENT

### **Basis:**

#### Loss

Rapid unexplained loss of pressure (i.e., not attributable to containment spray or condensation effects) following an initial pressure rise from a primary or secondary high energy line break indicates a loss of containment integrity. Containment pressure and sump levels should rise as a result of mass and energy release into containment from a LOCA. Thus, sump level or pressure not rising indicates containment bypass and a loss of containment integrity.

This indicator relies on operator recognition of an unexpected response for the condition and therefore, does not have a specific value associated with it. The unexpected response is important because it is the indicator for a containment bypass condition.

#### Potential Loss 1.

The site specific pressure is based on the containment design pressure.

#### Potential Loss 2.

Existence of an explosive mixture means a hydrogen and oxygen concentration of at least the lower deflagration limit curve exists. The hydrogen concentration of 4% has been recognized by the NRC staff as a well-established lower flammability limit in air or steam-air atmospheres that is adequately conservative for protecting against an H<sub>2</sub> explosion. Hydrogen control systems at ANO are designed and operated as to maintain the containment hydrogen concentration below this level, so that indications of hydrogen concentrations above this are considered a potential challenge to the containment integrity.

#### Potential Loss 3.

This EAL represents a potential loss of containment in that the containment heat removal/depressurization system (e.g., containment sprays, ice condenser fans, etc., but not including containment venting strategies) are either lost or performing in a degraded manner, as indicated by containment pressure greater than the setpoint at which the equipment was supposed to have actuated.

#### Reference Documents:

1. Unit 1 OP-1105.003, *"Engineering Safeguards Actuation System"*
2. Unit 1 SAR Sections 1.4.43, 5.2.1.2.1, 14.2.2.5.5.1 (reactor building design pressure)
3. Unit 1 SAR Section 6.6 (Post-Loss of Coolant Accident Hydrogen Control)
4. Unit 1 TS Table 3.3.5-1
5. Unit 2 SAR Section 6.2.5 (Combustible Gas Control In Containment)
6. Unit 2 SAR Section 3.8.1.3.1.D (Containment Design Pressure)
7. Unit 2 TS Table 3.3-4
8. Regulatory Guide 1.7, *"Control of Combustible Gas Concentrations in Containment Following a Loss-of-Coolant Accident, Rev. 2 1978"*

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## FISSION PRODUCT BARRIER CONTAINMENT

### 2. Core Exit Thermocouple Readings (CNB2)

**Loss:** None

**Potential Loss:**

1. a. CETs indicate > 1200 °F

**AND**

- b. Restoration procedures not effective within 15 minutes.

**OR**

2. a. CETs indicate > 700 °F

**AND**

- b. RVLMS indicates:

**Unit 1:** Levels 1 through 9 DRY

**Unit 2:** Levels 1 through 7 DRY

**AND**

- c. Restoration procedures not effective within 15 minutes.

**Basis:**

Loss

There is no Loss EAL associated with this item.

Potential Loss

The conditions in these EALs represent an IMMEDIATE core melt sequence which, if not corrected, could lead to vessel failure and a higher potential for containment failure. In conjunction with the Core Cooling and RCS Leakage criteria in the Fuel and RCS barrier columns, this threshold would result in the declaration of a General Emergency, i.e., loss of two barriers and the potential loss of a third. If the function restoration procedures are ineffective, there is no "success" path.

The function restoration procedures are those emergency operating procedures that address the recovery of the core cooling critical safety functions. The procedure is considered effective if the temperature is dropping or if the vessel water level is rising.



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## FISSION PRODUCT BARRIER CONTAINMENT

Whether or not the procedures will be effective should be apparent within 15 minutes. The SM / ED should make the declaration as soon as it is determined that the procedures have been, or will be ineffective.

### 3. SG Secondary Side Release With Primary-to-Secondary Leakage (CNB3)

**Loss:**

1. RUPTURED steam generator is also FAULTED outside of containment

**OR**

2. a. Primary-to-secondary leakrate > 10 gpm

**AND**

- b. UNISOLABLE steam release from affected steam generator to the environment

**Potential Loss:** None

**Basis:**

This loss EAL recognizes that SG tube leakage can represent a bypass of the containment barrier as well as a loss of the RCS barrier.

This EAL results in a NUE for smaller breaks that; (1) do not exceed the Normal Makeup Capacity for Unit 1 or the capacity of one charging pump in the normal charging lineup for Unit 2 EAL in RCS leak rate barrier Potential Loss , or (2) do not result in ECCS actuation in RCS SG tube rupture barrier Loss. For larger breaks, RCS barrier threshold criteria would result in an Alert. For SG tube ruptures which may involve multiple steam generators or UNISOLABLE secondary line breaks, this condition would exist in conjunction with RCS barrier conditions and would result in a Site Area Emergency. Escalation to General Emergency would be based on "Potential Loss" of the Fuel Clad Barrier.

**Loss 1.**

This EAL addresses the condition in which a RUPTURED steam generator is also FAULTED. This condition represents a bypass of the RCS and containment barriers and is a subset of the second threshold. In conjunction with RCS leak rate barrier loss EAL RCB2, this would always result in the declaration of a Site Area Emergency.

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## FISSION PRODUCT BARRIER CONTAINMENT

### Loss 2.

This EAL addresses SG tube leaks that exceed 10 gpm in conjunction with an UNISOLABLE release path to the environment from the affected steam generator. The threshold for establishing the UNISOLABLE secondary side release is intended to be a prolonged release of radioactivity from the RUPTURED steam generator directly to the environment. This could be expected to occur when the main condenser is unavailable to accept the contaminated steam (i.e., SG tube rupture with concurrent loss of off-site power and the RUPTURED steam generator is required for plant cooldown or a stuck open relief valve). The time it takes to isolate a SG with tube leakage > 10 gpm in accordance with plant specific EOPs is not considered a prolonged release. In this case the SG with tube leakage > 10 gpm with a concurrent loss of offsite power is normally steamed to the environment in a controlled manner to achieve and maintain a RCS Hot Leg temperature below that which corresponds to the Main Steam Safety Valve relief settings. However, if the SG cannot be isolated or if both SGs have tube leakage > 10 gpm, a prolonged release will likely be necessary to support plant cooldown. If the main condenser is available, there may be releases via air ejectors, gland seal exhausters, and other similar controlled, and often monitored, pathways. These pathways do not meet the intent of an UNISOLABLE release path to the environment. These minor releases are assessed using Abnormal Radiation Levels / Radiological Effluent ICs (TAB A).

### Potential Loss

There is no Potential Loss EAL associated with this item.

#### **4. Containment Isolation Failure or Bypass (CNB4)**

##### **Loss:**

1. UNISOLABLE breach of containment

##### **AND**

2. Direct downstream pathway to the environment exists after containment isolation signal

**Potential Loss:** None

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## **FISSION PRODUCT BARRIER CONTAINMENT**

### **Basis:**

#### Loss

This EAL addresses incomplete containment isolation that allows a direct release to the environment. As used here the term "environment" includes the atmosphere of a room or area, outside the containment, that may in turn communicate with the outside-the-plant atmosphere (e.g., through discharge of a ventilation system or atmospheric leakage).

A breach of containment has also occurred if an inboard and outboard pair of isolation valves fails to close on an automatic actuation signal or from a manual action in the Control Room with an open release path to the environment.

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

The use of the modifier "direct" in defining the release path discriminates against release paths into interfacing liquid systems alone. The subsequent leak of the interfacing liquid system to the environment would constitute a direct release. The existence of an in-line charcoal filter does not make a release path indirect since the filter is not effective at removing fission product noble gases. Typical filters have an efficiency of 95-99% removal of iodine. Given the magnitude of the core inventory of iodine, significant releases could still occur.

In addition, since the fission product release would be driven by boiling in the reactor vessel, the high humidity in the release stream can be expected to render the filters ineffective in a short period.

#### Potential Loss

There is no Potential Loss EAL associated with this item.

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## FISSION PRODUCT BARRIER CONTAINMENT

### 5. Containment Radiation Monitoring (CNB5)

**Loss:** None

**Potential Loss:**

Containment high range radiation monitor reading > 4000 R/hr

**Basis:**

Loss

There is no Loss EAL associated with this item.

Potential Loss

The 4000 R/hr reading on the containment high range radiation monitors (RE-8060 or RE-8061 for Unit 1, 2RE-8925-1 or 2RE-8925-2 for Unit 2) is a value which indicates significant fuel damage well in excess of the EALs associated with both loss of Fuel Clad and loss of RCS barriers. A major release of radioactivity requiring off-site protective actions from core damage is not possible unless a major failure of fuel cladding allows radioactive material to be released from the core into the reactor coolant.

Regardless of whether containment is challenged, this amount of activity in containment, if released, could have such severe consequences that it is prudent to treat this as a potential loss of containment, such that a General Emergency declaration is warranted.

Because the monitor reading exceeds the readings for Fuel Clad Barrier loss in **FCB4** and RCS Barrier loss in **RCB3**, the SM/ED should declare a General Emergency when this value on the Containment High Range Rad Monitor is exceeded as a loss of two barriers (fuel clad and RCS) and potential loss of the third (containment).

NRC Information Notice 97-045 Supplement 1 identifies the potential for erratic indications from the high range radiation monitors (HRRMs) as a result of thermally induced currents (TIC) which may cause the HRRM to read falsely high (for approximately 15 minutes) on a rapid temperature increase, and fail low intermittently on a rapid temperature decrease. Because of this phenomenon, any trends or alarms on the HRRM's should be validated by comparison to the containment low range/area radiation monitors and Air Monitoring Systems trends before actions are taken.

Reference Documents:

1. ANO Calculation 03-E-0002-01, "Radiation Monitor EAL Setpoints for Fission Product Barrier Degradation"
2. NUREG 1228, "Source Term Estimation During Incident Response to Severe Nuclear Power Plant Accidents"

**FISSION PRODUCT BARRIER  
CONTAINMENT**

**6. Other Indications (CNB6)**

Elevated readings on the following radiation monitors that indicate loss or potential loss of the Containment barrier:

<b>MONITORS – UNIT 1</b>	
RX-9820	Containment Purge
RX-9825	Radwaste Area
RX-9830	Fuel Handling Area
RX-9835	Emergency Penetration Room
<b>MONITORS – UNIT 2</b>	
2RX-9820	Containment Purge
2RX-9825	Radwaste Area
2RX-9830	Fuel Handling Area
2RX-9835	Emergency Penetration Room
2RX-9845	Aux. Building Extension

**Basis:**

This EAL covers other indications that may unambiguously indicate the loss or potential loss of the containment barrier.

**7. Emergency Director Judgment (CNB7)**

Any condition in the opinion of the SM / ED that indicates Loss or Potential Loss of the Containment Barrier.

**Basis:**

This EAL addresses any other factors that are to be used by the SM / ED in determining whether the Containment barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this EAL as a factor in SM / ED judgment that the barrier may be considered lost or potentially lost.

The Containment barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment barrier status is addressed by Technical Specifications

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# **HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY**

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**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY  
HU1**

**Initiating Condition - NOTIFICATION OF UNUSUAL EVENT**

Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant

**Operating Mode Applicability:** All

**Example Emergency Action Level(s):** (1 or 2 or 3)

1. A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by ANO Security Shift Supervision.

**OR**

2. A credible site specific security threat notification.

**OR**

3. A validated notification from NRC providing information of an aircraft threat.

**Basis:**

NOTE: Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

Security events which do not represent a potential degradation in the level of safety of the plant are reported under 10 CFR 73.71 or in some cases under 10 CFR 50.72. Security events assessed as HOSTILE ACTIONS are classifiable under HA1, HS1 and HG1.

A higher initial classification could be made based upon the nature and timing of the security threat and potential consequences. Consideration shall be given to upgrading the emergency response status and emergency classification in accordance with the Safeguards Contingency Plan and Emergency Plan.

**EAL #1**

The Security Shift Supervisor is the designated individual on-site qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the plant Safeguards Contingency Plan.

This EAL is based on the Safeguards Contingency Plan. The Safeguards Contingency Plan is based on guidance provided in NEI 03-12.

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## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY HU1

### EAL #2

This EAL is included to ensure that appropriate notifications for the security threat are made in a timely manner. This includes information of a credible threat. Only the plant to which the specific threat is made need declare the NUE.

The determination of "credible" is made through use of information found in the Safeguards Contingency Plan.

### EAL #3

The intent of this EAL is to ensure that notifications for the aircraft threat are made in a timely manner and that Offsite Response Organizations and plant personnel are at a state of heightened awareness regarding the credible threat. It is not the intent of this EAL to replace existing non-hostile related EALs involving aircraft.

This EAL is met when a plant receives information regarding an aircraft threat from NRC. Validation is performed by calling the NRC or by other approved methods of authentication. Only the plant to which the specific threat is made need declare the NUE.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Escalation to Alert via HA1 would be appropriate if the threat involves an airliner within 30 minutes of the plant.



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**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY  
HU2**

**Initiating Condition - NOTIFICATION OF UNUSUAL EVENT**

Other conditions exist which in the judgment of the SM warrant declaration of an NUE

**Operating Mode Applicability:** All

**Example Emergency Action Level(s):**

1. Other conditions exist which in the judgment of the SM 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 EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the SM to fall under the NUE emergency classification level.

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**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY  
HU4**

**Initiating Condition - NOTIFICATION OF UNUSUAL EVENT**

FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA

**Operating Mode Applicability:** All

**Example Emergency Action Level(s):** (1 or 2)

**Note:** *The SM should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the duration has exceeded, or will likely exceed, the applicable time.*

1. FIRE in any **Table H1** structure or area not extinguished:

1) within 15 minutes of Control Room notification

**OR**

2) within 15 minutes of verification of a Control Room FIRE alarm (i.e. Alarm valid until disproved).

**OR**

2. EXPLOSION within the PROTECTED AREA.

**Basis:**

This IC addresses the magnitude and extent of FIRES or EXPLOSIONS that may be potentially significant precursors of damage to safety systems. It addresses the FIRE / EXPLOSION, and not the degradation in performance of affected systems that may result.

As used here, detection is visual observation and report by plant personnel or sensor alarm indication.

**EAL #1**

The 15-minute time period begins with a credible notification that a FIRE is occurring or indication of a fire detection system alarm/actuation. Verification of a fire detection system alarm/actuation includes actions that can be taken within the Control Room or other nearby site specific location to ensure that it is not spurious. An alarm is assumed to be an indication of a FIRE unless it is disproved within the 15-minute period by personnel dispatched to the scene. In other words, a personnel report from the scene may be used to disprove a sensor alarm if received within 15 minutes of the alarm, but shall not be required to verify the alarm.

The intent of this 15-minute duration is to size the FIRE and to discriminate against small FIRES that are readily extinguished (e.g., smoldering waste paper basket).

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**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY  
HU4**

EAL #2

This EAL addresses only those EXPLOSIONS of sufficient force to damage permanent structures or equipment within the PROTECTED AREA.

No attempt is made to assess the actual magnitude of the damage. The occurrence of the EXPLOSION is sufficient for declaration.

The SM also needs to consider any security aspects of the EXPLOSION, if applicable.

Escalation of this emergency classification level, if appropriate, would be based on HA4.

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**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY  
HU4**

**Table H1  
Unit 1**

Reactor Building

All Elevations

Aux Building

All Elevations Including Penthouse/MSIV Room

Exceptions: Boric Acid Mix Tank Room (Chem Add Area) 404' (157-B)  
EDG Exhaust Fan area on 386' (1-E and 2-E)

Turbine Building

All Elevations

Including:

Pipechase under ICW Coolers

CRD Pump Pit / T-28 Room / Area under ICW Pumps

Outside Areas

Manholes adjacent to Startup #2 XFMR (MH-03/MH-04)

Manholes adjacent to Intake Structure (MH-05/MH-06)

Intake Structure (354' and 366')

Diesel Fuel Vault

Diesel Fuel Vault Pump Manholes MH-09 and MH-10 (Manhole, MH-09, is located approximately 15 feet northeast of the Unit 1 QCST , Manhole, MH-10, is located approximately 5 feet west of Unit 2 Condensate Storage Tank, 2T-41A)

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**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY  
HU4**

**Table H1  
Unit 2**

Reactor Building

All Elevations

Aux Building

All Elevations including Aux Extensions

Turbine Building

All Elevations

Outside Areas

Intake Structure (354' and 366')

Concrete Manhole East, NE of intake

Concrete Manhole East of Turbine building next to train bay

Diesel Fuel Vault

Diesel Fuel Vault Pump Manholes MH-09 and MH-10 (Manhole, MH-09, is located approximately 15 feet northeast of the Unit 1 QCST , Manhole, MH-10, is located approximately 5 feet west of Unit 2 Condensate Storage Tank, 2T-41A)

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## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY HU5

### Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS.

**Operating Mode Applicability:** All

**Example Emergency Action Level(s):** (1 or 2)

1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS.

**OR**

2. Report by Local, County or State officials for evacuation or sheltering of site personnel based on an offsite event.

### **Basis:**

This IC is based on the release of toxic, corrosive, asphyxiant or flammable gases of sufficient quantity to affect NORMAL PLANT OPERATIONS.

The fact that SCBAs may be worn does not eliminate the need to declare the event.

This IC is not intended to require significant assessment or quantification. It assumes an uncontrolled process that has the potential to affect plant operations. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation.

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.

Escalation of this emergency classification level, if appropriate, would be based on HA5.

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**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY  
HU6**

**Initiating Condition - NOTIFICATION OF UNUSUAL EVENT**

Natural or destructive phenomena affecting the PROTECTED AREA

**Operating Mode Applicability:** All

**Example Emergency Action Level:** (1 or 2 or 3 or 4 or 5 or 6)

1. Seismic event identified by any 2 of the following:
  - Seismic event confirmed by annunciation of the 0.01g acceleration alarm
  - Earthquake felt in plant
  - National Earthquake Center

**OR**

2. Tornado striking within PROTECTED AREA boundary or high winds > 67 mph (**2 minute average**).

**OR**

3. Internal flooding that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode in any of the structures or areas in **Table H1 (see Table H1 located in HU4)**.

**OR**

4. Turbine failure resulting in casing penetration or damage to turbine or generator seals.

**OR**

5. Lake Dardanelle level < 335 feet.

**OR**

6. Lake Dardanelle level > 345 feet.

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## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY HU6

### **Basis:**

These EALs are categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

### EAL #1

Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate.

As defined in the EPRI-sponsored Guidelines for Nuclear Plant Response to an Earthquake, dated October 1989, a "felt earthquake" is *an earthquake of sufficient intensity such that the vibratory ground motion is felt at the nuclear plant site and recognized as an earthquake based on a consensus of control room operators on duty at the time.*

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

### EAL #2

This EAL is based on a tornado striking (touching down) or high winds within the PROTECTED AREA.

The high wind value in EAL #2 is conservatively based on the SAR design basis for Unit 1 of 67 mph. Unit 2 Design basis is 80 mph.

Escalation of this emergency classification level, if appropriate, would be based on VISIBLE DAMAGE, or by other in plant conditions, via HA6.

### EAL #3

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps.

Escalation of this emergency classification level, if appropriate, would be via HA6, or by other plant conditions.

### EAL #4

This EAL addresses main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Generator seal damage observed after generator purge does not meet the intent of this EAL because it did not impact normal operation of the plant.

Of major concern is the potential for leakage of combustible fluids (lubricating oils) and gases (hydrogen cooling) to the plant environs. Actual FIRES and flammable gas build up are appropriately classified via HU4 and HU5.



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## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY HU6

This EAL is consistent with the definition of an NUE while maintaining the anticipatory nature desired and recognizing the risk to non-safety related equipment.

Escalation of this emergency classification level, if appropriate, would be to HA6 based on damage done by PROJECTILES generated by the failure or in conjunction with a steam generator tube rupture. These latter events would be classified by the radiological (A) ICs or Fission Product Barrier (F) ICs.

### EALs #5 and #6

EALs #5 and #6 are based on the levels of Lake Dardanelle at which the site will take specific action to reduce the impact of the lake level on plant safety by initiating plant shutdown.

### Reference Documents:

1. OP-1203.025, "Natural Emergencies"
2. OP-2203.008, "Natural Emergencies"
3. Unit 1 FSAR
4. Unit 2 FSAR

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**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY  
HA1**

**Initiating Condition - ALERT**

HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat

**Operating Mode Applicability:** All

**Example Emergency Action Level(s):** (1 or 2)

1. A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by ANO Security Shift Supervision.

**OR**

2. A validated notification from NRC of an airliner attack threat within 30 minutes of the site.

**Basis:**

NOTE: Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

These EALs address the contingency for a very rapid progression of events, such as that experienced on September 11, 2001. They are not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack or is an identified attack target with minimal time available for further preparation or additional assistance to arrive requires a heightened state of readiness and implementation of protective measures that can be effective (such as on-site evacuation, dispersal or sheltering).

**EAL #1**

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the OWNER CONTROLLED AREA. Those events are adequately addressed by other EALs.

Note that this EAL is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA. This includes Independent Spent Fuel Storage Installations that may be outside the PROTECTED AREA but still in the OWNER CONTROLLED AREA.

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**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY  
HA1**

EAL #2

This EAL addresses the immediacy of an expected threat arrival or impact on the site within a relatively short time.

The intent of this EAL is to ensure that notifications for the airliner attack threat are made in a timely manner and that Offsite Response Organizations and plant personnel are at a state of heightened awareness regarding the credible threat. Airliner is meant to be a large aircraft with the potential for causing significant damage to the plant.

This EAL is met when a plant receives information regarding an airliner attack threat from NRC and the airliner is within 30 minutes of the plant. Only the plant to which the specific threat is made need declare the Alert.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

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**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY  
HA2**

**Initiating Condition - ALERT**

Other conditions exist which in the judgment of the SM / ED warrant declaration of an Alert

**Operating Mode Applicability:** All

**Example Emergency Action Level(s):**

1. Other conditions exist which in the judgment of the SM / ED 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 EAL addresses unanticipated conditions not addressed explicitly elsewhere, but that warrant declaration of an emergency because conditions exist which are believed by the SM / ED to fall under the Alert emergency classification level.

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**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY  
HA3**

**Initiating Condition - ALERT**

Control room evacuation has been initiated

**Operating Mode Applicability:** All

**Example Emergency Action Level(s):**

1. Alternate Shutdown procedure requires Control Room evacuation:

**Unit 1:** 1203.002, "Alternate Shutdown"

**Unit 2:** 2203.014, "Alternate Shutdown"

**Basis:**

With the Control Room evacuated, additional support, monitoring and direction through the Technical Support Center and/or other emergency response facilities may be necessary.

Inability to establish plant control from outside the Control Room will escalate this event to a Site Area Emergency.

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## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY HA4

### Initiating Condition - ALERT

FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown

**Operating Mode Applicability:** All

### Example Emergency Action Level(s):

1. FIRE or EXPLOSION resulting in VISIBLE DAMAGE to any Table H1 structure or area containing safety systems or components or Control Room indication of degraded performance of those safety systems.

### Basis:

VISIBLE DAMAGE is used to identify the magnitude of the FIRE or EXPLOSION and to discriminate against minor FIRES and EXPLOSIONS.

The reference to structures or areas containing safety systems or components is included to discriminate against FIRES or EXPLOSIONS in areas having a low probability of affecting safe operation. The significance here is not that a safety system was degraded but the fact that the FIRE or EXPLOSION was large enough to cause damage to these systems.

The use of VISIBLE DAMAGE should not be interpreted as mandating a lengthy damage assessment prior to classification. The declaration of an Alert and the activation of the Technical Support Center will provide the SM/ED with the resources needed to perform detailed damage assessments.

The SM / ED also needs to consider any security aspects of the EXPLOSION.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunction (S), Fission Product Barrier Degradation (F) or Abnormal Radiation Levels / Radiological Effluent (A) ICs.

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**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY  
HA4**

**Table H1  
Unit 1**

Reactor Building

All Elevations

Aux Building

All Elevations Including Penthouse/MSIV Room

Exceptions: Boric Acid Mix Tank Room (Chem Add Area) 404' (157-B)  
EDG Exhaust Fan area on 386' (1-E and 2-E)

Turbine Building

All Elevations

Including:

Pipechase under ICW Coolers  
CRD Pump Pit / T-28 Room / Area under ICW Pumps

Outside Areas

Manholes adjacent to Startup #2 XFMR (MH-03/MH-04)

Manholes adjacent to Intake Structure (MH-05/MH-06)

Intake Structure (354' and 366')

Diesel Fuel Vault

Diesel Fuel Vault Pump Manholes MH-09 and MH-10 (Manhole, MH-09, is located approximately 15 feet northeast of the Unit 1 QCST , Manhole, MH-10, is located approximately 5 feet west of Unit 2 Condensate Storage Tank, 2T-41A)

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**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY  
HA4**

**Table H1  
Unit 2**

Reactor Building

All Elevations

Aux Building

All Elevations including Aux Extensions

Turbine Building

All Elevations

Outside Areas

Intake Structure (354' and 366')

Concrete Manhole East, NE of intake

Concrete Manhole East of Turbine building next to train bay

Diesel Fuel Vault

Diesel Fuel Vault Pump Manholes MH-09 and MH-10 (Manhole, MH-09, is located approximately 15 feet northeast of the Unit 1 QCST , Manhole, MH-10, is located approximately 5 feet west of Unit 2 Condensate Storage Tank, 2T-41A)



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**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY  
HA5**

**Initiating Condition - ALERT**

Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor.

Unit 1

<b>VITAL AREA</b>	<b>APPLICABLE MODES</b>
A-4 Switchgear Room	3, 4
Upper North Electrical Penetration Room	3, 4
Lower South Electrical Equipment Room	3, 4
Control Room	ALL

Unit 2

<b>VITAL AREA</b>	<b>APPLICABLE MODES</b>
Auxiliary Building 317' Emergency Core Cooling Rooms	3, 4
Auxiliary Building 317' Tendon Gallery Access	3, 4
Auxiliary Building 335' Charging Pumps / 2B-52	3, 4
Auxiliary Building 354' 2B-62 Area	3, 4
Emergency Diesel Generator Corridor	3, 4
Lower South Piping Penetration Room	3, 4
Auxiliary Building 386' Containment Hatch	3, 4
Control Room	ALL

**Operating Mode Applicability:** As stated in above tables.

**Example Emergency Action Level(s):**

**Note:** *If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.*

1. Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.

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## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY HA5

**Basis:**

Gases in a VITAL AREA can affect the ability to safely operate or safely shutdown the reactor. The fact that SCBAs may be worn does not eliminate the need to declare the event.

Declaration should not be delayed for confirmation from atmospheric testing if the atmosphere poses an immediate threat to life and health or an immediate threat of severe exposure to gases. This could be based upon documented analysis, indication of personal ill effects from exposure, or operating experience with the hazards.

If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

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.

An uncontrolled release of flammable gasses within a facility structure has the potential to affect safe operation of the plant by limiting either operator or equipment operations due to the potential for ignition and resulting equipment damage/personnel injury. Flammable gasses, such as hydrogen and acetylene, are routinely used to maintain plant systems (hydrogen) or to repair equipment/components (acetylene - used in welding). This EAL assumes concentrations of flammable gasses which can ignite/support combustion.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunction (S), Fission Product Barrier Degradation (F) or Abnormal Radiation Levels / Radioactive Effluent (A) ICs.

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**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY  
HA6**

**Initiating Condition - ALERT**

Natural or destructive phenomena affecting VITAL AREAS

**Operating Mode Applicability:** All

**Example Emergency Action Level(s):** (1 or 2 or 3 or 4 or 5 or 6)

1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by annunciation of the 0.1g acceleration alarm.

**AND**

- b. Earthquake confirmed by any of the following:
  - Earthquake felt in plant
  - National Earthquake Center
  - Control Room indication of degraded performance of systems required for the safe shutdown of the plant

**OR**

2. Tornado striking or high winds > 67 mph (2 minute average) resulting in VISIBLE DAMAGE to any of the following structures/equipment containing safety systems or components or Control Room indication of degraded performance of those safety systems:

Reactor Building	Turbine Building
Intake Structure	Q Condensate Storage Tank (QCST)
Ultimate Heat Sink	Control Room
Startup Transformers	Auxiliary Building
Diesel Fuel Vault	Borated Water Storage Tank (BWST)
Refueling Water Tank (RWT)	

**OR**

3. Internal flooding in any of the following areas resulting in an electrical shock hazard that precludes access to operate or monitor safety equipment or Control Room indication of degraded performance of those safety systems:

Intake Structure  
Turbine Building  
Auxiliary Building

**OR**

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**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY  
HA6**

4. Turbine failure-generated PROJECTILES resulting in VISIBLE DAMAGE to or penetration of any of the structures/equipment containing safety systems or components or Control Room indication of degraded performance of those safety systems:

Control Room	Turbine Building
Startup Transformers	Auxiliary Building

**OR**

5. Lake Dardanelle level < 335 feet and Emergency Cooling Pond inoperable.

**OR**

6. Vehicle crash resulting in VISIBLE DAMAGE to any of the structures/equipment containing safety systems or components or Control Room indication of degraded performance of those safety systems:

Reactor Building	Turbine Building
Intake Structure	QCST
Ultimate Heat Sink	RWT
Startup Transformers	Auxiliary Building
Diesel Fuel Vault	BWST

**Basis:**

These EALs escalate from HU6 in that the occurrence of the event has resulted in VISIBLE DAMAGE to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by Control Room indications of degraded system response or performance. The occurrence of VISIBLE DAMAGE and/or degraded system response is intended to discriminate against lesser events. The initial report should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of the damage. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction (S) ICs.

**EAL #1**

Seismic events of this magnitude can result in a VITAL AREA being subjected to forces beyond design limits, and thus damage may be assumed to have occurred to plant safety systems.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

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## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY HA6

### EAL #2

This EAL is based on a tornado striking (touching down) or high winds that have caused VISIBLE DAMAGE to structures containing functions or systems required for safe shutdown of the plant. The high wind value in EAL #2 is conservatively based on the SAR design basis for Unit 1 of 67 mph. Unit 2 Design basis is 80 mph.

### EAL #3

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. It is based on the degraded performance of systems, or has created industrial safety hazards (e.g., electrical shock) that preclude necessary access to operate or monitor safety equipment. The inability to access, operate or monitor safety equipment represents an actual or substantial potential degradation of the level of safety of the plant.

Flooding as used in this EAL describes a condition where water is entering the room faster than installed equipment is capable of removal, resulting in a rise of water level within the room. Classification of this EAL should not be delayed while corrective actions are being taken to isolate the water source.

### EAL #4

This EAL addresses the threat to safety related equipment imposed by PROJECTILES generated by main turbine rotating component failures. Therefore, this EAL is consistent with the definition of an ALERT in that the potential exists for actual or substantial potential degradation of the level of safety of the plant.

### EAL #5

EAL #5 addresses site specific phenomena which has the potential for the loss of primary and secondary heat sink.

### EAL #6

This EAL addresses vehicle crashes within the PROTECTED AREA that result in VISIBLE DAMAGE to VITAL AREAS or indication of damage to safety structures, systems, or components containing functions and systems required for safe shutdown of the plant.

### Reference Documents:

1. OP-1203.025, "Natural Emergencies"
2. OP-2203.008, "Natural Emergencies"
3. Unit 1 FSAR
4. Unit 2 FSAR

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## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY HS1

### Initiating Condition - SITE AREA EMERGENCY

HOSTILE ACTION within the PROTECTED AREA

**Operating Mode Applicability:** All

### Example Emergency Action Level(s):

1. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by ANO Security Shift Supervision.

### Basis:

This condition represents an escalated threat to plant safety above that contained in the Alert in that a HOSTILE FORCE has progressed from the OWNER CONTROLLED AREA to the PROTECTED AREA.

This EAL addresses the contingency for a very rapid progression of events, such as that experienced on September 11, 2001. It is not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack with minimal time available for further preparation or additional assistance to arrive requires Offsite Response Organization readiness and preparation for the implementation of protective measures.

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the PROTECTED AREA. Those events are adequately addressed by other EALs.

Escalation of this emergency classification level, if appropriate, would be based on actual plant status after impact or progression of attack.

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**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY  
HS2**

**Initiating Condition - SITE AREA EMERGENCY**

Other conditions exist which in the judgment of the SM / ED warrant declaration of a Site Area Emergency

**Operating Mode Applicability:** All

**Example Emergency Action Level(s):**

1. Other conditions exist which in the judgment of the SM / ED indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; (1) toward site personnel or equipment that could lead to the likely failure of or; (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

**Basis:**

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the SM / ED to fall under the emergency classification level description for Site Area Emergency.

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## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY HS3

### Initiating Condition - SITE AREA EMERGENCY

Control Room evacuation has been initiated and plant control cannot be established

**Operating Mode Applicability:** All

### Example Emergency Action Level(s):

1. a. Control room evacuation has been initiated

**AND**

- b. Control of the plant cannot be established in accordance with the following procedures within 15 minutes:

**Unit 1:** 1203.002, "Alternate Shutdown"

**Unit 2:** 2203.014, "Alternate Shutdown"

### **Basis:**

The intent of this IC is to capture those events where control of the plant cannot be reestablished in a timely manner. In this case, expeditious transfer of control of safety systems has not occurred (although fission product barrier damage may not yet be indicated).

The intent of the EAL is to establish control of important plant equipment and knowledge of important plant parameters in a timely manner. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions such as reactivity control (ability to shutdown the reactor and maintain it shutdown), RCS inventory (ability to cool the core), and decay heat removal (ability to maintain a heat sink).

The determination of whether or not control is established is based on SM / ED judgment. The SM / ED is expected to make a reasonable, informed judgment within 15 minutes that the plant staff has control of the plant .

Escalation of this emergency classification level, if appropriate, would be by Fission Product Barrier Degradation (F) or Abnormal Radiation Levels/Radiological Effluent (A) EALs.



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## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY HG1

### Initiating Condition - GENERAL EMERGENCY

HOSTILE ACTION resulting in loss of physical control of the facility

**Operating Mode Applicability:** All

**Example Emergency Action Level(s):** (1 or 2)

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions.

**OR**

2. A HOSTILE ACTION has caused failure of Spent Fuel Cooling Systems and IMMEDIATE fuel damage is likely for a freshly off-loaded reactor core in pool.

**Basis:**

**EAL #1**

This EAL encompasses conditions under which a HOSTILE ACTION has resulted in a loss of physical control of VITAL AREAS (containing vital equipment or controls of vital equipment) required to maintain safety functions and control of that equipment cannot be transferred to and operated from another location. These safety functions are reactivity control (ability to shut down the reactor and keep it shutdown) RCS inventory (ability to cool the core), and secondary heat removal (ability to maintain a heat sink).

Loss of physical control of the Control Room or remote shutdown/alternate shutdown capability alone may not prevent the ability to maintain safety functions per se. Design of the remote shutdown/alternate shutdown capability and the location of the transfer switches should be taken into account. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions.

If control of the plant equipment necessary to maintain safety functions can be transferred to another location, then the threshold is not met.

**EAL #2**

This EAL addresses failure of spent fuel cooling systems as a result of HOSTILE ACTION if IMMEDIATE fuel damage is likely, such as when a freshly off-loaded reactor core is in the spent fuel pool. At ANO, the term "freshly off-loaded reactor core" refers to fuel that has been discharged from the core and stored in the spent fuel pool for a period of LESS THAN one year.

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**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY  
HG2**

**Initiating Condition - GENERAL EMERGENCY**

Other conditions exist which in the judgment of the SM / ED warrant declaration of a General Emergency

**Operating Mode Applicability:** All

**Example Emergency Action Level(s):**

1. Other conditions exist which in the judgment of the SM / ED indicate that events are in progress or have occurred which involve actual or IMMEDIATE substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

**Basis:**

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the SM / ED to fall under the emergency classification level description for General Emergency.

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# **SYSTEM MALFUNCTION**

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## SYSTEM MALFUNCTION SU1

### Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Loss of all offsite AC power to Vital 4.16 KV busses  $\geq$  15 minutes

**Operating Mode Applicability:** Power Operations (Mode 1)  
Startup (Mode 2)  
Hot Standby (Mode 3)  
Hot Shutdown (Mode 4)

### Example Emergency Action Level(s):

**Note:** *The SM should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.*

1. Loss of all offsite AC power to Vital 4.16 KV busses  $\geq$  15 minutes.

### Basis:

Prolonged loss of offsite AC power reduces required redundancy and potentially degrades the level of safety of the plant by rendering the plant more vulnerable to a complete loss of AC power to emergency busses.

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

### Reference Documents:

1. 1202.007, "Degraded Power"
2. 1202.008, "Blackout"
3. 2202.007, "Loss of Off-Site Power"
4. 2202.008, "Station Blackout"

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## SYSTEM MALFUNCTION SU6

### Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

UNPLANNED loss of safety system annunciation or indication in the Control Room  $\geq$  15 minutes

**Operating Mode Applicability:** Power Operations (Mode 1)  
Startup (Mode 2)  
Hot Standby (Mode 3)  
Hot Shutdown (Mode 4)

### Example Emergency Action Level(s):

**Note:** *The SM should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.*

1. UNPLANNED Loss of  $>$  approximately 75% of the following  $\geq$  15 minutes:
  - a. Control Room annunciators associated with safety systems.

**OR**

- b. Control Room safety system indication.

### **Basis:**

This IC and its associated EAL are intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment.

Recognition of the availability of computer based indication equipment is considered e.g., SPDS, plant computer, etc.

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10 CFR 50.72. If the shutdown is not in compliance with the Technical Specification action, the NUE is based on SU11 "Inability to reach required operating mode within Technical Specification limits."

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## **SYSTEM MALFUNCTION SU6**

Indicators associated with safety systems are those indicators for reactivity control, core cooling, maintaining reactor coolant system integrity or maintaining containment integrity.

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

This NUE will be escalated to an Alert based on a concurrent loss of compensatory indications or if a SIGNIFICANT TRANSIENT is in progress during the loss of annunciation or indication (SA6).

### Reference Documents:

1. 1203.043, "Loss Control Room Annunciators"
2. 2203.042, "Loss of Control Room Annunciators"

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## SYSTEM MALFUNCTION SU7

### Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

RCS leakage

**Operating Mode Applicability:** Power Operations (Mode 1)  
 Startup (Mode 2)  
 Hot Standby (Mode 3)  
 Hot Shutdown (Mode 4)

**Example Emergency Action Level(s):** (1 or 2)

1. Unidentified or pressure boundary leakage > 10 gpm.

**OR**

2. Identified leakage > 25 gpm.

**Basis:**

With respect to this IC, RCS leakage is defined as a loss of RCS inventory due to a leak in the RCS or a supporting system that is not or cannot be isolated within 10 minutes. For example, isolation of the RCS Letdown (purification) system is a standard abnormal operating procedure action and may prevent unnecessary classifications when a non-RCS leakage path leak exists. However, the intent of this condition is met if attempts to isolate the RCS leak are NOT successful.

This IC is included as an NUE because it may be a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified or pressure boundary leakage was selected as it is observable with normal Control Room indications. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances).

Relief valve normal operation should be excluded from this IC. However, a relief valve that operates and fails to close per design should be considered applicable to this IC if the relief valve cannot be isolated.

The EAL for identified leakage is set at a higher value due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage. Steam generator tube leakage is identified leakage. In either case, escalation of this IC to the Alert level is via Fission Product Barrier Degradation (F) ICs.

**SYSTEM MALFUNCTION  
SU8**

**Initiating Condition - NOTIFICATION OF UNUSUAL EVENT**

Loss of all onsite or offsite communications capabilities

**Operating Mode Applicability:** Power Operations (Mode 1)  
Startup (Mode 2)  
Hot Standby (Mode 3)  
Hot Shutdown (Mode 4)

**Example Emergency Action Level(s):** (1 or 2)

1. Loss of all Table M1 onsite communications methods affecting the ability to perform routine operations.

**OR**

2. Loss of all Table M2 offsite communications methods affecting the ability to perform offsite notifications.

<b>Table M1 Onsite Communications Methods</b>
Station radio system Plant paging system In-plant telephones Gaitronics

<b>Table M2 Offsite Communications Methods</b>
All telephone lines (commercial and microwave) ENS

**Basis:**

The purpose of this IC and its associated EALs is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with offsite authorities.

The availability of one method of ordinary offsite communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

Reference Documents:

1. 1903.062, "Communications System Operating Procedure"



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**SYSTEM MALFUNCTION  
SU9**

**Initiating Condition - NOTIFICATION OF UNUSUAL EVENT**

Fuel clad degradation

**Operating Mode Applicability:** Power Operations (Mode 1)  
 Startup (Mode 2)  
 Hot Standby (Mode 3)  
 Hot Shutdown (Mode 4)

**Example Emergency Action Level(s):** (1 or 2)

1. Failed Fuel Iodine radiation monitor reading indicates fuel clad degradation > Technical Specification allowable limits:

**Unit 1:**

RI-1237S reads >  $1.3 \times 10^5$  counts per minute

**Unit 2:**

2RITS-4806B reads >  $.65 \times 10^5$  counts per minute

**OR**

2. RCS sample activity value indicating fuel clad degradation > Technical Specification allowable limits:

- > 1.0 uCi/gm Dose Equivalent I-131 for more than 48 hours

**OR**

- **Unit 1:**

≥ 60 uCi/gm Dose Equivalent I-131

**Unit 2:**

> 60 uCi/gm Dose Equivalent I-131

**OR**

- **Unit 1:**

> 2200 μCi/gm Dose Equivalent Xe-133 for more than 48 hours

**Unit 2:**

> 3100 μCi/gm Dose Equivalent Xe-133 for more than 48 hours

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## SYSTEM MALFUNCTION SU9

**Basis:**

This IC is included because it is a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant.

EAL #1

This threshold addresses the Letdown Radiation Monitor readings that provide indication of a degradation of fuel clad integrity.

EAL #2

This EAL addresses coolant samples exceeding coolant technical specifications for transient iodine spiking limits and coolant samples exceeding coolant Technical Specifications for nominal operating limits for the time period specified in the Technical Specifications.

Escalation of this IC to the Alert level is via the Fission Product Barriers (F).

Reference Documents:

1. ANO1 Technical Specifications
2. ANO2 Technical Specifications

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## SYSTEM MALFUNCTION SU10

### Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Inadvertent criticality

**Operating Mode Applicability:** Hot Standby (Mode 3)  
Hot Shutdown (Mode 4)

### Example Emergency Action Level(s):

1. UNPLANNED sustained positive startup rate observed on nuclear instrumentation.

### Basis:

This IC addresses inadvertent criticality events. This IC indicates a potential degradation of the level of safety of the plant, warranting an NUE classification. This IC excludes inadvertent criticalities that occur during planned reactivity changes associated with reactor startups (e.g., criticality earlier than estimated).

This condition can be identified using the startup rate meter. The term “sustained” is used in order to allow exclusion of expected short term positive startup rates from planned control rod movements for (such as shutdown bank withdrawal). These short term positive startup rates are the result of the rise in neutron population due to subcritical multiplication.

Escalation would be by the Fission Product Barrier Table (F), as appropriate to the operating mode at the time of the event.

### Reference Documents:

1. 1203.012G, “Annunciator K08 Corrective Action”
2. 2203.012D, “Annunciator 2K04 Corrective Action”

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## **SYSTEM MALFUNCTION SU11**

### **Initiating Condition - NOTIFICATION OF UNUSUAL EVENT**

Inability to reach required operating mode within Technical Specification limits

**Operating Mode Applicability:** Power Operations (Mode 1)  
Startup (Mode 2)  
Hot Standby (Mode 3)  
Hot Shutdown (Mode 4)

### **Example Emergency Action Level(s):**

1. Plant is not brought to required operating mode within Technical Specifications LCO Action Statement time.

### **Basis:**

Limiting Conditions of Operation (LCOs) require the plant to be brought to a required operating mode when the Technical Specification required configuration cannot be restored. Depending on the circumstances, this may or may not be an emergency or precursor to a more severe condition. In any case, the initiation of plant shutdown required by the site Technical Specifications requires a four hour report under 10 CFR 50.72 (b) Non-emergency events. The plant is within its safety envelope when being shut down within the allowable action statement time in the Technical Specifications. An immediate NUE is required when the plant is not brought to the required operating mode within the allowable action statement time in the Technical Specifications. Declaration of an NUE is based on the time at which the LCO-specified action statement time period elapses under the site Technical Specifications and is not related to how long a condition may have existed.

### Reference Documents:

1. ANO2 Technical Specifications
2. ANO1 Technical Specifications

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## SYSTEM MALFUNCTION SA1

### Initiating Condition - ALERT

AC power capability to Vital 4.16 KV busses reduced to a single power source  $\geq$  15 minutes such that any additional single power source failure would result in station blackout

**Operating Mode Applicability:** Power Operations (Mode 1)  
Startup (Mode 2)  
Hot Standby (Mode 3)  
Hot Shutdown (Mode 4)

### Example Emergency Action Level(s):

**Note:** *The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.*

1. a. AC power capability to Vital 4.16 KV busses reduced to a single power source  $\geq$  15 minutes.

**AND**

- b. Any additional single power source failure will result in station blackout.

### Basis:

The condition indicated by this IC is the degradation of the offsite and onsite AC power systems such that any additional single power source failure would result in a station blackout. This condition could occur due to a loss of offsite power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. Another related condition could be the loss of all offsite power and loss of onsite emergency generators with only one train of emergency busses being backfed from the unit main generator, or the loss of onsite emergency generators with only one train of emergency busses being backfed from offsite power. The subsequent loss of this single power source would escalate the event to a Site Area Emergency in accordance with **SS1**.

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

The EAL allows credit for operation of the Alternate AC Diesel Generator.

### Reference Documents:

1. 1202.007, "Degraded Power"
2. 1202.008, "Blackout"
3. 2202.007, "Loss of Off-Site Power"
4. 2202.008, "Station Blackout"
5. 2104.037, "Alternate AC Diesel Generator Operations"

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## SYSTEM MALFUNCTION SA3

### Initiating Condition - ALERT

Automatic trip fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor

**Operating Mode Applicability:** Power Operations (Mode 1)  
Startup (Mode 2)

### Example Emergency Action Level(s):

1. a. An automatic trip failed to shutdown the reactor as indicated by reactor power  $\geq 5\%$ .

**AND**

- 
- b. Manual actions taken at the reactor control console successfully shutdown the reactor as indicated by reactor power  $< 5\%$ .

### Basis:

Manual trip actions taken at the reactor control console are any set of actions by the Reactor Operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor. Any action taken to trip the reactor from any location other than panel C03 (Unit 1) or 2C03/2C14 (Unit 2) constitutes a failure of the manual trip function. Failure of manual trip would escalate the event to a Site Area Emergency (**SS3**).

This condition indicates failure of the automatic protection system to trip the reactor. This condition is more than a potential degradation of a safety system in that a front line automatic protection system did not function in response to a plant transient. Thus the plant safety has been compromised because design limits of the fuel may have been exceeded. An Alert is indicated because conditions may exist that lead to potential loss of fuel clad or RCS and because of the failure of the Reactor Protection System to automatically shutdown the plant. This EAL applies whether or not a mode change has occurred. (Reference "**Operating Mode Applicability**" page 72)

If manual actions taken at the reactor control console fail to shutdown the reactor, the event would escalate to a Site Area Emergency.

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**SYSTEM MALFUNCTION  
SA6**

**Initiating Condition - ALERT**

UNPLANNED loss of safety system annunciation or indication in the Control Room with either (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable

**Operating Mode Applicability:** Power Operations (Mode 1)  
 Startup (Mode 2)  
 Hot Standby (Mode 3)  
 Hot Shutdown (Mode 4)

**Example Emergency Action Level(s):**

**Note:** *The SM/ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.*

1. a. UNPLANNED loss of > approximately 75% of the following ≥ 15 minutes:

- Control Room annunciators associated with safety systems

**OR**

- Control Room safety system indication

**AND**

b. Either of the following:

- A SIGNIFICANT TRANSIENT is in progress

**OR**

- Compensatory indications are unavailable.

**Basis:**

This IC is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a SIGNIFICANT TRANSIENT.

Recognition of the availability of computer based indication equipment is considered (e.g., SPDS, plant computer, etc.).

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

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## **SYSTEM MALFUNCTION SA6**

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10 CFR 50.72. If the shutdown is not in compliance with the Technical Specification action, the NUE is based on SU11 "Inability to reach required operating mode within Technical Specification limits."

Indicators associated with safety systems are those indicators for reactivity control, core cooling, maintaining reactor coolant system integrity or maintaining containment integrity.

"Compensatory indications" in this context includes computer based information such as SPDS, QSPDS, COLSS, etc. If both a major portion of the annunciation system and all computer monitoring are unavailable, the Alert is required.

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

This Alert will be escalated to a Site Area Emergency if the operating crew cannot monitor the transient in progress due to a concurrent loss of compensatory indications with a SIGNIFICANT TRANSIENT in progress during the loss of annunciation or indication.

### Reference Documents:

1. 1015.037, "Post Transient Review"
2. 1203.043, "Loss of Control Room Annunciators"
3. 2203.042, "Loss of Control Room Annunciators"



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## SYSTEM MALFUNCTION SS1

### Initiating Condition - SITE AREA EMERGENCY

Loss of all offsite and all onsite AC power to Vital 4.16 KV busses  $\geq$  15 minutes

**Operating Mode Applicability:** Power Operations (Mode 1)  
Startup (Mode 2)  
Hot Standby (Mode 3)  
Hot Shutdown (Mode 4)

### Example Emergency Action Level(s):

**Note:** *The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.*

1. Loss of all offsite and all onsite AC power to Vital 4.16 KV busses  $\geq$  15 minutes.

### Basis:

Loss of all AC power to emergency busses compromises all plant safety systems requiring electric power including Shutdown Cooling, ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all AC power to emergency busses will lead to loss of Fuel Clad, RCS, and Containment, thus this event can escalate to a General Emergency.

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

Escalation to General Emergency is via Fission Product Barrier Degradation (F) or IC SG1, "Prolonged loss of all offsite and all onsite AC power to Vital 4.16 KV busses."

### Reference Documents:

1. 1202.007, "Degraded Power"
2. 1202.008, "Blackout"
3. 2202.007, "Loss of Off-Site Power"
4. 2202.008, "Station Blackout"
5. 2104.037, "Alternate AC Diesel Generator Operations"

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## **SYSTEM MALFUNCTION SS3**

### **Initiating Condition - SITE AREA EMERGENCY**

Automatic trip fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor

**Operating Mode Applicability:** Power Operations (Mode 1)  
Startup (Mode 2)

### **Example Emergency Action Level(s):**

1. a. An automatic trip failed to shutdown the reactor.

**AND**

- b. Manual actions taken at the reactor control console do not shutdown the reactor as indicated by reactor power  $\geq 5\%$ .

### **Basis:**

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful. A Site Area Emergency is warranted because conditions exist that lead to IMMEDIATE loss or potential loss of both fuel clad and RCS.

Manual trip actions taken at the reactor control console are any set of actions by the Reactor Operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

Manual trip actions are not considered successful if action away from panel C03 (Unit 1) or panels 2C03/2C14 (Unit 2) is required to trip the reactor. This EAL is still applicable even if actions taken away from panel C03 (Unit 1) or panels 2C03/2C14 (Unit 2) are successful in shutting the reactor down because the design limits of the fuel may have been exceeded or because of the gross failure of the Reactor Protection System to shutdown the plant. This EAL applies whether or not a mode change has occurred. (Reference "**Operating Mode Applicability**" page 72)

Escalation of this event to a General Emergency would be due to a prolonged condition leading to an extreme challenge to either core-cooling or heat removal.

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## SYSTEM MALFUNCTION SS4

### Initiating Condition - SITE AREA EMERGENCY

Loss of all vital DC power  $\geq 15$  minutes

**Operating Mode Applicability:** Power Operations (Mode 1)  
Startup (Mode 2)  
Hot Standby (Mode 3)  
Hot Shutdown (Mode 4)

### Example Emergency Action Level(s):

**Note:** *The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.*

1.  $< 105$  volts on all Vital DC busses  $\geq 15$  minutes.

### Basis:

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power will cause core uncovering and loss of containment integrity when there is significant decay heat and sensible heat in the reactor system.

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

Escalation to a General Emergency would occur by Abnormal Radiation Levels/Radiological Effluent (A), Fission Product Barrier Degradation (F).

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## SYSTEM MALFUNCTION SS6

### Initiating Condition - SITE AREA EMERGENCY

Inability to monitor a SIGNIFICANT TRANSIENT in progress

**Operating Mode Applicability:** Power Operations (Mode 1)  
Startup (Mode 2)  
Hot Standby (Mode 3)  
Hot Shutdown (Mode 4)

### Example Emergency Action Level(s):

**Note:** *The SM / ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.*

1. a. Loss of > approximately 75% of the following  $\geq$  15 minutes:
    - Control Room annunciators associated with safety systems

**OR**

    - Control Room safety system indication

**AND**
  - b. A SIGNIFICANT TRANSIENT is in progress.
- AND**
- c. Compensatory indications are unavailable.

### Basis:

This IC is intended to recognize the threat to plant safety associated with the complete loss of capability of the control room staff to monitor plant response to a SIGNIFICANT TRANSIENT.

"Planned" and "UNPLANNED" actions are not differentiated since the loss of instrumentation of this magnitude is of such significance during a transient that the cause of the loss is not an ameliorating factor.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

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## **SYSTEM MALFUNCTION SS6**

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10 CFR 50.72. If the shutdown is not in compliance with the Technical Specification action, the NUE is based on SU11 "Inability to reach required operating mode within Technical Specification limits."

A Site Area Emergency is considered to exist if the Control Room staff cannot monitor safety functions needed for protection of the public while a significant transient is in progress.

Site specific indications needed to monitor safety functions necessary for protection of the public must include Control Room indications, computer generated indications and dedicated annunciation capability.

Indicators associated with safety systems are those indicators for reactivity control, core cooling, maintaining reactor coolant system integrity or maintaining containment integrity.

"Compensatory indications" in this context includes computer based information such as SPDS, QSPDS, COLSS, etc. This should include all computer systems available for this use depending on specific plant design and subsequent retrofits.

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

### Reference Documents:

1. 015.037, "Post Transient Review"
2. 1203.043, "Loss of Control Room Annunciators"
3. 2203.042, "Loss of Control Room Annunciators"

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## **SYSTEM MALFUNCTION SG1**

### **Initiating Condition - GENERAL EMERGENCY**

Prolonged loss of all offsite and all onsite AC power to Vital 4.16 KV busses

**Operating Mode Applicability:** Power Operations (Mode 1)  
Startup (Mode 2)  
Hot Standby (Mode 3)  
Hot Shutdown (Mode 4)

### **Example Emergency Action Level(s):**

1. a. Loss of all offsite and all onsite AC power to Vital 4.16 KV busses.

**AND**

- b. Either of the following:
  - Restoration of at least one Vital 4.16 KV bus in <4 hours is not likely.

**OR**

- Continuing degradation of core cooling based on Fission Product Barrier monitoring as indicated by CETs  $\geq 700$  °F.

### **Basis:**

Loss of all AC power to Vital 4.16 KV busses compromises all plant safety systems requiring electric power including Shutdown Cooling, ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all AC power to Vital 4.16 KV busses will lead to loss of fuel clad, RCS, and containment, thus warranting declaration of a General Emergency.

This IC is specified to assure that in the unlikely event of a prolonged station blackout, timely recognition of the seriousness of the event occurs and that declaration of a General Emergency occurs as early as is appropriate, based on a reasonable assessment of the event trajectory.

The likelihood of restoring at least one Vital 4.16 KV bus should be based on a realistic appraisal of the situation since a delay in an upgrade decision based on only a chance of mitigating the event could result in a loss of valuable time in preparing and implementing public protective actions.

In addition, under these conditions, fission product barrier monitoring capability may be degraded.

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## **SYSTEM MALFUNCTION SG1**

Although it may be difficult to predict when power can be restored, it is necessary to give the SM / ED a reasonable idea of how quickly (s)he may need to declare a General Emergency based on two major considerations:

1. Are there any present indications that core cooling is already degraded to the point that loss or potential loss of Fission Product Barriers is IMMEDIATE?
2. If there are no present indications of such core cooling degradation, how likely is it that power can be restored in time to assure that a loss of two barriers with a potential loss of the third barrier can be prevented?

Thus, indication of continuing core cooling degradation must be based on Fission Product Barrier monitoring with particular emphasis on SM / ED judgment as it relates to IMMEDIATE loss or potential loss of fission product barriers and degraded ability to monitor fission product barriers.

### Reference Documents:

1. Unit 1 Calculation 85-E-0072-02, "Time from Loss of All AC Power to Loss of Subcooling"
2. Unit 2 Calculation 85-E-0072-01, "Time from Loss of All AC Power to Loss of Subcooling"

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## **SYSTEM MALFUNCTION SG3**

### **Initiating Condition - GENERAL EMERGENCY**

Automatic trip and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists

**Operating Mode Applicability:** Power Operations (Mode 1)  
Startup (Mode 2)

### **Example Emergency Action Level(s):**

1. a. An automatic trip failed to shutdown the reactor

**AND**

- 
- b. All manual actions do not shutdown the reactor as indicated by reactor power  $\geq 5\%$ .

**AND**

- 
- 
- c. Either of the following exist or have occurred due to continued power generation:

- CET temperatures at or approaching 1200 °F

**OR**

- Feedwater flow rate less than:

**Unit 1:** 430 gpm

**Unit 2:** 485 gpm

### **Basis:**

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful.

In the event either of these challenges exists at a time that the reactor has not been brought below the power associated with the safety system design a core melt sequence exists. In this situation, core degradation can occur rapidly. For this reason, the General Emergency declaration is intended to be anticipatory of the fission product barrier table declaration to permit maximum off-site intervention time.



Attachment 3  
EAL Matrix Chart

Attachment 3  
EAL Matrix Chart 1903.010 Rev 057

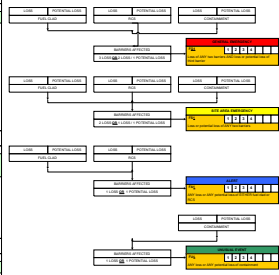
Main EAL Matrix Chart table with columns for General Emergency, Plant Malfunction, and Insignificant Event, and rows for various system malfunctions like Loss of AC Power, Reactor Protection System, etc.

Table III: Revision History table with columns for Revision Number, Description, and Date.

Attachment 3  
EAL Matrix Chart

Attachment 3  
EAL Matrix Chart Procedure 1903.010 Rev 057

GENERAL EMERGENCY	DEFINITION	INITIAL	UNUSUAL EVENT
<b>COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION - Loss of RCS / Reactor Vessel Inventory</b>	<b>REFUELING SYSTEM MALFUNCTION - Loss of RCS / Reactor Vessel Inventory</b>	<b>DEFINITIONS</b>	<b>INITIAL</b>
<b>COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION - Loss of Decay Heat Removal</b>	<b>REFUELING SYSTEM MALFUNCTION - Loss of Decay Heat Removal</b>	<b>DEFINITIONS</b>	<b>INITIAL</b>
<b>COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION - Loss of AC Power</b>	<b>REFUELING SYSTEM MALFUNCTION - Loss of AC Power</b>	<b>DEFINITIONS</b>	<b>INITIAL</b>
<b>COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION - Loss of DC Power</b>	<b>REFUELING SYSTEM MALFUNCTION - Loss of DC Power</b>	<b>DEFINITIONS</b>	<b>INITIAL</b>
<b>COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION - Inadvertent Criticality</b>	<b>REFUELING SYSTEM MALFUNCTION - Inadvertent Criticality</b>	<b>DEFINITIONS</b>	<b>INITIAL</b>
<b>COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION - Loss of Communications</b>	<b>REFUELING SYSTEM MALFUNCTION - Loss of Communications</b>	<b>DEFINITIONS</b>	<b>INITIAL</b>



**INITIAL**  
 Mode 1 = Power Operator - KAF ± 0.04, Reactor Power = 5%  
 Mode 2 = Standby - KAF ± 0.04, Reactor Power = 5%  
 Mode 3 = Hot Standby - KAF ± 0.04, RCS ± 200 °F  
 Mode 4 = Cold Shutdown - KAF ± 0.04, RCS ± 200 °F  
 Mode 5 = Cold Shutdown - KAF ± 0.04, RCS ± 200 °F  
 Mode 6 = Standby - Class 0 (no reactor vessel head closure both heat fully vented)  
 Deleted (C) - All reactor fuel removed from reactor pressure vessel (full core offload during refueling or extended outage). This is not an operating mode designated by Technical Specifications.

**INITIAL**  
 Mode 1 = Power Operator - KAF ± 0.04, Reactor Power = 5%, RCS ± 200 °F  
 Mode 2 = Standby - KAF ± 0.04, Reactor Power = 5%, RCS ± 200 °F  
 Mode 3 = Hot Standby - KAF ± 0.04, Reactor Power = 5%, RCS ± 200 °F  
 Mode 4 = Cold Shutdown - KAF ± 0.04, Reactor Power = 5%, RCS ± 200 °F  
 Mode 5 = Cold Shutdown - KAF ± 0.04, Reactor Power = 5%, RCS ± 200 °F  
 Mode 6 = Standby - Class 0 (no reactor vessel head closure both heat fully vented)  
 Deleted (C) - All reactor fuel removed from reactor pressure vessel (full core offload during refueling or extended outage). This is not an operating mode designated by Technical Specifications.