



Entergy Operations, Inc.
1448 S.R. 333
Russellville, AR 72802
Tel 479-858-4704

Stephenie L Pyle
Manager, Licensing
Arkansas Nuclear One

0CAN081202

August 17, 2012

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

SUBJECT: Response to Request for Additional Information Related to
Proposed Emergency Action Levels Using
NEI 99-01 Revision 5 Scheme
Arkansas Nuclear One – Units 1 and 2
Docket Nos. 50-313 and 50-368
License Nos. DPR-51 and NPF-6

- References:**
1. Entergy letter dated December 1, 2011, *Proposed Emergency Action Levels Using NEI 99-01 Revision 5 Scheme*, TAC Nos. ME7661 and ME7662 (ML113350317) (0CAN121102)
 2. Email from Kaly Kalyanam (U.S. Nuclear Regulatory Commission) to David Bice (Entergy Operations, Inc.) - *Proposed Emergency Action Levels Using NEI 99-01 Revision 5 Scheme*, dated May 10, 2012
 3. Entergy letter dated July 9, 2012, *Response to Request for Additional Information Related to Proposed Emergency Action Levels Using NEI 99-01 Revision 5 Scheme*, (0CAN071203)
 4. Email from Kaly Kalyanam (U.S. Nuclear Regulatory Commission) to David Bice (Entergy Operations, Inc.) - *ANO Correspondence Submitted to the NRC via EIE on 7/9/2012*, dated July 18, 2012

Dear Sir or Madam:

In Reference 1, Entergy Operations, Inc. (Entergy) requested NRC review and approval of the Arkansas Nuclear One (ANO) proposed revision to the Emergency Plan (EP) Emergency Action Levels (EALs). The proposed changes involve revisions to ANO's current EP EAL scheme which is based on NUREG 0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants" (the current "implemented" version of the EALs at ANO). Entergy is proposing to adopt the EAL scheme based on the guidance provided in NEI 99-01, Revision 5.

By Reference 2, the NRC requested additional information to support continued review of the aforementioned EP EAL revisions. By Reference 3, Entergy submitted the requested information along with a markup of affected Reference 1 pages and a clean version of the revised ANO EAL Basis. However, the markup pages and the clean EAL Basis were included in a single attachment in the Reference 3 letter. By email dated July 18, 2012 (Reference 4), the NRC requested the response to the request for additional information be resubmitted with an attachment including the response, an attachment illustrating a markup of only affected pages associated with the original Reference 1 letter (i.e., not in a "replacement page" form), and an attachment containing the revised (clean) ANO EAL Basis document. Therefore, the information presented in Entergy's Reference 3 response is hereby resubmitted in the format described above. No technical changes to the information contained in the Reference 3 letter have been made. This letter supersedes Entergy's July 9, 2012 letter (Reference 3).

This letter contains no new commitments. If you have any questions or require additional information, please contact me.

Sincerely,

ORIGINAL SIGNED BY STEPHENIE L. PYLE

SLP/dbb

Enclosures: 1. Response to Request for Additional Information
 2. Markup of Attachments Included in Entergy letter dated December 1, 2011
 3. Revised (Clean) ANO EAL Basis Document

cc: Mr. Elmo Collins
 Regional Administrator
 U. S. Nuclear Regulatory Commission
 Region IV
 1600 East Lamar Boulevard
 Arlington, TX 76011-4511

NRC Senior Resident Inspector
Arkansas Nuclear One
P.O. Box 310
London, AR 72847

U. S. Nuclear Regulatory Commission
Attn: Mr. Kaly Kalyanam
MS O-8 B1
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

Enclosure 1 to

OCAN081202

Response to Request for Additional Information

Response to Request for Additional Information

As stated, in part, in the NRC's request for additional information (RAI) dated May 10, 2012:

"Attached are the draft requests for additional information (RAIs) to facilitate the technical review being conducted by the Operating Reactor Licensing and Outreach Branch staff. Timely and accurate response to these draft RAIs is requested. Please note that the staff assumes the licensee has verified that all values and setpoints can be read on the stated instrumentation, i.e., all values are within the calibrated range (0-100% of scale) of the stated instrumentation."

Below are the specific questions from the aforementioned RAI with associated responses. Following the questions/responses is a table matrix describing the pages of the new Emergency Action Level (EAL) scheme that are affected. The changes describe refer to the Entergy Operations, Inc. (Entergy) original EAL scheme submittal dated December 1, 2011 (ML113350317) (OCAN121102). A markup of affected pages, with regard to the original submittal, are referred to below and included in Enclosure 2 of this submittal. A revised (clean) version of the Arkansas Nuclear One (ANO) EAL Basis document is included in Enclosure 3 of this submittal.

1. *EAL Technical Basis Document – Front Section:*

- a. *The endorsed EAL scheme development guidance document contains information the staff considers to be necessary for EAL decision makers to understand consistently. Please provide justification for the omission of the following sections from NEI 99-01 Revision 5 into your site specific EAL Basis Document or revise accordingly to include:*
 - i. *Section 3.2 – Definitions of emergency classification level, initiating condition, and emergency action level.*

Response

Definitions conforming to NEI 99-01, Revision 5 guidance for emergency classification level, initiating condition, and emergency action level have been added to the ANO EAL Basis document (Attachment 3 of the original submittal). Refer to Pages 6 and 7 of Enclosure 2 – Attachment 3 markup.

- ii. *Section 3.7 – Definitions of unusual event, alert, site area emergency, and general emergency.*

Response

Definitions conforming to NEI 99-01, Revision 5 guidance for notification of unusual event, alert, site area emergency, and general emergency have been added to the ANO EAL Basis document (Attachment 3 of the original submittal). Refer to Pages 5, 6, 7, and 8 of Enclosure 2 – Attachment 3 markup.

- iii. *Sections 3.9, 3.10, 3.11, 3.12, and 3.13 – All of the information provided.*

Response

Sections 3.9, 3.10, 3.11, 3.12, and 3.13 of NEI 99-01, Revision 5, have been added to the ANO EAL Basis document (Attachment 3 of the original submittal) immediately following the Definitions section. The NEI information is modified as appropriate for pressurized water reactor (PWR) and/or site-specific applicability. Refer to Page 8 of Enclosure 2 – Attachment 3 markup.

- iv. Section 5.3 – Last paragraph.

Response

The last paragraph of NEI 99-01, Revision 5, Section 5.3 has been added to the ANO EAL Basis document (Attachment 3 of the original submittal) following the Definitions section. The NEI information is modified as appropriate for site-specific applicability. Refer to Page 8 of Enclosure 2 – Attachment 3 markup.

2. *Definitions – Please provide justification why the site-specific definition of “CONTAINMENT CLOSURE” was not included or revise accordingly.*

Response

The definition of “CONTAINMENT CLOSURE” as contained in Attachment 3 of the original submittal has been revised to match the definition presented in ANO procedure OP-1015.008, “Unit 2 SDC Control.” Refer to Page 5 of Enclosure 2 – Attachment 3 markup.

3. *EALs AA1, AS1, AG1: Please explain how the limits from the table were developed. If this is the top of the calibrated scale, please explain how this will be differentiated from failed instrumentation.*

Response

ANO Chemistry Procedure 1604.051, “Eberline Radiation Monitoring System”, describes the setup and operation for each of the eleven Super Particulate Iodine Noble Gas (SPING) monitors used for monitoring and assessing radiological releases at the ANO site. Each SPING is associated with a particular ventilation pathway and provides continuous monitoring of air discharged via the respective release pathway. Attachment 2 of the procedure, “SPING Parameter File Values,” provides a list of setpoints identifying the radiological value (in $\mu\text{ci/cc}$) that is associated with each of the four emergency classes (Notification of Unusual Event (NUE), Alert, Site Area Emergency (SAE), and General Emergency (GE)). The setpoints are linear in nature based upon the emergency class dose rate criteria that is associated with the SPING. For example, the value for the SPING 6 (Unit 2 Radwaste Area) Alert setpoint is a factor of 10 higher than the SPING 6 NUE setpoint. This factor of 10 can be derived using a ratio between the current 0.05 mR/hr NUE dose rate classification criteria and the 0.5 mR/hr Alert dose rate classification criteria.

The new EAL classification setpoints were established with the same logic as stated above using the following example:

$$\begin{array}{l} \text{New NEI EAL Limit for NUE:} \\ \text{Current EAL Limit for NUE:} \end{array} \quad \frac{0.1 \text{ mR/hr}}{0.05 \text{ mR/hr}} = 2$$

By multiplying the ratio of 2 as determined above to the current setpoint, the new setpoint value is obtained:

$$2 \times 1.66\text{E-}2 \text{ }\mu\text{Ci/cc} = 3.32 \text{ E-}2 \text{ }\mu\text{Ci/cc}$$

Each of the SPING setpoint values were determined in the manner described above.

As noted in the AA1 discussion of Differences (Attachment 1 of the original submittal), ANO will not employ the current dose assessment model (RDACS) when the new EALs are implemented. A new dose assessment model using RASCAL is under final development and is scheduled to be fully implemented later this year. As part of the RASCAL implementation process, the SPING monitor setpoints will be evaluated for accuracy given the new model.

For the non-SPING monitors included in EAL AA1 below, a 95% of full scale value was selected. A review of release permit setpoint records indicate that these monitors would indicate nearly a full scale value or off-scale, if the monitor setpoint were multiplied by 200 as stated in Section 2 of this EAL. Note that these monitors (except 2RE-4425) will automatically secure the release when the release permit setpoint is reached in addition to alarming the condition. Steam Generator (SG) Blowdown is not normally discharged to the environment, but is processed back into the condensate and feedwater system.

The radiation monitor limits included in EALs AA1, AS1, AG1 have been verified to be within scale. The first table in each of the aforementioned EAL sections contains identical instruments in all three sections. EAL AA1 is included below because it refers to Channel 7 (medium range noble gas) on each SPING. With regard to Channel 9 (high range noble gas) on each SPING, EAL AG1 contains the highest limits; therefore, EAL AS1 limits are not listed below (also associated with Channel 9 of each SPING) because the AS1 EAL limit would be on scale if the (higher) AG1 EAL limit is on scale. EAL AA1 includes a second table of instrumentation which is also included below.

During response development, Entergy Operations, Inc. (Entergy) noted that limits for SPING 11, Channel 9 (high range noble gas) were inadvertently included in EAL AS1 and AG1. SPING 11, associated with the Low Level Radwaste (LLRW) Building does not contain a high range noble gas channel due to the low levels of radioactivity present in the building. Therefore, this channel has been removed from appropriate attachments. Refer to Pages 18 and 21 of Enclosure 2 – Attachment 1 markup, Pages 14 and 17 of Enclosure 2 – Attachment 2 markup, Pages 21 and 23 of Enclosure 2 – Attachment 3 markup, and Page 1 of Enclosure 2 – Attachment 4 markup.

From EAL AA1:

MONITORS – UNIT 1		EAL VALUE	UPPER RANGE OF MONITOR
RX-9820	Containment Purge	5.90E0 µCi/cc	1.8E3 – 2.5E4 µCi/cc
RX-9825	Radwaste Area	5.36E0 µCi/cc	1.8E3 – 2.5E4 µCi/cc
RX-9830	Fuel Handling Area	4.54E0 µCi/cc	1.8E3 – 2.5E4 µCi/cc
RX-9835	Emergency Penetration Room	9.56E1 µCi/cc	1.8E3 – 2.5E4 µCi/cc
MONITORS – UNIT 2		EAL VALUE	UPPER RANGE OF MONITOR
2RX-9820	Containment Purge	4.46E0 µCi/cc	1.8E3 – 2.5E4 µCi/cc
2RX-9825	Radwaste Area	3.32E0 µCi/cc	1.8E3 – 2.5E4 µCi/cc
2RX-9830	Fuel Handling Area	4.46E0 µCi/cc	1.8E3 – 2.5E4 µCi/cc
2RX-9835	Emergency Penetration Room	8.84E1 µCi/cc	1.8E3 – 2.5E4 µCi/cc
2RX-9840	Post Accident Sampling Building	4.42E1 µCi/cc	1.8E3 – 2.5E4 µCi/cc
2RX-9845	Aux. Building Extension	1.26E1 µCi/cc	1.8E3 – 2.5E4 µCi/cc
2RX-9850	Low Level Radwaste Storage Bldg.	1.77E1 µCi/cc	1.8E3 – 2.5E4 µCi/cc

MONITORS – UNIT 1		EAL VALUE	UPPER RANGE OF MONITOR
RX-9820	Containment Purge (Channel 7 or 9)	N/A	(see other tables)
RE-4830	Waste Gas Radiation Monitor	9.5E7 cpm	1E8 cpm
RE-4642	Liquid Radwaste Monitor	9.5E7 cpm	1E8 cpm
MONITORS – UNIT 2		EAL VALUE	UPPER RANGE OF MONITOR
2RX-9820	Containment Purge (Channel 7 or 9)	N/A	(see other tables)
2RE-2429	Waste Gas Monitoring System	9.5E5 cpm	1E6 cpm
2RE-2330	BMS Liquid Discharge Monitor	9.5E5 cpm	1E6 cpm
2RE-4423	Regenerative Waste Discharge Monitor	9.5E5 cpm	1E6 cpm
2RE-4425	SG Blowdown to Flume Radiation Monitor	9.5E5 cpm	1E6 cpm

From EAL AG1:

MONITORS – UNIT 1		EAL VALUE	UPPER RANGE OF MONITOR
RX-9820	Containment Purge	5.90E2 µCi/cc	1.4E5 – 5.2E5 µCi/cc
RX-9825	Radwaste Area	5.36E2 µCi/cc	1.4E5 – 5.2E5 µCi/cc
RX-9830	Fuel Handling Area	4.54E2 µCi/cc	1.4E5 – 5.2E5 µCi/cc
RX-9835	Emergency Penetration Room	9.56E3 µCi/cc	1.4E5 – 5.2E5 µCi/cc
MONITORS – UNIT 2		EAL VALUE	UPPER RANGE OF MONITOR
2RX-9820	Containment Purge	4.46E2 µCi/cc	1.4E5 – 5.2E5 µCi/cc
2RX-9825	Radwaste Area	3.32E2 µCi/cc	1.4E5 – 5.2E5 µCi/cc
2RX-9830	Fuel Handling Area	4.46E2 µCi/cc	1.4E5 – 5.2E5 µCi/cc
2RX-9835	Emergency Penetration Room	8.84E3 µCi/cc	1.4E5 – 5.2E5 µCi/cc
2RX-9840	Post Accident Sampling Building	4.42E3 µCi/cc	1.4E5 – 5.2E5 µCi/cc
2RX-9845	Aux. Building Extension	1.26E3 µCi/cc	1.4E5 – 5.2E5 µCi/cc

Note that the above SPING values designate a range of activity. This is because the vendor technical manual describes the noble gas detector design and setup considering the energy level of two discrete isotopes, Xe¹³³ and Kr⁸⁵. This design provides high confidence that the noble gas detectors are setup and calibrated to detect activity over a broad range of possible isotopes released during normal and abnormal conditions. In any case, the upper bounds of the monitors are sufficient to establish the appropriate EAL declaration during an event.

4. *EAL CG1: Please revise the EAL accordingly to reflect that the inability to monitor reactor vessel level for ≥ 30 minutes with core uncover indicated, by any of the bulleted items you provided, is what the EAL is intended to be. This is a known inconsistency with the generic EAL development guidance for CG1 (NEI) and CS1 (NEI).*

Response

EAL CG1, part 2.a has been revised consistent with EAL CS1, part 3. Refer to Page 41 of Enclosure 2 – Attachment 1 markup, Page 36 of Enclosure 2 – Attachment 2 markup, Page 41 of Enclosure 2 – Attachment 3 markup, and Page 5 of Enclosure 2 – Attachment 4 markup.

5. *EAL E-HU1: Please clarify, via adding a note or other means, that security events are bounded by the Hazard EALs.*

Response

A Note stating that security events are bounded by the Hazards EALs has been added to EAL E-HU1. Refer to Page 43 of Enclosure 2 – Attachment 1, Page 39 of Enclosure 2 – Attachment 2 markup, Page 44 of Enclosure 2 – Attachment 3 markup, and Page 11 of Enclosure 2 – Attachment 4 markup.

6. *FISSION BARRIER MATRIX – CONTAINMENT BARRIER: Please explain, in more detail, why there is no threshold for a “Ruptured steam generator is also faulted outside containment.”*

Response

The aforementioned SG threshold was included Attachment 1, Page 59, but was inadvertently shown as deleted in Attachment 2 (EAL Bases Markup) and omitted in Attachments 3 and 4. Attachment 2 has been revised to show this threshold as retained. In addition, the SG threshold is added to Attachments 3 and 4. Refer to Page 56 of Enclosure 2 – Attachment 2 markup, Page 58 of Enclosure 2 – Attachment 3 markup, and Page 13 of revised Enclosure 2 – Attachment 4 markup.

7. *EAL HU6, HA6: Please explain whether the 0.01g acceleration alarm is available to Operators in the Control Room.*

Response

ANO-1 seismic trigger XSH-8007 provides alarm in the ANO-1 control room at 0.01 g, as described in both unit Technical Requirements Manual bases for seismic monitoring instrumentation. Both ANO units credit this alarm for EAL response.

8. *EAL HA3: Please develop a list of areas applicable to this EAL. The intent of this EAL is to declare an Alert when access to an area is impeded due to a gaseous event. The areas of concern are limited to those that must be entered for safe operation, safe shutdown, or safe cooldown. If access to the area is unnecessary to operate said equipment, then the table does not need the area listed. Note that this EAL is to be declared when an area, already pre-identified as an area where access is required, is subject to a gaseous event that impedes access. Note that this EAL would be declared regardless of whether access was required at the present time or not. Also note that this may entail a column on the table for operating mode applicability. In addition, please revise the wording in the initiating condition and EAL from “prohibited” to “impeded” as this error is to be corrected with the next revision of the generic EAL scheme development guidance.*

Response

Note that NEI 99-01, Revision 5, EAL HA3, is the equivalent of ANO EAL HA5. An assessment of operational areas was performed as part of the original submittal development and the results illustrated in Table H-1 contained in Attachments 1, 2, 3, and 4 of the original submittal. Of these areas, none need be routinely accessed during normal operations to maintain safe operation of the plant.

Station procedures provide defense-in-depth operation by requiring an Operator (or other) to access equipment areas when placing or removing equipment in/from service. However, provided the unit Control Room remains accessible, most of these requirements may be omitted as necessary without a significant impact to safe plant operation and/or shutdown/cooldown. As a result, only those areas requiring local operator manipulations are considered in this follow-up assessment associated with this RAI. As stated above, none of the areas must be accessed to support normal safe operations. In addition, no area is required to be accessed to perform a shutdown where the reactor is tripped from its steady-state power condition. Although procedures may direct local equipment manipulations in support of shutdown involving a power descent, the option of tripping the reactor from any power level remains available. Therefore, this assessment is focused on establishing steady-state conditions following a reactor trip and a subsequent cooldown of the plant.

A review of shutdown and cooldown procedures for both units was performed. Based on these reviews, the following vital areas were identified as requiring access in support of a shutdown or cooldown. The purpose for access is also provided.

Unit 1

AREA	MODES	PURPOSE	REFERENCE
A-4 Switchgear Room	3, 4	Core flood tank valves, decay heat removal (DHR)	OP-1102.010 Step 8.25, OP-1104.004 Steps 7.2.6
Upper North Electrical Penetration Room	3, 4	DHR alignment	OP-1104.004 Step 7.2.4
Lower South Electrical Equipment Room	3, 4	DHR alignment	OP-1104.004 Step 7.2.5
Control Room	ALL	Overall plant control	Various

Unit 2

AREA	MODES	PURPOSE	REFERENCE
Aux Building 317' Emergency Core Cooling Rooms	3, 4	Shutdown Cooling (SDC) venting and alignment	OP-2104.004 Steps 7.9, 7.10.2, 7.10.3, 7.13.2,
Aux Building 317' Tendon Gallery Access	3, 4	SDC alignment	OP-2104.004 Step 7.13.2
Aux Building 335' Charging Pumps / Motor Control Center (MCC) 2B-52	3, 4	Charging low pressure operation, T-Hot injection valves, and SDC alignment	OP-2102.010 Steps 8.13, 8.20, 9.18.12 and OP- 2104.004 Step 7.13.4
Auxiliary Building 354' MCC 2B-62 Area	3, 4	SDC alignment and T-Hot injection valves at MCC 2B-62	OP-2102.010 Steps 8.20, 9.18.12 and OP-2104.004 Step 7.13.4
Emergency Diesel Generator Corridor	3, 4	Close Safety Injection Tank (SIT) valves and SDC / Low Temperature Overpressure (LTOP) valve alignment at MCC 2B-51	OP-2102.010 Steps 8.18, 8.20
Lower South Piping Penetration Room	3, 4	SDC alignment	OP-2104.004 Steps 7.10.4, 7.10.5, 7.11.1, 7.12.1, 7.13.2, 8.8, 8.10.1, 8.11.2
Aux Building 386' Containment Hatch	3, 4	Close SIT valves at MCC 2B-61	OP-2102.010 Step 8.18
Control Room	ALL	Overall plant control	Various

Mode 3 is included above for DHR- and SDC-related activities because the procedures begin alignment in Mode 3; however, these actions could be delayed until Mode 4, if necessary. In order to ensure adequate guidance to emergency response personnel, the above areas are added to the EAL in order to provide prompt operator guidance for EAL declaration. Refer to Page 77 of Enclosure 2 – Attachment 1 markup, Page 79 of Enclosure 2 – Attachment 2 markup, Page 79 of Enclosure 2 – Attachment 3 markup, and Pages 19 of Enclosure 2 – Attachment 4 markup.

9. *EAL HA6: Please explain how the list of areas can be susceptible to the specific hazards. Please provide a hazard specific list of applicable areas for these EALs (which may need to be operating mode dependent), or provide justification that supports these areas being considered for the particular hazard.*

Response

EAL HA6 refers to damage caused by natural or destructive phenomenon in certain vital areas. The original ANO letter considers the following events: 1) earthquake, 2) tornado, 3) flood, 4) main turbine projectiles, 5) loss of Lake Dardanelle, and 6) vehicle crash onsite. NEI 99-01, Revision 5, states the following for EALs #2 - #5: "These EALs should specify

site specific structures or areas that contain safety system, or component and functions required for safe shutdown of the plant.” Entergy provided this list of structures and areas in the original submittal, but did not perform a review to determine the applicability of each specific hazard to the list. Entergy has performed this review and updated the submittal documents accordingly. The review results are provided below as part of this response. No structures or areas are listed for earthquake or loss of Lake Dardanelle events (ANO EALs #1 and #5); therefore, these EALs were not included in the review.

With regard to the other events listed above, the following discussion describes how the listed areas or components (as depicted in the original submittal) are affected by the subject event.

Tornado – All areas were considered susceptible to damage

Internal Flooding

AREA	COMMENTS
Intake Structure	Structure evaluated for internal flooding. Pump motors are located above flood level. Some indication could be lost. Access may be limited.
Ultimate Heat Sink	This is a pond and cannot be impacted by internal flooding. This area is removed from the internal flooding list.
Startup Transformers	Located in an outside area and not susceptible to internal flooding. Indications are consistently exposed to rain and inadvertent actuation of the fire suppression system will not result in the loss of the transformer or indication. This area is removed from the internal flooding list.
Diesel Fuel Vault	Structure evaluated for internal flooding. The common fuel oil vault contains independent fuel oil tanks within separate sub-vaults. It is unlikely all sub-vaults would be affected by internal flooding (resulting from tank rupture or fire system actuation). In addition, the tanks “float” (are maintained full) on the above ground fuel oil storage bulk tank; therefore, the inability to access a sub-vault to verify tank level should have no impact on safe operation of the unit. This area is removed from the internal flooding list.
Refueling Water Tank (RWT)	Located in an outside area and not susceptible to internal flooding. This area is removed from the internal flooding list.
Turbine Building	Area of pipe break may be inaccessible. Loss of some indication possible. Possible loss of non-vital auxiliary feedwater pump.
Qualified Condensate Storage Tank (QCST)	Located in an outside area and not susceptible to internal flooding. This area is removed from the internal flooding list.
Control Room	Internal flooding not assumed. Halon system provides fire protection. This area is removed from the internal flooding list.

Internal Flooding (continued)

Auxiliary Building	Safety equipment evaluated for internal flooding considerations. Loss of indications and control possible.
Borated Water Storage Tank (BWST)	Located in an outside area and not susceptible to internal flooding. This area is removed from the internal flooding list.

Main Turbine Projectiles

AREA	COMMENTS
Reactor Building	Not in the vicinity of the Main Turbine. This area is removed from the turbine projectile list.
Intake Structure	Not in the vicinity of the Main Turbine. This area is removed from the turbine projectile list.
Ultimate Heat Sink	Not in the vicinity of the Main Turbine. This area is removed from the turbine projectile list.
Startup Transformers	Possible damage, but considered remote due to location outside Turbine Building. EDGs are unaffected by turbine missiles and can provide power if transformers are lost.
Diesel Fuel Vault	Not in the vicinity of the Main Turbine. This area is removed from the turbine projectile list.
RWT	Not in the vicinity of the Main Turbine. This area is removed from the turbine projectile list.
Turbine Building	Susceptible to significant internal damage. However, is not expected to result in a significant impact to safe shutdown capability.
QCST	Not in the vicinity of the Main Turbine. This area is removed from the turbine projectile list.
Control Room	External damage only. Some indications can be affected by impacts to CA-2, located next to the Control Room.
Auxiliary Building	Some internal damage on Elevation 386' which could affect indication or limited safety equipment.
BWST	Not in the vicinity of the Main Turbine. This area is removed from the turbine projectile list.

Vehicle Crash – The only area not susceptible to damage from a vehicle crash is the Control Room, due to the elevation of this area. Therefore, the Control Room is removed from the vehicle crash list.

Based on the recommendations included in the above tables, the individual lists in the associated EALs are modified accordingly. Refer to Pages 79 and 80 of Enclosure 2 – Attachment 1 markup, Page 73 of Enclosure 2 – Attachment 2 markup, Pages 80 and 81 of Enclosure 2 – Attachment 3 markup, and Pages 21 and 22 of Enclosure 2 – Attachment 4 markup.

10. *EAL SU6, SA6, SS6: Please provide a site-specific list of annunciators and indicators, or provide more detail on the specific systems being monitored.*

Response

These EALS consider the annunciators and indicators used to effectively monitor safety systems necessary for ensuring safety functions are met. The safety functions are reactivity control, core cooling, maintaining reactor coolant system (RCS) integrity, and maintaining containment integrity. These indicators and annunciators are generally available to the Control Room Operators from a single monitoring location. In addition to indicators installed in Control Room panels, several computer-based displays are also available, again capable of being monitored from the same Control Room location as the annunciators and panel indicators. Most Control Room indicator and annunciator panels display information necessary for safety function assessment. The following provides a brief description of each panel.

ANO-1 Annunciator Panels

K-01	Electrical Power Status
K-02	Electrical Power Status
K-07	Reactivity (Integrated Control System), SG
K-08	Reactivity
K-09	RCS, DHR
K-10	Engineered Safeguards (ES), Radiation
K-11	ES
K-12	Fire, Emergency Feedwater Initiation and Control

ANO-1 Indication/Control Panels

C-03	Reactor Power, Reactivity, RCS pressure/temperature, SG pressure/temperature
C-04	Pressurizer level/pressure, margin-to-saturation (MTS)
C-09	SG pressure/level, Emergency Feedwater (EFW)
C-10	Electrical and Vital Electrical Power
C-13	RCS temperature/flow, Reactor Coolant Pumps (RCPs), SG level
C-14	Reactor Building (RB) sump level, DHR, RB Spray flow, RCS pressure
C-16	ES
C-18	ES
C-19	Fire, Safety Parameter Display System (SPDS)
C-26	RB hydrogen
C-100	Plant Monitoring System (computer and displays)
C-486	RB pressure/level/high range radiation, Acoustic monitors, Main Steam radiation

ANO-2 Annunciator Panels

2K-01	Electrical Power Status
2K-04	Engineered Safety Features (ESF), Reactor Power
2K-05	ESF
2K-06	ESF
2K-07	ESF, SDC
2K-08	Vital Electrical Power
2K-09	Vital Electrical Power
2K-10	Reactivity, RCS pressure/temperature, Radiation, Containment level/temp/ humidity/ hydrogen
2K-11	RCPs, Fire, SG tube leakage, Radiation

ANO-2 Indication/Control Panels

2C-02	SG level/pressure
2C-03	Reactivity, Reactor Power, ES, SPDS
2C-04	RCS pressure/temperature/level, MTS, SDC, Pressurizer heaters
2C-14	RCS pressure/temperature, radiation, RB pressure
2C-16	ES
2C-17	ES
2C-33	Vital Electrical, RB temperature/pressure/humidity/level, SDC, ES
2C-100	Plant Monitoring System (computer and displays)
2C-336	RB high range radiation, MTS, Main Steam radiation, Reactor Power, RCS pressure, Acoustic monitors

In light of the above information, there are only 2 to 3 annunciators and 2 to 3 indication / control panels (in view of the primary monitoring location) on each unit that have minimal or no indications necessary to support safe operation/shutdown/cooldown of the units. As a result, listing the above panels in the EAL offers little beneficial guidance to Operations personnel. The inability to monitor a safety function due to the unavailability of an adequate number of associated annunciators and control panel or computer-based indicators is expected to be quickly recognized and the subject EALs applied as appropriate. Just as the Shift Manager is expected to use his/her judgment in assessing the loss of 75% of safety related annunciation and indication, the Shift Manager is best situated to assess those Control Room panel indicators and annunciation that are associated with safety systems. Based on the above, no changes to the subject EALs are proposed.

11. *EAL SA3: Please explain how there can be two required thresholds with competing reactor power values (i.e., SA3.1.a requires reactor power $\geq 5\%$ while SA3.1.b requires reactor power $< 5\%$). Please provide further justification for differing reactor power levels or revise accordingly to remove the reactor power value from SA3.1.a or SA3.1.b.*

Response

The ALERT classification is based on failure of the reactor trip upon receipt of an automatic trip signal, but successfully tripping the reactor manually. SA3.1.a assumes power should be below 5% immediately following an automatic reactor trip; if not, then the trip has failed.

SA3.1.b assumes a manual trip has taken place due to failure of the automatic trip sequence, which is verified as successful by power indicating below 5%. These values, the EAL wording, and the EAL flow have been verified by Operations and practiced on the simulator. Therefore, Entergy concludes that a change to this EAL is not required.

12. *EAL SG1: Please explain why the nomenclature used to depict the safety busses of concern (vital 4.16 KV) changed for this EAL to “safety busses” or revise accordingly.*

Response

The EAL SG1 nomenclature has been revised in the markup and clean versions of the Basis Document, consistent with other EALs, to read “Vital 4.16 KV”. This nomenclature is currently used in Attachments 1 and 4 of the original submittal. Refer to Page 109 of Enclosure 2 – Attachment 2 markup and Page 108 of Enclosure 2 – Attachment 3 markup.

During the review of the Reference 1 submittal in response to the Reference 2 NRC request, Entergy noted an editorial error in Attachment 3 (Reference 1), EAL SU9, associated with the RCS sample activity described in Item 2. The numerical value for the activity was shown in the other Reference 1 attachments, but was inadvertently omitted from Attachment 3. Refer to Page 95 of Enclosure 2 – Attachment 3 markup.

Below is a summary of the original submittal dated December 1, 2011 (ML113350317) affected pages included in Enclosure 2. Enclosure 3 contains a revised (clean) version of the ANO EAL Basis document.

Enclosure 2 Attachment	Affected Pages
Attachment 1	18, 21, 41, 43, 77, 79, 80
Attachment 2	14, 17, 36, 39, 56, 73, 79, 109
Attachment 3	5, 6, 7, 8, 21, 23, 41, 44, 58, 79, 80, 81, 95, 108
Attachment 4	1, 5, 11, 13, 19, 21, 22

Enclosure 2 to

OCAN081202

Markup of Attachments Included in Entergy letter dated December 1, 2011

NEI 99-01 Revision 5 EAL Deviation-Differences Document

ANO: AS1

Offsite dose resulting from an actual or imminent 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

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

Note: *The SM / TSC Director / EOF Director 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 Channel 9 on any of the following radiation monitors > the reading shown for ≥ 15 minutes:

MONITORS – UNIT 1		LIMIT
RX-9820	Containment Purge	5.90E+1 µCi/cc
RX-9825	Radwaste Area	5.36E+1 µCi/cc
RX-9830	Fuel Handling Area	4.54E+1 µCi/cc
RX-9835	Emergency Penetration Room	9.56E+2 µCi/cc
MONITORS – UNIT 2		LIMIT
2RX-9820	Containment Purge	4.46E+1 µCi/cc
2RX-9825	Radwaste Area	3.32E+1 µCi/cc
2RX-9830	Fuel Handling Area	4.46E+1 µCi/cc
2RX-9835	Emergency Penetration Room	8.84E+2 µCi/cc
2RX-9840	Post Accident Sampling Building	4.42E+2 µCi/cc
2RX-9845	Aux. Building Extension	1.26E+2 µCi/cc
2RX-9850	Low Level Radwaste Storage Building	1.77E+2 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

NEI 99-01 Revision 5 EAL Deviation-Differences Document

ANO: AG1

Offsite dose resulting from an actual or imminent 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

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

Note: *The SM / TSC Director / EOF Director 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 Channel 9 on any of the following radiation monitors > the reading shown for ≥ 15 minutes:

MONITORS – UNIT 1		LIMIT
RX-9820	Containment Purge	5.90E+2 (μCi/cc)
RX-9825	Radwaste Area	5.36E+2 (μCi/cc)
RX-9830	Fuel Handling Area	4.54E+2 (μCi/cc)
RX-9835	Emergency Penetration Room	9.56E+3 (μCi/cc)
MONITORS – UNIT 2		LIMIT
2RX-9820	Containment Purge	4.46E+2 (μCi/cc)
2RX-9825	Radwaste Area	3.32E+2 (μCi/cc)
2RX-9830	Fuel Handling Area	4.46E+2 (μCi/cc)
2RX-9835	Emergency Penetration Room	8.84E+3 (μCi/cc)
2RX-9840	Post Accident Sampling Building	4.42E+3 (μCi/cc)
2RX-9845	Aux. Building Extension	1.26E+3 (μCi/cc)
2RX-9850	Low Level Radwaste Storage Building	1.77E+3 (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.

NEI 99-01 Revision 5 EAL Deviation-Differences Document

ANO: CG1

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

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

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

Note: *The SM / TSC Director / EOF Director 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 ≥ 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 ≥ 30 minutes with a loss of RCS / reactor vessel inventory as core uncover indicated by any of the following for ≥ 30 minutes:
 - Containment High Range Radiation Monitor reading > 10 R/hr
 - Erratic source range monitor indication
 - UNPLANNEDunexplained level rise in Reactor Building Sump, Reactor Drain Tank, Quench Tank, Auxiliary Building Equipment Drain Tank, or Auxiliary Building Sump

AND

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

Deviations:

None.

NEI 99-01 Revision 5 EAL Deviation-Differences Document

NEI 99-01: E-HU1

Damage to a loaded cask CONFINEMENT BOUNDARY

Operating Mode Applicability: Not applicable

Example Emergency Action Level:

1. Damage to a loaded cask CONFINEMENT BOUNDARY.

ANO: E-HU1

[Note: Security Events are bounded by the Hazards EALs.](#)

Damage to a loaded cask CONFINEMENT BOUNDARY

Operating Mode Applicability: All

Emergency Action Level(s):

1. Damage to a loaded cask CONFINEMENT BOUNDARY.

Deviations:

None.

Differences:

An operating mode applicability of “all” is used vice the NEI designation of “N/A.” The net effect is that this event is applicable regardless of operating mode and therefore, the same as the NEI intent. In addition, a clarifying Note is added to remind users that security related events are bounded by the Hazards EALs.

NEI 99-01: HA3

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.

Operating Mode Applicability: All

Example Emergency Action Levels:

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.

ANO: 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.

Operating Mode Applicability: [As stated in below tables.](#)**All**

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.

[Unit 1](#)

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

[Unit 2](#)

<u>VITAL AREA</u>	<u>APPLICABLE MODES</u>
<u>Auxiliary Building 317' Emergency Core Cooling Rooms</u>	<u>3.4</u>
<u>Auxiliary Building 317' Tendon Gallery Access</u>	<u>3.4</u>
<u>Auxiliary Building 335' Charging Pumps / 2B-52</u>	<u>3.4</u>
<u>Auxiliary Building 354' 2B-62 Area</u>	<u>3.4</u>
<u>Emergency Diesel Generator Corridor</u>	<u>3.4</u>
<u>Lower South Piping Penetration Room</u>	<u>3.4</u>
<u>Auxiliary Building 386' Containment Hatch</u>	<u>3.4</u>
<u>Control Room</u>	<u>ALL</u>

Deviations:

None.

Differences:

NEI 99-01 **HA3** is renumbered to ANO **HA5** for formatting purposes based on site preference for order of ICs alone.

ANO: HA6

Natural or destructive phenomena affecting VITAL AREAS

Operating Mode Applicability: All

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 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
Ultimate Heat Sink	Control Room
BWST / RWT	Startup Transformers
Auxiliary Building	Diesel Fuel Vault
QCST	

ANO: HA6 (Cont'd)

Emergency Action Level(s) (Cont'd)

OR

4. Turbine failure-generated PROJECTILES resulting in VISIBLE DAMAGE to or penetration of any of the structures/equipment in Table H2 containing safety systems or components or Control Room indication of degraded performance of those safety systems.

Table H2	
Reactor Building Intake Structure Ultimate Heat Sink BWST/RWT Auxiliary Building	Turbine Building QCST Control Room Startup Transformers Diesel Fuel Vault

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 in Table H2 containing safety systems or components or Control Room indication of degraded performance of those safety systems.

Table H2	
Reactor Building Intake Structure Ultimate Heat Sink BWST/RWT Auxiliary Building	Turbine Building QCST Control Room Startup Transformers Diesel Fuel Vault

Deviations:

None.

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AS1

Initiating Condition -- SITE AREA EMERGENCY

Offsite dose resulting from an actual or IMMEDIATE release of gaseous radioactivity ~~> greater than~~ 100 mRrem TEDE or 500 mRrem 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 ~~or 4~~)

Note: The ~~SM/TSC Director/EOF Director~~ Emergency Director 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 declaration should be based on EAL #2 dose assessment instead of ~~EAL #1 radiation monitor values~~. Do not delay declaration awaiting dose assessment results.

1. VALID reading on Channel 9 on any ANY of the following radiation monitors ~~> greater than~~ the reading shown for ≥ 15 minutes ~~or longer~~:

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

<u>MONITORS – UNIT 1</u>		<u>LIMIT</u>
<u>RX-9820</u>	<u>Containment Purge</u>	<u>5.90E+1 μCi/cc</u>
<u>RX-9825</u>	<u>Radwaste Area</u>	<u>5.36E+1 μCi/cc</u>
<u>RX-9830</u>	<u>Fuel Handling Area</u>	<u>4.54E+1 μCi/cc</u>
<u>RX-9835</u>	<u>Emergency Penetration Room</u>	<u>9.56E+2 μCi/cc</u>
<u>MONITORS – UNIT 2</u>		<u>LIMIT</u>
<u>2RX-9820</u>	<u>Containment Purge</u>	<u>4.46E+1 μCi/cc</u>
<u>2RX-9825</u>	<u>Radwaste Area</u>	<u>3.32E+1 μCi/cc</u>
<u>2RX-9830</u>	<u>Fuel Handling Area</u>	<u>4.46E+1 μCi/cc</u>
<u>2RX-9835</u>	<u>Emergency Penetration Room</u>	<u>8.84E+2 μCi/cc</u>
<u>2RX-9840</u>	<u>Post Accident Sampling Building</u>	<u>4.42E+2 μCi/cc</u>
<u>2RX-9845</u>	<u>Aux. Building Extension</u>	<u>1.26E+2 μCi/cc</u>

OR

2. Dose assessment using actual meteorology indicates doses ~~> greater than~~ 100 mRrem TEDE or 500 mRrem child thyroid CDE at or beyond the site boundary.
3. ~~VALID perimeter radiation monitoring system reading greater than 100 mR/hr for 15 minutes or longer. [for sites having telemetered perimeter monitors]~~

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AG1

Initiating Condition -- GENERAL EMERGENCY

Offsite dose resulting from an actual or IMMEDIATE release of gaseous radioactivity > greater than 1000 mRrem TEDE or 5000 mRrem child t 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 ~~or 4~~)

Note: The SM/TSC Director/EOF Director Emergency Director 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 declaration should be based on EAL #2 dose assessment instead of EAL #1 radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on Channel 9 on any ANY of the following radiation monitors > greater than the reading shown for ≥ 15 minutes ~~or longer~~:

(site specific monitor list and threshold values)

<u>MONITORS – UNIT 1</u>		<u>LIMIT</u>
<u>RX-9820</u>	<u>Containment Purge</u>	<u>5.90E+2 (μCi/cc)</u>
<u>RX-9825</u>	<u>Radwaste Area</u>	<u>5.36E+2 (μCi/cc)</u>
<u>RX-9830</u>	<u>Fuel Handling Area</u>	<u>4.54E+2 (μCi/cc)</u>
<u>RX-9835</u>	<u>Emergency Penetration Room</u>	<u>9.56E+3 (μCi/cc)</u>
<u>MONITORS – UNIT 2</u>		<u>LIMIT</u>
<u>2RX-9820</u>	<u>Containment Purge</u>	<u>4.46E+2 (μCi/cc)</u>
<u>2RX-9825</u>	<u>Radwaste Area</u>	<u>3.32E+2 (μCi/cc)</u>
<u>2RX-9830</u>	<u>Fuel Handling Area</u>	<u>4.46E+2 (μCi/cc)</u>
<u>2RX-9835</u>	<u>Emergency Penetration Room</u>	<u>8.84E+3 (μCi/cc)</u>
<u>2RX-9840</u>	<u>Post Accident Sampling Building</u>	<u>4.42E+3 (μCi/cc)</u>
<u>2RX-9845</u>	<u>Aux. Building Extension</u>	<u>1.26E+3 (μCi/cc)</u>

OR

2. Dose assessment using actual meteorology indicates doses > greater than 1000 mRrem TEDE or 5000 mRrem child thyroid CDE at or beyond the site boundary.
3. ~~VALID perimeter radiation monitoring system reading greater than 1000 mR/hr for 15 minutes or longer. [for sites having telemetered perimeter monitors]~~

OR

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CG1

Initiating Condition - GENERAL EMERGENCY

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

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

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

Note: The SM/TSC Director/EOF Director~~Emergency Director~~ 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 RCS/~~RPV level less than (site-specific level for TOAF)~~ for \geq 30 minutes or longer.

AND

- b. Any of the following containment challenge indications:~~ANY containment challenge indication (see Table):~~

- CONTAINMENT CLOSURE not established
- Explosive mixture inside containment
- UNPLANNED rise in containment pressure

OR

2. a. RCS/reactor vessel~~RPV~~ level cannot be monitored for \geq 30 minutes with a loss of RCS / reactor vessel inventory as with core uncover indicated by any ANY of the following for 30 minutes:

- Containment High Range Radiation Monitor reading $>$ 10R/hr (~~Site-specific radiation monitor) reading greater than (site specific setpoint).~~
- Erratic source range monitor indication
- UNexplained~~PLANNED~~ level rise in Reactor Building Sump, Reactor Drain Tank, Quench Tank, Aux. Building Equipment Drain Tank, or Aux. Building Sump (~~site specific sump or tank).~~
[Other site specific indications]

AND

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 Not applicable

Example Emergency Action Level(s):

1. Damage to a loaded cask CONFINEMENT BOUNDARY.

Basis:

An NUEA-NOUE 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.

~~[The results of the ISFSI Safety Analysis Report (SAR) per NUREG 1536 or SAR referenced in the cask(s) Certificate of Compliance and the related NRC Safety Evaluation Report identify natural phenomena events and accident conditions that could potentially effect the CONFINEMENT BOUNDARY]~~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 BARRIERS
PWR TABLE 5-F-3

CONTAINMENT

1A. RUPTURED steam generatorSG is also FAULTED outside of containment

OR

2B. a. Primary-to-sSecondary leakrate >greater than 10 gpm

AND

b. UNISOLABLE steam release from affected steam generatorSG to the environment

Potential Loss: None~~Not Applicable~~

Basis:

This loss EAL~~threshold~~ recognizes that SG tube leakage can represent a bypass of the c~~o~~ntainment barrier as well as a loss of the RCS barrier.

~~Users should realize that the two loss thresholds could be considered redundant. This was recognized during the development process. The inclusion of an threshold that uses Emergency Procedure commonly used terms like "RUPTURED and FAULTED" adds to the ease of the classification process and has been included based on this human factor concern.~~

This EAL ~~threshold~~ results in a NUE-NOUE 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 ~~the normal charging capacity~~ EAL ~~threshold~~ in RCS leak rate barrier Potential Loss ~~threshold~~, or (2) do not result in ECCS actuation in RCS SG tube rupture barrier Loss ~~threshold~~. For larger breaks, RCS barrier threshold criteria would result in an Alert. For SG tube ruptures which may involve multiple steam generators or UNISOLABLE~~unisolable~~ secondary line breaks, this condition ~~threshold~~ would exist in conjunction with RCS barrier condition~~thresholds~~ 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.Threshold A

This EAL~~threshold~~ 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~~threshold~~, this would always result in the declaration of a Site Area Emergency.

Loss 2.Threshold B

This EAL~~threshold~~ 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

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA64

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

~~(site specific area list)~~

- Intake Structure
- Auxiliary Building
- Turbine Building

OR

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

~~(site specific structure list)~~

<u>Control Room</u>	<u>Turbine Building</u>
<u>Startup Transformers</u>	<u>Auxiliary Building</u>

OR

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

OR

65. Vehicle crash resulting in VISIBLE DAMAGE to anyANY of the ~~following~~ structures/equipment containing safety systems or components orOR Control Room indication of degraded performance of those safety systems:

~~(site specific structure list)~~

<u>Table H2</u>	
<u>Reactor Building</u>	<u>Turbine Building</u>
<u>Intake Structure</u>	<u>QCST</u>
<u>Ultimate Heat Sink</u>	<u>Control Room</u>
<u>BWST/RWT</u>	<u>Startup Transformers</u>
<u>Auxiliary Building</u>	<u>Diesel Fuel Vault</u>

- ~~6. (Site specific occurrences) resulting in VISIBLE DAMAGE to ANY of the following structures containing safety systems or components OR control room indication of degraded performance of those safety systems:~~

~~(site specific structure list)~~

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA53

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

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

Unit 2

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

Operating Mode Applicability: All 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.

SYSTEM MALFUNCTION

SG1

Initiating Condition - GENERAL EMERGENCY

Prolonged loss of all ~~o~~ffsite and all ~~o~~ns-Site AC power to Vital 4.16 KVemergency 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(site-specific emergency busses).~~

AND

- b. ~~Either~~**EITHER** of the following:

- Restoration of at least one Vital 4.16 KVemergency bus in ~~< less than (site-specific 4 hours)~~ is not likely.

OR

- Continuing degradation of core cooling based on Fission Product Barrier monitoring as indicated by CETs > 700°F. ~~(Site-specific indication of continuing degradation of core cooling based on Fission Product Barrier monitoring.)~~

Basis:

Loss of all AC power to Vital 4.16 KVemergency busses compromises all plant safety systems requiring electric power including Shutdown CoolingRHR, ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all AC power to Vital 4.16 KVemergency busses will lead to loss of fuel clad, RCS, and containment, thus warranting declaration of a General Emergency.

~~[The (site-specific hours) to restore AC power can be based on a site blackout coping analysis performed in conformance with 10 CFR 50.63 and Regulatory Guide 1.155, "Station Blackout," as available. Appropriate allowance for off-site emergency response including evacuation of surrounding areas should be considered. Although this IC may be viewed as redundant to the Fission Product Barrier Degradation IC, its inclusion is necessary to better assure timely recognition and emergency response.]~~

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 KVemergency 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.

ANO EAL BASIS DOCUMENT

DEFINITIONS

The following definitions are taken from NEI 99-01 are applicable to the ANO emergency classification system:

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."

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.

BOMB:

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

CIVIL DISTURBANCE:

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

CONFINEMENT BOUNDARY:

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

CONTAINMENT CLOSURE:

The ~~site specific procedurally defined~~ actions ~~taken~~ 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.

ANO EAL BASIS DOCUMENT

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.

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)

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.

EXTORTION:

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

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.

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.

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.

ANO EAL BASIS DOCUMENT

HOSTAGE:

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

HOSTILE ACTION:

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

HOSTILE FORCE:

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

IMMINENT:

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 IMMEDIATE timeframes are specified, they shall apply.

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.

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.

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.

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.

ANO EAL BASIS DOCUMENT

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.

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.

PROJECTILE:

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

PROTECTED AREA:

An area encompassed by physical barriers (i.e., the security fence) and to which access is controlled.

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.

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.

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.

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%.

ANO EAL BASIS DOCUMENT

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.

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.

UNISOLABLE:

A breach or leak that cannot be promptly isolated.

UNPLANNED:

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

VALID:

An indication, report, or condition, is considered to be VALID when it is verified by (1) an instrument channel check, (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.

VISIBLE DAMAGE:

Damage to equipment or structure that is readily observable without measurements, 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.

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.

ANO EAL BASIS DOCUMENT

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.

ANO EAL BASIS DOCUMENT

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.

ANO EAL BASIS DOCUMENT

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.

ANO EAL BASIS DOCUMENT

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.

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AS1

Initiating Condition -- SITE AREA EMERGENCY

Offsite dose resulting from an actual or IMMINENT 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 / TSC Director / EOF Director 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 Channel 9 on any of the following radiation monitors > the reading shown for ≥ 15 minutes:

MONITORS – UNIT 1		LIMIT
RX-9820	Containment Purge	5.90E+1 µCi/cc
RX-9825	Radwaste Area	5.36E+1 µCi/cc
RX-9830	Fuel Handling Area	4.54E+1 µCi/cc
RX-9835	Emergency Penetration Room	9.56E+2 µCi/cc
MONITORS – UNIT 2		LIMIT
2RX-9820	Containment Purge	4.46E+1 µCi/cc
2RX-9825	Radwaste Area	3.32E+1 µCi/cc
2RX-9830	Fuel Handling Area	4.46E+1 µCi/cc
2RX-9835	Emergency Penetration Room	8.84E+2 µCi/cc
2RX-9840	Post Accident Sampling Building	4.42E+2 µCi/cc
2RX-9845	Aux. Building Extension	1.26E+2 µCi/cc
2RX-9850	Low Level Radwaste Storage Bldg.	1.77E+2 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.

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AG1

Initiating Condition -- GENERAL EMERGENCY

Offsite dose resulting from an actual or IMMINENT 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 / TSC Director / EOF Director 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 Channel 9 on any of the following radiation monitors > the reading shown for ≥ 15 minutes:

MONITORS – UNIT 1		LIMIT
RX-9820	Containment Purge	5.90E+2 (μCi/cc)
RX-9825	Radwaste Area	5.36E+2 (μCi/cc)
RX-9830	Fuel Handling Area	4.54E+2 (μCi/cc)
RX-9835	Emergency Penetration Room	9.56E+3 (μCi/cc)
MONITORS – UNIT 2		LIMIT
2RX-9820	Containment Purge	4.46E+2 (μCi/cc)
2RX-9825	Radwaste Area	3.32E+2 (μCi/cc)
2RX-9830	Fuel Handling Area	4.46E+2 (μCi/cc)
2RX-9835	Emergency Penetration Room	8.84E+3 (μCi/cc)
2RX-9840	Post Accident Sampling Building	4.42E+3 (μCi/cc)
2RX-9845	Aux. Building Extension	1.26E+3 (μCi/cc)
2RX-9850	Low Level Radwaste Storage Building	1.77E+3 (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

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 / TSC Director / EOF Director 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 ≥ 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 ~~with core uncover~~for ≥ 30 minutes with a loss of RCS / reactor vessel inventory as indicated by any of the following ~~for ≥ 30 minutes:~~
 - Containment High Range Radiation Monitor reading > 10 R/hr
 - Erratic source range monitor indication
 - ~~UNPLANNED~~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

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 BARRIERS

CONTAINMENT

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.

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

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

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

Unit 2

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

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.

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 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
Ultimate Heat Sink	Control Room
BWST / RWT	Startup Transformers
Auxiliary Building	Diesel Fuel Vault
QCST	

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA6

OR

4. Turbine failure-generated PROJECTILES resulting in VISIBLE DAMAGE to or penetration of any of the structures/equipment in ~~Table H-2~~ containing safety systems or components or Control Room indication of degraded performance of those safety systems:

Table H2	
Reactor Building	Turbine Building
Intake Structure	QCST
Ultimate Heat Sink	Control Room
BWST/RWT	Startup Transformers
Auxiliary Building	Diesel Fuel Vault

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 in ~~Table H-2~~ containing safety systems or components or Control Room indication of degraded performance of those safety systems:

Table H2	
Reactor Building	Turbine Building
Intake Structure	QCST
Ultimate Heat Sink	Control Room
BWST/RWT	Startup Transformers
Auxiliary Building	Diesel Fuel Vault

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.

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 > 1.3×10^5 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

SYSTEM MALFUNCTION

SG1

Initiating Condition - GENERAL EMERGENCY

Prolonged loss of all offsite and all onsite AC power to [Vital 4.16 KV_{safety}](#) 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_{safety}](#) busses.

AND

b. Either of the following:

- Restoration of at least one [Vital 4.16 KV_{safety}](#) bus in < 4 hours is not likely.

OR

- Continuing degradation of core cooling based on Fission Product Barrier monitoring as indicated by CETs ≥ 700 °F.

Basis:

Loss of all AC power to [Vital 4.16 KV_{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 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_{emergency}](#) 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.

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT																																																																																																																																																												
ABNORMAL RADIOLOGICAL EFFLUENTS																																																																																																																																																															
<p>AG1 1 2 3 4 5 6 D</p> <p>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</p> <p>Emergency Action Level(s):</p> <p>NOTE:</p> <p><i>The SM / TSC Director / EOF Director 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 Channel 9 on any of the following radiation monitors > the reading shown for ≥ 15 minutes:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <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>5.90E+2 µCi/cc</td></tr> <tr><td>RX-9825</td><td>Radwaste Area</td><td>5.36E+2 µCi/cc</td></tr> <tr><td>RX-9830</td><td>Fuel Handling Area</td><td>4.54E+2 µCi/cc</td></tr> <tr><td>RX-9835</td><td>Emerg. Penetration Room</td><td>9.56E+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>4.46E+2 µCi/cc</td></tr> <tr><td>2RX-9825</td><td>Radwaste Area</td><td>3.32E+2 µCi/cc</td></tr> <tr><td>2RX-9830</td><td>Fuel Handling Area</td><td>4.46E+2 µCi/cc</td></tr> <tr><td>2RX-9835</td><td>Emerg. Penetration Room</td><td>8.84E+3 µCi/cc</td></tr> <tr><td>2RX-9840</td><td>PASS Building</td><td>4.42E+3 µCi/cc</td></tr> <tr><td>2RX-9845</td><td>Aux. Building Extension</td><td>1.26E+3 µCi/cc</td></tr> <tr><td>2RX-9850</td><td>LLRW Storage Building</td><td>1.77E+3 µCi/cc</td></tr> </tbody> </table>	MONITORS – Unit 1		LIMIT	RX-9820	Containment Purge	5.90E+2 µCi/cc	RX-9825	Radwaste Area	5.36E+2 µCi/cc	RX-9830	Fuel Handling Area	4.54E+2 µCi/cc	RX-9835	Emerg. Penetration Room	9.56E+3 µCi/cc	MONITORS – Unit 2		LIMIT	2RX-9820	Containment Purge	4.46E+2 µCi/cc	2RX-9825	Radwaste Area	3.32E+2 µCi/cc	2RX-9830	Fuel Handling Area	4.46E+2 µCi/cc	2RX-9835	Emerg. Penetration Room	8.84E+3 µCi/cc	2RX-9840	PASS Building	4.42E+3 µCi/cc	2RX-9845	Aux. Building Extension	1.26E+3 µCi/cc	2RX-9850	LLRW Storage Building	1.77E+3 µCi/cc	<p>AS1 1 2 3 4 5 6 D</p> <p>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</p> <p>Emergency Action Level(s):</p> <p>NOTE:</p> <p><i>The SM / TSC Director / EOF Director 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 Channel 9 on any of the following radiation monitors > the reading shown for ≥ 15 minutes:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <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>5.90E+1 µCi/cc</td></tr> <tr><td>RX-9825</td><td>Radwaste Area</td><td>5.36E+1 µCi/cc</td></tr> <tr><td>RX-9830</td><td>Fuel Handling Area</td><td>4.54E+1 µCi/cc</td></tr> <tr><td>RX-9835</td><td>Emerg. Penetration Room</td><td>9.56E+2 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>4.46E+1 µCi/cc</td></tr> <tr><td>2RX-9825</td><td>Radwaste Area</td><td>3.32E+1 µCi/cc</td></tr> <tr><td>2RX-9830</td><td>Fuel Handling Area</td><td>4.46E+1 µCi/cc</td></tr> <tr><td>2RX-9835</td><td>Emerg. Penetration Room</td><td>8.84E+2 µCi/cc</td></tr> <tr><td>2RX-9840</td><td>PASS Building</td><td>4.42E+2 µCi/cc</td></tr> <tr><td>2RX-9845</td><td>Aux. Building Extension</td><td>1.26E+2 µCi/cc</td></tr> <tr><td>2RX-9850</td><td>LLRW Storage Building</td><td>1.77E+2 µCi/cc</td></tr> </tbody> </table>	MONITORS – Unit 1		LIMIT	RX-9820	Containment Purge	5.90E+1 µCi/cc	RX-9825	Radwaste Area	5.36E+1 µCi/cc	RX-9830	Fuel Handling Area	4.54E+1 µCi/cc	RX-9835	Emerg. Penetration Room	9.56E+2 µCi/cc	MONITORS – Unit 2		LIMIT	2RX-9820	Containment Purge	4.46E+1 µCi/cc	2RX-9825	Radwaste Area	3.32E+1 µCi/cc	2RX-9830	Fuel Handling Area	4.46E+1 µCi/cc	2RX-9835	Emerg. Penetration Room	8.84E+2 µCi/cc	2RX-9840	PASS Building	4.42E+2 µCi/cc	2RX-9845	Aux. Building Extension	1.26E+2 µCi/cc	2RX-9850	LLRW Storage Building	1.77E+2 µCi/cc	<p>AA1 1 2 3 4 5 6 D</p> <p>Any release of gaseous or liquid radioactivity to the environment > 200 times the ODCM limits for ≥ 15 minutes</p> <p>Emergency Action Level(s):</p> <p>NOTE:</p> <p><i>The SM / TSC Director / EOF Director 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.</i></p> <p>1. VALID reading on Channel 7 on any of the following radiation monitors > the reading shown for ≥ 15 minutes:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <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>5.90E0 µCi/cc</td></tr> <tr><td>RX-9825</td><td>Radwaste Area</td><td>5.36E0 µCi/cc</td></tr> <tr><td>RX-9830</td><td>Fuel Handling Area</td><td>4.54E0 µCi/cc</td></tr> <tr><td>RX-9835</td><td>Emerg. Penetration Room</td><td>9.56E+1 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>4.46E0 µCi/cc</td></tr> <tr><td>2RX-9825</td><td>Radwaste Area</td><td>3.32E0 µCi/cc</td></tr> <tr><td>2RX-9830</td><td>Fuel Handling Area</td><td>4.46E0 µCi/cc</td></tr> <tr><td>2RX-9835</td><td>Emerg. Penetration Room</td><td>8.84E+1 µCi/cc</td></tr> <tr><td>2RX-9840</td><td>PASS Building</td><td>4.42E+1 µCi/cc</td></tr> <tr><td>2RX-9845</td><td>Aux. Building Extension</td><td>1.26E+1 µCi/cc</td></tr> <tr><td>2RX-9850</td><td>LLRW Storage Building</td><td>1.77E+1 µCi/cc</td></tr> </tbody> </table> <p style="text-align: center;">OR</p>	MONITORS – Unit 1		LIMIT	RX-9820	Containment Purge	5.90E0 µCi/cc	RX-9825	Radwaste Area	5.36E0 µCi/cc	RX-9830	Fuel Handling Area	4.54E0 µCi/cc	RX-9835	Emerg. Penetration Room	9.56E+1 µCi/cc	MONITORS – Unit 2		LIMIT	2RX-9820	Containment Purge	4.46E0 µCi/cc	2RX-9825	Radwaste Area	3.32E0 µCi/cc	2RX-9830	Fuel Handling Area	4.46E0 µCi/cc	2RX-9835	Emerg. Penetration Room	8.84E+1 µCi/cc	2RX-9840	PASS Building	4.42E+1 µCi/cc	2RX-9845	Aux. Building Extension	1.26E+1 µCi/cc	2RX-9850	LLRW Storage Building	1.77E+1 µCi/cc	<p>AU1 1 2 3 4 5 6 D</p> <p>Any release of gaseous or liquid radioactivity to the environment > 2 times the ODCM limits for ≥ 60 minutes</p> <p>Emergency Action Level(s):</p> <p>NOTE:</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 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.</i></p> <p>1. VALID reading on Channel 7 on any of the following radiation monitors > the reading shown for ≥ 60 minutes:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <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>5.90E-2 µCi/cc</td></tr> <tr><td>RX-9825</td><td>Radwaste Area</td><td>5.36E-2 µCi/cc</td></tr> <tr><td>RX-9830</td><td>Fuel Handling Area</td><td>4.54E-2 µCi/cc</td></tr> <tr><td>RX-9835</td><td>Emerg. Penetration Room</td><td>9.56E-1 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>4.46E-2 µCi/cc</td></tr> <tr><td>2RX-9825</td><td>Radwaste Area</td><td>3.32E-2 µCi/cc</td></tr> <tr><td>2RX-9830</td><td>Fuel Handling Area</td><td>4.46E-2 µCi/cc</td></tr> <tr><td>2RX-9835</td><td>Emerg. Penetration Room</td><td>8.84E-1 µCi/cc</td></tr> <tr><td>2RX-9840</td><td>PASS Building</td><td>4.42E-1 µCi/cc</td></tr> <tr><td>2RX-9845</td><td>Aux. Building Extension</td><td>1.26E-1 µCi/cc</td></tr> <tr><td>2RX-9850</td><td>LLRW Storage Building</td><td>1.77E-1 µCi/cc</td></tr> </tbody> </table> <p style="text-align: center;">OR</p>	MONITORS – Unit 1		LIMIT	RX-9820	Containment Purge	5.90E-2 µCi/cc	RX-9825	Radwaste Area	5.36E-2 µCi/cc	RX-9830	Fuel Handling Area	4.54E-2 µCi/cc	RX-9835	Emerg. Penetration Room	9.56E-1 µCi/cc	MONITORS – Unit 2		LIMIT	2RX-9820	Containment Purge	4.46E-2 µCi/cc	2RX-9825	Radwaste Area	3.32E-2 µCi/cc	2RX-9830	Fuel Handling Area	4.46E-2 µCi/cc	2RX-9835	Emerg. Penetration Room	8.84E-1 µCi/cc	2RX-9840	PASS Building	4.42E-1 µCi/cc	2RX-9845	Aux. Building Extension	1.26E-1 µCi/cc	2RX-9850	LLRW Storage Building	1.77E-1 µCi/cc
MONITORS – Unit 1		LIMIT																																																																																																																																																													
RX-9820	Containment Purge	5.90E+2 µCi/cc																																																																																																																																																													
RX-9825	Radwaste Area	5.36E+2 µCi/cc																																																																																																																																																													
RX-9830	Fuel Handling Area	4.54E+2 µCi/cc																																																																																																																																																													
RX-9835	Emerg. Penetration Room	9.56E+3 µCi/cc																																																																																																																																																													
MONITORS – Unit 2		LIMIT																																																																																																																																																													
2RX-9820	Containment Purge	4.46E+2 µCi/cc																																																																																																																																																													
2RX-9825	Radwaste Area	3.32E+2 µCi/cc																																																																																																																																																													
2RX-9830	Fuel Handling Area	4.46E+2 µCi/cc																																																																																																																																																													
2RX-9835	Emerg. Penetration Room	8.84E+3 µCi/cc																																																																																																																																																													
2RX-9840	PASS Building	4.42E+3 µCi/cc																																																																																																																																																													
2RX-9845	Aux. Building Extension	1.26E+3 µCi/cc																																																																																																																																																													
2RX-9850	LLRW Storage Building	1.77E+3 µCi/cc																																																																																																																																																													
MONITORS – Unit 1		LIMIT																																																																																																																																																													
RX-9820	Containment Purge	5.90E+1 µCi/cc																																																																																																																																																													
RX-9825	Radwaste Area	5.36E+1 µCi/cc																																																																																																																																																													
RX-9830	Fuel Handling Area	4.54E+1 µCi/cc																																																																																																																																																													
RX-9835	Emerg. Penetration Room	9.56E+2 µCi/cc																																																																																																																																																													
MONITORS – Unit 2		LIMIT																																																																																																																																																													
2RX-9820	Containment Purge	4.46E+1 µCi/cc																																																																																																																																																													
2RX-9825	Radwaste Area	3.32E+1 µCi/cc																																																																																																																																																													
2RX-9830	Fuel Handling Area	4.46E+1 µCi/cc																																																																																																																																																													
2RX-9835	Emerg. Penetration Room	8.84E+2 µCi/cc																																																																																																																																																													
2RX-9840	PASS Building	4.42E+2 µCi/cc																																																																																																																																																													
2RX-9845	Aux. Building Extension	1.26E+2 µCi/cc																																																																																																																																																													
2RX-9850	LLRW Storage Building	1.77E+2 µCi/cc																																																																																																																																																													
MONITORS – Unit 1		LIMIT																																																																																																																																																													
RX-9820	Containment Purge	5.90E0 µCi/cc																																																																																																																																																													
RX-9825	Radwaste Area	5.36E0 µCi/cc																																																																																																																																																													
RX-9830	Fuel Handling Area	4.54E0 µCi/cc																																																																																																																																																													
RX-9835	Emerg. Penetration Room	9.56E+1 µCi/cc																																																																																																																																																													
MONITORS – Unit 2		LIMIT																																																																																																																																																													
2RX-9820	Containment Purge	4.46E0 µCi/cc																																																																																																																																																													
2RX-9825	Radwaste Area	3.32E0 µCi/cc																																																																																																																																																													
2RX-9830	Fuel Handling Area	4.46E0 µCi/cc																																																																																																																																																													
2RX-9835	Emerg. Penetration Room	8.84E+1 µCi/cc																																																																																																																																																													
2RX-9840	PASS Building	4.42E+1 µCi/cc																																																																																																																																																													
2RX-9845	Aux. Building Extension	1.26E+1 µCi/cc																																																																																																																																																													
2RX-9850	LLRW Storage Building	1.77E+1 µCi/cc																																																																																																																																																													
MONITORS – Unit 1		LIMIT																																																																																																																																																													
RX-9820	Containment Purge	5.90E-2 µCi/cc																																																																																																																																																													
RX-9825	Radwaste Area	5.36E-2 µCi/cc																																																																																																																																																													
RX-9830	Fuel Handling Area	4.54E-2 µCi/cc																																																																																																																																																													
RX-9835	Emerg. Penetration Room	9.56E-1 µCi/cc																																																																																																																																																													
MONITORS – Unit 2		LIMIT																																																																																																																																																													
2RX-9820	Containment Purge	4.46E-2 µCi/cc																																																																																																																																																													
2RX-9825	Radwaste Area	3.32E-2 µCi/cc																																																																																																																																																													
2RX-9830	Fuel Handling Area	4.46E-2 µCi/cc																																																																																																																																																													
2RX-9835	Emerg. Penetration Room	8.84E-1 µCi/cc																																																																																																																																																													
2RX-9840	PASS Building	4.42E-1 µCi/cc																																																																																																																																																													
2RX-9845	Aux. Building Extension	1.26E-1 µCi/cc																																																																																																																																																													
2RX-9850	LLRW Storage Building	1.77E-1 µCi/cc																																																																																																																																																													

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
COLD SHUTDOWN / REFUELING SYSTEM MALFUNCTION – Loss of RCS / Reactor Vessel Inventory			
<p>CG1 <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/>5<input type="checkbox"/>6</p> <p>Loss of RCS / reactor vessel inventory affecting fuel clad integrity with containment challenged</p> <p><u>Emergency Action Level(s):</u></p> <p>NOTE: <i>The SM / TSC Director / EOF Director 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 > 30 minutes.</p> <p>AND</p> <p>b. Any of the following containment challenge indications:</p> <ul style="list-style-type: none"> • CONTAINMENT CLOSURE not established • Explosive mixture inside containment • UNPLANNED rise in containment pressure <p>OR</p> <p>2. a. RCS / reactor vessel level cannot be monitored <u>for ≥ 30 minutes with core uncover with a loss of RCS / reactor vessel inventory as indicated by any of the following for ≥ 30 minutes:</u></p>	<p>CS1 <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/>5<input type="checkbox"/>6</p> <p>Loss of RCS / reactor vessel inventory affecting core decay heat removal capability</p> <p><u>Emergency Action Level(s):</u></p> <p>NOTE: <i>The SM / TSC Director / EOF Director 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 not established:</p> <p>Loss of RCS / reactor vessel level as indicated by:</p> <p>Unit 1: RVLMS Levels 1 through 9 indicate DRY</p> <p>Unit 2: RVLMS Levels 1 through 6 indicate DRY</p> <p>OR</p> <p>2. With CONTAINMENT CLOSURE established, core exit thermocouples indicate superheat.</p> <p>OR</p>	<p>CA1 <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/>5<input type="checkbox"/>6</p> <p>Loss of RCS / reactor vessel inventory</p> <p><u>Emergency Action Level(s):</u></p> <p>NOTE: <i>The SM / TSC Director / EOF Director 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>Unit 1: RVLMS Levels 1 through 8 indicate DRY</p> <p>Unit 2: RVLMS Levels 1 through 5 indicate DRY</p> <p>OR</p> <p>Unit 1: Reactor vessel level < 368 ft., 0 in. (bottom of the hot leg)</p> <p>Unit 2: Reactor vessel level < 369 ft., 1.5 in. (bottom of the hot leg)</p> <p>OR</p>	<p>CU1 <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/>5</p> <p>RCS leakage</p> <p><u>Emergency Action Level(s):</u></p> <p>NOTE: <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 ≥ 15 minutes.</p> <p>CU2 <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/>6</p> <p>UNPLANNED loss of RCS / reactor vessel Inventory</p> <p><u>Emergency Action Level(s):</u></p> <p>NOTE: <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>

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

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
FISSION PRODUCT BARRIER MALFUNCTION – Barriers			
<p>FG1 1 2 3 4</p> <p>Loss of ANY two barriers AND loss or potential loss of third barrier</p>	<p>FS1 1 2 3 4</p> <p>Loss or potential loss of ANY two barriers</p>	<p>FA1 1 2 3 4</p> <p>ANY loss or ANY potential loss of EITHER fuel clad or RCS</p>	<p>FU1 1 2 3 4</p> <p>ANY loss or ANY potential loss of containment</p>

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 IMMEDIATE. In this IMMEDIATE 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
2. Core Exit Thermocouple Readings (FCB2)		2. SG Tube Rupture (RCB2)		2. Core Exit Thermocouple Readings (CNB2)	
> 1200 °F CET temperature	<p>Unit 1: ICC exists as evidenced by CETs indicating superheated conditions</p> <p>Unit 2: Average CETs indicate superheat for current RCS pressure</p>	SGTR that results in an ECCS (SI) actuation	None	None	<p>1. a. CETs indicate > 1200 °F AND</p> <p>b. Restoration procedures not effective within 15 minutes OR</p> <p>2. a. CETs indicate > 700 °F AND</p> <p>b. RVLMS indicates Unit 1: Levels 1 through 9 DRY Unit 2: Levels 1 through 7 DRY AND</p> <p>c. Restoration procedures not effective within 15 minutes</p>
3. Reactor Vessel Water Level (FCB3)		3. Containment Radiation Monitoring (RCB3)		3. SG Secondary Side Release With Primary-to-Secondary Leakage (CNB3)	
None	<p>Unit 1: RVLMS Levels 1 through 9 indicate DRY</p> <p>Unit 2: RVLMS Levels 1 through 7 indicate DRY</p>	Containment high range radiation monitor reading > 100 R/hr	None	<p>1. RUPTURED steam generator is also FAULTED outside of containment OR</p> <p>2. a. Primary-to-secondary leakrate > 10 gpm AND b2. UNISOLABLE steam release from affected steam generator to the environment</p>	None

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT																	
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY																				
Toxic Gas																				
		<p>HA5 (continued)</p> <p><u>Emergency Action Level(s):</u></p> <p>NOTE:</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> <p style="text-align: center;">Unit 1</p> <table border="1" data-bbox="1060 1089 1484 1370"> <thead> <tr> <th data-bbox="1060 1089 1310 1154"><u>VITAL AREA</u></th> <th data-bbox="1310 1089 1484 1154"><u>APPLICABLE MODES</u></th> </tr> </thead> <tbody> <tr> <td data-bbox="1060 1154 1310 1195">A-4 Switchgear Room</td> <td data-bbox="1310 1154 1484 1195" style="text-align: center;">3, 4</td> </tr> <tr> <td data-bbox="1060 1195 1310 1263">Upper North Electrical Penetration Room</td> <td data-bbox="1310 1195 1484 1263" style="text-align: center;">3, 4</td> </tr> <tr> <td data-bbox="1060 1263 1310 1328">Lower South Electrical Equipment Room</td> <td data-bbox="1310 1263 1484 1328" style="text-align: center;">3, 4</td> </tr> <tr> <td data-bbox="1060 1328 1310 1370">Control Room</td> <td data-bbox="1310 1328 1484 1370" style="text-align: center;">ALL</td> </tr> </tbody> </table>	<u>VITAL AREA</u>	<u>APPLICABLE MODES</u>	A-4 Switchgear Room	3, 4	Upper North Electrical Penetration Room	3, 4	Lower South Electrical Equipment Room	3, 4	Control Room	ALL	<p>HU5</p> <table border="1" data-bbox="1772 412 1944 453"> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">4</td> <td style="text-align: center;">5</td> <td style="text-align: center;">6</td> <td style="text-align: center;">D</td> </tr> </table> <p>Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS</p> <p><u>Emergency Action Level(s):</u></p> <p>1. Toxic, corrosive, asphyxiant, or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS.</p> <p><u>OR</u></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
<u>VITAL AREA</u>	<u>APPLICABLE MODES</u>																			
A-4 Switchgear Room	3, 4																			
Upper North Electrical Penetration Room	3, 4																			
Lower South Electrical Equipment Room	3, 4																			
Control Room	ALL																			
1	2	3	4	5	6	D														

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT																			
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY																									
Table H1				Toxic Gas		Natural or Destructive Phenomena																			
Unit 1		Unit 2		<u>HA5 (continued)</u>		HU6 <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>		1	2	3	4	5	6	D											
1	2	3	4	5	6	D																			
CA-1 & HP Office Area Condensate Demineralizer Room Corridor 98 Fire Area C Lower North Electrical Penetration Room (LNEPR) Lower South Electrical Equipment Room (LSEER) / Air Compressor Room Lower South Electrical Penetration Room (LSEPR) Lower South Piping Penetration Room (LSPPR) Main Steam Isolation Violation (MSIV) Room North Engineered Safeguards (ES) SWGR Room (A4) South ES SWGR Room Turbine Building <ul style="list-style-type: none"> • A1, A2, H1, H2 SWGR area • 354' Bowling Alley north end west of Breathing Air compressor room • 368' West Heater Deck from LSEER (orange door) along east wall of ES SWGR Rooms to Corridor 98 door Upper North Electrical Penetration Room (UNEPR) / Hot Tool Room / Decon Room Upper South Electrical Penetration Room (USEPR) Upper South Piping Penetration Room (USPPR)		2A3 Room 2A4, 2D02, & East Battery Room 2B53 Room 2B63 Room 2B9/2B10 Room 2Y11/13 Equipment Room Auxiliary Building 317' General Access Auxiliary Building 335' Auxiliary Building 354' 'B' Engineered Safeguards Features (ESF) Room Corridor Behind Door 340 Turbine Building <ul style="list-style-type: none"> • 2A1, 2A2, 2H1, 2H2 Area • 354' West wall of Demineralizer area • 368' West Heater Deck north of north Switchgear (SWGR) Room (2A3) and East of LNEPR Intake Structure 354' or 366' LNEPR LSEPR Motor-Generator (MG) Set Room Steam Pipe Area Hot Machine Shop UNEPR, UNPPR, LNPPR, USPPR		<u>Unit 2</u> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>VITAL AREA</u></th> <th style="text-align: center;"><u>APPLICABLE MODES</u></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>		<u>VITAL AREA</u>	<u>APPLICABLE MODES</u>	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	Natural or destructive phenomena affecting the PROTECTED AREA Emergency Action Level(s): 1. Seismic event identified by any 2 of the following: <ul style="list-style-type: none"> • 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. 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 . OR	
<u>VITAL AREA</u>	<u>APPLICABLE MODES</u>																								
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																								

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT												
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY															
<table border="1" data-bbox="306 756 886 1015" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2" data-bbox="306 756 886 821" style="text-align: center;">Table H2</th> </tr> </thead> <tbody> <tr> <td data-bbox="306 821 598 862" style="text-align: center;">Reactor Building</td> <td data-bbox="598 821 886 862" style="text-align: center;">Turbine Building</td> </tr> <tr> <td data-bbox="306 862 598 902" style="text-align: center;">Intake Structure</td> <td data-bbox="598 862 886 902" style="text-align: center;">QCST</td> </tr> <tr> <td data-bbox="306 902 598 943" style="text-align: center;">Ultimate Heat Sink</td> <td data-bbox="598 902 886 943" style="text-align: center;">Control Room</td> </tr> <tr> <td data-bbox="306 943 598 984" style="text-align: center;">BWST/RWT</td> <td data-bbox="598 943 886 984" style="text-align: center;">Startup Transformers</td> </tr> <tr> <td data-bbox="306 984 598 1015" style="text-align: center;">Auxiliary Building</td> <td data-bbox="598 984 886 1015" style="text-align: center;">Diesel Fuel Vault</td> </tr> </tbody> </table>		Table H2		Reactor Building	Turbine Building	Intake Structure	QCST	Ultimate Heat Sink	Control Room	BWST/RWT	Startup Transformers	Auxiliary Building	Diesel Fuel Vault	Natural or Destructive Phenomena	
		Table H2													
Reactor Building	Turbine Building														
Intake Structure	QCST														
Ultimate Heat Sink	Control Room														
BWST/RWT	Startup Transformers														
Auxiliary Building	Diesel Fuel Vault														
		<p>HA6 <i>(continued)</i></p> <ul style="list-style-type: none"> • Reactor Building • Intake Structure • Ultimate Heat Sink • BWST/RWT • Auxiliary Building • Turbine Building • QCST • Control Room • Startup Transformers • Diesel Fuel Vault <p>OR</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"> • Intake Structure • Ultimate Heat Sink • BWST/RWT • Auxiliary Building • Turbine Building • QCST • Control Room • Startup Transformers • Diesel Fuel Vault 	<p>HU6 <i>(continued)</i></p> <p>5. Lake Dardanelle level < 335 feet.</p> <p style="text-align: center;">OR</p> <p>6. Lake Dardanelle level > 345 feet.</p>												

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT				
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY							
<table border="1" data-bbox="306 688 886 946" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2" data-bbox="306 688 886 753" style="text-align: center;">Table H2</th> </tr> </thead> <tbody> <tr> <td data-bbox="306 753 598 946" style="text-align: center;"> Reactor Building Intake Structure Ultimate Heat Sink BWST/RWT Auxiliary Building </td> <td data-bbox="598 753 886 946" style="text-align: center;"> Turbine Building QCST Control Room Startup Transformers Diesel Fuel Vault </td> </tr> </tbody> </table>		Table H2		Reactor Building Intake Structure Ultimate Heat Sink BWST/RWT Auxiliary Building	Turbine Building QCST Control Room Startup Transformers Diesel Fuel Vault	Natural or Destructive Phenomena	
		Table H2					
Reactor Building Intake Structure Ultimate Heat Sink BWST/RWT Auxiliary Building	Turbine Building QCST Control Room Startup Transformers Diesel Fuel Vault						
<p data-bbox="1058 412 1260 440">HA6 <i>(continued)</i></p> <p data-bbox="1094 459 1136 487"><u>OR</u></p> <p data-bbox="1058 506 1470 805">4. Turbine failure-generated PROJECTILES resulting in VISIBLE DAMAGE to or penetration of any of the structures/equipment in in Table H2 containing safety systems or components or Control Room indication of degraded performance of those safety systems.</p> <ul data-bbox="1104 829 1381 951" style="list-style-type: none"> • Auxiliary Building • Turbine Building • Control Room • Startup Transformers <p data-bbox="1094 971 1136 998"><u>OR</u></p> <p data-bbox="1058 1018 1455 1105">5. Lake Dardanelle level < 335 feet and Emergency Cooling Pond inoperable.</p> <p data-bbox="1094 1125 1136 1153"><u>OR</u></p> <p data-bbox="1058 1172 1474 1409">6. Vehicle crash resulting in VISIBLE DAMAGE to any of the structures/equipment in in Table H2 containing safety systems or components or Control Room indication of degraded performance of those safety systems.</p>							

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY			
	<ul style="list-style-type: none">• Reactor Building• Intake Structure• Ultimate Heat Sink• BWST/RWT• Auxiliary Building• Turbine Building• QCST• Startup Transformers• Diesel Fuel Vault		

Enclosure 3 to

0CAN081202

Revised (Clean) ANO EAL Basis Document

ANO EAL BASIS DOCUMENT

ANO EAL BASIS DOCUMENT

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
General Notes on Basis Document Use	4
Definitions	5
Overview	10
Abnormal Radiation Levels / Radiological Effluents	14
AU1	15
AU2	18
AA1	20
AA2	23
AA3	25
AS1	26
AG1	28
Cold Shutdown / Refueling System Malfunction	30
CU1	31
CU2	32
CU3	34
CU5	35
CU6	36
CU7	37
CU8	38
CA1	39
CA3	41
CA5	43
CS1	44
CG1	45
Independent Spent Fuel Storage Installation (ISFSI) Malfunction	48
E-HU1	49
Fission Product Barrier Degradation	50
General Bases	51
Fuel Clad Barrier EALs (FCB)	52
RCS Barrier EALs (RCB)	57
Containment Barrier EALS (CNB)	60

ANO EAL BASIS DOCUMENT

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
Hazards and Other Conditions Affecting Plant Safety	67
HU1	68
HU2	69
HU4	71
HU5	73
HU6	74
HA1.....	78
HA2.....	80
HA3.....	81
HA4.....	82
HA5.....	84
HA6.....	85
HS1.....	89
HS2.....	90
HS3.....	91
HG1	92
HG2	93
System Malfunction.....	94
SU1.....	95
SU6.....	96
SU7.....	98
SU8.....	99
SU9.....	100
SU10.....	102
SU11.....	103
SA1.....	104
SA3.....	105
SA6.....	106
SS1.....	108
SS3.....	109
SS4.....	110
SS6.....	111
SG1	113
SG3	115

ANO EAL BASIS DOCUMENT

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 ≥ 280 °F

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

Mode 5 = Cold Shutdown – $K_{eff} < .99$, RCS ≤ 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 ≥ 300 °F

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

Mode 3 = Hot Standby – $K_{eff} < .99$, Reactor Power 0, RCS ≥ 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 ≤ 200 °F

Mode 6 = Refueling – $K_{eff} \leq .95$, Reactor Power 0, RCS ≤ 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.

ANO EAL BASIS DOCUMENT

DEFINITIONS

The following definitions are taken from NEI 99-01 are applicable to the ANO emergency classification system:

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."

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.

BOMB:

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

CIVIL DISTURBANCE:

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

CONFINEMENT BOUNDARY:

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

CONTAINMENT CLOSURE:

The action 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.

ANO EAL BASIS DOCUMENT

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.

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)

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.

EXTORTION:

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

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.

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.

GENERAL EMERGENCY (GE):

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

ANO EAL BASIS DOCUMENT

HOSTAGE:

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

HOSTILE ACTION:

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

HOSTILE FORCE:

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

IMMINENT:

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 IMMEDIATE timeframes are specified, they shall apply.

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.

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.

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.

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.

ANO EAL BASIS DOCUMENT

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.

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.

PROJECTILE:

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

PROTECTED AREA:

An area encompassed by physical barriers (i.e., the security fence) and to which access is controlled.

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.

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.

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.

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%.

ANO EAL BASIS DOCUMENT

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.

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.

UNISOLABLE:

A breach or leak that cannot be promptly isolated.

UNPLANNED:

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

VALID:

An indication, report, or condition, is considered to be VALID when it is verified by (1) an instrument channel check, (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.

VISIBLE DAMAGE:

Damage to equipment or structure that is readily observable without measurements, 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.

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.

ANO EAL BASIS DOCUMENT

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.

ANO EAL BASIS DOCUMENT

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.

ANO EAL BASIS DOCUMENT

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.

ANO EAL BASIS DOCUMENT

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.

ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENTS

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

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 Channel 7 on any of the following radiation monitors > the reading shown for ≥ 60 minutes:

MONITORS – UNIT 1		LIMIT
RX-9820	Containment Purge	5.90E-2 µCi/cc
RX-9825	Radwaste Area	5.36E-2 µCi/cc
RX-9830	Fuel Handling Area	4.54E-2 µCi/cc
RX-9835	Emergency Penetration Room	9.56E-1 µCi/cc
MONITORS – UNIT 2		LIMIT
2RX-9820	Containment Purge	4.46E-2 µCi/cc
2RX-9825	Radwaste Area	3.32E-2 µCi/cc
2RX-9830	Fuel Handling Area	4.46E-2 µCi/cc
2RX-9835	Emergency Penetration Room	8.84E-1 µCi/cc
2RX-9840	Post Accident Sampling Building	4.42E-1 µCi/cc
2RX-9845	Aux. Building Extension	1.26E-1 µCi/cc
2RX-9850	Low Level Radwaste Storage Bldg.	1.77E-1 µCi/cc

OR

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

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.

EFFLUENT MONITORS – Unit 1	
RX-9820	Containment Purge (Channel 7 or 9)
RE-4830	Waste Gas Radiation Monitor
RE-4642	Liquid Radwaste Monitor
EFFLUENT MONITORS – Unit 2	
2RX-9820	Containment Purge (Channel 7 or 9)
2RE-2429	Waste Gas Decay Tank Vent Line Radiation Monitor
2RE-2330	BMS Liquid Discharge Monitor
2RE-4423	Regenerative Waste 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.

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

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, "Eberline Radiation Monitor System"
2. Offsite Dose Calculation Manual

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

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:

Unit 1	
RE-8009	Spent Fuel Area
RE-8017	Fuel Handling Area
Unit 2	
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.

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

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.

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

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 / TSC Director / EOF Director 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 Channel 7 on any of the following radiation monitors > the reading shown for ≥ 15 minutes:

MONITORS – UNIT 1		LIMIT
RX-9820	Containment Purge	5.90E0 µCi/cc
RX-9825	Radwaste Area	5.36E0 µCi/cc
RX-9830	Fuel Handling Area	4.54E0 µCi/cc
RX-9835	Emergency Penetration Room	9.56E+1 µCi/cc
MONITORS – UNIT 2		LIMIT
2RX-9820	Containment Purge	4.46E0 µCi/cc
2RX-9825	Radwaste Area	3.32E0 µCi/cc
2RX-9830	Fuel Handling Area	4.46E0 µCi/cc
2RX-9835	Emergency Penetration Room	8.84E+1 µCi/cc
2RX-9840	Post Accident Sampling Building	4.42E+1 µCi/cc
2RX-9845	Aux. Building Extension	1.26E+1 µCi/cc
2RX-9850	Low Level Radwaste Storage Bldg.	1.77E+1 µCi/cc

OR

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

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.

MONITORS – UNIT 1		LIMIT
RX-9820	Containment Purge (Channel 7 or 9)	N/A
RE-4830	Waste Gas Radiation Monitor	9.5E7 cpm
RE-4642	Liquid Radwaste Monitor	9.5E7 cpm
MONITORS – UNIT 2		LIMIT
2RX-9820	Containment Purge (Channel 7 or 9)	N/A
2RE-2429	Waste Gas Monitoring System	9.5E5 cpm
2RE-2330	BMS Liquid Discharge Monitor	9.5E5 cpm
2RE-4423	Regenerative Waste 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 / TSC Director / EOF Director 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.

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AA1

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.

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, "Eberline Radiation Monitor System"
2. Offsite Dose Calculation Manual

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

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.

Unit 1	
RX-9820	Containment Purge (Channel 7 or 9)
RX-9825	Radwaste Area (Channel 7 or 9)
RX-9830	Fuel Handling Area (Channel 7 or 9)
RE-8060	Containment High Range Radiation Monitors
RE-8061	Containment High Range Radiation Monitors
RE-8009	Spent Fuel Area
RE-8017	Fuel Handling
Unit 2	
2RX-9820	Containment Purge (Channel 7 or 9)
2RX-9825	Radwaste Area (Channel 7 or 9)
2RX-9830	Fuel Handling Area (Channel 7 or 9)
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.

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

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.

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

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/TSC Director/EOF Director 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.

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AS1

Initiating Condition -- SITE AREA EMERGENCY

Offsite dose resulting from an actual or IMMINENT 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 / TSC Director / EOF Director 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 Channel 9 on any of the following radiation monitors > the reading shown for ≥ 15 minutes:

MONITORS – UNIT 1		LIMIT
RX-9820	Containment Purge	5.90E+1 µCi/cc
RX-9825	Radwaste Area	5.36E+1 µCi/cc
RX-9830	Fuel Handling Area	4.54E+1 µCi/cc
RX-9835	Emergency Penetration Room	9.56E+2 µCi/cc
MONITORS – UNIT 2		LIMIT
2RX-9820	Containment Purge	4.46E+1 µCi/cc
2RX-9825	Radwaste Area	3.32E+1 µCi/cc
2RX-9830	Fuel Handling Area	4.46E+1 µCi/cc
2RX-9835	Emergency Penetration Room	8.84E+2 µCi/cc
2RX-9840	Post Accident Sampling Building	4.42E+2 µCi/cc
2RX-9845	Aux. Building Extension	1.26E+2 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

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

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, "Eberline Radiation Monitor System"
2. Offsite Dose Calculation Manual

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

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 / TSC Director / EOF Director 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 Channel 9 on any of the following radiation monitors > the reading shown for ≥ 15 minutes:

MONITORS – UNIT 1		LIMIT
RX-9820	Containment Purge	5.90E+2 (μCi/cc)
RX-9825	Radwaste Area	5.36E+2 (μCi/cc)
RX-9830	Fuel Handling Area	4.54E+2 (μCi/cc)
RX-9835	Emergency Penetration Room	9.56E+3 (μCi/cc)
MONITORS – UNIT 2		LIMIT
2RX-9820	Containment Purge	4.46E+2 (μCi/cc)
2RX-9825	Radwaste Area	3.32E+2 (μCi/cc)
2RX-9830	Fuel Handling Area	4.46E+2 (μCi/cc)
2RX-9835	Emergency Penetration Room	8.84E+3 (μCi/cc)
2RX-9840	Post Accident Sampling Building	4.42E+3 (μCi/cc)
2RX-9845	Aux. Building Extension	1.26E+3 (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

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AG1

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.

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, "Eberline Radiation Monitor System"
2. Offsite Dose Calculation Manual

Cold Shutdown / Refueling System Malfunction

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 ≥ 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.

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 ≥ 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 ≥ 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 reduced 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.

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.

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 reduced 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.

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 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 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*"

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.

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.

Table C2 Onsite Communications Methods
Station radio system Plant paging system In-plant telephones Gaitronics

Table C3 Offsite Communications Methods
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.

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 / TSC Director / EOF Director 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., 0 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 ≥ 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., 0 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.

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.

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
* 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.

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 reduced (e.g., mid-loop operation). As discussed above, RCS integrity should be

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA3

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 / TSC Director / EOF 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 SM / TSC Director / EOF Director, an IMMINENT situation is at hand, the classification should be made as if the threshold has been exceeded.

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 / TSC Director / EOF Director 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.

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 / TSC Director / EOF Director 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 ≥ 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.

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.

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 / TSC Director / EOF Director 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 ≥ 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 ≥ 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

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 uncover therefore, 30 minutes was conservatively chosen.

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

In the early stages of a core uncover event, it is unlikely that hydrogen buildup due to a core uncover could result in an explosive mixture of dissolved gasses 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"*

INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) MALFUNCTION

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

FISSION PRODUCT BARRIERS

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 / TSC Director / EOF Director 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.

FISSION PRODUCT BARRIERS

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 $\mu\text{Ci/gm}$ 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 $\mu\text{Ci/gm}$ 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"

FISSION PRODUCT BARRIERS

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 subcooling 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

FISSION PRODUCT BARRIERS

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

FISSION PRODUCT BARRIERS

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.

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"

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.

FISSION PRODUCT BARRIERS

FUEL CLAD

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 / TSC Director / EOF Director 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 / TSC Director / EOF Director 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 / TSC Director / EOF Director judgment that the barrier may be considered lost or potentially lost.

FISSION PRODUCT BARRIERS

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).

For Unit 1 this is based on indications that leakage is greater than normal makeup capacity. The operator could not batch in water and boric acid to the makeup system fast enough to maintain the makeup tank level during a 50 gpm RCS leak. It is not necessary to perform a detailed assessment of the RCS leakrate to implement this EAL. Any event or condition which, in the judgment of the SM / TSC Director / EOF Director, could result in RCS leakage in excess of Unit 1 normal makeup capacity would meet the intent of this EAL; for example:

- Need to open the BWST suction for the operating makeup pump due to lowering makeup tank level
- Full or partial HPI is needed to maintain the RCS pressure or pressurizer level
- Two out of three seal stages failed on any RCP
- RCS pressure lowering due to failure of a primary relief valve to reseal

FISSION PRODUCT BARRIERS

RCS

For Unit 2, this is considered as the capacity of one charging pump discharging to the charging header (44 gpm). Any event or condition which, in the judgment of the SM / TSC Director / EOF Director, could result in RCS leakage in excess of Unit 2 normal makeup capacity would meet the intent of this EAL; for example:

- A second charging pump being required is indicative of a substantial RCS leak
- Three out of four seal stages failed on any RCP
- RCS pressure lowering due to failure of a primary relief valve to reseal

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

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.

FISSION PRODUCT BARRIERS

RCS

Potential Loss

There is no Potential Loss EAL associated with this item.

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.

During the initial fifteen minutes after a thermal event inside containment, the high range radiation monitor readings are considered invalid due to possibility of a transient thermally-induced current.

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*"

4. Emergency Director Judgment (RCB4)

Any condition in the opinion of the SM / TSC Director / EOF Director 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 / TSC Director / EOF Director 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 / TSC Director / EOF Director judgment that the barrier may be considered lost or potentially lost.

FISSION PRODUCT BARRIERS

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

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.

FISSION PRODUCT BARRIERS

CONTAINMENT

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 H₂ 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"*

FISSION PRODUCT BARRIERS

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.

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

FISSION PRODUCT BARRIERS

CONTAINMENT

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.

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

FISSION PRODUCT BARRIERS

CONTAINMENT

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

Basis:

Loss

This EAL addresses incomplete containment isolation that allows a direct release to the environment. 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 and opens a 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 through interfacing liquid systems. 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.

FISSION PRODUCT BARRIERS

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/TSC Director/EOF Director 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).

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 BARRIERS

CONTAINMENT

6. Other Indications (CNB6)

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

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-9840	Post Accident Sampling Building
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 / TSC Director / EOF Director 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 / TSC Director / EOF Director 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 / TSC Director / EOF Director 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.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

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.

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.

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.

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.

Table H1	
Unit 1	Unit 2
CA-1 & HP Office Area	2A3 Room
Condensate Demineralizer Room	2A4, 2D02, & East Battery Room
Corridor 98	2B53 Room
Fire Area C	2B63 Room
Lower North Electrical Penetration Room (LNEPR)	2B9/2B10 Room
Lower South Electrical Equipment Room (LSEER) / Air Compressor Room	2Y11/13 Equipment Room
Lower South Electrical Penetration Room (LSEPR)	Auxiliary Building 317' General Access
Lower South Piping Penetration Room (LSPPR)	Auxiliary Building 335'
Main Steam Isolation Violation (MSIV) Room	Auxiliary Building 354'
North Engineered Safeguards (ES) SWGR Room (A4)	'B' Engineered Safeguards Features (ESF) Room
South ES SWGR Room	Corridor Behind Door 340
Turbine Building	Turbine Building
<ul style="list-style-type: none"> • A1, A2, H1, H2 SWGR area • 354' Bowling Alley north end west of Breathing Air compressor room • 368' West Heater Deck from LSEER (orange door) along east wall of ES SWGR Rooms to Corridor 98 door. 	<ul style="list-style-type: none"> • 2A1, 2A2, 2H1, 2H2 Area • 354' West wall of Demineralizer area • 368' West Heater Deck north of north Switchgear (SWGR) Room (2A3) and East of LNEPR
Upper North Electrical Penetration Room (UNEPR) / Hot Tool Room / Decon Room	Intake Structure 354' or 366'
Upper South Electrical Penetration Room (USEPR)	LNEPR
Upper South Piping Penetration Room (USPPR)	LSEPR
	Motor-Generator (MG) Set Room
	Steam Pipe Area
	Hot Machine Shop
	UNEPR, UNPPR, LNPPR, USPPR

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4

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).

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.

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.

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.

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**.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU6

Table H1	
Unit 1	Unit 2
CA-1 & HP Office Area	2A3 Room
Condensate Demineralizer Room	2A4, 2D02, & East Battery Room
Corridor 98	2B53 Room
Fire Area C	2B63 Room
Lower North Electrical Penetration Room (LNEPR)	2B9/2B10 Room
Lower South Electrical Equipment Room (LSEER) / Air Compressor Room	2Y11/13 Equipment Room
Lower South Electrical Penetration Room (LSEPR)	Auxiliary Building 317' General Access
Lower South Piping Penetration Room (LSPPR)	Auxiliary Building 335'
Main Steam Isolation Violation (MSIV) Room	Auxiliary Building 354'
North Engineered Safeguards (ES) SWGR Room (A4)	'B' Engineered Safeguards Features (ESF) Room
South ES SWGR Room	Corridor Behind Door 340
Turbine Building	Turbine Building
<ul style="list-style-type: none"> • A1, A2, H1, H2 SWGR area • 354' Bowling Alley north end west of Breathing Air compressor room • 368' West Heater Deck from LSEER (orange door) along east wall of ES SWGR Rooms to Corridor 98 door. 	<ul style="list-style-type: none"> • 2A1, 2A2, 2H1, 2H2 Area • 354' West wall of Demineralizer area • 368' West Heater Deck north of north Switchgear (SWGR) Room (2A3) and East of LNEPR
Upper North Electrical Penetration Room (UNEPR) / Hot Tool Room / Decon Room	Intake Structure 354' or 366'
Upper South Electrical Penetration Room (USEPR)	LNEPR
Upper South Piping Penetration Room (USPPR)	LSEPR
	Motor-Generator (MG) Set Room
	Steam Pipe Area
	Hot Machine Shop
	UNEPR, UNPPR, LNPPR, USPPR

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.

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: (a) 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, and (b) for plants with operable seismic instrumentation, the seismic switches of the plant are activated.*

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.

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

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.

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.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA2

Initiating Condition - ALERT

Other conditions exist which in the judgment of the SM / TSC Director / EOF Director 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 / TSC Director / EOF Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Basis:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere, but that warrant declaration of an emergency because conditions exist which are believed by the SM / TSC Director / EOF Director to fall under the Alert emergency classification level.

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.

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.

Table H1	
Unit 1	Unit 2
CA-1 & HP Office Area	2A3 Room
Condensate Demineralizer Room	2A4, 2D02, & East Battery Room
Corridor 98	2B53 Room
Fire Area C	2B63 Room
Lower North Electrical Penetration Room (LNEPR)	2B9/2B10 Room
Lower South Electrical Equipment Room (LSEER) / Air Compressor Room	2Y11/13 Equipment Room
Lower South Electrical Penetration Room (LSEPR)	Auxiliary Building 317' General Access
Lower South Piping Penetration Room (LSPPR)	Auxiliary Building 335'
Main Steam Isolation Violation (MSIV) Room	Auxiliary Building 354'
North Engineered Safeguards (ES) SWGR Room (A4)	'B' Engineered Safeguards Features (ESF) Room
South ES SWGR Room	Corridor Behind Door 340
Turbine Building	Turbine Building
<ul style="list-style-type: none"> • A1, A2, H1, H2 SWGR area • 354' Bowling Alley north end west of Breathing Air compressor room • 368' West Heater Deck from LSEER (orange door) along east wall of ES SWGR Rooms to Corridor 98 door. 	<ul style="list-style-type: none"> • 2A1, 2A2, 2H1, 2H2 Area • 354' West wall of Demineralizer area • 368' West Heater Deck north of north Switchgear (SWGR) Room (2A3) and East of LNEPR
Upper North Electrical Penetration Room (UNEPR) / Hot Tool Room / Decon Room	Intake Structure 354' or 366'
Upper South Electrical Penetration Room (USEPR)	LNEPR
Upper South Piping Penetration Room (USPPR)	LSEPR
	Motor-Generator (MG) Set Room
	Steam Pipe Area
	Hot Machine Shop
	UNEPR, UNPPR, LNPPR, USPPR

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4

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/TSC Director/EOF Director with the resources needed to perform detailed damage assessments.

The SM / TSC Director / EOF Director 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.

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

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

Unit 2

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

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.

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.

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 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

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.

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

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.

EAL #6

EAL #6 addresses site specific phenomena which has the potential for the loss of primary and secondary heat sink.

Reference Documents:

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

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.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS2

Initiating Condition - SITE AREA EMERGENCY

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

Basis:

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 / TSC Director / EOF Director to fall under the emergency classification level description for Site Area Emergency.

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 at the remote shutdown panel is based on SM / TSC Director / EOF Director judgment. The SM / TSC Director / EOF Director is expected to make a reasonable, informed judgment within 15 minutes that the plant staff has control of the plant from the remote shutdown panel.

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

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.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG2

Initiating Condition - GENERAL EMERGENCY

Other conditions exist which in the judgment of the SM / TSC Director / EOF Director 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 / TSC Director / EOF Director 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 / TSC Director / EOF Director to fall under the emergency classification level description for General Emergency.

SYSTEM MALFUNCTION

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"

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 > 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.

SYSTEM MALFUNCTION

SU6

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.

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"

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.

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

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"

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 > 1.3×10^5 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

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

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”

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

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 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 / TSC Director / EOF Director 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 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"

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.

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

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/TSC Director/EOF Director 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 \geq 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.

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"

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 / TSC Director / EOF Director 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"

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.

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.

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 / TSC Director / EOF Director 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).

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 / TSC Director / EOF Director 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.

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"

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 ≥ 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.

SYSTEM MALFUNCTION

SG1

Although it may be difficult to predict when power can be restored, it is necessary to give the SM / TSC Director / EOF Director 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 / TSC Director / EOF Director 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"

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.