



Entergy

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OCAN020407

February 27, 2004

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Subject: Proposed Upgraded Emergency Action Levels
Arkansas Nuclear One – Units 1 and 2
Docket Nos. 50-313 and 50-368
License Nos. DPR-51 and NPF-6

Dear Sir or Madam:

Upgraded Emergency Action Levels (EALs) for Arkansas Nuclear One (ANO), Units 1 and 2 are enclosed for NRC staff review and approval as required by 10CFR50 Appendix E, IV.B. These new EALs were written using the methodology outlined in NEI 99-01, *Methodology for Development of Emergency Action Levels*, Revision 4, January 2003. NEI 99-01 has been endorsed by the NRC Staff in Regulatory Guide 1.101, Revision 4, July 2003, *Emergency Planning and Preparedness for Nuclear Power Reactors* and in NRC Regulatory Issue Summary 2003-18, October 8, 2003, *Methodology for Development of Emergency Action Levels*. The proposed changes to the ANO EALs have been reviewed and approved by the Onsite Safety Review Committee. Additionally, agreement on the proposed EALs has been obtained from the State of Arkansas and local governmental authorities.

The guidance contained in NEI 99-01 was found to be acceptable to the NRC staff as an alternative method for development of EALs to that described in Appendix 1 to NUREG-0654/FEMA-REP-1, *Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants* and in NUMARC/NESP-007, *Methodology for Development of Emergency Action Levels*.

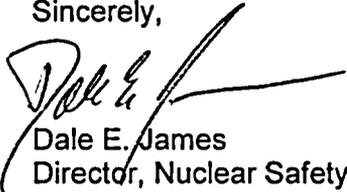
Plant specific information is attached in the following order:

- Current Emergency Plan Mark-Up
- Proposed Emergency Plan Pages – Changes Incorporated
- Proposed EALs
- Arkansas Nuclear One Deviations and Differences from the NEI 99-01, Revision 4 Emergency Action Levels

A 1045

This correspondence contains no new commitments. If you have any questions regarding this submittal, please contact Mr. Robert Holeyfield, Manager, Emergency Planning at 479-858-4995.

Sincerely,

A handwritten signature in black ink, appearing to read "Dale E. James", with a long horizontal flourish extending to the right.

Dale E. James
Director, Nuclear Safety Assurance (Acting)

DEJ/fpv

Attachments:

1. Current Emergency Plan Mark-Up
2. Proposed Emergency Plan Changes – Changes Incorporated
3. Proposed EALs
4. Arkansas Nuclear One Deviations and Differences from the NEI 99-01, Revision 4
Emergency Action Levels

cc: Dr. Bruce S. Mallett
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Attachment 1

OCAN020407

Current Emergency Plan Mark-Up

TABLE D-1

UNIT ONE EMERGENCY CLASS INITIATING CONDITIONS

NOTIFICATION OF UNUSUAL EVENT

1. PRIMARY SYSTEM EVENTS

a) RCS activity indicates $>0.1\%$ fuel cladding failure.

2. REACTOR COOLANT SYSTEM LEAKAGE

a) RCS leakage > 10 gpm unidentified or RCS Pressure Boundary leakage or > 25 gpm identified RCS leakage

3. SECONDARY SYSTEM EVENTS

a) Uncontrolled OTSG depressurization resulting in MSLI actuation.

b) OTSG Tube Leakage \geq Tech. Spec. Limits

4. ELECTRICAL POWER FAILURES

a) Degraded power

5. RADIOLOGICAL EFFLUENTS

a) Projected or measured activity at the site boundary, averaged over one hour, is greater than or equal to $.05$ mrem/hr TEDE or $.15$ mrem/hr Child Thyroid CDE or liquid radiological effluents exceed ODCM limits.

6. SAFETY SYSTEM FUNCTION

a) Deviation from Technical Specification action statement when required to shutdown or cooldown or deviations pursuant to 10CFR50.54(x).

b) Loss of dose assessment capabilities.

c) Loss of communications.

~~TABLE D-1 (Continued)~~

~~7. HAZARDS TO STATION OPERATIONS~~

- ~~a) Security threat onsite but outside the Protected Area Security Fence (e.g. attempted entry or sabotage which has been stopped outside the security fence).~~
- ~~b) Fire or explosion onsite.~~
- ~~c) Aircraft crash, unusual aircraft activity, train derailment, turbine failure, toxic or flammable gas release.~~

~~8. NATURAL EVENTS~~

- ~~a) Tornado, flood, loss of Dardanelle Reservoir, earthquake.~~

~~9. MISCELLANEOUS EVENTS~~

- ~~a) Other plant conditions exist that warrant increased awareness on the part of the operating staff and state and/or local offsite authorities or involve other than a normal controlled shutdown.~~

~~TABLE D-1 (Continued)~~

ALERT

~~1. PRIMARY SYSTEM EVENTS~~

~~a) RCS activity indicates > 1% fuel cladding failure.~~

~~2. REACTOR COOLANT SYSTEM LEAKAGE~~

~~a) RCS leakage > normal makeup capacity (50gpm).~~

~~3. SECONDARY SYSTEM EVENTS~~

~~a) OTSG tube leakage > 10 gpm concurrent with ongoing steam release or loss of offsite power.~~

~~4. ELECTRICAL POWER FAILURES~~

~~a) Station Blackout.~~

~~b) Loss of all vital DC power.~~

~~5. RADIOLOGICAL EFFLUENTS~~

~~a) Projected or measured activity at the site boundary, averaged over one hour, is greater than or equal to .5 mrem/hr TEDE or 1.5 mrem/hr Child Thyroid CDE or liquid radiological effluents exceed 10 times ODCM limits.~~

~~b) High radiation/airborne levels.~~

~~6. SAFETY SYSTEM FUNCTION~~

~~a) RPS failure to complete an automatic trip.~~

~~b) Loss of control room annunciators.~~

~~c) Control Room evacuation.~~

~~d) Loss of decay heat removal capabilities.~~

~~TABLE D-1 (Continued)~~

~~7. HAZARDS TO STATION OPERATION~~

- ~~a) Ongoing security threat within the Protected Area Security Fence but outside of plant buildings.~~
- ~~b) Fire or explosion onsite affecting one train of any ES system.~~
- ~~c) Aircraft crash, missiles, toxic or flammable gas affecting one train of any ES system.~~

~~8. NATURAL EVENTS~~

- ~~a) Tornado, high winds, flood, loss of Dardanelle Reservoir, earthquake.~~

~~9. MISCELLANEOUS EVENTS~~

- ~~a) Other plant conditions exist that warrant precautionary activation of the Technical Support Center and placing the near site Emergency Operations Facility and other key emergency personnel on stand-by.~~

~~TABLE D-1 (Continued)~~

~~SITE AREA EMERGENCY~~

~~1. PRIMARY SYSTEM EVENTS~~

- ~~a) Core damage indicated with an inadequate core cooling condition.~~
- ~~b) Containment radiation readings which indicate LOCA and >1% fuel cladding failure.~~

~~2. REACTOR COOLANT SYSTEM LEAKAGE~~

- ~~a) RCS leakage > normal makeup capacity (50gpm) with >1.0% fuel cladding failure.~~
- ~~b) RCS leakage > HPI capacity.~~

~~3. SECONDARY SYSTEM EVENTS~~

- ~~a) OTSG tube rupture with primary to secondary leakage > normal makeup capacity (50gpm) with ongoing steam release or loss of offsite power.~~
- ~~b) OTSG tube leak > 1 gpm with > 1% fuel cladding failure with ongoing steam release.~~

~~4. ELECTRICAL POWER FAILURES~~

- ~~a) Blackout for more than 15 minutes.~~
- ~~b) Loss of all vital DC power for more than 15 minutes.~~

~~5. RADIOLOGICAL EFFLUENTS~~

- ~~a) Radiological effluents are greater than or equal to 50 mrem/hr TEDE or 150 mrem/hr Child Thyroid CDE at the Site Boundary.~~
- ~~b) Spent fuel accident.~~

~~TABLE D-1 (Continued)~~

~~6. SAFETY SYSTEM FUNCTION~~

- ~~a) RPS failure to complete a manual trip.~~
- ~~b) Loss of Control Room annunciators with a transient in progress.~~
- ~~c) Control room evacuation and control of shutdown systems not established in 15 minutes.~~
- ~~d) Degraded hot shutdown capability.~~

~~7. HAZARDS TO STATION OPERATION~~

- ~~a) Ongoing security threat within plant buildings but not within the Control Room or vital areas.~~
- ~~b) Fire or explosion onsite affecting both trains of any ES system.~~
- ~~c) Aircraft crash, missiles, toxic or flammable gas affecting both trains of any ES system.~~

~~8. NATURAL EVENTS~~

- ~~a) Tornado, high winds, flood, loss of Dardanelle Reservoir, earthquake~~

~~9. MISCELLANEOUS EVENTS~~

- ~~a. Other plant conditions exist that warrant activation of emergency response facilities and monitoring teams or a precautionary notification to the public near the site.~~

~~TABLE D-1 (Continued)~~

~~GENERAL EMERGENCY~~

~~1. PRIMARY SYSTEM EVENTS~~

- ~~a) Containment radiation readings which indicate LOCA and >50% fuel
overheat.~~
- ~~b) Core melt.~~
- ~~c) Loss of or challenge to all three fission product barriers.~~

~~2. REACTOR COOLANT SYSTEM LEAKAGE~~

~~N/A~~

~~3. SECONDARY SYSTEM EVENTS~~

~~N/A~~

~~4. ELECTRICAL POWER FAILURES~~

~~N/A~~

~~5. RADIOLOGICAL EFFLUENTS~~

- ~~a) Radiological effluents are greater than or equal to 250 mrem/hr TEDE or
500 mrem/hr Child Thyroid CDE at the site boundary.~~

~~6. SAFETY SYSTEM FUNCTION~~

~~N/A~~

~~7. HAZARDS TO STATION OPERATION~~

- ~~a) Ongoing security threat within the Control Room or vital areas.~~

~~TABLE D-1 (Continued)~~

~~8. NATURAL EVENTS~~

~~— N/A~~

~~9. MISCELLANEOUS EVENTS~~

~~a) — Plant conditions exist that make release of large amounts of radioactivity possible.~~

~~TABLE D-2~~

~~UNIT TWO EMERGENCY CLASS INITIATING CONDITIONS~~

~~NOTIFICATION OF UNUSUAL EVENT~~

~~1. PRIMARY SYSTEM EVENTS~~

~~a) RCS activity indicates $> 0.1\%$ fuel cladding failure~~

~~2. REACTOR COOLANT SYSTEM LEAKAGE~~

~~a) RCS leakage > 10 gpm unidentified or RCS Pressure Boundary leakage or > 25 gpm identified RCS leakage~~

~~3. SECONDARY SYSTEM EVENTS~~

~~a) Uncontrolled S/G depressurization resulting in MSIS actuation.~~

~~b) S/G tube leak $>$ Tech. Spec. Limits~~

~~4. ELECTRICAL POWER FAILURES~~

~~a) Degraded power~~

~~5. RADIOLOGICAL EFFLUENTS~~

~~a) Projected or measured activity at the site boundary, averaged over one hour, is greater than or equal to .05 mrem/hr TEDE or .15 mrem/hr Child Thyroid CDE or liquid radiological effluents exceed ODCM limits.~~

~~6. SAFETY SYSTEM FUNCTION~~

~~a) Deviation from Technical Specification action statements when required to shutdown or cooldown or deviations pursuant to 10CFR50.54(x).~~

~~b) Loss of dose assessment capabilities.~~

~~c) Loss of communications.~~

~~TABLE D-2 (Continued)~~

~~7. HAZARDS TO STATION OPERATION~~

- ~~a) Security threat onsite but outside the Protected Area Security Fence (e.g. attempted entry or sabotage which has been stopped outside the security fence).~~
- ~~b) Fire or explosion onsite.~~
- ~~c) Aircraft crash, unusual aircraft activity, train derailment, turbine failure, toxic or flammable gas.~~

~~8. NATURAL EVENTS~~

- ~~a) Tornado, flood, loss of Dardanelle Reservoir, earthquake.~~

~~9. MISCELLANEOUS EVENTS~~

- ~~a) Other plant conditions exist that warrant increased awareness on the part of the operating staff and state and/or local offsite authorities or involve other than a normal controlled shutdown.~~

~~TABLE D-2 (Continued)~~

ALERT

~~1. PRIMARY SYSTEM EVENTS~~

~~a) RCS activity indicates > 1% fuel cladding failure~~

~~2. REACTOR COOLANT SYSTEM LEAKAGE~~

~~a) RCS leakage > 44 gpm.~~

~~3. SECONDARY SYSTEM EVENTS~~

~~a) S/G Tube Leak > 10 gpm with an ongoing steam release~~

~~4. ELECTRICAL POWER FAILURES~~

~~a) Station Blackout.~~

~~b) Loss of all vital DC.~~

~~5. RADIOLOGICAL EFFLUENTS~~

~~a) Projected or measured activity at the site boundary, averaged over one hour, is greater than or equal to .5 mrem/hr TEDE or 1.5 mrem/hr Child Thyroid CDE or liquid radiological effluents exceed 10 times ODCM limits.~~

~~b) High radiation/airborne levels.~~

~~6. SAFETY SYSTEM FUNCTION~~

~~a) RPS failure to complete an automatic trip.~~

~~b) Control Room evacuation.~~

~~c) Loss of decay heat removal capabilities.~~

~~d) Loss of Control Room Annunciators.~~

~~TABLE D-2 (Continued)~~

~~7. HAZARDS TO STATION OPERATION~~

- ~~a) Ongoing security threat within the Protected Area Security Fence but outside of plant buildings.~~
- ~~b) Fire or explosion onsite affecting one train of ESF systems.~~
- ~~c) Aircraft crash, missiles, toxic or flammable gas affecting one train of ESF systems.~~

~~8. NATURAL EVENTS~~

- ~~a) Tornado, high winds, flood, loss of Dardanelle Reservoir, earthquake.~~

~~9. MISCELLANEOUS EVENTS~~

- ~~a) Other plant conditions exist that warrant precautionary activation of the Technical Support Center and placing the near-site Emergency Operations Facility and other key emergency personnel on standby.~~

~~TABLE D-2 (Continued)~~

~~SITE AREA EMERGENCY~~

~~1. PRIMARY SYSTEM EVENTS~~

- ~~a) Core damage indicated with an inadequate core cooling condition.~~
- ~~b) Containment radiation readings which indicate LOCA and >1% fuel cladding failure.~~

~~2. REACTOR COOLANT SYSTEM LEAKAGE~~

- ~~a) RCS leakage > 44 gpm with ICC conditions.~~

~~3. SECONDARY SYSTEM EVENTS~~

- ~~a) S/G tube rupture > 44 gpm with an ongoing steam release and RCS Activity >1.0 μ Ci/gm, but < 378 μ Ci/gm (1% fuel cladding failure).~~

~~4. ELECTRICAL POWER FAILURES~~

- ~~a) Blackout > 15 minutes.~~
- ~~b) Loss of ALL vital DC for > 15 minutes.~~

~~5. RADIOLOGICAL EFFLUENTS~~

- ~~a) Radiological effluents are greater than or equal to 50 mrem/hr TEDE or 150 mrem/hr Child Thyroid CDE at the site boundary.~~
- ~~b) Spent fuel accident.~~

~~TABLE D-2 (Continued)~~

~~6. SAFETY SYSTEM FUNCTION~~

- ~~a) RPS failure to complete a manual trip.~~
- ~~b) Control room evacuation and control of shutdown systems not established in 15 minutes.~~
- ~~c) Loss of both S/Gs as a heat removal method.~~
- ~~d) Loss of Control Room annunciators with a transient in progress.~~

~~7. HAZARDS TO STATION OPERATION~~

- ~~a) Ongoing security threat within plant buildings but not within the Control Room or vital areas.~~
- ~~b) Fire or explosion onsite affecting both trains of ESF Systems.~~
- ~~c) Aircraft crash, missiles, toxic or flammable gas affecting both redundant ESF trains.~~

~~8. NATURAL EVENTS~~

- ~~a) Tornado, high winds, flood, loss of Dardanelle Reservoir, earthquake.~~

~~9. MISCELLANEOUS EVENTS~~

- ~~a) Other plant conditions exist that warrant activation of the emergency response facilities and monitoring teams or a precautionary notification to the public near the site.~~

~~TABLE D-2 (Continued)~~

~~GENERAL EMERGENCY~~

~~1. PRIMARY SYSTEM EVENTS~~

- ~~a) Containment radiation readings which indicate LOCA and >50% fuel
overheat.~~
- ~~b) Core melt with Containment Integrity Lost or Challenged.~~
- ~~c) Loss of or challenge to all three fission product barriers.~~

~~2. REACTOR COOLANT SYSTEM LEAKAGE~~

~~N/A~~

~~3. SECONDARY SYSTEM EVENTS~~

~~N/A~~

~~4. ELECTRICAL POWER FAILURES~~

~~N/A~~

~~5. RADIOLOGICAL EFFLUENTS~~

- ~~a) Radiological effluents are greater than or equal to 250 mrem/hr TEDE or
500 mrem/hr Child Thyroid CDE at the Site Boundary.~~

~~6. SAFETY SYSTEM FUNCTION~~

~~N/A~~

~~7. HAZARDS TO STATION OPERATION~~

- ~~a) Ongoing security threat within the Control Room or vital areas.~~

~~TABLE D-2 (Continued)~~

~~8. NATURAL EVENTS~~

~~— N/A~~

~~9. MISCELLANEOUS EVENTS~~

~~— Plant conditions exist that make release of large amount of radioactivity possible.~~

Attachment 2

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Proposed Emergency Plan Changes – Changes Incorporated

TABLE D-1**Index of Emergency Action Levels**

Abnormal Rad Levels/Radiological Effluent	
AG1	Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 1000 mR TEDE or 5000 mR child thyroid CDE for the actual or projected duration of the release using actual meteorology
AS1	Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 100 mR TEDE or 500 mR child thyroid CDE for the actual or projected duration of the release
AA1	Any UNPLANNED release of gaseous or liquid radioactivity to the environment exceeds 200 times the radiological effluent ODCM limits for 15 minutes or longer
AA2	Damage to irradiated fuel or loss of water level that has or will result in the uncovering of irradiated fuel outside the reactor vessel
AA3	Release of radioactive material or elevated radiation levels within the facility that impede operation of systems required to maintain safe operations or to establish or maintain cold shutdown
AU1	Any UNPLANNED release of gaseous or liquid radioactivity to the environment that exceeds two times the radiological effluent ODCM limits for 60 minutes or longer
AU2	Unexpected rise in plant radiation
Cold Shutdown/Refueling System Malfunction	
CG1	Loss of reactor vessel inventory affecting fuel clad integrity with containment challenged with irradiated fuel in the reactor vessel
CS1	Loss of reactor vessel inventory affecting core decay heat removal capability
CS2	Loss of reactor vessel inventory affecting core decay heat removal capability with irradiated fuel in the reactor vessel
CA1	Loss of RCS inventory
CA2	Loss of reactor vessel inventory with irradiated fuel in the reactor vessel
CA3	Loss of all offsite power and loss of all onsite AC power to required 4.16KV busses
CA4	Inability to maintain plant in cold shutdown with irradiated fuel in the reactor vessel
CU1	RCS leakage
CU2	UNPLANNED loss of RCS inventory with irradiated fuel in the reactor vessel
CU3	Loss of all offsite power to vital busses for greater than 15 minutes
CU4	UNPLANNED loss of decay heat removal capability with irradiated fuel in the reactor vessel
CU5	Fuel clad degradation
CU6	UNPLANNED loss of all onsite or offsite communications capabilities
CU7	UNPLANNED loss of required DC power for greater than 15 minutes
CU8	Inadvertent criticality

TABLE D-1 (Continued)

Index of Emergency Action Levels

Events Related to ISFSI Malfunction	
E-HU1	Damage to a loaded cask CONFINEMENT BOUNDARY
E-HU2	Confirmed security event with potential loss of level of safety of the ISFSI
Fission Product Barrier Degradation	
FG1	Loss of ANY two barriers AND loss or potential loss of third barrier
FS1	Loss or potential loss of ANY two barriers
FA1	ANY loss or ANY potential loss of EITHER fuel clad OR RCS
FU1	ANY loss or ANY potential loss of containment
Hazards and Other Conditions Affecting Plant Safety	
HG1	Security event resulting in loss of physical control of the facility
HG2	Other conditions exist which in the judgment of the SM/TSC Director/EOF Director warrant declaration of General Emergency
HS1	Confirmed security event in a plant VITAL AREA
HS2	Other conditions exist which in the judgment of the SM/TSC Director/EOF Director warrant declaration of Site Area Emergency
HS3	Control Room evacuation has been initiated and plant control cannot be established
HA1	Confirmed security event within a plant PROTECTED AREA
HA2	Other conditions exist which in the judgment of the SM/TSC Director/EOF Director warrant declaration of an Alert
HA3	Control Room evacuation has been initiated
HA4	FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown
HA5	Release of toxic or flammable gases within or adjacent to a VITAL AREA which jeopardizes operation of systems required to establish or maintain safe shutdown
HA6	Natural and destructive phenomena affecting the plant VITAL AREA
HU1	Confirmed security event which indicates a potential degradation in the level of safety of the plant
HU2	Other conditions exist which in the judgment of the SM/TSC Director/EOF Director warrant declaration of an NUE
HU4	FIRE within PROTECTED AREA boundary not extinguished within 15 minutes of detection
HU5	Release of toxic or flammable gases deemed detrimental to normal operation of the plant
HU6	Natural and destructive phenomena affecting the PROTECTED AREA

TABLE D-1 (Continued)**Index of Emergency Action Levels**

System Malfunction	
SG1	Prolonged loss of all offsite power and prolonged loss of all onsite AC power to vital 4.16KV busses
SG2	Failure of the Reactor Protection System to complete an automatic trip and manual trip was NOT successful and there is indication of an extreme challenge to the ability to cool the core
SS1	Loss of all offsite power and loss of all onsite AC power to vital 4.16KV busses
SS2	Failure of Reactor Protection System instrumentation to complete or initiate an automatic reactor trip once a Reactor Protection System setpoint has been exceeded and manual trip was NOT successful
SS3	Loss of all vital DC power
SS4	Complete loss of heat removal capability
SS6	Inability to monitor a TRANSIENT in progress
SA2	Failure of Reactor Protection System instrumentation to complete or initiate an automatic reactor trip once a Reactor Protection System setpoint has been exceeded and manual trip was successful
SA4	UNPLANNED loss of most or all safety system annunciation or indication in control room with either (1) a PLANT TRANSIENT in progress, or (2) SPDS and PMS dynamic alarm functions are unavailable
SA5	AC power capability to vital 4.16KV busses reduced to a single power source for greater than 15 minutes such that any additional single failure would result in station blackout
SU1	Loss of all offsite power to vital 4.16KV busses for greater than 15 minutes
SU2	Inability to reach required shutdown within Technical Specification limits
SU3	UNPLANNED loss of most or all safety system annunciation or indication in the control room for greater than 15 minutes
SU4	Fuel clad degradation
SU5	RCS leakage
SU6	UNPLANNED loss of all onsite or offsite communications capabilities
SU8	Inadvertent criticality

Attachment 3

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Proposed EALs

PROC./WORK PLAN NO. 1903.010	PROCEDURE/WORK PLAN TITLE: EMERGENCY ACTION LEVEL CLASSIFICATION	PAGE: 1 of 156 CHANGE: XXX-XX-0
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1.0 PURPOSE

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

2.0 SCOPE

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

3.0 REFERENCES

3.1 REFERENCES USED IN PROCEDURE PREPARATION:

- 3.1.1 ANO Emergency Plan
- 3.1.2 NUREG-0654/FEMA-REP-1, Rev. 1
- 3.1.3 10 CFR 50
- 3.1.4 NRC Branch Position on Acceptable Deviations to Appendix 1 to NUREG-0654/FEMA-REP-1, July 11, 1994
- 3.1.5 NEI 99-01 Rev. 4 Methodology for Development of Emergency Action Levels

3.2 REFERENCES USED IN CONJUNCTION WITH THIS PROCEDURE:

- 3.2.1 LI-102, "Corrective Action Process"
- 3.2.2 1903.011, "Emergency Response/Notifications"
- 3.2.3 1903.064, "Emergency Response Facility - Control Room"
- 3.2.4 1903.065, "Emergency Response Facility - Technical Support Center (TSC)"
- 3.2.5 1903.066, "Emergency Response Facility - Operational Support Center (OSC)"
- 3.2.6 1903.067, "Emergency Response Facility - Emergency Operations Facility (EOF)"
- 3.2.7 1203.025, "Natural Emergencies"
- 3.2.8 2203.008, "Natural Emergencies"
- 3.2.9 1202.XXX, "Emergency Operating Procedures"
- 3.2.10 2202.XXX, "Emergency Operating Procedures"
- 3.2.11 1404.016, "Post Earthquake Data acquisition and Measurement"

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- 3.2.12 1904.002, "Offsite Projections-RDACS Computer Method"
- 3.2.13 NRC Position Paper on "Timeliness of Classification of Emergency Conditions", dated August 17, 1995
- 3.2.14 1607.001, "Reactor Coolant System Sampling"
- 3.2.15 2607.001, "Unit 2 Reactor Coolant System Sampling"

3.3 RELATED ANO PROCEDURES:

- 3.3.1 1043.042, "Response to Contingencies"
- 3.3.2 1502.004, "Control of Unit 1 Refueling", Attachment H
- 3.3.3 1903.023, "Personnel Emergency"
- 3.3.4 ANO Security Plan/Security Procedures
- 3.3.5 1015.007, "Fire Brigade Organization and Responsibilities"
- 3.3.6 1903.042, "Duties of the Emergency Medical Team"
- 3.3.7 1903.043, "Duties of the Emergency Radiation Team"

3.4 REGULATORY CORRESPONDENCE CONTAINING NRC COMMITMENTS WHICH ARE IMPLEMENTED IN THIS PROCEDURE (DENOTED IN LEFT HAND MARGIN AND BY [BOLD]):

- 3.4.1 OCAN068320 (P-10766) - Section 4.11

4.0 DEFINITIONS

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

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

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- 4.2 Bomb: refers to an explosive device suspected of having sufficient force to damage plant systems or structures.
- 4.3 Civil Disturbance: A group of persons violently protesting station operations or activities at the site.
- 4.4 Confinement Boundary: The barrier(s) between areas containing radioactive substances and the environment.
- 4.5 Containment Closure (Unit 1): A condition where at least one integral barrier to the release of radioactive material is provided.
- 4.6 Containment Closure (Unit 2): Containment Closure is a preliminary action that immediately and effectively reduces the likelihood of a release while providing flexibility to have the Containment Building open under appropriate conditions. The Containment Building provides the last integral barrier to the release of radioactive material to the general public. During core alterations with less than 23 feet of coolant above the fuel, Containment Closure must be set; with greater than 23 feet of coolant above the fuel, Containment Closure must be capable of being set. Containment Closure is set when the following conditions have been met:
- The equipment hatch door is closed and held in place by a minimum of four bolts such that no gaps exist in the sealing surface or the Temporary Equipment Hatch Cover (TEHC) is installed per Temporary Equipment Hatch Cover Installation/Removal (2504.036).
 - A minimum of one barrier in each airlock is closed.
 - Each penetration providing access from Containment to the outside atmosphere, is closed by a valve, blank flange, or other approved closure mechanism. Opening of systems inside Containment may create a Containment breach potential that is NOT readily apparent. An example would be an opening of the S/G secondary side manways thus expanding closure concerns to piping and valves up to the MSIVs.

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4.7 Containment Integrity (Unit 1): CONTAINMENT INTEGRITY shall exist when:

- All penetrations required to be closed during accident conditions are either:
 - a. Capable of being closed by an OPERABLE containment automatic isolation valve system, or
 - b. Closed by manual valves, blind flanges, or deactivated automatic valves secured in their closed positions, except for valves that are open under administrative control as permitted by Technical Specification 3.6.3.1.
- All equipment hatches are closed and sealed.
- Each airlock is OPERABLE pursuant to Technical Specification 3.6.2.
- The containment leakage rates are within the limits of Technical Specification 3.6.1.
- The sealing mechanism associated with each penetration (e.g., welds, bellows or O-rings) is OPERABLE.

4.8 Containment Integrity (Unit 2): CONTAINMENT INTEGRITY shall exist when:

- All penetrations required to be closed during accident conditions are either:
 - a. Capable of being closed by an OPERABLE containment automatic isolation valve system, or
 - b. Closed by manual valves, blind flanges, or deactivated automatic valves secured in their closed positions, except for valves that are open under administrative control as permitted by Technical Specification 3.6.3.1.
- All equipment hatches are closed and sealed.
- Each airlock is OPERABLE pursuant to Technical Specification 3.6.1.3.
- The containment leakage rates are within the limits of Technical Specification 3.6.1.2.
- The sealing mechanism associated with each penetration (e.g., welds, bellows or O-rings) is OPERABLE.

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

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4.10 Emergency Action Level: Alarms, instrument readings or visual sightings that have exceeded pre-determined limits which would categorize the situation into an initiating condition of one of the following four Emergency Classes:

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

4.10.1 Notification of Unusual Event: Unusual events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

4.10.2 Alert: Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

4.10.3 Site Area Emergency: Events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public. Any releases are not expected to exceed EPA Protective Action Guideline exposure levels except near the site boundary.

4.10.4 General Emergency: Events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with the potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels off site for more than the immediate site area.

{OCAN068320} 4.11 [Emergency Direction and Control: Overall direction of facility response which must include the non-delegable responsibilities for the decision to notify and to recommend protective actions to Arkansas Department of Health personnel and other authorities responsible for offsite emergency measures. With activation of the EOF, the EOF Director typically assumes the responsibility for Emergency Direction and Control. The management of on-site facility activities to mitigate accident consequences remains with the TSC Director in the Technical Support Center. The Shift Manager retains responsibility for the Control Room and plant systems operation.]

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- 4.12 Emergency Operations Facility (EOF): A near-site emergency response facility located approximately 0.65 miles northeast of the reactor buildings (the ANO Training Center).
- 4.13 Emergency Planning Zone (EPZ): The EPZ considered by this procedure is the inhalation zone and is that area within approximately a 10 mile radius of ANO.
- 4.14 Emergency Response Organization (ERO): The organization which is composed of the Initial Response Staff (IRS), the EOF staff, the TSC staff, the OSC staff, and the Emergency Team members. It has the capability to provide manpower and other resources necessary for immediate and long-term response to an emergency situation.
- 4.15 EPA Protective Action Guideline (PAG) Exposure Levels: The projected dose to reference man, or other defined individual, from an unplanned release of radioactive material at which a specific protective action to reduce or avoid that dose is recommended (i.e., 1 Rem TEDE or 5 Rem Child Thyroid (CDE)).
- 4.16 Exclusion Area: That area surrounding ANO within a minimum radius of 0.65 miles of the reactor buildings, but outside the protected area and controlled to the extent necessary by ANO during periods of emergency.
- 4.17 Explosion: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.
- 4.18 Extortion: An attempt to cause an action at the station by threat of force.
- 4.19 Faulted: In a steam generator, the existence of secondary side leakage that results in an uncontrolled decrease in steam generator pressure or the steam generator being completely depressurized.
- 4.20 Fire: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.
- 4.21 Hostage: A person(s) held as leverage against the station to ensure that demands will be met by the station.
- 4.22 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.

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- 4.23 Immediately Dangerous To Life and Health (IDLH): A condition that either poses an immediate threat to life and health or an immediate threat of severe exposure to contaminants which are likely to have adverse delayed effects on health.
- 4.24 Independent Spent Fuel Storage Installation (ISFSI): A complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage.
- 4.25 Initial Response Staff (IRS): The emergency organization composed of plant personnel which must be able to respond to the site in accordance with Table B-1 of the Emergency Plan.
- 4.26 Initiating Condition (IC): One of a predetermined subset of nuclear power plant conditions where either the potential exists for a radiological emergency, or such an emergency has occurred.
- 4.27 Intrusion/Intruder: A person(s) present in a specified area without authorization. Discovery of a BOMB in a specified area is indication of INTRUSION into that area by a HOSTILE FORCE.
- 4.28 Lower Flammability Limit (LFL): The minimum concentration of combustible substance that is capable of propagating a flame through a homogenous mixture of the combustible and a gaseous oxidizer.
- 4.29 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 abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.
- 4.30 Normal Makeup (MU) Capacity: Normal MU capacity is defined as the maximum expected water addition to the RCS through the MU line with the letdown line isolated. This amount will vary with RCS pressure.
- 4.31 Offsite: Those areas outside the Exclusion Area boundary.
- 4.32 Onsite: The area within the Exclusion Area boundary.
- 4.33 Operational Support Center (OSC): Emergency response center within the ANO Maintenance Facility where support is coordinated for the following functions:
- Onsite Radiological Monitoring
 - Maintenance
 - Nuclear Chemistry
 - Emergency Medical Support
 - Fire Fighting Support

The OSC also serves as the briefing area for repair and damage control teams and is located in the Maintenance Facility.

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4.34 PLANT TRANSIENT:

- 4.34.1 Any unplanned reactor trip from criticality.
- 4.34.2 A planned reactor trip in which the expected post-trip response did not occur.
- 4.34.3 Any event resulting in an automatic ESAS (Unit 1) or ESF (Unit 2) actuation or any event requiring manual initiation of these systems where automatic initiation would likely have occurred.
- 4.34.4 Any turbine-generator power change in excess of 100 MWe in less than one (1) minute other than a momentary spike due to a grid disturbance or a manually initiated runback.
- 4.34.5 Any unplanned main turbine or main feedwater pump turbine trip which results in a significant plant transient (change in excess of 100 MWe).
- 4.35 Protected Area: The area encompassed by physical barriers (i.e., the security fence) and to which access is controlled.
- 4.36 RCS Leakage: 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.
- 4.37 Ruptured: In a steam generator, existence of primary-to-secondary leakage of a magnitude sufficient to require or cause a reactor trip and safety injection.
- 4.38 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.
- 4.39 Significant Transient: An UNPLANNED event involving one or more of the following: (1) automatic turbine runback greater than 25% thermal reactor power, (2) electrical load rejection greater than 25% full electrical load, (3) Reactor Trip, (4) Safety Injection Activation, or (5) thermal power oscillations greater than 10%
- 4.40 Strike Action: A work stoppage within the PROTECTED AREA by a body of workers to enforce compliance with demands made on the company. The STRIKE ACTION must threaten to interrupt NORMAL PLANT OPERATIONS.
- 4.41 Technical Support Center (TSC): The location within the ANO Administration Building equipped with instrumentation and communication systems and facilities useful in monitoring the course of an accident; this center is located in the 3rd Floor of the ANO Administration Building.

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- 4.42 Unplanned: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.
- 4.43 Valid: An indication, report, or condition, is considered to be VALID when it is verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel, such that doubt related to the indicator's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.
- 4.44 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 affected safety 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.

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4.45 Vital Area: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

5.0 RESPONSIBILITY AND AUTHORITY

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

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

5.3 Any individual who observes an initiating condition which warrants an emergency class declaration, as described in Attachment 3, shall immediately notify the person with current responsibility for Emergency Direction and Control (i.e. SM/TSC Director/EOF Director).

6.0 INSTRUCTIONS

NOTE

On emergencies that affect both units such as earthquakes, tornadoes, etc., the unit with the highest Emergency Classification should declare the emergency.

6.1 CLASSIFYING EMERGENCIES:

NOTE

NRC guidelines recommend that once indications are available to ANO staff that an EAL has been exceeded, a 15 minute goal is a reasonable period of time for assessing and classifying an emergency.

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

- A. Verify the indications of the off-normal event or reported sighting.
- B. Ensure that the immediate actions (e.g., use of Emergency and Abnormal Operating Procedures) are taken for the safe and proper operation of the plant.
- C. Compare the abnormal conditions with those listed in the "Index of Emergency Action Levels".
- D. Turn to the appropriate tab which corresponds to the condition picked from the Index of EALs.

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- E. Assess the information available from valid indications or reports, then:
1. Compare information to criteria given for EAL.
 2. Review any Related EALs to determine if the abnormal conditions meet those criteria.
 3. Declare the emergency classification that is indicated. If it appears that different classifications could be made for the current plant conditions, the highest classification indicated should be the one that is declared.

NOTE

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

- 6.1.2 Due to the speed in which events sometimes progress and the duty of the plant operators to take immediate corrective actions, an event may occur which was classifiable as an emergency, however, prior to offsite notifications the corrective actions taken may have removed the conditions that would have resulted in an emergency declaration. In this situation, it is not necessary to make an actual declaration of the emergency class, but an ENS notification to the NRC within one hour of the discovery of the undeclared event will provide an acceptable alternative. A courtesy call shall be made to ADH. Subsequent activation of response organization should be based upon the current plant conditions.
- 6.1.3 If no emergency declaration is required, then refer to procedure 1903.011, "Emergency Response/Notifications", Section 6.4, to determine if the event warrants a "For Information Only" notification to Entergy Management, NRC Resident Inspector and/or the Arkansas Department of Health.
- 6.1.4 Upon declaration of an emergency classification implement procedure, 1903.011, "Emergency Response Notifications", to ensure that immediate notification requirements are met and the proper Emergency Plan response is taken.
- 6.1.5 Upgrade the emergency classification if plant conditions degrade per steps 6.1.1.A through E.
- 6.1.6 Downgrade the emergency classification when plant conditions have improved and step 6.2 is applicable.

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6.2 DOWNGRADING THE EMERGENCY CLASSIFICATION:

- 6.2.1 Assess the current plant conditions, then perform the following:
- A. Compare the abnormal conditions with those listed in the "Index of Emergency Action Levels".
 - B. Turn to the appropriate tab which corresponds to the condition picked from the Index of EALs.
 - C. Assess the information available from valid indications or reports; compare it to the given EALs. Obtain concurrence from NRC and State officials that downgrading is appropriate (if their emergency response organizations have been activated as a result of this event). Downgrade to the emergency classification that is indicated.
 - D. If the indications or reports do not match the given EALs, then refer to the Miscellaneous Tab and using appropriate judgment, determine if the plant status warrants downgrading the emergency classification.
- 6.2.2 Perform notifications to downgrade the emergency classification if appropriate per procedure 1903.011, "Emergency Response/Notifications".
- 6.2.3 If no emergency classification appears necessary, then terminate the emergency per step 6.3.
- 6.2.4 If the emergency classification is still required, repeat steps 6.2.1 through 6.2.3 whenever plant conditions again appear to have improved.

6.3 TERMINATING THE EMERGENCY:

- 6.3.1 Compare the existing plant conditions with the following:
- A. Plant conditions no longer meet the emergency action level criteria AND it appears unlikely that current conditions will degrade further requiring reinstatement of an emergency classification.
 - B. Non-routine releases of radioactive material to the environment are under control or terminated.
 - C. Any fire, flood, earthquake, or similar emergency condition is controlled or has ceased.

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- D. All specified corrective actions have occurred OR the plant has been placed in the appropriate operational mode.
- E. All required notifications have been completed.
- F. NRC and State officials are in agreement that termination or transition to the recovery phase is appropriate (if their emergency response organizations have been activated as a result of this event).

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

7.0 ATTACHMENTS AND FORMS

- 7.1 Attachment 1: Index of EALs
- 7.2 Attachment 2: EAL Matrix
- 7.3 Attachment 3: Emergency Action Levels

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ATTACHMENT 1

NOTE

Once available plant parameters reach an Emergency Action Level (EAL), classifications should be made within 15 minutes.

Index of Emergency Action Levels

Abnormal Rad Levels / Radiological Effluent		Basis	Upgrade
AG1	Offsite Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 1000 mR TEDE or 5000 mR child thyroid CDE for the actual or projected duration of the release using actual meteorology.	Pg. 52	
AS1	Offsite Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 100 mR TEDE or 500 mR child thyroid CDE for the Actual or Projected Duration of the Release.	Pg. 49	
AA1	Any UNPLANNED Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds 200 Times the Radiological Effluent ODCM limits for 15 Minutes or Longer.	Pg. 42	AS1
AA2	Damage to irradiated fuel or loss of water level that has or will result in uncovering irradiated fuel.	Pg. 45	AS1
AA3	Release of Radioactive Material or elevated Radiation Levels Within the Facility That Impedes Operation of Systems Required to Maintain Safe Operations or to Establish or Maintain Cold Shutdown	Pg. 47	
AU1	Any UNPLANNED Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds Two Times the Radiological Effluent ODCM limits for 60 Minutes or Longer.	Pg. 37	AA1
AU2	Unexpected rise in plant radiation	Pg. 40	AA3
Cold Shutdown / Refueling System Malfunction			
CG1	Loss of reactor vessel inventory affecting fuel clad integrity with containment challenged with irradiated fuel in the reactor vessel.	Pg. 76	
CS1	Loss of reactor vessel inventory affecting core decay heat removal capability	Pg. 72	
CS2	Loss of reactor vessel inventory affecting core decay heat removal capability with irradiated fuel in the reactor vessel	Pg. 74	CG1 AG1
CA1	Loss of RCS inventory.	Pg. 65	CS1
CA2	Loss of reactor vessel inventory with irradiated fuel in the reactor vessel.	Pg. 67	CS2
CA3	Loss of all offsite power and loss of all onsite AC power to required 4.16KV busses	Pg. 69	AS1 HS1
CA4	Inability to maintain plant in cold shutdown with irradiated fuel in the reactor vessel.	Pg. 70	CS1
CU1	RCS leakage.	Pg. 55	CA1 CA3
CU2	UNPLANNED loss of RCS inventory with irradiated fuel in the reactor vessel.	Pg. 56	CA2 CA4
CU3	Loss of all offsite power to vital busses for greater than 15 minutes	Pg. 58	
CU4	UNPLANNED loss of decay heat removal capability with irradiated fuel in the reactor vessel.	Pg. 59	CA1 CA3
CU5	Fuel clad degradation	Pg. 61	
CU6	UNPLANNED loss of all onsite or offsite communications capabilities.	Pg. 62	
CU7	UNPLANNED loss of required DC power for greater than 15 minutes.	Pg. 63	CA3
CU8	Inadvertent criticality.	Pg. 64	HA2

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ATTACHMENT 1

NOTE

Once available plant parameters reach an Emergency Action Level (EAL), classifications should be made within 15 minutes.

Index of Emergency Action Levels

Events Related to ISFSI Malfunction			
E-HU1	Damage to a loaded cask CONFINEMENT BOUNDARY.	Pg. 79	
E-HU2	Confirmed security event with potential loss of level of safety of the ISFSI	Pg. 81	
Fission Product Barrier Degradation			
FG1	Loss of ANY two barriers AND loss or potential loss of third barrier.	Pg. 85	
FS1	Loss or potential loss of ANY two barriers.	Pg. 84	
FA1	ANY loss or ANY potential loss of EITHER fuel clad OR RCS.	Pg. 83	
FU1	ANY loss or ANY potential loss of containment.	Pg. 82	
Hazards and Other Conditions Affecting Plant Safety			
HG1	Security event resulting in loss of physical control of the facility.	Pg. 129	
HG2	Other conditions existing which in the judgment of the SM/TSC Director/EOF Director warrant declaration of General Emergency.	Pg. 130	
HS1	Confirmed security event in a plant VITAL AREA	Pg. 126	HG1
HS2	Other conditions existing which in the judgment of the SM/TSC Director/EOF Director warrant declaration of Site Area Emergency.	Pg. 127	
HS3	Control Room evacuation has been initiated and plant control cannot be established.	Pg. 128	HG2 FG1 AG1
HA1	Confirmed security event within a plant PROTECTED AREA.	Pg. 116	HS1
HA2	Other conditions existing which in the judgment of the SM/TSC Director/EOF Director warrant declaration of an Alert.	Pg. 117	
HA3	Control Room evacuation has been initiated.	Pg. 118	HS3
HA4	FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown.	Pg. 119	SS1 FS1 AS1 HS2
HA5	Release of toxic or flammable gases within or adjacent to a VITAL AREA which jeopardizes operation of systems required to establish or maintain safe shutdown.	Pg. 121	SS1 FS1 AS1 HS2
HA6	Natural and destructive phenomena affecting the plant VITAL AREA.	Pg. 123	
HU1	Confirmed security event which indicates a potential degradation in the level of safety of the plant.	Pg. 110	HA1
HU2	Other conditions existing which in the judgment of the SM/TSC Director/EOF Director warrant declaration of an NUE.	Pg. 111	
HU4	FIRE within PROTECTED AREA boundary not extinguished within 15 Minutes of detection.	Pg. 112	HA4
HU5	Release of toxic or flammable gases deemed detrimental to normal operation of the plant.	Pg. 113	HA3
HU6	Natural and destructive phenomena affecting the PROTECTED AREA.	Pg. 114	HA6

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ATTACHMENT 1

NOTE

Once available plant parameters reach an Emergency Action Level (EAL), classifications should be made within 15 minutes.

Index of Emergency Action Levels

System Malfunction			
SG1	Prolonged loss of all offsite power and prolonged loss of all onsite AC power to Vital 4.16KV busses.	Pg. 153	
SG2	Failure of the Reactor Protection System to complete an automatic trip and manual trip was NOT successful and there is indication of an extreme challenge to the ability to cool the core.	Pg. 155	
SS1	Loss of all offsite power and loss of all onsite AC power to Vital 4.16KV busses.	Pg. 146	FG1 SG1
SS2	Failure of reactor protection system instrumentation to complete or initiate an automatic reactor trip once a Reactor Protection System setpoint has been exceeded and manual trip was NOT successful.	Pg. 148	FG1 HG1
SS3	Loss of all vital DC power.	Pg. 149	AG1 FG1
SS4	Complete loss of heat removal capability	Pg. 150	AG1 FG1
SS6	Inability to monitor a TRANSIENT in progress.	Pg. 151	
SA2	Failure of Reactor Protection System instrumentation to complete or initiate an automatic reactor trip once a reactor protection system setpoint has been exceeded and manual trip was successful.	Pg. 141	SS2
SA4	UNPLANNED loss of most or all safety system annunciation or indication in control room with either (1) a PLANT TRANSIENT in progress, or (2) SPDS and PMS dynamic alarm functions are unavailable.	Pg. 142	SS6
SA5	AC power capability to Vital 4.16KV busses reduced to a single power source for greater than 15 minutes such that any additional single failure would result in station blackout.	Pg. 144	SS1
SU1	Loss of all offsite power to Vital 4.16KV busses for greater than 15 Minutes.	Pg. 131	SA5
SU2	Inability to reach required shutdown within Technical Specification limits.	PG. 133	
SU3	UNPLANNED loss of most or all safety system annunciation or indication in the control room for greater than 15 minutes.	Pg. 134	SA4
SU4	Fuel clad degradation.	Pg. 136	
SU5	RCS leakage.	Pg. 137	FA1
SU6	UNPLANNED loss of all onsite or offsite communications capabilities.	Pg. 138	
SU8	Inadvertent criticality.	Pg. 140	FA1 HA2

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT																																																																																																																																																																																														
ABNORMAL RADIATION LEVELS/EFFLUENT RELEASES																																																																																																																																																																																																				
Radiological Effluent	<p>AG1 Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 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: <i>Note: If dose assessment results are available at the time of declaration, the classification should be based on EAL #2 instead of EAL #1. While necessary declarations should not be delayed awaiting results, the dose assessment should be initiated/completed in order to determine if the classification should be subsequently escalated.</i></p> <p>1. VALID reading on Channel 9 of one or more of the following radiation monitors that exceeds or is expected to exceed the reading shown for 15 minutes or longer:</p> <table border="1"> <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>Emergency 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>Emergency Penetration Room</td><td>8.84E+3 µCi/cc</td></tr> <tr><td>2RX-9840</td><td>Post Accident Sampling 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>Low Level Radwaste Storage Bldg.</td><td>1.77E+3 µCi/cc</td></tr> </tbody> </table> <p style="text-align: center;">OR</p> <p>2. Dose assessment using actual meteorology indicates doses greater than 1000 mR TEDE or 5000 mR child thyroid CDE at or beyond the site boundary.</p> <p style="text-align: center;">OR</p> <p>3. Field survey results indicate closed-window dose rates exceeding 1000 mR/hr expected to continue for more than one hour; or analyses of field survey samples indicate child thyroid CDE of 5000 mR for 60 minutes of inhalation, at or beyond site boundary.</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	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 Bldg.	1.77E+3 µCi/cc	<p>AS1 Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 100 mR TEDE or 500 mR child thyroid CDE for the actual or projected duration of the release</p> <p>Emergency Action Level: <i>Note: If dose assessment results are available at the time of declaration, the classification should be based on EAL #2 instead of EAL #1. While necessary declarations should not be delayed awaiting results, the dose assessment should be initiated/completed in order to determine if the classification should be subsequently escalated.</i></p> <p>1. 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Plant Modes (white boxes indicate applicable modes)

- 1 Power Operation
 2 Startup
 3 Hot Standby
 4 Hot Shutdown
 5 Cold Shutdown
 6 Refueling
 D Defueled

GENERAL EMERGENCY SITE AREA EMERGENCY ALERT UNUSUAL EVENT

ABNORMAL RADIATION LEVELS/EFFLUENT RELEASES

Abnormal Radiation Levels	<p>AA2 Damage to irradiated fuel or loss of water level that has or will result in the uncovering of irradiated fuel outside the reactor vessel 1 2 3 4 5 6 D</p> <p><u>Emergency Action Level:</u> 1. A VALID alarm on one or more of the following radiation monitors:</p> <table border="1" style="width: 100%;"> <tr><th colspan="2">Unit 1</th></tr> <tr><td>RX-9820</td><td>Containment Purge (Channel 7 or 9)</td></tr> <tr><td>RX-9825</td><td>Radwaste Area (Channel 7 or 9)</td></tr> <tr><td>RX-9830</td><td>Fuel Handling Area (Channel 7 or 9)</td></tr> <tr><td>RE-8060</td><td>Containment High Range Radiation Monitors</td></tr> <tr><td>RE-8061</td><td>Containment High Range Radiation Monitors</td></tr> <tr><td>RE-8009</td><td>Spent Fuel Area</td></tr> <tr><td>RE-8017</td><td>Fuel Handling</td></tr> <tr><th colspan="2">Unit 2</th></tr> <tr><td>2RX-9820</td><td>Containment Purge (Channel 7 or 9)</td></tr> <tr><td>2RX-9825</td><td>Radwaste Area (Channel 7 or 9)</td></tr> <tr><td>2RX-9830</td><td>Fuel Handling Area (Channel 7 or 9)</td></tr> <tr><td>2RE-8925-1</td><td>Containment High Range Radiation Monitors</td></tr> <tr><td>2RE-8925-2</td><td>Containment High Range Radiation Monitors</td></tr> <tr><td>2RE-8914</td><td>Spent Fuel Area</td></tr> <tr><td>2RE-8915</td><td>Spent Fuel Area</td></tr> <tr><td>2RE-8916</td><td>Spent Fuel Area</td></tr> <tr><td>2RE-8912</td><td>Containment Incore Inst.</td></tr> </table> <p style="text-align: center;">OR</p> <p>2. Water level drop in the refueling canal or spent fuel pool exceeds makeup capacity such that irradiated fuel has or will become uncovered.</p>	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-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.		<p>AU2 Unexpected rise in plant radiation 1 2 3 4 5 6 D</p> <p><u>Emergency Action Level:</u> 1. VALID indication of uncontrolled water level drop in the refueling canal or spent fuel pool with all irradiated fuel assemblies remaining covered by water.</p> <p style="text-align: center;">AND</p> <p>Unplanned VALID area radiation monitor reading rise</p> <table border="1" style="width: 100%;"> <tr><th colspan="2">Unit 1</th></tr> <tr><td>RE-8009</td><td>Spent Fuel Area</td></tr> <tr><td>RE-8017</td><td>Fuel Handling Area</td></tr> <tr><th colspan="2">Unit 2</th></tr> <tr><td>2RE-8914</td><td>Spent Fuel Area</td></tr> <tr><td>2RE-8915</td><td>Spent Fuel Area</td></tr> <tr><td>2RE-8916</td><td>Spent Fuel Area</td></tr> <tr><td>2RE-8912</td><td>Containment Incore Instrumentation</td></tr> </table> <p style="text-align: center;">OR</p> <p>2. Unplanned VALID area radiation monitor readings rise by a factor of 1000 over normal* levels.</p> <p><small>*Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.</small></p>	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
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	<p>AA3 Release of radioactive material or elevated radiation levels within the facility that impede operation of systems required to maintain safe operations or to establish or maintain cold shutdown 1 2 3 4 5 6 D</p> <p><u>Emergency Action Level:</u> 1. VALID radiation readings greater than 15 mR/hr in areas requiring continuous occupancy to maintain plant safety functions such as Control Room, TSC, Controlled Access Area entry control point, Security Central Alarm Station (CAS).</p> <p style="text-align: center;">OR</p> <p>2. VALID radiation readings greater than 5000 mR/hr in plant vital areas requiring infrequent access to maintain plant safety functions and access is required for safe plant operation, but is impeded due to radiation dose rates.</p>																																																						

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT	
COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION							
Loss of Reactor Pressure Vessel Inventory	CG1	Loss of reactor vessel inventory affecting fuel clad integrity with containment challenged with irradiated fuel in the reactor vessel	5	6	CS1	Loss of reactor vessel inventory affecting core decay heat removal capability	5
	<p><u>Emergency Action Level:</u></p> <p>1. Loss of reactor vessel inventory as indicated by unexplained Reactor Building Sump, Reactor Drain Tank, Quench Tank, Aux. Building Equipment Drain Tank, or Aux. Building Sump level rise.</p> <p style="text-align: center;">AND</p> <p>2. Reactor vessel level cannot be monitored for greater than 30 minutes with indication of core uncover, as evidenced by one or more of the following:</p> <ul style="list-style-type: none"> • Erratic source range monitor indication. • Core exit thermocouples indicating superheat. <p style="text-align: center;">AND</p> <p>3. Indication of CONTAINMENT challenged as indicated by one or more of the following:</p> <ul style="list-style-type: none"> • Containment hydrogen greater than or equal to 4%. • Pressure above 59 psig (Unit 1) or 73.7 psia (Unit 2) with CONTAINMENT INTEGRITY. • CONTAINMENT CLOSURE not established. 		<p><u>Emergency Action Level:</u></p> <p>1. With CONTAINMENT CLOSURE <u>not</u> established:</p> <p>a. Loss of reactor vessel inventory is indicated by unexplained Reactor Building Sump, Reactor Drain Tank, Quench Tank, Aux. Building Equipment Drain Tank, or Aux. Building Sump level rise.</p> <p style="text-align: center;">AND</p> <p>b. Reactor vessel level cannot be monitored for greater than 30 minutes.</p> <p style="text-align: center;">OR</p> <p>2. With CONTAINMENT CLOSURE established:</p> <p>a. loss of reactor vessel inventory is indicated by either:</p> <ul style="list-style-type: none"> • Unexplained Reactor Building Sump, Reactor Drain Tank, Quench Tank, Aux. Building Equipment Drain Tank, or Aux. Building Sump level rise. • Erratic source range monitor indication. • Core exit thermocouples indicating superheat. <p style="text-align: center;">AND</p> <p>b. Reactor vessel level cannot be monitored for greater than 30 minutes.</p>		<p>CA1 Loss of RCS inventory</p> <p><u>Emergency Action Level:</u></p> <p>1. a. Loss of reactor vessel inventory as indicated by unexplained Reactor Building Sump, Reactor Drain Tank, Aux. Building Equipment Drain Tank, Aux. Building Sump, or Quench Tank level rise.</p> <p style="text-align: center;">AND</p> <p>b. RCS level cannot be monitored for greater than 15 minutes.</p>		<p>CU1 RCS leakage</p> <p><u>Emergency Action Level:</u></p> <p>1. Unidentified or pressure boundary leakage greater than 10 gpm.</p> <p style="text-align: center;">OR</p> <p>2. Identified leakage greater than 25 gpm.</p>

Plant Modes (white boxes indicate applicable modes)

1 Power Operation

2 Startup

3 Hot Standby

4 Hot Shutdown

5 Cold Shutdown

6 Refueling

D Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION				
Loss of Reactor Pressure Vessel Inventory	<p>CG1 Loss of reactor vessel inventory affecting fuel clad integrity with containment challenged with irradiated fuel in the reactor vessel [][][][]5[]6[]</p> <p><u>Emergency Action Level:</u></p> <p>1. Loss of reactor vessel inventory as indicated by unexplained Reactor Building Sump, Reactor Drain Tank, Quench Tank, Aux. Building Equipment Drain Tank, or Aux. Building Sump level rise.</p> <p style="text-align: center;">AND</p> <p>2. Reactor vessel level cannot be monitored for greater than 30 minutes with indication of core uncover, as evidenced by one or more of the following:</p> <ul style="list-style-type: none"> • Erratic source range monitor indication. • Core exit thermocouples indicating superheat. <p style="text-align: center;">AND</p> <p>3. Indication of CONTAINMENT challenged as indicated by one or more of the following:</p> <ul style="list-style-type: none"> • Containment hydrogen greater than or equal to 4%. • Pressure above 59 psig (Unit 1) or 73.7 psia (Unit 2) with CONTAINMENT INTEGRITY. • CONTAINMENT CLOSURE not established. 	<p>CS2 Loss of reactor vessel inventory affecting core decay heat removal capability with irradiated fuel in the reactor vessel [][][][]6[]</p> <p><u>Emergency Action Level:</u></p> <p>1. With CONTAINMENT CLOSURE not established:</p> <p style="padding-left: 20px;">a. Loss of reactor vessel inventory is indicated by unexplained Reactor Building Sump, Reactor Drain Tank, Quench Tank, Aux. Building Equipment Drain Tank, or Aux. Building Sump level rise.</p> <p style="text-align: center;">AND</p> <p style="padding-left: 20px;">b. Reactor vessel level cannot be monitored for greater than 30 minutes.</p> <p style="text-align: center;">OR</p> <p>2. With CONTAINMENT CLOSURE established:</p> <p style="padding-left: 20px;">a. Loss of reactor vessel inventory is indicated by either:</p> <ul style="list-style-type: none"> • Unexplained Reactor Building Sump, Reactor Drain Tank, Quench Tank, Aux. Building Equipment Drain Tank, or Aux. Building Sump level rise. • Erratic source range monitor indication. • Core exit thermocouples indicating superheat. <p style="text-align: center;">AND</p> <p style="padding-left: 20px;">b. Reactor vessel level cannot be monitored for greater than 30 minutes.</p>	<p>CA2 Loss of reactor vessel inventory with irradiated fuel in the reactor vessel [][][][]6[]</p> <p><u>Emergency Action Level:</u></p> <p>1. a. Loss of reactor vessel inventory as indicated by unexplained Reactor Building Sump, Reactor Drain Tank, Aux. Building Equipment Drain Tank, Aux. Building Sump, or Quench Tank level rise.</p> <p style="text-align: center;">AND</p> <p style="padding-left: 20px;">b. Reactor vessel level cannot be monitored for greater than 15 minutes.</p>	<p>CU2 UNPLANNED loss of RCS inventory with irradiated fuel in the reactor vessel [][][][]6[]</p> <p><u>Emergency Action Level:</u></p> <p>1. UNPLANNED RCS level drop below the reactor vessel flange greater than 15 minutes.</p> <p style="text-align: center;">OR</p> <p>2. a. Loss of reactor vessel inventory as indicated by unexplained Reactor Building Sump, Reactor Drain Tank, Aux. Building Equipment Drain Tank, Aux. Building Sump, or Quench Tank level rise.</p> <p style="text-align: center;">AND</p> <p style="padding-left: 20px;">b. Reactor vessel level cannot be monitored.</p>

Plant Modes (white boxes indicate applicable modes)

- | | | | | | | |
|-----------------|---------|-------------|--------------|---------------|-----------|----------|
| 1 | 2 | 3 | 4 | 5 | 6 | D |
| Power Operation | Startup | Hot Standby | Hot Shutdown | Cold Shutdown | Refueling | Defueled |

GENERAL EMERGENCY		SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION				
Loss of Power			<p>CA3 Loss of all offsite power and loss of all onsite AC power to required 4.16KV busses <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 5 6 D</p> <p><u>Emergency Action Level:</u></p> <p>1. a. Loss of power to <u>all</u> unit auxiliary and startup transformers supplying a unit.</p> <p style="text-align: center;">AND</p> <p>b. <u>No</u> diesel generator is supplying power to emergency busses on the affected unit.</p> <p style="text-align: center;">AND</p> <p>c. Failure to restore power to at least one emergency bus within 15 minutes from the time of loss of both offsite and onsite AC power.</p>	<p>CU3 Loss of all offsite power to vital busses for greater than 15 minutes <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 5 6 D</p> <p><u>Emergency Action Level:</u></p> <p>1. a. Loss of power to <u>all</u> unit auxiliary and startup transformers supplying a unit for greater than 15 minutes.</p> <p style="text-align: center;">AND</p> <p>b. At least <u>one</u> vital 4.16 KV bus being powered from <u>ANY</u> diesel generator.</p>
	Loss of Decay Heat Removal			<p>CA4 Inability to maintain plant in cold shutdown with irradiated fuel in the reactor vessel <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 5 6</p> <p><u>Emergency Action Level:</u></p> <p>1. With CONTAINMENT CLOSURE <u>and</u> RCS integrity not established an UNPLANNED event results in RCS temperature exceeding 200°F.</p> <p style="text-align: center;">OR</p> <p>2. With CONTAINMENT CLOSURE established</p> <p style="text-align: center;">AND</p> <p>RCS integrity <u>not</u> established <u>OR</u> RCS inventory reduced, an UNPLANNED event results in RCS temperature exceeding 200°F for greater than 20 minutes¹.</p> <p style="text-align: center;">OR</p> <p>3. An UNPLANNED event results in RCS temperature exceeding 200°F for greater than 60 minutes¹ or results in an RCS pressure rise of greater than 10 psi.</p> <p>¹Note: <u>IF</u> decay heat removal system (Decay Heat or Shutdown Cooling) is in operation within this time frame <u>AND</u> RCS temperature is being reduced, <u>THEN</u> this EAL is not applicable.</p>

Plant Modes (white boxes indicate applicable modes)

- 1 Power Operation
 2 Startup
 3 Hot Standby
 4 Hot Shutdown
 5 Cold Shutdown
 6 Refueling
 D Defueled

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT																		
COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION																								
Fuel Clad Degradation						CU5 Fuel clad degradation <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Emergency Action Level: 1. RCS sample activity value indicating fuel clad degradation greater than Technical Specification allowable limits. Unit 1: Greater than 3.5 µCi/gm IDE Greater than 72/É µCi/gm Gross Activity Unit 2: Greater than 1.0 µCi/gm IDE Greater than 100/É µCi/gm Gross Activity																	
Loss of Communications						CU6 UNPLANNED loss of all onsite <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> or offsite communications capabilities	Emergency Action Level: 1. Loss of all onsite communications capability (Table C1) affecting the ability to perform routine operations. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><th colspan="2">Table C1</th></tr> <tr><th colspan="2">Onsite Communications Equipment</th></tr> <tr><td>Station radio system</td></tr> <tr><td>Plant paging system</td></tr> <tr><td>In-plant telephones</td></tr> <tr><td>Plant cell phones</td></tr> <tr><td>Gaitronics</td></tr> </table> <p style="text-align: center;">OR</p> 2. Loss of all offsite communications capability (Table C2). <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><th colspan="2">Table C2</th></tr> <tr><th colspan="2">Offsite Communications Equipment</th></tr> <tr><td>All telephone lines (commercial and microwave)</td></tr> <tr><td>Station radio system</td></tr> <tr><td>ENS</td></tr> <tr><td>Cellular phones</td></tr> </table>	Table C1		Onsite Communications Equipment		Station radio system	Plant paging system	In-plant telephones	Plant cell phones	Gaitronics	Table C2		Offsite Communications Equipment		All telephone lines (commercial and microwave)	Station radio system	ENS	Cellular phones
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Plant Modes (white boxes indicate applicable modes) Power Operation Startup Hot Standby Hot Shutdown Cold Shutdown Refueling Defueled

Attachment 2

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION			
Loss of DC Power			<p>CU7 UNPLANNED loss of required DC power for greater than 15 minutes [][][][] 5 6 []</p> <p><u>Emergency Action Level:</u></p> <p>1. a. UNPLANNED loss of vital DC power to required DC busses based on bus voltage indicating 105 volts or less.</p> <p style="text-align: center;">AND</p> <p>b. Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.</p>
Inadvertent Criticality			<p>CU8 Inadvertent criticality [][][][] 5 6 []</p> <p><u>Emergency Action Level:</u></p> <p>1. An UNPLANNED sustained positive startup rate observed on nuclear instrumentation.</p>

Plant Modes (white boxes indicate applicable modes)
 1 Power Operation
 2 Startup
 3 Hot Standby
 4 Hot Shutdown
 5 Cold Shutdown
 6 Refueling
 D Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
ISFSI MALFUNCTION			
Cask Damage			<p>E-HU1 Damage to a loaded cask 1 2 3 4 5 6 D CONFINEMENT BOUNDARY</p> <p><u>Emergency Action Level:</u></p> <p>1. Natural phenomena events affecting a loaded cask CONFINEMENT BOUNDARY.</p> <ul style="list-style-type: none"> • Tornado/high winds • Flood <p style="text-align: center;"><u>OR</u></p> <p>2. Accident conditions affecting a loaded cask CONFINEMENT BOUNDARY.</p> <ul style="list-style-type: none"> • Cask drop accident • Blockage of air inlets • Fire or explosion <p style="text-align: center;"><u>OR</u></p> <p>3. Any condition in the opinion of the SMTSC Director/EOF Director that indicates loss of loaded fuel storage cask CONFINEMENT BOUNDARY.</p>
Security Event			<p>E-HU2 Confirmed security event with potential loss of level of safety of the ISFSI 1 2 3 4 5 6 D</p> <p><u>Emergency Action Level:</u></p> <p>1. Security event as determined from the ANO Safeguards Contingency Plan and reported by the ANO Security Shift Commander.</p>

Plant Modes (white boxes indicate applicable modes)

- | | | | | | | |
|--|------------------------------------|--|---|--|--------------------------------------|-------------------------------------|
| <input type="checkbox"/> 1 Power Operation | <input type="checkbox"/> 2 Startup | <input type="checkbox"/> 3 Hot Standby | <input type="checkbox"/> 4 Hot Shutdown | <input type="checkbox"/> 5 Cold Shutdown | <input type="checkbox"/> 6 Refueling | <input type="checkbox"/> D Defueled |
|--|------------------------------------|--|---|--|--------------------------------------|-------------------------------------|

GENERAL EMERGENCY:	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT									
FISSION PRODUCT BARRIER DEGRADATION												
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:5%; text-align: center;">Barrier</td> <td style="width:25%;"> FG1 Loss of ANY two barriers AND loss or potential loss of third barrier </td> <td style="width:10%; text-align: center;"> <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/> </td> </tr> </table>	Barrier	FG1 Loss of ANY two barriers AND loss or potential loss of third barrier	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/>	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%;"> FS1 Loss or potential loss of ANY two barriers </td> <td style="width:10%; text-align: center;"> <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/> </td> </tr> </table>	FS1 Loss or potential loss of ANY two barriers	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/>	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%;"> FA1 ANY loss or ANY potential loss of EITHER fuel clad or RCS </td> <td style="width:10%; text-align: center;"> <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/> </td> </tr> </table>	FA1 ANY loss or ANY potential loss of EITHER fuel clad or RCS	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/>	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%;"> FU1 ANY loss or ANY potential loss of containment. </td> <td style="width:10%; text-align: center;"> <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/> </td> </tr> </table>	FU1 ANY loss or ANY potential loss of containment.	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/>
Barrier	FG1 Loss of ANY two barriers AND loss or potential loss of third barrier	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/>										
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FA1 ANY loss or ANY potential loss of EITHER fuel clad or RCS	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/>											
FU1 ANY loss or ANY potential loss of containment.	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/>											

Plant Modes (white boxes indicate applicable modes)
1 Power Operation
2 Startup
3 Hot Standby
4 Hot Shutdown
5 Cold Shutdown
6 Refueling
D Defueled

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 an event or multiple events could occur which result in the conclusion that exceeding the loss or potential loss thresholds is imminent (i.e., within 2 hours). In this imminent loss situation use judgment and classify as if the thresholds are exceeded.

Fuel Clad Barrier EALS	RCS Barrier EALS	Containment Barrier EALS	
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS
1. Safety Function Status/Functional Recovery (FCB1)		1. Containment Pressure (CNB1)	
None	ANO-1: HPI Cooling is required to be initiated. ANO-2: Inadequate RCS heat removal via SGs leads to initiation of once-through cooling.	Rapid unexplained containment pressure loss following initial rise Containment parameters not consistent with expected event response	ANO-1: 73.7 PSIA (59 PSIG) and rising ANO-2: 73.7 PSIA and rising Containment Hydrogen concentration greater than 4.0% Containment pressure greater than containment spray actuation setpoint with less than one full train of spray operating
2. Primary Coolant Activity Level (FCB2)		2. Core Exit Thermocouples (CNB2)	
Coolant Activity GREATER THAN 300 µCi/gm dose equivalent I-131 activity by Chemistry sample ANO-1: Radiation levels at SA-229 indicate greater than 1000 mR/hr. ANO-2: Radiation levels at 2TCD-19 indicate greater than 1000 mR/hr.	None	None	ANO-1: Significant ICC exists as evidenced by CETs indicating superheated conditions and restoration procedures not effective within 15 minutes ANO-2: CETs greater than 1200°F and restoration procedures not effective within 15 minutes
3. Core Exit Thermocouple Readings (FCB3)		3. SG Secondary Side Release With Primary-to-Secondary Leakage (CNB3)	
ANO-1: Greater than or equal to 1200°F CET temperature Significant ICC exists as evidenced by CETs indicating superheated conditions ANO-2: Greater than or equal to 1200°F average CET temperature	ANO-1: ICC exists as evidenced by CETs indicating superheated conditions ANO-2: Average CETs indicate superheat for current RCS pressure	Primary-to-secondary leakrate greater than 10 gpm with nonisolable steam release from affected SG to the environment	None
4. Containment Radiation Monitoring (RCB4)			
1. Safety Function Status/Functional Recovery (RCB1)			
None	ANO-1: HPI Cooling is required to be initiated RCS Pressure greater than 2450 PSIG AND not lowering ANO-2: Inadequate RCS heat removal via SGs leads to initiation of once-through cooling. RCS Pressure greater than 2465 PSIA AND not lowering		
2. RCS Leak Rate (RCB2)			
RCS leakage greater than available makeup capacity as indicated by: ANO-1: Loss of adequate subcooling margin ANO-2: RCS subcooling (MTS) can NOT be maintained at least 30°F	ANO-1: RCS leakage exceeding normal makeup capacity (50 gpm) ANO-2: RCS leakage exceeding the capacity of one charging pump in the normal charging mode (44 gpm)		
3. SG Tube Rupture (RCB3)			
SGTR that results in an ECCS (SI) actuation	None		

Attachment 2

Fuel Clad Barrier EALS	
LOSS	POTENTIAL LOSS
4. Reactor Vessel Water Level (FCB4)	
None	If CET indication is unavailable AND all RCPs are secured, indication of core uncover : ANO-1: All RVLMS sensors indicate DRY following lowering trend ANO-2: RVLMS LVL6 indicates DRY following lowering trend
5. Containment Radiation Monitoring (FCB5)	
Containment high range rad monitor reading greater than 1000 R/hr.	None
6. Core Damage Assessment (FCB6)	
At least 5 % fuel clad damage as determined from core damage assessment	None
7. SM/TSC Director/EOF Director Judgment (FCB7)	
Any condition in the opinion of the SM/TSC Director/EOF Director that indicates Loss or Potential Loss of the fuel clad barrier based on: <ul style="list-style-type: none"> • Imminent barrier degradation (within 2 hours) due to degraded safety system performance • Degraded ability to monitor barrier 	

RCS Barrier EALS	
LOSS	POTENTIAL LOSS
5. SM/TSC Director/EOF Director Judgment (RCB5)	
Any condition in the opinion of the SM/TSC Director/EOF Director that indicates Loss or Potential Loss of the RCS barrier based on: <ul style="list-style-type: none"> • Imminent barrier degradation (within 2 hours) due to degraded safety system performance • Degraded ability to monitor barrier 	

Containment Barrier EALS	
LOSS	POTENTIAL LOSS
4. CNMT Isolation Valve Status After Containment Isolation (CNB4)	
Unisolable breach of containment with a direct release path to the environment following containment isolation actuation	None
5. Significant Radioactive Inventory in Containment (CNB5)	
None	Containment high range rad monitor reading greater than 4000 R/hr
6. Core Damage Assessment (CNB6)	
None	At least 20% fuel clad failure as determined from core damage assessment.
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 based on: <ul style="list-style-type: none"> • Imminent barrier degradation (within 2 hours) due to degraded safety system performance • Degraded ability to monitor barrier 	

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT	
HAZARDS AND OTHER CONDITIONS							
Security	HG1 Security event resulting in loss of physical control of the facility <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> D <u>Emergency Action Level:</u> 1. A HOSTILE FORCE has taken control of plant equipment such that plant personnel are unable to operate equipment required to maintain safety functions.	HS1 Confirmed security event in a plant VITAL AREA <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> D <u>Emergency Action Level:</u> 1. INTRUSION into the plant VITAL AREA by a HOSTILE FORCE. OR 2. Other security events as determined from the Safeguards Contingency Plan and reported by the Security Shift Commander.	HA1 Confirmed security event within a plant PROTECTED AREA <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> D <u>Emergency Action Level:</u> 1. INTRUSION into the plant PROTECTED AREA by a HOSTILE FORCE. OR 2. Other security events as determined from the Safeguards Contingency Plan and reported by the Security Shift Commander.	HU1 Confirmed security event which indicates a potential degradation in the level of safety of the plant <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> D <u>Emergency Action Level:</u> 1. Security events as determined from the Safeguards Contingency Plan and reported by the Security Shift Commander. OR 2. A credible security threat notification.			
	HG2 Other conditions existing which in the judgment of the SM/TSC Director/EOF Director warrant declaration of General Emergency <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> D <u>Emergency Action Level:</u> 1. Other conditions exist which in the judgment of the SM/TSC Director/EOF Director indicate that events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels beyond the exclusion area.	HS2 Other conditions exist which in the judgment of the SM/TSC Director/EOF Director warrant declaration of Site Area Emergency <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> D <u>Emergency Action Level:</u> 1. Other conditions exist which in the judgment of the SM/TSC Director/EOF Director indicate that events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the exclusion area.	HA2 Other conditions exist which in the judgment of the SM/TSC Director/EOF Director warrant declaration of an Alert <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> D <u>Emergency Action Level:</u> 1. Other conditions exist which in the judgment of the SM/TSC Director/EOF Director indicate that events are in process or have occurred which involve actual or likely potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	HU2 Other conditions existing which in the judgment of the SM/TSC Director/EOF Director warrant declaration of an NUE <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> D <u>Emergency Action Level:</u> 1. Other conditions exist which in the judgment of the SM/TSC Director/EOF Director indicate that events are in process or have occurred which indicate a potential degradation of the level of safety of the plant. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.			
Main Control Room Evacuation		HS3 Control Room evacuation has been initiated and plant control cannot be established <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> D <u>Emergency Action Level:</u> 1. a. Control Room evacuation has been initiated. AND b. Control of the plant cannot be established within 15 minutes.	HA3 Control Room evacuation has been initiated <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> D <u>Emergency Action Level:</u> 1. Control Room evacuation in progress.				

Plant Modes (white boxes indicate applicable modes) 1 Power Operation 2 Startup 3 Hot Standby 4 Hot Shutdown 5 Cold Shutdown 6 Refueling D Defueled

GENERAL EMERGENCY		SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT																																				
HAZARDS AND OTHER CONDITIONS																																								
Fire			<p>HA4 FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6<input type="checkbox"/>D</p> <p><u>Emergency Action Level:</u></p> <p>1. FIRE or EXPLOSION in any Table H1 areas on either unit.</p> <table border="1"> <tr><th colspan="2">Table H1</th></tr> <tr><td>Intake Structure</td><td></td></tr> <tr><td>Containment</td><td></td></tr> <tr><td>Auxiliary Building</td><td></td></tr> <tr><td>Aux. Extension Building</td><td></td></tr> <tr><td>QCST/RWT/BWST</td><td></td></tr> <tr><td>Diesel Fuel Oil Vault</td><td></td></tr> <tr><td>Transformer Yard</td><td></td></tr> <tr><td>Turbine Building</td><td></td></tr> </table> <p style="text-align: center;">AND</p> <p>Affected system parameter indications show degraded performance or plant personnel report VISIBLE DAMAGE to permanent structures or equipment within the specified area.</p>	Table H1		Intake Structure		Containment		Auxiliary Building		Aux. Extension Building		QCST/RWT/BWST		Diesel Fuel Oil Vault		Transformer Yard		Turbine Building		<p>HU4 FIRE within PROTECTED AREA boundary not extinguished within 15 minutes of detection <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6<input type="checkbox"/>D</p> <p><u>Emergency Action Level:</u></p> <p>1. FIRE in Table H1 buildings or areas adjacent to any of Table H1 areas on either unit not extinguished within 15 minutes of Control Room notification or verification of a Control Room alarm.</p> <table border="1"> <tr><th colspan="2">Table H1</th></tr> <tr><td>Intake Structure</td><td></td></tr> <tr><td>Containment</td><td></td></tr> <tr><td>Auxiliary Building</td><td></td></tr> <tr><td>Aux. Extension Building</td><td></td></tr> <tr><td>QCST/RWT/BWST</td><td></td></tr> <tr><td>Diesel Fuel Oil Vault</td><td></td></tr> <tr><td>Transformer Yard</td><td></td></tr> <tr><td>Turbine Building</td><td></td></tr> </table>	Table H1		Intake Structure		Containment		Auxiliary Building		Aux. Extension Building		QCST/RWT/BWST		Diesel Fuel Oil Vault		Transformer Yard		Turbine Building	
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Toxic Gas			<p>HA5 Release of toxic or flammable gases within or adjacent to a VITAL AREA which jeopardizes operation of systems required to establish or maintain safe shutdown <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6<input type="checkbox"/>D</p> <p><u>Emergency Action Level:</u></p> <p>1. Report or detection of toxic gases within or adjacent to a VITAL AREA in concentrations that may result in an atmosphere IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH).</p> <p style="text-align: center;">OR</p> <p>2. Report or detection of gases in concentration greater than the LOWER FLAMMABILITY LIMIT within or adjacent to a VITAL AREA.</p>	<p>HU5 Release of toxic or flammable gases deemed detrimental to normal operation of the plant <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6<input type="checkbox"/>D</p> <p><u>Emergency Action Level:</u></p> <p>1. Report or detection of toxic or flammable gases that have or could enter normally occupied areas of the site in amounts that can affect NORMAL PLANT OPERATIONS.</p> <p style="text-align: center;">OR</p> <p>2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.</p>																																				

Plant Modes (white boxes indicate applicable modes)

1 Power Operation

2 Startup

3 Hot Standby

4 Hot Shutdown

5 Cold Shutdown

6 Refueling

D Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
HAZARDS AND OTHER CONDITIONS			
Natural Events	<p>HA6 Natural and destructive phenomena affecting the plant VITAL AREA 1 2 3 4 5 6 D</p> <p><u>Emergency Action Level:</u></p> <ol style="list-style-type: none"> 1. An earthquake is felt and the 0.1g acceleration alarm annunciates indicating an Operating Basis Earthquake has occurred. <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> 2. Tornado or high winds greater than 67 mph within PROTECTED AREA boundary resulting in VISIBLE DAMAGE to any of the plant structures/equipment in Table H2 or Control Room indication of degraded performance of those systems on either unit. <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> 3. Vehicle crash within PROTECTED AREA boundary resulting in VISIBLE DAMAGE to any of the plant structures/equipment in Table H2 or Control Room indication of degraded performance of those systems. <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> 4. Turbine failure-generated missiles resulting in VISIBLE DAMAGE to or penetration of any of the plant structures/equipment in Table H2 or Control Room indication of degraded performance of those systems. <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> 5. Uncontrolled flooding in areas of the plant that results in degraded safety system performance as indicated in the Control Room or that creates industrial safety hazards (e.g., electric shock) that preclude access necessary to operate or monitor safety equipment. <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> 6. Lake Dardanelle level less than 335 feet and emergency cooling pond inoperable. <div style="border: 1px solid black; padding: 5px; margin-top: 10px; text-align: center;"> <p>Table H2</p> <p>Intake Structure Fuel Handling Building Containment Auxiliary Building QCST/RWT/BWST Diesel Fuel Oil Vault Start Up Transformer Emergency Cooling Pond Control Room</p> </div>	<p>HU6 Natural and destructive phenomena affecting the PROTECTED AREA 1 2 3 4 5 6 D</p> <p><u>Emergency Action Level:</u></p> <ol style="list-style-type: none"> 1. An earthquake is felt and the 0.01g acceleration alarm annunciates indicating an earthquake has occurred. <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> 2. Report by plant personnel of tornado or high winds greater than 67 mph striking within PROTECTED AREA boundary. <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> 3. Vehicle crash into plant structures or systems within PROTECTED AREA boundary. <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> 4. Report by plant personnel of an unanticipated EXPLOSION within PROTECTED AREA boundary resulting in VISIBLE DAMAGE to permanent structure or equipment. <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> 5. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals. <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> 6. Uncontrolled flooding in areas of the plant that has the potential to affect safety related equipment needed for the current operating mode. <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> 7. Lake Dardanelle level greater than 345 feet. <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> 8. Lake Dardanelle level less than 335 feet. 	

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT																																																																						
SYSTEM MALFUNCTION																																																																									
<p>SG1 Prolonged loss of all offsite power and prolonged loss of all onsite AC power to vital 4.16 KV busses 1 2 3 4</p> <p><u>Emergency Action Level:</u></p> <p>1. Loss of power to all unit auxiliary and startup transformers on a unit.</p> <table style="width:100%; border: none;"> <tr> <td style="text-align: center;"><u>Unit 1</u></td> <td style="text-align: center;"><u>Unit 2</u></td> </tr> <tr> <td style="text-align: center;">SU1</td> <td style="text-align: center;">SU3</td> </tr> <tr> <td style="text-align: center;">SU2</td> <td style="text-align: center;">SU2</td> </tr> <tr> <td style="text-align: center;">Unit Aux</td> <td style="text-align: center;">Unit Aux</td> </tr> </table> <p style="text-align: center;">AND</p> <p>No vital 4.16 KV bus being supplied power from ANY diesel generator.</p> <table style="width:100%; border: none;"> <tr> <td style="text-align: center;"><u>Unit 1 DG</u></td> <td style="text-align: center;"><u>Unit 2 DG</u></td> <td style="text-align: center;"><u>Unit 1 Bus</u></td> <td style="text-align: center;"><u>Unit 2 Bus</u></td> </tr> <tr> <td style="text-align: center;">1DG1</td> <td style="text-align: center;">2DG1</td> <td style="text-align: center;">A3</td> <td style="text-align: center;">2A3</td> </tr> <tr> <td style="text-align: center;">1DG2</td> <td style="text-align: center;">2DG2</td> <td style="text-align: center;">A4</td> <td style="text-align: center;">2A4</td> </tr> <tr> <td style="text-align: center;">AACG</td> <td style="text-align: center;">AACG</td> <td></td> <td></td> </tr> </table> <p style="text-align: center;">AND</p> <p>Either of the following: (a or b)</p> <p>a. Restoration of at least one emergency bus within four (4) hours is not likely</p> <p style="text-align: center;">OR</p> <p>b. FA1 entry conditions met.</p>	<u>Unit 1</u>	<u>Unit 2</u>	SU1	SU3	SU2	SU2	Unit Aux	Unit Aux	<u>Unit 1 DG</u>	<u>Unit 2 DG</u>	<u>Unit 1 Bus</u>	<u>Unit 2 Bus</u>	1DG1	2DG1	A3	2A3	1DG2	2DG2	A4	2A4	AACG	AACG			<p>SS1 Loss of all offsite power and loss of all onsite AC power to vital 4.16 KV busses 1 2 3 4</p> <p><u>Emergency Action Level:</u></p> <p>1. Loss of power to ALL Unit Auxiliary and Startup transformers on a unit.</p> <table style="width:100%; border: none;"> <tr> <td style="text-align: center;"><u>Unit 1</u></td> <td style="text-align: center;"><u>Unit 2</u></td> </tr> <tr> <td style="text-align: center;">SU1</td> <td style="text-align: center;">SU3</td> </tr> <tr> <td style="text-align: center;">SU2</td> <td style="text-align: center;">SU2</td> </tr> <tr> <td style="text-align: center;">Unit Aux</td> <td style="text-align: center;">Unit Aux</td> </tr> </table> <p style="text-align: center;">AND</p> <p>NO vital 4.16 KV bus being supplied power from ANY diesel generator for greater than 15 minutes.</p> <table style="width:100%; border: none;"> <tr> <td style="text-align: center;"><u>Unit 1 DG</u></td> <td style="text-align: center;"><u>Unit 2 DG</u></td> <td style="text-align: center;"><u>Unit 1 Bus</u></td> <td style="text-align: center;"><u>Unit 2 Bus</u></td> </tr> <tr> <td style="text-align: center;">1DG1</td> <td style="text-align: center;">2DG1</td> <td style="text-align: center;">A3</td> <td style="text-align: center;">2A3</td> </tr> <tr> <td style="text-align: center;">1DG2</td> <td style="text-align: center;">2DG2</td> <td style="text-align: center;">A4</td> <td style="text-align: center;">2A4</td> </tr> <tr> <td style="text-align: center;">AACG</td> <td style="text-align: center;">AACG</td> <td></td> <td></td> </tr> </table>	<u>Unit 1</u>	<u>Unit 2</u>	SU1	SU3	SU2	SU2	Unit Aux	Unit Aux	<u>Unit 1 DG</u>	<u>Unit 2 DG</u>	<u>Unit 1 Bus</u>	<u>Unit 2 Bus</u>	1DG1	2DG1	A3	2A3	1DG2	2DG2	A4	2A4	AACG	AACG			<p>SA5 AC power capability to vital 4.16 KV busses reduced to a single power source for greater than 15 minutes such that any additional single failure would result in station blackout 1 2 3 4</p> <p><u>Emergency Action Level:</u></p> <p>1. Only ONE vital 4.16 KV bus energized from a single power source for greater than 15 minutes.</p> <table style="width:100%; border: none;"> <tr> <td style="text-align: center;"><u>Unit 1</u></td> <td style="text-align: center;"><u>Unit 2</u></td> </tr> <tr> <td style="text-align: center;">A3</td> <td style="text-align: center;">2A3</td> </tr> <tr> <td style="text-align: center;">A4</td> <td style="text-align: center;">2A4</td> </tr> </table> <p style="text-align: center;">AND</p> <p>Any additional single failure will result in station blackout.</p>	<u>Unit 1</u>	<u>Unit 2</u>	A3	2A3	A4	2A4	<p>SU1 Loss of all offsite power to vital 4.16 KV busses for greater than 15 minutes 1 2 3 4</p> <p><u>Emergency Action Level:</u></p> <p>1. Loss of power to all Unit Auxiliary and Startup Transformers for greater than 15 minutes.</p> <table style="width:100%; border: none;"> <tr> <td style="text-align: center;"><u>Unit 1</u></td> <td style="text-align: center;"><u>Unit 2</u></td> </tr> <tr> <td style="text-align: center;">SU1</td> <td style="text-align: center;">SU3</td> </tr> <tr> <td style="text-align: center;">SU2</td> <td style="text-align: center;">SU2</td> </tr> <tr> <td style="text-align: center;">Unit Aux</td> <td style="text-align: center;">Unit Aux</td> </tr> </table> <p style="text-align: center;">AND</p> <p>Both vital 4.16 KV busses supplied power from independent diesel generator.</p> <table style="width:100%; border: none;"> <tr> <td style="text-align: center;"><u>Unit 1</u></td> <td style="text-align: center;"><u>Unit 2</u></td> </tr> <tr> <td style="text-align: center;">1DG1</td> <td style="text-align: center;">2DG1</td> </tr> <tr> <td style="text-align: center;">1DG2</td> <td style="text-align: center;">2DG2</td> </tr> <tr> <td style="text-align: center;">AACG</td> <td style="text-align: center;">AACG</td> </tr> </table>	<u>Unit 1</u>	<u>Unit 2</u>	SU1	SU3	SU2	SU2	Unit Aux	Unit Aux	<u>Unit 1</u>	<u>Unit 2</u>	1DG1	2DG1	1DG2	2DG2	AACG	AACG
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Plant Modes (white boxes indicate applicable modes)
1 Power Operation
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D Defueled

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT	
SYSTEM MALFUNCTION							
Failure of Reactor Protection System/ Failure to Shutdown	<p>SG2 Failure of the Reactor Protection System to complete an automatic trip and manual trip was NOT successful and there is indication of an extreme challenge to the ability to cool the core <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6</p> <p><u>Emergency Action Level:</u></p> <p>1. Indications exist that automatic and manual reactor trips were <u>NOT</u> successful</p> <p style="text-align: center;">AND</p> <p>Either of the following: (a or b)</p> <p>a. Indication(s) exist that core cooling is extremely challenged.</p> <p><u>Unit 1:</u> OUTSIDE Region 1 of EOP Figure 4</p> <p><u>Unit 2:</u> CET average temperature greater than 700°F</p> <p style="text-align: center;">OR</p> <p>b. Indication(s) exist that heat removal is extremely challenged with ALL of the following being TRUE:</p> <ul style="list-style-type: none"> • Loss of ALL normal Feedwater • Loss of ALL Emergency/Auxiliary Feedwater • <u>Unit 1:</u> High Pressure Injection NOT established • <u>Unit 2:</u> Once-Through Core Cooling NOT established 	<p>SS2 Failure of Reactor Protection System instrumentation to complete or initiate an automatic reactor trip once a Reactor Protection System setpoint has been exceeded and manual trip was NOT successful <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6</p> <p><u>Emergency Action Level:</u></p> <p>1. Indication(s) exist that automatic and manual reactor trips were not successful.</p>	<p>SA2 Failure of Reactor Protection System instrumentation to complete or initiate an automatic reactor trip once a Reactor Protection System setpoint has been exceeded and manual trip was successful <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6</p> <p><u>Emergency Action Level:</u></p> <p>1. Indication(s) exist that indicate that reactor protection system setpoint was exceeded and automatic trip did not occur, and a successful manual trip occurred.</p>	<p>SU2 Inability to reach required shutdown within Technical Specification limits <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6</p> <p><u>Emergency Action Level:</u></p> <p>1. Plant is not brought to required operating mode within Technical Specifications LCO action statement time.</p>			

Plant Modes (white boxes indicate applicable modes)

1 Power Operation

2 Startup

3 Hot Standby

4 Hot Shutdown

5 Cold Shutdown

6 Refueling

D Defueled

Attachment 2

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
SYSTEM MALFUNCTION			
Loss of DC	<p>SS3 Loss of all vital DC power <input type="checkbox"/>1 <input type="checkbox"/>2 <input type="checkbox"/>3 <input type="checkbox"/>4 <input type="checkbox"/>5</p> <p><u>Emergency Action Level:</u></p> <p>1. Loss of ALL of the following busses has occurred for greater than 15 minutes:</p> <p><u>Unit 1:</u> D01 and D02 <u>Unit 2:</u> 2D01 and 2D02</p>		

Plant Modes (white boxes indicate applicable modes)

- | | | | | | | |
|--|------------------------------------|--|---|--|--------------------------------------|-------------------------------------|
| <input type="checkbox"/> 1 Power Operation | <input type="checkbox"/> 2 Startup | <input type="checkbox"/> 3 Hot Standby | <input type="checkbox"/> 4 Hot Shutdown | <input type="checkbox"/> 5 Cold Shutdown | <input type="checkbox"/> 6 Refueling | <input type="checkbox"/> D Defueled |
|--|------------------------------------|--|---|--|--------------------------------------|-------------------------------------|

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT	
SYSTEM MALFUNCTION							
Heat Sink/Fuel Degradation		<p>SS4 Complete loss of heat removal capability <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/></p> <p><u>Emergency Action Level:</u></p> <p>1. Loss of core cooling and heat sink as indicated by:</p> <p>a. Loss of ALL Normal Feedwater</p> <p style="text-align: center;">AND</p> <p>b. Loss of ALL Emergency/Auxiliary Feedwater</p> <p style="text-align: center;">AND</p> <p>c. High Pressure Injection (Unit 1)/Once-Through Core Cooling (Unit 2) NOT established.</p>				<p>SU4 Fuel clad degradation <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/></p> <p><u>Emergency Action Level:</u></p> <p>1. RCS sample activity value indicating fuel clad degradation greater than Technical Specification allowable limits.</p> <p>Unit 1: RCS sample analysis: greater than 3.50 µCi/gm IDE RCS sample analysis: greater than 72/Ē µCi/gm gross activity</p> <p>Unit 2: RCS sample analysis: greater than 1.0 µCi/gm IDE RCS sample analysis: greater than 100/Ē µCi/gm gross activity</p>	
	Loss of Annunciators		<p>SS6 Inability to monitor a TRANSIENT in progress <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/></p> <p><u>Emergency Action Level:</u></p> <p>1. a. Loss of most or all annunciators associated with safety systems.</p> <p>Unit 1: Loss of greater than or equal to 50% of Control Room annunciators</p> <p>Unit 2: Loss of AC AND DC to greater than or equal to 9 Control Room annunciator panels</p> <p style="text-align: center;">AND</p> <p>b. SPDS and PMS dynamic alarm functions are unavailable.</p> <p style="text-align: center;">AND</p> <p>c. Loss of 75% of indicators associated with safety systems.</p> <p style="text-align: center;">AND</p> <p>d. A TRANSIENT in progress</p>	<p>SA4 UNPLANNED loss of most or all safety system annunciation or indication in Control Room with either (1) a PLANT TRANSIENT in progress, or (2) SPDS and PMS dynamic alarm functions unavailable <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/></p> <p><u>Emergency Action Level:</u></p> <p>1. UNPLANNED loss of annunciators or indicators associated with safety systems for greater than 15 minutes as follows:</p> <p>Unit 1: Loss of AC AND DC to greater than or equal to 50% of Control Room annunciators</p> <p>Unit 2: Loss of AC AND DC to greater than or equal to 9 Control Room annunciator panels</p> <p style="text-align: center;">AND</p> <p>Either of the following: (a or b)</p> <p>a. PLANT TRANSIENT is in progress.</p> <p style="text-align: center;">OR</p> <p>b. SPDS and PMS dynamic alarm functions are unavailable.</p>	<p>SU3 UNPLANNED loss of most or all safety system annunciation or indication in the Control Room for greater than 15 minutes <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/></p> <p><u>Emergency Action Level:</u></p> <p>1. UNPLANNED loss of annunciators or indicators associated with safety systems for greater than 15 minutes as follows:</p> <p>Unit 1: Loss of AC AND DC to greater than or equal to 50% of Control Room annunciators</p> <p>Unit 2: Loss of AC AND DC to greater than or equal to 9 Control Room annunciator panels</p> <p style="text-align: center;">OR</p> <p>2. UNPLANNED loss of 75% of indicators associated with safety systems for greater than 15 minutes.</p>		

Plant Modes (white boxes indicate applicable modes)

1 Power Operation

2 Startup

3 Hot Standby

4 Hot Shutdown

5 Cold Shutdown

6 Refueling

D Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
SYSTEM MALFUNCTION			
RCS Leakage			<div style="float: right; border: 1px solid black; padding: 2px;"> <input type="checkbox"/>1 <input type="checkbox"/>2 <input type="checkbox"/>3 <input type="checkbox"/>4 </div> <p>SU5 RCS leakage</p> <p><u>Emergency Action Level:</u></p> <ol style="list-style-type: none"> Unidentified or pressure boundary leakage greater than 10 gpm. <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> Identified leakage greater than 25 gpm.
Loss of Communications			<div style="float: right; border: 1px solid black; padding: 2px;"> <input type="checkbox"/>1 <input type="checkbox"/>2 <input type="checkbox"/>3 <input type="checkbox"/>4 </div> <p>SU6 UNPLANNED loss of all onsite or offsite communications capabilities</p> <p><u>Emergency Action Level:</u></p> <ol style="list-style-type: none"> Loss of all onsite communications capability (Table M1) affecting the ability to perform routine operations. <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p style="text-align: center;">Table M1 Onsite Communications Equipment</p> <p>Station radio system Plant paging system In-plant telephones Plant cell phones Gaitronics</p> </div> <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> Loss of all offsite communications capability (Table M2). <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p style="text-align: center;">Table M2 Offsite Communications Equipment</p> <p>All telephone lines (commercial and microwave) Station radio system ENS Cellular phones</p> </div>

Plant Modes (white boxes indicate applicable modes)
1 Power Operation
2 Startup
3 Hot Standby
4 Hot Shutdown
5 Cold Shutdown
6 Refueling
D Defueled

SITE AREA EMERGENCY

ALERT

UNUSUAL EVENT

SYSTEM MALFUNCTION

3 4

Inadvertent Criticality

SU8 Inadvertent criticality

Emergency Action Level:

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

Unit 1:

Greater than 2 DPM (Source Range)
Greater than 3 DPM (Intermediate Range)

Unit 2:

Greater than 1.6 DPM

Plant Modes (white boxes indicate applicable modes)

1 Power Operation

2 Startup

3 Hot Standby

4 Hot Shutdown

5 Cold Shutdown

6 Refueling

D Defueled

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Attachment 3
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

AU1

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

Any UNPLANNED release of gaseous or liquid radioactivity to the environment that exceeds two times the radiological effluent ODCM limits for 60 minutes or longer

Operating Mode Applicability:

All

Emergency Action Level: 1 OR 2 OR 3 OR 4

Note: If monitor reading is sustained for the time period indicated in the EAL AND the required assessments using procedure calculations cannot be completed within this period, declaration must be made based on the valid radiation monitor reading.

1. VALID reading on any effluent monitor that exceeds two times the alarm setpoint established by a current release permit for 60 minutes or longer.

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 Monitoring System
2RE-2330	BMS Liquid Discharge Monitor
2RE-4423	Radwaste Liquid Discharge Monitor

2. VALID reading on Channel 7 of one or more of the following radiation monitors that exceeds the reading shown for 60 minutes or longer during a discharge:

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 Building	1.77E-1 (µCi/cc)

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Attachment 3
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT (AU1)

3. Confirmed grab sample analyses for gaseous or liquid releases indicates concentrations or release rates, with a release duration of longer than 60 minutes, in excess of two times the applicable values of the ODCM.
4. RDACS data indicating NUE.

Basis:

This IC addresses a potential or actual drop 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. These controls are located in the Offsite Dose Calculation Manual (ODCM). The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of 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.

The ODCM contains the site specific release limits and appropriate surveillance requirements which normally monitor these limits. 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. The one hour time period allows sufficient time to isolate any release after exceeding ODCM limits. Release continuing for more than one hour represents inability to isolate or control the release. The SM/TSC Director/EOF Director should not wait until 60 minutes has elapsed, but should declare the event as soon as it is determined that the release duration has or will likely exceed 60 minutes. Also, if an ongoing release is detected and the starting time for that release is unknown, the SM/TSC Director/EOF Director should, in the absence of data to the contrary, assume that the release has exceeded 60 minutes.

"UNPLANNED", as used in this context, includes any release for which a liquid waste release or a gaseous waste release discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm set points, etc.) on the applicable package permit. Unplanned releases in excess of two times of the ODCM limit that continue for 60 minutes or longer represent an uncontrolled situation and a potential degradation in the level of safety. It is not intended that the release be averaged over 60 minutes. The event should be declared as soon as it is determined that the release duration has or will likely exceed one hour.

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Attachment 3
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT (AU1)

EAL #1 addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed two times the alarm setpoint and releases are not terminated within 60 minutes. This alarm setpoint may be associated with a planned batch release, or a continuous release path. In either case, the setpoint is established by the discharge permit to warn of a release that is not in compliance.

EAL #2 is similar to EAL #1, but is intended to address effluent or accident radiation monitors on release pathways for which a discharge permit would not be prepared for a non-routine release. The ODCM establishes a methodology for determining effluent radiation monitor setpoints. The ODCM specifies default source terms from SAR and, for gaseous releases, prescribes the use of pre-determined annual average meteorology in the most limiting downwind sector for showing compliance with the regulatory commitments. These monitor reading EALs have been determined using this methodology.

EAL #3 addresses uncontrolled releases that are detected by sample analyses, particularly on unmonitored pathways, (e.g., spills of radioactive liquids into storm drains, leakage into the river water systems or lake, etc.).

EAL #4 addresses RDACS calculation for NUE. RDACS is a 60 minute rolling calculation and once alarmed no additional 60 minutes are required.

Escalation is via AA1, AS1, or AG1.

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Attachment 3
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

AU2

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

Unexpected rise in plant radiation

Operating Mode Applicability:

All

Emergency Action Level: 1 OR 2

1. VALID indication of uncontrolled water level drop in the refueling canal or spent fuel pool with all irradiated fuel assemblies remaining covered by water.

AND

Unplanned VALID Area Radiation Monitor reading rise

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

2. Unplanned VALID Area Radiation Monitor readings rise by a factor of 1000 over normal* levels.

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

Basis:

All of the above events tend to have long lead times relative to a potential for radiological release outside the site boundary; thus impact to public health and safety is very low.

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

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Attachment 3
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT (AU2)

In light of reactor cavity seal failure incidents, explicit coverage of these types of events via EAL #1 is appropriate given their potential for higher doses to plant staff. Specific indications may include instrumentation such as water level and local area radiation monitors, and personnel (e.g., refueling crew) reports. Depending on available level instrumentation, the declaration threshold may be based on indications of water makeup rate or drop in BWST (Unit 1) or RWT (Unit 2) level.

Classification as an Unusual Event is warranted as a precursor to a more serious event.

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, the reading on an area radiation monitor located on the refueling bridge may rise due to planned evolutions such as head lift, or even a fuel assembly being raised in the manipulator mast. Generally, higher 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 reactor vessel 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 addresses UNPLANNED rises in in-plant radiation levels that represent degradation in the control of radioactive material, and represent a potential degradation in the level of safety of the plant. Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

This event escalates to an Alert per AA3 if the rise in dose rates impedes personnel access necessary for safe operation.

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Attachment 3
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

AA1

ALERT

Initiating Condition:

Any UNPLANNED release of gaseous or liquid radioactivity to the environment exceeds 200 times the radiological effluent ODCM limits for 15 minutes or longer

Operating Mode Applicability:

All

Emergency Action Level: 1 OR 2 OR 3 OR 4

Note: If monitor reading is sustained for the time period indicated in the EAL AND the required assessments using procedure calculations cannot be completed within this period, declaration must be made based on the valid radiation monitor reading.

1. VALID reading on any effluent monitor that exceeds 200 times the alarm setpoint established by a current release permit for 15 minutes or longer.

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 Monitoring System
2RE-2330	BMS Liquid Discharge Monitor
2RE-4423	Radwaste Liquid Discharge Monitor

2. VALID reading on Channel 7 of one or more of the following radiation monitors that exceeds the reading shown for 15 minutes or longer:

MONITORS - Unit 1		LIMIT
RX-9820	Containment Purge	5.90E0 (µCi/cc)
RX-9830	Fuel Handling Area	4.54E0 (µCi/cc)
RX-9825	Radwaste Area	5.36E0 (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 Building	1.77E+1 (µCi/cc)

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Attachment 3
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT (AA1)

3. Confirmed grab sample analyses for gaseous or liquid releases indicates concentrations or release rates, with a release duration of 15 minutes or longer, in excess of 200 times the applicable values of the ODCM.
4. RDACS data indicating ALERT.

Basis:

This event escalates from the Unusual Event by escalating the magnitude of the release.

These EALs address a potential or actual drop 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. These controls are located in the ODCM. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of degradation in these features and/or controls.

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

Releases should not be prorated or averaged. For example, a release exceeding 400 times ODCM limits for 7.5 minutes does not meet the threshold for this event classification.

"UNPLANNED", as used in this context, includes any release for which a liquid waste release or a gaseous waste release discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm set points, etc.) on the applicable package permit. The SM/TSC Director/EOF Director should not wait until 15 minutes has elapsed, but should declare the event as soon as it is determined that the release duration has or will likely exceed 15 minutes. Also, if an ongoing release is detected and the starting time for that release is unknown, the SM/TSC Director/EOF Director should, in the absence of data to the contrary, assume that the release has exceeded 15 minutes.

EAL #1 addresses radioactivity releases that, for whatever reason, cause effluent radiation monitor readings to exceed 200 times the alarm setpoint and are not terminated within 15 minutes. This alarm setpoint may be associated with a planned batch release, or a continuous release path. In either case, the setpoint is established by the discharge permit to warn of a release that is not in compliance.

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Attachment 3
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT (AA1)

EAL #2 is similar to EAL #1, but is intended to address effluent or accident radiation monitors on release pathways for which a discharge permit would not be prepared for a non-routine release. The ODCM establishes a methodology for determining effluent radiation monitor setpoints. The ODCM specifies default source terms from SAR and, for gaseous releases, prescribes the use of predetermined annual average meteorology in the most limiting downwind sector for showing compliance with the regulatory commitments. These monitor reading EALs have been determined using this methodology.

EAL #3 addresses uncontrolled releases that are detected by sample analysis, particularly on unmonitored pathways, e.g., spills of radioactive liquids into storm drains, leakage into Lake Dardanelle, etc.

EALs #1 and #2 directly correlate with the ODCM since annual average meteorology is required to be used in showing compliance with the ODCM and is used in calculating the alarm setpoints. The fundamental basis of these ICs is not a dose or dose rate, but rather the degradation in the level of safety of the plant implied by the uncontrolled release that was not isolated within 15 minutes.

Due to the uncertainty associated with meteorology, emergency implementing procedures should call for the timely performance of dose assessments using actual (real-time and sector) meteorology in the event of a gaseous radioactivity release of this magnitude. The results of these assessments should be compared to AS1 and AG1 to determine if the event classification should be escalated. Classification should not be delayed pending the results of these dose assessments.

EAL #4 addresses RDACS calculations for ALERT. Once RDACS data indicates ALERT, no additional time is required.

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Attachment 3
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

AA2

ALERT

Initiating Condition:

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

Operating Mode Applicability:

All

Emergency Action Level: 1 OR 2

1. A VALID alarm on one or more of the following radiation monitors:

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-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.

2. Water level drop in the refueling canal or spent fuel pool exceeds makeup capacity such that irradiated fuel has or will become uncovered.

Basis:

This IC, and associated EALs, address specific events that have resulted, or may result in unexpected 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 a 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.

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Attachment 3
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT (AA2)

These EALs apply to spent fuel requiring water coverage. There is time available to take corrective actions, and there is little potential for substantial fuel damage. Uncontrolled lowering of water level may be detected by visual observation, elevated radiation levels, or various other symptoms that consider valid indicators of the event. Fuel uncover may be expected based on abnormal radiation level, visual observation, or best judgment of the SM/TSC Director/EOF Director based on present and past trends.

EAL #1 addresses radiation monitor indications of fuel uncover and/or fuel damage. Elevated readings on ventilation monitors may be indicative of a radioactivity release from the fuel, confirming that damage has occurred. Elevated background at the monitor due to water level drop may mask elevated ventilation exhaust airborne activity and should 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, the 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. Application of these ICs requires understanding of the actual radiological conditions present in the vicinity of the monitor.

EAL #2 indicators 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 threshold may need to be based on indications of water makeup rate or lowering in BWST (Unit 1) or RWT (Unit 2) level.

Escalation, if appropriate, would occur via AS1 or AG1 or SM/TSC Director/EOF Director judgment.

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Attachment 3
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

AA3

ALERT

Initiating Condition:

Release of radioactive material or elevated radiation levels within the facility that impede operation of systems required to maintain safe operations or to establish or maintain cold shutdown

Operating Mode Applicability:

All

Emergency Action Level: 1 OR 2

1. VALID radiation readings greater than 15 mR/hr in areas requiring continuous occupancy to maintain plant safety functions such as Control Room/TSC, Controlled Access Area entry control point, Security Central Alarm Station (CAS).
2. VALID radiation readings greater than 5000 mR/hr in plant vital areas requiring infrequent access to maintain plant safety functions and access is required for safe plant operation, but is impeded due to radiation dose rates.

Basis:

This IC addresses elevated radiation levels that impede necessary access to operating stations, or other areas containing equipment that must be operated manually or that requires local monitoring, in order to maintain safe operation or perform a safe shutdown. It is this impaired ability to operate the plant that results in the actual or potential substantial degradation of the level of safety of the plant. The cause and/or magnitude of the rise in radiation levels is not a concern of these EALs. The SM/TSC Director/EOF Director must consider the source or cause of the elevated radiation levels and determine if any other EAL may be involved. For example, a 15 mR/hr dose rate in the control room or a high radiation monitor reading may be a problem in itself. However, the elevated radiation readings levels may also be indicative of high dose rates in the containment due to a LOCA. In this latter case, an SAE or GE may be indicated by the fission product barrier matrix EALs.

This IC is not meant to apply to elevated radiation levels in the containment as these are events which are addressed in the fission product barrier matrix EALs. This IC is not intended to apply to anticipated temporary rises due to planned events (e.g., incore detector movement, radwaste container movement, depleted resin transfers, etc.).

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Attachment 3
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT (AA3)

Areas requiring continuous occupancy include the control room and any other control stations that are manned continuously, such as CA-1 or CAS. The value of 15mR/hr is derived from the GDC 19 value of 5 Rem in 30 days with adjustment for expected occupancy times. Although Section III.D.3 of NUREG-0737, "Clarification of TMI Action Plan Requirements", provides that the 15 mR/hr value can be averaged over the 30 days, the value is used here without averaging, as a 30 day duration implies an event potentially more significant than an Alert.

For areas requiring infrequent access, the single value of 5000 mR/hr was selected because it is based on radiation levels which result in exposure control measures intended to maintain doses within normal occupational exposure guidelines and limits (i.e., 10 CFR 20), and in doing so, will impede necessary access. As used here, "impede" includes hindering or interfering provided that the interference or delay is sufficient to significantly threaten the safe operation of the plant. Stay times for levels up to that value are generally several minutes; enough time to enter an area and manually operate the equipment in order to maintain safe operation or perform a safe shutdown. The magnitude of the rise in radiation levels is not a concern of these EALs. The SM/TSC Director/EOF Director must consider the source or cause of the elevated radiation levels and determine if any other EAL may be involved.

Applicable areas requiring infrequent access are identified in the site's Abnormal Operating Procedures, Emergency Operating Procedures, the 10 CFR 50 Appendix R analysis, and/or the analyses performed in response to Section 2.1.6b of NUREG-0578, "TMI-2 Lessons Learned Task Force Status Report and Short-term Recommendations", when identifying areas containing safe shutdown equipment.

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Attachment 3
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

AS1

SITE AREA EMERGENCY

Initiating Condition:

Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 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: 1 OR 2 OR 3

Note: If dose assessment results are available at the time of declaration, the classification should be based on EAL #2 instead of EAL #1. While necessary declarations should not be delayed awaiting results, the dose assessment should be initiated/completed in order to determine if the classification should be subsequently escalated.

1. VALID reading on Channel 9 of one or more of the following radiation monitors that exceeds or is expected to exceed the reading shown for 15 minutes or longer:

MONITORS - UNIT 1		LIMIT
RX-9820	Containment Purge	5.90E+1 (µCi/cc)
RX-9830	Fuel Handling Area	4.54E+1 (µCi/cc)
RX-9825	Radwaste Area	5.36E+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)

2. Dose assessment using actual meteorology indicates doses greater than 100 mR TEDE or 500 mR child thyroid CDE at or beyond the site boundary.
3. Field survey results indicate closed-window dose rates exceeding 100 mR/hr expected to continue for more than one hour; or analyses of field survey samples indicate child thyroid CDE of 500 mR for 60 minutes of inhalation, at or beyond the site boundary.

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Attachment 3
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT (AS1)

Basis:

This IC addresses radioactivity releases that result in doses at or beyond the site boundary that exceed a small fraction 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. While these failures may be addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone (e.g., fuel handling accident in spent fuel building).

The actual or projected dose of 100 mR TEDE is set at 10% of the EPA Protective Action Guide (PAG) values given in EPA-400-R-92-001, while the 500 mR child thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE. The TEDE integrated dose value also provides a desirable gradient (one order of magnitude) between the Alert, Site Area Emergency and General Emergency Classes.

The SM/TSC Director/EOF Director should not wait until 15 minutes has elapsed, but should declare the event as soon as it is determined that the release duration has or will likely exceed 15 minutes.

The monitor list in EAL #1 includes monitors on all potential release pathways (plant stack, primary-secondary leak, fuel handling accident). The EPA PAGs are expressed in terms of the sum of the "effective dose equivalent (EDE)" and the "committed effective dose equivalent (CEDE)", or as the child thyroid "committed dose equivalent (CDE)". For the purpose of these ICs, the dose quantity "total effective dose equivalent (TEDE)", as defined in 10 CFR 20, is used in lieu of "...sum of EDE and CEDE...". The EPA PAG guidance in EPA-400R-92-001 provides for the use adult thyroid dose conversion factors.

The monitor readings in EAL #1 were determined using a dose assessment method that back-calculates from the dose values specified. The meteorology and source term (noble gases, particulates, and halogens) used are the same as those used for determining the monitor reading EALs in AU1 and AA1. This protocol maintains intervals between the ICs for the four classifications. Since doses are generally not monitored in real-time, a release duration of one hour was assumed, and the EALs are based on a site boundary (or beyond) dose of 100 mR/hour whole body or 500 mR/hour child thyroid, whichever is more limiting (as was done for EAL #3).

Monitor indications in EAL #1 are calculated using SAR source terms applicable to each monitored pathway in conjunction with annual average meteorology, one hour release duration and Dose Conversion Factors (DCFs) from EPA-400R-92-001, Tables 5-1 and 5-2.

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Attachment 3
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT (AS1)

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 performance of dose assessments within 15 minutes 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. However, classification should not be delayed pending the results of these dose assessments. If dose assessment team calculations cannot be completed in 15 minutes, then valid monitor readings should be used for emergency classification.

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.

Escalation is via AG1.

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Attachment 3
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

AG1

GENERAL EMERGENCY

Initiating Condition:

Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 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: 1 OR 2 OR 3

Note: *If dose assessment results are available at the time of declaration, the classification should be based on EAL #2 instead of EAL #1. While necessary declarations should not be delayed awaiting results, the dose assessment should be initiated/completed in order to determine if the classification should be subsequently escalated.*

1. VALID reading on Channel 9 of one or more of the following radiation monitors that exceeds or is expected to exceed the reading shown for 15 minutes or longer:

MONITORS - UNIT 1		LIMIT
RX-9820	Containment Purge	5.90E+2 (µCi/cc)
RX-9830	Fuel Handling Area	4.54E+2 (µCi/cc)
RX-9825	Radwaste Area	5.36E+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)

2. Dose assessment using actual meteorology indicates doses greater than 1000 mR TEDE or 5000 mR child thyroid CDE at or beyond the site boundary.
3. Field survey results indicate closed window dose rates exceeding 1000 mR/hr expected to continue for more than one hour; or analyses of field survey samples indicate child thyroid CDE of 5000 mR for 60 minutes of inhalation, at or beyond site boundary.

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Attachment 3
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT (AG1)

Basis:

This IC and associated EALs address 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. While these failures are addressed by other EALs, this EAL provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that, for the more severe accidents, the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

The actual or projected dose of 1000 mR TEDE and 5000 mR child thyroid CDE integrated doses are based on the EPA Protective Action Guide (PAG) values given in EPA-400-R-92-001, which indicates that public protective actions are indicated if doses exceed these values. This is consistent with the emergency class description of a General Emergency.

The SM/TSC Director/EOF Director should not wait until 15 minutes has elapsed, but should declare the event as soon as it is determined that the release duration has or will likely exceed 15 minutes.

The monitor list in EAL #1 includes monitors on all potential release pathways (Plant stack, Primary/Secondary Leak, Fuel Handling Accident). The EPA PAGs are expressed in terms of the sum of the "effective dose equivalent (EDE)" and the "committed effective dose equivalent (CEDE)", or as the child thyroid "committed dose equivalent (CDE)". For the purpose of these ICs, the dose quantity "total effective dose equivalent (TEDE)", as defined in 10 CFR 20, is used in lieu of "...sum of EDE and CEDE..." The EPA PAG guidance EPA-400R-92-001 provides for the use of adult thyroid dose conversion factors.

The monitor readings in EAL #1 were determined using a dose assessment method that back-calculates from the dose values. The meteorology and source term (noble gases, particulates, and halogens) used are the same as those used for determining the monitor reading EALs in AU1 and AA1. This protocol maintains intervals between the EALs for the four classifications. Since doses are generally not monitored in real-time, a release duration of one hour was assumed, and the ICs are based on a site boundary (or beyond) dose of 1000 mR/hour whole body or 5000 mR/hour child thyroid, whichever is more limiting (as was done for EAL #3). If the site analyses indicate a longer or shorter duration for the period in which the substantial portion of the activity is released, the longer duration should be used.

Monitor indications in EAL #1 are calculated using SAR source terms applicable to each monitored pathway in conjunction with annual average meteorology, one hour release duration and dose conversion factors (DCFs) from EPA-400R-92-001, Tables 5-1 and 5-2.

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Attachment 3
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT (AG1)

Since dose assessment in EAL #2 is based on actual meteorology, whereas the monitor reading 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 performance of dose assessments within 15 minutes 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. However, classification should not be delayed pending the results of these dose assessments. If dose assessment team calculations cannot be completed in 15 minutes, then valid monitor readings should be used for emergency classification.

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 charcoal cartridge should determine the iodine value.

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Attachment 3
Cold Shutdown/Refueling System Malfunction

CU1

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

RCS leakage

Operating Mode Applicability:

Cold Shutdown (Mode 5)

Emergency Action Level: 1 OR 2

1. Unidentified or pressure boundary leakage greater than 10 gpm.
2. Identified leakage greater than 25 gpm.

Basis:

This IC is included as an NUE because it is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified and pressure boundary leakage was selected as it is sufficiently large to be observable via normally installed instrumentation (e.g., pressurizer level, RCS loop level instrumentation, etc.) or reduced inventory instrumentation such as level hose indication. Lesser values must generally be determined through time consuming surveillance tests (e.g., mass balances). 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. Prolonged loss of RCS inventory may result in escalation to the ALERT level via either IC CA1 or CA4.

The difference between CU1 and CU2 deals with the RCS conditions that exist between cold shutdown and refueling mode applicability. In cold shutdown the RCS will normally be intact and RCS inventory and level monitoring means such as pressurizer level indication and makeup volume control tank levels are normally available.

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Attachment 3
Cold Shutdown/Refueling System Malfunction

CU2

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

UNPLANNED loss of RCS inventory with irradiated fuel in the reactor vessel

Operating Mode Applicability:

Refueling (Mode 6)

Emergency Action Level: 1 OR 2

1. UNPLANNED RCS level drop below the reactor vessel flange for greater than 15 minutes.
2. a. Loss of reactor vessel inventory as indicated by unexplained Reactor Building Sump, Reactor Drain Tank, Aux. Building Equipment Drain Tank, Aux. Building Sump, or Quench Tank level rise.

AND

- b. Reactor vessel level cannot be monitored.

Basis:

This IC is included as an NUE because it may be 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. 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 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 that a more serious condition exists. Continued loss of RCS inventory will result in escalation to the ALERT level via either IC CA2 or CA4.

The difference between CU1 and CU2 deals with the RCS conditions that exist between cold shutdown and refueling modes. In cold shutdown the RCS will normally be intact and standard indications of RCS inventory are available.

In the refueling mode, 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

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Attachment 3
Cold Shutdown/Refueling System Malfunction (CU2)

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 ALERT would be via either CA2 or CA4.

EAL #1 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 lowering levels in flooded refueling canal level (covered by AU2, EAL #1) until such time as the level lowering to the level of the vessel flange.

If the reactor vessel level continues to lower and reaches the bottom of the reactor coolant system hot leg penetration into the vessel, then escalation to CA2 would be appropriate.

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Attachment 3
Cold Shutdown/Refueling System Malfunction

CU3

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

Loss of all offsite power to vital busses for greater than 15 minutes

Operating Mode Applicability:

Cold Shutdown (Mode 5)
Refueling (Mode 6)
Defueled

Emergency Action Level:

1. a. Loss of power to all unit auxiliary and startup transformers supplying a unit for greater than 15 minutes.

AND

- b. At least one vital 4.16 KV bus being powered from ANY diesel generator.

Basis:

Prolonged loss of 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 (e.g., station blackout). Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Escalation is via CA3.

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Attachment 3
Cold Shutdown/Refueling System Malfunction

CU4

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

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

Operating Mode Applicability:

Cold Shutdown (Mode 5)
Refueling (Mode 6)

Emergency Action Level: 1 OR 2

1. An UNPLANNED event results in RCS temperature exceeding 200°F.
2. Loss of all RCS temperature and reactor vessel level indication for greater than 15 minutes.

Basis:

This IC is included as an NUE because it may be 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. In cold shutdown, the decay heat available to raise RCS temperature during a loss of inventory or loss of heat removal event may be significantly greater than in the refueling mode. Entry into cold shutdown conditions may be attained within hours of operating at power. Entry into the refueling mode procedurally may not occur for many hours after the reactor has been shut down. Thus, the heatup threat (and, therefore, the threat to damaging the fuel clad) may be lower for events that occur in the refueling mode with irradiated fuel in the reactor vessel. In addition, the operators should be able to monitor RCS temperature and reactor vessel level so that escalation to the ALERT level via CA2 or CA4 will occur if required.

Loss of forced decay heat removal at reduced inventory may result in more rapid rises in reactor coolant temperatures depending on the time since shutdown. Escalation to the Alert level via CA4 is provided should an UNPLANNED event result in RCS temperature exceeding the Technical Specification cold shutdown temperature limit for greater than 30 minutes with CONTAINMENT CLOSURE not established.

Unlike the cold shutdown mode, 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 procedurally installed to assure that the ability to monitor level will not be interrupted. However, if all

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Attachment 3

Cold Shutdown/Refueling System Malfunction (CU4)

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 either temperature or level indication cannot be restored within 15 minutes from the loss of both means of indication. Escalation to ALERT would be via CA2 based on an inventory loss or CA4 based on exceeding its temperature criterion.

The SM/TSC Director/EOF Director must remain attentive to events or conditions that lead to the conclusion that exceeding the EAL threshold 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.

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Attachment 3
Cold Shutdown/Refueling System Malfunction

CU5

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

Fuel clad degradation

Operating Mode Applicability:

Cold Shutdown (Mode 5)
Refueling (Mode 6)

Emergency Action Level:

1. RCS sample activity value indicating fuel clad degradation greater than Technical Specification allowable limits.

Unit 1:

Greater than 3.50 $\mu\text{Ci/gm}$ IDE
Greater than 72/E $\mu\text{Ci/gm}$ Gross Activity

Unit 2:

Greater than 1.0 $\mu\text{Ci/gm}$ IDE
Greater than 100/E $\mu\text{Ci/gm}$ Gross Activity

Basis:

The condition noted in this EAL is considered to be a potential degradation in the level of safety of the plant and a potential precursor of more serious problems. This EAL addresses reactor coolant samples exceeding Technical Specifications for iodine spikes that are indicative of a loss of fuel clad integrity.

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Attachment 3
Cold Shutdown/Refueling System Malfunction

CU6

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

UNPLANNED loss of all onsite or offsite communications capabilities

Operating Mode Applicability:

Cold Shutdown (Mode 5)
Refueling (Mode 6)

Emergency Action Level: 1 OR 2

1. Loss of all onsite communications capability (Table C1) affecting the ability to perform routine operations.

Table C1 Onsite Communications Equipment
Station radio system
Plant paging system
In-plant telephones
Plant cell phones
Gaitronics

2. Loss of all offsite communications capability (Table C2).

Table C2 Offsite Communications Equipment
All telephone lines (commercial and microwave)
Station radio system
ENS
Cellular phones

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's ability to perform routine tasks necessary for plant operations or the ability to communicate problems to offsite authorities. The loss of offsite 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 state and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from radio transmissions, individuals being sent to offsite locations, etc.) are being utilized to make communications possible.

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Attachment 3
Cold Shutdown/Refueling System Malfunction

CU7

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

UNPLANNED loss of required DC power for greater than 15 minutes

Operating Mode Applicability:

Cold Shutdown (Mode 5)
Refueling (Mode 6)

Emergency Action Level:

1. a. UNPLANNED Loss of Vital DC power to required DC busses based on bus voltage indicating 105 volts or less.

AND

- b. Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

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. This EAL is intended to be anticipatory since the operating crew may not have necessary indication and control of equipment needed to respond to the loss.

UNPLANNED is included in this IC and EAL to preclude the declaration of an emergency as a result of planned maintenance activities. Routinely, plants perform maintenance on a train related basis during shutdown periods. It is intended that the loss of the operating (operable) train is to be considered.

The specified bus voltage indication, 105 volts, is based on the minimum bus voltage necessary for the operation of safety related equipment.

If the loss of DC power results in the inability to maintain cold shutdown, the escalation to an ALERT will be per CA4.

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Attachment 3
Cold Shutdown/Refueling System Malfunction

CU8

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

Inadvertent criticality

Operating Mode Applicability:

Cold Shutdown (Mode 5)
Refueling (Mode 6)

Emergency Action Level:

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

Basis:

This IC addresses criticality events that occur in cold shutdown or refueling modes (NUREG-1449, *Shutdown and Low-Power Operation at Commercial Nuclear Power Plants in the United States*) such as fuel misloading events and inadvertent dilution events. This condition indicates a potential degradation of the level of safety of the plant warranting an NUE classification. The IC excludes inadvertent criticalities that occur during planned reactivity changes associated with reactor startups (e.g., criticality earlier than estimated) which are addressed in the companion IC SU8.

This condition can be identified using the startup rate monitor. 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/TSC Director/EOF Director judgment.

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Attachment 3
Cold Shutdown/Refueling System Malfunction

CA1

ALERT

Initiating Condition:

Loss of RCS inventory

Operating Mode Applicability:

Cold Shutdown (Mode 5)

Emergency Action Level:

1. a. Loss of reactor vessel inventory as indicated by unexplained Reactor Building Sump, Reactor Drain Tank, Aux. Building Equipment Drain Tank, Aux. Building Sump, or Quench Tank level rise.

AND

- b. RCS level cannot be monitored for greater than 15 minutes.

Basis:

This EAL serves as a precursor to a loss of heat removal. 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 drop and potential core uncover. This condition will result in a minimum classification of ALERT. 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, remote RCS level indication may be lost and loss of suction to decay heat removal systems may occur. The inability to restore and maintain level after reaching this setpoint would, therefore, be indicative of a failure of the RCS barrier.

In cold shutdown the decay heat available to raise RCS temperature during a loss of inventory or heat removal event may be significantly greater than in the refueling mode. Entry into cold shutdown conditions may be attained within hours of operating at power or hours after refueling is completed. Entry into the refueling mode procedurally may not occur for several hours after the reactor has been shutdown. Thus the heatup threat and therefore the threat to damaging the fuel clad may be lower for events that occur in the refueling mode with irradiated fuel in the reactor vessel. The above forms the basis for needing both a cold shutdown specific IC (CA1) and a refueling specific IC (CA2).

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Attachment 3

Cold Shutdown/Refueling System Malfunction (CA1)

In the refueling mode, normal means of reactor vessel level indication may not be available. Redundant means of reactor vessel level indication will be normally installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indications 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 reactor vessel leakage. The 15-minute duration for the loss of level indication was chosen because it is half of the CS2 Site Area Emergency EAL duration. The 15-minute duration allows CA2 to be an effective precursor to CS2. Significant fuel damage is not expected to occur until the core has been uncovered for greater than 1 hour per the analysis referenced in the CS2 basis. Therefore, this EAL meets the definition for an ALERT.

The difference between CA1 and CA2 deals with the reactor conditions that exist between cold shutdown and refueling mode applicability. In cold shutdown the reactor vessel will normally be intact and standard reactor vessel level monitoring means are available.

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

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Attachment 3
Cold Shutdown/Refueling System Malfunction

CA2

ALERT

Initiating Condition:

Loss of reactor vessel inventory with irradiated fuel in the reactor vessel

Operating Mode Applicability:

Refueling (Mode 6)

Emergency Action Level:

1. a. Loss of reactor vessel inventory as indicated by unexplained Reactor Building Sump, Reactor Drain Tank, Aux. Building Equipment Drain Tank, Aux. Building Sump, or Quench Tank level rise.

AND

- b. Reactor vessel level cannot be monitored for greater than 15 minutes.

Basis:

This EAL serves as a precursor to a loss of heat removal. 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 drop and potential core uncover. This condition will result in a minimum classification of ALERT. 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, remote RCS level indication may be lost and loss of suction to decay heat removal systems may occur. The inability to restore and maintain level after reaching this setpoint would, therefore, be indicative of a failure of the RCS barrier.

In cold shutdown the decay heat available to raise RCS temperature during a loss of inventory or heat removal event may be significantly greater than in the refueling mode. Entry into cold shutdown conditions may be attained within hours of operating at power or hours after refueling is completed. Entry into the refueling mode procedurally may not occur for several hours after the reactor has been shutdown. Thus, the heatup threat and, therefore, the threat to damaging the fuel clad may be lower for events that occur in the refueling mode with irradiated fuel in the reactor vessel. The above forms the basis for needing both a cold shutdown specific IC (CA1) and a refueling specific IC (CA2).

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Attachment 3

Cold Shutdown/Refueling System Malfunction (CA2)

In the refueling mode, normal means of reactor vessel level indication may not be available. Redundant means of reactor vessel level indication will be normally 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 reactor vessel leakage. The 15-minute duration for the loss of level indication was chosen because it is half of the CS2 Site Area Emergency EAL duration. The 15-minute duration allows CA2 to be an effective precursor to CS2. Significant fuel damage is not expected to occur until the core has been uncovered for greater than 1 hour per the analysis referenced in the CS2 basis. Therefore, this EAL meets the definition for an ALERT.

The difference between CA1 and CA2 deals with the reactor conditions that exist between cold shutdown and refueling mode applicability. In cold shutdown the reactor vessel will normally be intact and standard reactor vessel level monitoring means are available. In the refueling mode the reactor vessel is not intact and reactor vessel inventory is monitored by different means.

If reactor vessel level continues to drop, then escalation to Site Area Emergency will be via CS2.

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Attachment 3
Cold Shutdown/Refueling System Malfunction

CA3

ALERT

Initiating Condition:

Loss of all offsite power and loss of all onsite AC power to required 4.16 KV busses

Operating Mode Applicability:

Cold Shutdown (Mode 5)
Refueling (Mode 6)
Defueled

Emergency Action Level:

1. a. Loss of power to all unit auxiliary and startup transformers supplying a unit.

AND

b. No diesel generator is supplying power to emergency busses on the affected unit.

AND

c. Failure to restore power to at least one emergency bus within 15 minutes from the time of loss of both offsite and onsite AC power.

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. When in the cold shutdown, refueling, or defueled mode the event can be classified as an Alert 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. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses. Escalating to Site Area Emergency, if appropriate, is by Abnormal Rad Levels/Radiological Effluent, or SM/TSC Director/EOF Director judgment ICs.

Consideration should be given to available loads necessary to remove decay heat or provide reactor vessel makeup capability when evaluating loss of AC power to vital busses. Even though a vital bus may be energized, if necessary loads (i.e., loads that, if lost, would inhibit decay heat removal capability or reactor vessel makeup capability) are not available on the energized bus, then the bus should not be considered available.

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Attachment 3
Cold Shutdown/Refueling System Malfunction

CA4

ALERT

Initiating Condition:

Inability to maintain plant in cold shutdown with irradiated fuel in the reactor vessel

Operating Mode Applicability:

Cold Shutdown (Mode 5)
Refueling (Mode 6)

Emergency Action Level: 1 OR 2 OR 3

1. With CONTAINMENT CLOSURE and RCS integrity not established, an UNPLANNED event results in RCS temperature exceeding 200°F
2. With CONTAINMENT CLOSURE established

AND

- RCS integrity not established OR RCS inventory reduced, an UNPLANNED event results in RCS temperature exceeding 200°F for greater than 20 minutes¹.
3. An UNPLANNED event results in RCS temperature exceeding 200°F for greater than 60 minutes¹ or results in an RCS pressure rise of greater than 10 psi.

¹Note: IF decay heat removal system (Decay Heat or Shutdown Cooling) is in operation within this time frame AND RCS temperature is being reduced, THEN this EAL is not applicable.

Basis:

This IC and its associated EALs are based on concerns raised by Generic Letter 88-17, *Loss of Decay Heat Removal*. A number of phenomena such as pressurization, vortexing, steam generator U-tube draining, RCS level differences when operating at a mid-loop condition, decay heat removal system design, and level instrumentation problems can lead to conditions where decay heat removal is lost and core uncover can occur. NRC analyses show that sequences of events can cause core uncover in 15 to 20 minutes and severe core damage within an hour after decay heat removal is lost.

A loss of Technical Specification components alone is not intended to constitute an Alert. The same is true of a momentary UNPLANNED excursion above 200°F when the heat removal function is available.

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Attachment 3

Cold Shutdown/Refueling System Malfunction (CA4)

The SM/TSC Director/EOF Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL threshold 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.

EAL #1 addresses complete loss of functions required for core cooling during refueling and cold shutdown modes when neither CONTAINMENT CLOSURE nor RCS integrity are established. RCS integrity is in place when the RCS pressure boundary is in its normal condition to be pressurized (e.g., no freeze seals or nozzle dams). No delay time is allowed for EAL #1 because the evaporated reactor coolant that may be released into the containment during this heatup condition could also be directly released to the environment.

EAL #2 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 in EAL #1, RCS integrity should be assumed to be in place when the RCS pressure boundary is in its normal condition to be pressurized (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. The allowed time frame is consistent with the guidance provided by Generic Letter 88-17, *Loss of Decay Heat Removal*, and is believed to be conservative given that a low pressure containment barrier to fission product release is established. Note 1 indicates that EAL #2 is not applicable if actions are successful in restoring an RCS heat removal system to operation and RCS temperature is being reduced within the 20-minute time frame.

EAL #3 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. As in EAL #1 and #2, RCS integrity should be considered to be in place when the RCS pressure boundary is in its normal condition to be pressurized (e.g., no freeze seals or nozzle dams). The status of CONTAINMENT CLOSURE in this EAL is immaterial given that the RCS is providing a high pressure barrier to fission product release to the environment. The 60-minute time frame should allow sufficient time to restore cooling without a substantial degradation in plant safety. The 10 psi pressure rise covers 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 is 10 psi, which can be read on installed control board instrumentation. Note 1 indicates that EAL 3 is not applicable if actions are successful in restoring a shutdown cooling system to operation and RCS temperature is being reduced within the 60-minute time frame assuming that the RCS pressure rise has remained less than 10 psi.

Escalation to Site Area Emergency would be via CS1 or CS2 should boiling result in significant reactor vessel level loss leading to core uncover.

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Attachment 3
Cold Shutdown/Refueling System Malfunction

CS1

SITE AREA EMERGENCY

Initiating Condition:

Loss of reactor vessel inventory affecting core decay heat removal capability

Operating Mode Applicability:

Cold Shutdown (Mode 5)

Emergency Action Level: 1 OR 2

1. With CONTAINMENT CLOSURE not established:

a. Loss of reactor vessel inventory is indicated by unexplained Reactor Building Sump, Reactor Drain Tank, Quench Tank, Aux. Building Equipment Drain Tank, or Aux. Building Sump level rise.

AND

b. Reactor vessel level cannot be monitored for greater than 30 minutes.

2. With CONTAINMENT CLOSURE established:

a. Loss of reactor vessel inventory is indicated by either:

- Unexplained Reactor Building Sump, Reactor Drain Tank, Quench Tank, Aux. Building Equipment Drain Tank, or Aux. Building Sump level rise
- Erratic source range monitor indication
- Core exit thermocouples indicating superheat

AND

b. Reactor vessel level cannot be monitored for greater than 30 minutes.

Basis:

Under the conditions specified by these EALs, continued lowering in reactor vessel level is indicative of a loss of inventory control. Inventory loss may be due to a reactor vessel breach, pressure boundary leakage, or continued boiling in the reactor vessel.

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Attachment 3

Cold Shutdown/Refueling System Malfunction (CS1)

If all reactor vessel level indications 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 containment sump level, reactor drain tank level, or quench tank level change. Containment sump level, reactor drain tank level, or quench 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. This EAL is based on concerns raised by Generic Letter 88-17, *Loss of Decay Heat Removal*, SECY 91-283, *Evaluation of Shutdown and Low Power Risk Issues*, NUREG-1449, *Shutdown and Low-Power Operation at Commercial Nuclear Power Plants in the United States*, and, NUMARC 91-06, *Guidelines for Industry Actions to Assess Shutdown Management*. A number of variables, (mid-loop, reduced level/flange level, head in place, cavity flooded, RCS venting strategy, decay heat removal system design, vortexing pre-disposition, or steam generator U-tube draining) can have a significant impact on heat removal capability challenging the fuel clad barrier. Analysis in the above references indicates that core damage may occur within an hour following continued core uncover; therefore, 30 minutes was chosen to be conservative.

The 30-minute duration allowed when CONTAINMENT CLOSURE is established allows sufficient time for actions to be performed to recover needed cooling equipment and is considered to be conservative. As water level in the reactor vessel lowers, the dose rate above the core will rise. Additionally, studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and can be used as a tool for making such determinations. In the refueling mode, normal means of reactor vessel level indication may not be available; however, redundant means of reactor vessel level indication is normally installed to assure that the ability to monitor level will not be interrupted. Since effluent release is not expected with closure established, declaration of a Site Area Emergency is warranted under the conditions specified.

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Attachment 3
Cold Shutdown/Refueling System Malfunction

CS2

SITE AREA EMERGENCY

Initiating Condition:

Loss of reactor vessel inventory affecting core decay heat removal capability with irradiated fuel in the reactor vessel

Operating Mode Applicability:

Refueling (Mode 6)

Emergency Action Level: 1 OR 2

1. With CONTAINMENT CLOSURE not established:

- a. Loss of reactor vessel inventory is indicated by unexplained Reactor Building Sump, Reactor Drain Tank, Quench Tank, Aux. Building Equipment Drain Tank, or Aux. Building Sump level rise.

AND

- b. Reactor vessel level cannot be monitored for greater than 30 minutes.

2. With CONTAINMENT CLOSURE established:

a. Loss of reactor vessel inventory is indicated by either:

- Unexplained Reactor Building Sump, Reactor Drain Tank, Quench Tank, Aux Building Equipment Drain Tank, or Aux Building Sump level rise
- Erratic source range monitor indication
- Core exit thermocouples indicating superheat

AND

- b. Reactor vessel level cannot be monitored for greater than 30 minutes.

Basis:

Under the conditions specified by these EALs, continued drop in reactor vessel level is indicative of a loss of inventory control. Inventory loss may be due to a reactor vessel breach, pressure boundary leakage, or continued boiling in the reactor vessel.

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Attachment 3

Cold Shutdown/Refueling System Malfunction (CS2)

In cold shutdown the decay heat available to raise RCS temperature during a loss of inventory or heat removal event may be significantly greater than in the refueling mode. Entry into cold shutdown conditions may be attained within hours of operating at power or hours after refueling is completed. Entry into the refueling mode procedurally may not occur for several hours after the reactor has been shutdown. Thus the heatup threat and, therefore, the threat to damaging the fuel clad may be lower for events that occur in the refueling mode with irradiated fuel in the reactor vessel (note that the heatup threat could be lower for cold shutdown conditions if the entry into cold shutdown was following a refueling). The above forms the basis for needing both a cold shutdown specific IC (CS1) and a refueling specific IC (CS2)

If all reactor vessel 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 containment sump level, reactor drain tank level, or quench tank level change. Containment sump level, reactor drain tank level, or quench 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. This EAL is based on concerns raised by Generic Letter 88-17, *Loss of Decay Heat Removal*, SECY 91-283, *Evaluation of Shutdown and Low Power Risk Issues*, NUREG-1449, *Shutdown and Low-Power Operation at Commercial Nuclear Power Plants in the United States*, and, NUMARC 91-06, *Guidelines for Industry Actions to Assess Shutdown Management*. A number of variables, (mid-loop, reduced level/flange level, head in place, cavity flooded, RCS venting strategy, decay heat removal system design, vortexing pre-disposition, or steam generator U-tube draining) can have a significant impact on heat removal capability challenging the fuel clad barrier. Analysis in the above references indicates that core damage may occur within an hour following continued core uncovering; therefore, 30 minutes was chosen to be conservative.

The 30-minute duration allowed when CONTAINMENT CLOSURE is established allows sufficient time for actions to be performed to recover needed cooling equipment and is considered to be conservative. As water level in the reactor vessel lowers, the dose rate above the core will rise. Additionally, studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and can be used as a tool for making such determinations. In the refueling mode, normal means of reactor vessel level indication may not be available; however, redundant means of reactor vessel level indication is normally installed to assure that the ability to monitor level will not be interrupted. Since effluent release is not expected with closure established, declaration of a Site Area Emergency is warranted under the conditions specified.

Declaration of an Site Area Emergency is warranted under the conditions specified by the IC. Escalation to a General Emergency is via CG1 or AG1.

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Attachment 3
Cold Shutdown/Refueling System Malfunction

CG1

GENERAL EMERGENCY

Initiating Condition:

Loss of reactor vessel inventory affecting fuel clad integrity with containment challenged with irradiated fuel in the reactor vessel

Operating Mode Applicability:

Cold Shutdown (Mode 5)
Refueling (Mode 6)

Emergency Action Level: 1 AND 2 AND 3

1. Loss of reactor vessel inventory as indicated by unexplained Reactor Building Sump, Reactor Drain Tank, Quench Tank, Aux. Building Equipment Drain Tank, or Aux. Building Sump level rise.
2. Reactor vessel level cannot be monitored for greater than 30 minutes with indication of core uncover, as evidenced by one or more of the following:
 - Erratic source range monitor indication.
 - Core exit thermocouples indicating superheat.
3. Indication of CONTAINMENT challenged as indicated by one or more of the following:
 - Containment hydrogen greater than or equal to 4%.
 - Pressure above 59 psig (Unit 1) or 73.7 psia (Unit 2) with CONTAINMENT INTEGRITY.
 - CONTAINMENT CLOSURE not established.

Basis:

For EAL #1 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.

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Attachment 3
Cold Shutdown/Refueling System Malfunction (CG1)

EAL #2 represents the inability to restore and maintain reactor vessel level above the top of active fuel. Fuel damage is probable if reactor vessel level cannot be restored, as available decay heat will cause boiling further reducing the reactor vessel level. These EALs are based on concerns raised by Generic Letter 88-17, *Loss of Decay Heat Removal*, SECY 91-283, *Evaluation of Shutdown and Low Power Risk Issues*, NUREG-1449, *Shutdown and Low-Power Operation at Commercial Nuclear Power Plants in the United States*, and NUMARC 91-06, *Guidelines for Industry Actions to Assess Shutdown Management*. A number of variables (e.g., mid-loop, reduced level/flange level, head in place, cavity flooded, RCS venting strategy, decay heat removal system design, vortexing pre-disposition, or steam generator U-tube draining) can have a significant impact on heat removal capability challenging the fuel clad barrier. Analysis in the above references indicates that core damage may occur within an hour following continued core uncover; therefore, 30 minutes was chosen to be conservative. As water level in the reactor vessel lowers, the dose rate above the core will rise. Additionally, post-TMI studies indicated that the installed nuclear instrumentation will operate erratically when the core is uncovered and that this should be used as a tool for making such determinations. The GE is declared on the occurrence of the loss or imminent loss of function of all three barriers. Based on the above discussion, RCS barrier failure resulting in core uncover for 30 minutes or more may cause fuel clad failure. With the CONTAINMENT breached or challenged, 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.

In the context of EAL #3, containment closure is the action taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions. Containment closure should not be confused with refueling containment integrity as defined in technical specifications. Site shutdown contingency plans provide for re-establishing containment closure following a loss of heat removal or RCS inventory functions. If the closure is re-established prior to exceeding the temperature or level thresholds of the RCS barrier and fuel clad barrier EALs, escalation to GE would not occur.

The pressure at which containment is considered challenged is based on the condition of the containment. If containment integrity is established, then the containment will be challenged at the design pressure. This is consistent with the owners groups' Emergency Response Procedures. Since no significant pressurization is expected during cold shutdown/refueling operations, there is no specific pressure setpoint at which the containment is considered to be challenged. Plant procedures provide for the establishment of containment closure when required and for the monitoring of the status of containment closure.

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Attachment 3
Cold Shutdown/Refueling System Malfunction (CG1)

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 that hydrogen concentrations greater than 4.0% exist. The 4.0% value, though not representative of an explosive mixture of hydrogen, is consistent with the concentration that can be maintained with at least one hydrogen recombiner in service.

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Attachment 3
EVENTS RELATED TO ISFSI

E-HU1

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

Damage to a loaded cask CONFINEMENT BOUNDARY

Operating Mode Applicability:

Not Applicable

Emergency Action Level: 1 OR 2 OR 3

1. Natural phenomena events affecting a loaded cask CONFINEMENT BOUNDARY.
 - Tornado/High winds
 - Flood
2. Accident conditions affecting a loaded cask CONFINEMENT BOUNDARY.
 - Cask drop accident
 - Blockage of air inlets
 - Fire or explosion
3. Any condition in the opinion of the SM/TSC Director/EOF Director that indicates loss of loaded fuel storage cask CONFINEMENT BOUNDARY.

Basis:

A NUE would be declared 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.

For EAL #1 and EAL #2, the results of the ISFSI Safety Analysis Report (SAR) referenced in the cask('s) Certificate of Compliance and the related NRC Safety Evaluation Report are used to develop a list of natural phenomena events and accident conditions. These EALs address responses to a dropped cask, a tipped-over cask, explosion, missile damage, fire damage or natural phenomena affecting a cask (e.g., seismic event, tornado, etc.).

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Attachment 3

EVENTS RELATED TO ISFSI (E-HU1)

For EAL #3, any condition not explicitly detailed as an EAL threshold value, which, in the judgment of the SM/TSC Director/EOF Director, is a potential degradation in the level of safety of the ISFSI. SM/TSC Director/EOF Director judgment is to be based on known conditions and the expected response to mitigating activities within a short time period.

Possible damage mode to the storage cask involves loss of shielding from impact damage due to tornado-generated missiles. Cask containment loss due to a tornado is not postulated except long-term loss of heat transfer due to blockage of air inlets as discussed in following paragraphs.

There is no fully immersing flood that might move or tip-over the cask postulated for the ANO site. The Maximum Probable Flood blocks the air inlets of the Holtec casks above site Elevation 354 feet.

The VSC-24 storage cask drop accident is a cask drop of 5 feet onto an essentially unyielding surface. The Holtec storage cask drop accident is a cask drop of 11 inches onto an essentially unyielding surface. Any similar drop or tipover of a loaded canister while being transported in a site transfer cask can also potentially affect a confinement boundary.

The full blockage of air inlets event is a postulated blockage of the airflow inlets for greater than 24 hours for the VSC-24 casks and 72 hours (or 24 hours with the difference between the average air outlet temperature and the ISFSI ambient temperature equal to or greater than 126°F) for the Holtec casks. The cask has four air inlets and the classification is not based on a loss of confinement boundary, but the condition could lead to the degradation of the fuel during storage or posing an operational safety problem with respect to its removal from storage.

A fire inside the ISFSI fence or explosion that generates missiles that enter the ISFSI area could lead to the degradation of the fuel during storage or pose an operational safety problem with respect to its removal from storage.

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Attachment 3
EVENTS RELATED TO ISFSI

E-HU2

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

Confirmed security event with potential loss of level of safety of the ISFSI

Operating Mode Applicability:

Not applicable

Emergency Action Level:

1. Security event as determined from the ANO Safeguards Contingency Plan and reported by the ANO Security Shift Commander.

Basis:

This EAL is based on ANO Security Plans. Security events which do not represent a potential degradation in the level of safety of the ISFSI are reported under 10 CFR 73.71 or in some cases under 10 CFR 50.72.

Reference is made to ANO Security Shift Commander because these individuals are the designated personnel 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 Security Plan.

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Attachment 3
FISSION PRODUCT BARRIER DEGRADATION

FU1

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

ANY loss or ANY potential loss of containment

Operating Mode Applicability:

Power Operations (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

Emergency Action Level:

Comparison of conditions/values with those listed in fission product barrier matrix indicates:

Loss or potential loss of containment.

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

Basis:

The fuel cladding and the reactor coolant system are weighted more heavily than the containment barrier.

Loss of the containment would be a potential degradation in the level of plant safety.

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Attachment 3
FISSION PRODUCT BARRIER DEGRADATION

FA1

ALERT

Initiating Condition:

ANY loss or ANY potential loss of EITHER fuel clad or RCS

Operating Mode Applicability:

Power Operation (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

Emergency Action Level: 1 OR 2

Comparison of conditions/values with those listed in fission product barrier matrix indicates:

1. Loss or potential loss of fuel clad.

OR

2. Loss or potential loss of RCS.

Fuel Clad Barrier EALs: FCB1 OR FCB2 OR FCB3 OR FCB4 OR FCB5 OR
FCB6 OR FCB7

OR

RCS Barrier EALs: RCB1 OR RCB2 OR RCB3 OR RCB4 OR RCB5

Basis:

The fuel cladding and the reactor coolant system are weighted more heavily than the containment barrier.

Loss of either the fuel cladding or the reactor coolant system would be a substantial degradation in the level of plant safety.

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Attachment 3
FISSION PRODUCT BARRIER DEGRADATION

FS1

SITE AREA EMERGENCY

Initiating Condition:

Loss or potential loss of ANY two barriers

Operating Mode Applicability:

Power Operation (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

Emergency Action Level: ANY 2 of the 3

Comparison of conditions/values with those listed in fission product barrier Matrix indicates ANY 2 of the following:

Loss or Potential Loss of the fuel clad.
Loss or Potential Loss of the RCS.
Loss or Potential Loss of the containment.

Fuel Clad Barrier EALs: FCB1 OR FCB2 OR FCB3 OR FCB4 OR FCB5 OR
FCB6 OR FCB7

RCS Barrier EALs: RCB1 OR RCB2 OR RCB3 OR RCB4 OR RCB5

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

Basis:

Loss of 2 fission product barriers would be a major failure of plant systems needed for protection of the public.

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Attachment 3
FISSION PRODUCT BARRIER DEGRADATION

FG1

GENERAL EMERGENCY

Initiating Condition:

Loss of ANY two barriers AND loss or potential loss of third barrier

Operating Mode Applicability:

Power Operation (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

Emergency Action Level: 1 AND 2

Comparison of conditions/values with those listed in fission product barrier matrix indicates:

1. Loss of 2 fission product barriers.
- AND
2. Loss or potential loss of third.

Fuel Clad Barrier EALs: FCB1 OR FCB2 OR FCB3 OR FCB4 OR FCB5 OR
FCB6 OR FCB7

RCS Barrier EALs: RCB1 OR RCB2 OR RCB3 OR RCB4 OR RCB5

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

Basis:

Conditions/events causing the loss of 2 Fission Product Barriers with the loss or potential loss of the third could reasonably be expected to cause a release beyond the immediate site area exceeding EPA Protective Action Guidelines.

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Attachment 3
FISSION PRODUCT BARRIER DEGRADATION

FUEL CLAD BARRIER EALS: FCB1 OR FCB2 OR FCB3 OR FCB4 OR FCB5 OR
FCB6 OR FCB7

The fuel clad barrier is the zircalloy tubes that contain the fuel pellets.

1. Safety Function Status/Functional Recovery (FCB1)

Loss: None

Potential Loss:

ANO-1: HPI Cooling is required to be initiated.

ANO-2: Inadequate RCS heat removal via SGs leads to initiation of once-through cooling.

Basis:

There is no Loss EAL for this item.

The potential loss EAL for this item is a significant challenge to the ability to remove heat from the RCS, and therefore represents a potential challenge to both the fuel clad barrier and the RCS barrier.

ANO-2 EOP 2202.009, "Functional Recovery", contains success paths for RCS heat removal by the steam generators with and without SIAS (HR-2 and HR-1, respectively). An effective SG heatsink is defined as a SG having enough secondary inventory with steaming capability such that core decay heat can be removed without uncontrolled RCS temperature rise. Upon determination that RCS heat removal via unisolated or intact SGs is NOT adequate, the operator is directed to success path HR-3, Once Through Cooling. The criteria used for adequate RCS heat removal via unisolated or intact SGs is based on at least ONE SG with level greater than 70 inches (120 inches under harsh conditions) AND RCS T_c NOT rising in an uncontrolled manner. ANO-2 EOP 2202.006, "Loss of Feedwater", uses similar criteria for initiating once-through cooling. The SGs are the preferred means of core heat removal, and once-through cooling is the method of last resort for core cooling.

Note that this criterion is also considered a challenge to the RCS barrier in the RCS potential loss EAL, RCB1. Therefore, this EAL condition represents a potential loss of both the fuel clad and the RCS barriers, and represents a Site Area Emergency per FS1.

Similarly, the ANO-1 EOP 1202.004, "Overheating", attempts to recover from a challenge to the heat sink, including CET temperatures rising above 610°F AND all MFW/EFW is lost during a loss of adequate SCM, or loss of all feedwater (MFW and EFW) following a reactor trip. Heat removal via the SGs is the preferred means for cooling the core. Upon failure of actions to correct

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Attachment 3

FISSION PRODUCT BARRIER DEGRADATION (FCB1)

overheating as evidenced by the ERV opening, RCS pressure greater than or equal to 2450 psig, or RCS pressure approaching the NDTT Limit of EOP Figure 3, or secondary feed is NOT expected to become available, the operator is directed to initiate HPI cooling. HPI cooling involves adding relatively cold water to the RCS with the HPI system while removing relatively hot water through the ERV, and can result in releasing large quantities of RCS to the reactor building. Additionally, HPI cooling will probably not initially match the decay heat rate.

Note that this criterion is also considered a challenge to the RCS barrier in the RCS potential loss EAL, RCB1. Therefore, this EAL condition represents a potential loss of both the fuel clad and the RCS barriers, and represents a Site Area Emergency per FS1.

Reference Documents

1. ANO-1 EOP 1202.004, "OVERHEATING"
2. ANO-2 EOP 2202.006, "LOSS OF FEEDWATER"
3. ANO-2 EOP 2202.009, "FUNCTIONAL RECOVERY"
4. BWOG EOP Technical Bases Document, Vol. 3, Chapter III.C

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Attachment 3
FISSION PRODUCT BARRIER DEGRADATION

FUEL CLAD BARRIER EALs: FCB1 OR FCB2 OR FCB3 OR FCB4 OR FCB5 OR
FCB6 OR FCB7

The fuel clad barrier is the zircalloy tubes that contain the fuel pellets.

2. Primary Coolant Activity Level (FCB2)

Loss:

Greater than 300 $\mu\text{Ci/gm}$ dose equivalent I-131 activity by Chemistry sample.

OR

ANO-1: Radiation levels at SA-229 indicate greater than 1000 mR/hr.

OR

ANO-2: Radiation levels at 2TCD-19 indicate greater than 1000 mR/hr.

Potential Loss: None

Basis:

An RCS concentration of 300 $\mu\text{Ci/gm}$ dose equivalent I-131 has been determined to correspond to approximately 2.9% failed clad for ANO-1, and 2.1% clad damage for ANO-2, which is consistent with the NUMARC EAL Task Force Assessment that this level corresponds to less than 5% clad damage. This amount of radioactivity is well above that expected for iodine spikes and thus 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 ANO-1, 2TCD-19 for ANO-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.

There is no equivalent potential loss EAL for this item.

Reference Documents

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

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FISSION PRODUCT BARRIER DEGRADATION

FUEL CLAD BARRIER EALs: FCB1 OR FCB2 OR FCB3 OR FCB4 OR FCB5 OR
FCB6 OR FCB7

The fuel clad barrier is the zircalloy tubes that contain the fuel pellets.

3. Core Exit Thermocouple Readings (FCB3)

Loss: ANO-1: Greater than or equal to 1200°F CET temperature

OR

Significant ICC exists as evidenced by CETs indicating superheated conditions

ANO-2: Greater than or equal to 1200°F average CET Temperature

Potential loss: ANO-1: ICC exists as evidenced by CETs indicating superheated conditions

ANO-2: Average CETs indicate superheat for current RCS pressure.

Basis:

The loss EAL reading corresponds to significant superheating of the coolant. The loss EAL of greater than or equal to 1200°F for ANO-2 is consistent with the generic value and is also consistent with recommendations from CE in reference document #5. The elevated temperature corresponds to significant superheating of the coolant and is indicative of a loss of the fuel clad barrier. Figure 5-2 of reference document #5 is the bases for Figure 1-2 of reference document #4, used to estimate core damage using core exit thermocouples for either unit, and indicates that clad rupture due to high temperature is not expected for CET temperature readings of less than 1200°F.

For ANO-1, the loss EAL is consistent with the treatment of inadequate core cooling (ICC) in the EOPs, which is based on a pressure-temperature curve. The basis for Region 3 of this curve from the BWOE EOP Technical Basis Document states, "If the RCS P-T reaches Region Three, then cladding temperature in the high power regions of the core may be 1400°F or higher." This is consistent with the intent of the 1200°F CET reading recommendation, as CET temperature will be lower than fuel clad temperature.

The potential loss EAL corresponds to a loss of subcooling. For ANO-2, there is a Functional Recovery EOP (2202.009), and the core and RCS heat removal acceptance criteria for safety function status checks include determination of RCS superheated.

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FISSION PRODUCT BARRIER DEGRADATION (FCB3)

For ANO-1, the RCS P-T in Region 2 (CET temperatures above saturation for indicated pressure) of the EOP Figure 4 corresponds to a loss of subcooling. This is consistent with EOP 1202.005, "Inadequate Core Cooling".

Note that the loss or potential loss EAL for this category will occur after a loss of adequate sub-cooling margin, which represents a loss of the RCS barrier in EAL RCB2, 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. ANO-1 EOP 1202.005, "Inadequate Core Cooling"
2. ANO-1 EOP 1202.013, EOP Figures
3. ANO-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. BWOE EOP Technical Bases Document, Vol. 3, Chapter III.F

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Attachment 3
FISSION PRODUCT BARRIER DEGRADATION

FUEL CLAD BARRIER EALs: FCB1 OR FCB2 OR FCB3 OR FCB4 OR FCB5 OR FCB6 OR FCB7

The fuel clad barrier is the zircalloy tubes that contain the fuel pellets.

4. Reactor Vessel Water Level (FCB4)

Loss: None

Potential Loss: If CET indication is unavailable AND all RCPs are secured, indication of core uncoverly:

ANO-1: All RVLMS sensors indicate DRY following lowering trend

ANO-2: RVLMS LVL6 indicates DRY following lowering trend

Basis:

The Reactor Vessel Level Monitoring Systems at ANO do not provide positive indication of core uncoverly. 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 uncoverly, and are the only positive indication of core uncoverly. Consistent with this approach, RVLMS is used as an indication of potential core uncoverly only if CET indication is unavailable.

Per reference document #1, the reactor vessel level indicators installed in ANO-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, ANO-1 Inadequate Core Cooling
2. Calculation 84-EQ-0080-02, Loop Error Analysis for Reactor Vessel Level Monitoring System
3. ULD-2-SYS-24, ANO-2 Inadequate Core Cooling
4. Calculation 90-E-0116-01, ANO-2 EOP Setpoint Document, Setpoint R.3

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FISSION PRODUCT BARRIER DEGRADATION

FUEL CLAD BARRIER EALs: FCB1 OR FCB2 OR FCB3 OR FCB4 OR FCB5 OR
FCB6 OR FCB7

The fuel clad barrier is the zircalloy tubes that contain the fuel pellets.

5. Containment Radiation Monitoring (FCB5)

Loss: Containment high range rad monitor reading greater than 1000 R/hr

Potential Loss: NONE

Basis:

The 1000 R/hr reading on the containment high range radiation monitors (RE-8060 or RE-8061 for ANO-1, 2RE-8925-1 or 2RE-8925-2 for ANO-2) is a value which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the containment. The reading was calculated assuming the instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with approximately 2-5% cladding failure into the containment atmosphere. Reactor coolant concentrations of this magnitude are several times larger than that expected for iodine spikes and are therefore indicative of fuel damage. This value is higher than that specified for RCS barrier loss EAL RCB4. Therefore, this EAL condition represents a potential loss of both the fuel clad and the RCS barriers, and represents a Site Area Emergency per FS1.

There is no potential loss EAL associated with this item.

Reference Documents

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

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FISSION PRODUCT BARRIER DEGRADATION

FUEL CLAD BARRIER EALs: FCB1 OR FCB2 OR FCB3 OR FCB4 OR FCB5 OR
FCB6 OR FCB7

The fuel clad barrier is the zircalloy tubes that contain the fuel pellets.

6. Core Damage Assessment (FCB6)

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

Potential Loss: NONE

Basis:

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

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

There is no potential loss EAL associated with this item.

Reference Documents

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

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FISSION PRODUCT BARRIER DEGRADATION

FUEL CLAD BARRIER EALs: FCB1 OR FCB2 OR FCB3 OR FCB4 OR FCB5 OR
FCB6 OR FCB7

The Fuel Clad Barrier is the zircalloy tubes that contain the fuel pellets.

7. SM/TSC Director/EOF Director Judgment (FCB7)

Any condition in the opinion of the SM/TSC Director/EOF Director that indicates loss or potential loss of the fuel clad barrier based on:

- Imminent barrier degradation (within 2 hours) due to degraded safety system performance
- Degraded ability to monitor 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 the SM/TSC Director/EOF Director judgment that the barrier may be considered lost or potentially lost. (See also IC SG1, "Prolonged Loss or All Offsite Power and Prolonged Loss of All Onsite AC Power", for additional information.)

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Attachment 3
FISSION PRODUCT BARRIER DEGRADATION

RCS BARRIER EALs: RCB1 OR RCB2 OR RCB3 OR RCB4 OR RCB5

The RCS barrier is the reactor coolant system pressure boundary and includes the reactor vessel and all reactor coolant system piping up to the isolation valves.

1. Safety Function Status/Functional Recovery (RCB1)

Loss: None

Potential Loss

ANO-1: HPI cooling is required to be initiated
OR
RCS Pressure greater than 2450 PSIG AND not lowering

ANO-2: Inadequate RCS heat removal via SGs leads to initiation of once-through cooling
OR
RCS Pressure greater than 2465 PSIA AND not lowering

Basis:

There is no loss EAL associated with this item.

The first potential loss EAL for this item is a significant challenge to the ability to remove heat from the RCS, and therefore represents a potential challenge to both the fuel clad and the RCS barriers.

ANO-2 EOP 2202.009, "Functional Recovery", contains success paths for RCS heat removal by the steam generators with and without SIAS (HR-2 and HR-1, respectively). An effective SG heatsink is defined as a SG having enough secondary inventory with steaming capability such that core decay heat can be removed without uncontrolled RCS temperature increase. Upon determination that RCS heat removal via unisolated or intact SGs is NOT adequate, the operator is directed to success path HR-3, Once Through Cooling. The criteria used for adequate RCS heat removal via unisolated or intact SGs is based on at least ONE SG with level greater than 70 inches (120 inches under harsh conditions) AND RCS T_c NOT rising in an uncontrolled manner. ANO-2 EOP 2202.006, "Loss of Feedwater", uses similar criteria for initiating once-through cooling. The SGs are the preferred means of core heat removal, and once-through cooling is the method of last resort for core cooling.

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FISSION PRODUCT BARRIER DEGRADATION (RCB1)

Note that this criteria is also considered a challenge to the fuel clad barrier in the fuel clad barrier potential loss EAL, FCB1. Therefore this first potential loss EAL condition represents a potential loss of both the fuel clad and the RCS barriers, and represents a Site Area Emergency per FS1.

Similarly, the ANO-1 EOP 1202.004, "Overheating", attempts to recover from a challenge to the heat sink, including CET temperatures rising above 610°F AND all MFW/EFW is lost during a loss of adequate SCM, or loss of all feedwater (MFW and EFW) following a reactor trip. Heat removal via the SGs is the preferred means for cooling the core. Upon failure of actions to correct overheating as evidenced by the ERV opening, RCS pressure greater than or equal to 2450 psig, RCS pressure approaching the NDTT Limit of EOP Figure 3, or secondary feed is NOT expected to become available, the operator is directed to initiate HPI cooling. HPI cooling involves adding relatively cold water to the RCS with the HPI system while removing relatively hot water through the ERV, and can result in releasing large quantities of RCS to the reactor building. Additionally, HPI cooling will probably not initially match the decay heat rate.

Note that this criteria is also considered a challenge to the fuel clad barrier in the fuel clad potential loss EAL FCB1. Therefore this EAL condition represents a potential loss of both the fuel clad and the RCS barriers, and represents a Site Area Emergency per FS1.

Historically, ANO-1 and ANO-2 have regarded that RCS pressure greater than 2450 PSIG (Unit 1) and greater than 2465 PSIA (Unit 2) and NOT lowering represents a challenge to RCS integrity, in that it represents a possible uncontrolled overpressurization of the RCS. For ANO-1, the combination of the ERV setpoint, the pressurizer code safety setpoints, the RCS high pressure trip, and the DSS high pressure trip, in conjunction with recovery actions are all expected to be able to lower RCS pressure below 2450 PSIG. For ANO-2, the pressurizer code safety setpoints, the RCS high pressure trip, and the DSS high pressure trip, in conjunction with recovery actions are all expected to be able to lower RCS pressure below 2465 PSIA.

Reference Documents

1. ANO-1 EOP 1202.004, "Overheating"
2. ANO-2 EOP 2202.006, "Loss Of Feedwater"
3. ANO-2 EOP 2202.009, "Functional Recovery"
4. CEN-152, Emergency Operating Procedure Guidelines
5. Calculation 90-E-0116-01, ANO-2 EOP Setpoint Document
6. BWOE EOP Technical Bases Document, Vol. 3, Chapter III.C

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Attachment 3
FISSION PRODUCT BARRIER DEGRADATION

RCS BARRIER EALs: RCB1 OR RCB2 OR RCB3 OR RCB4 OR RCB5

The RCS barrier is the reactor coolant system pressure boundary and includes the reactor vessel and all reactor coolant system piping up to the isolation valves.

2. RCS Leak Rate (RCB2)

Loss: RCS leakage greater than available makeup capacity as indicated by:

ANO-1: Loss of adequate subcooling margin

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

Potential Loss:

ANO-1: RCS leakage exceeding Normal Makeup Capacity (50 gpm)

ANO-2: RCS leakage exceeding the capacity of one charging pump in the normal charging mode (44 gpm)

Basis:

The loss 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.

The potential loss EAL is based on the 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 ANO-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 ANO-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 decreasing makeup tank level
- Full or partial HPI is needed to maintain the RCS pressure or pressurizer level

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Attachment 3

FISSION PRODUCT BARRIER DEGRADATION (RCB2)

- Two out of three seal stages failed on any RCP
- RCS pressure decreasing due to failure of a primary relief valve to reseal

For ANO-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 ANO-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 decreasing due to failure of a primary relief valve to reseal

Reference Documents

1. ANO-1 EOP 1202.013, Figure 1, Saturation and Adequate SCM
2. ANO-1 EOP Setpoint Document, Calculation 90-E-0016-07, Setpoint B.19
3. ANO-2 EOP 2202.009, "Functional Recovery"
4. ANO-2 EOP Setpoint Document, Calculation 90-E-0116-01
5. Unit 2 SAR Table 9.3-14, Charging Pumps Design Data

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Attachment 3
FISSION PRODUCT BARRIER DEGRADATION

RCS BARRIER EALs: RCB1 OR RCB2 OR RCB3 OR RCB4 OR RCB5

The RCS barrier is the reactor coolant system pressure boundary and includes the reactor vessel and all reactor coolant system piping up to the isolation valves.

3. SG Tube Rupture (RCB3)

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

Potential Loss: NONE

Basis:

This EAL is intended to address the full spectrum of steam generator (SG) tube rupture events in conjunction with containment barrier loss EAL CNB3 and fuel clad barrier EALs. The loss EAL addresses RUPTURED SG(s) for which the leakage is large enough to cause actuation of ECCS safety injection. This is consistent to the RCS barrier potential loss EAL RCB2. 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.

There is no potential loss EAL.

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FISSION PRODUCT BARRIER DEGRADATION

RCS BARRIER EALs: RCB1 OR RCB2 OR RCB3 OR RCB4 OR RCB5

The RCS barrier is the reactor coolant system pressure boundary and includes the reactor vessel and all reactor coolant system piping up to the isolation valves.

4. Containment Radiation Monitoring (RCB4)

Loss: Containment rad monitor reading greater than 100 R/hr

Potential Loss: NONE

Basis:

The 100 R/hr reading on the containment high range radiation monitors (RE-8060 or RE-8061 for ANO-1, 2RE-8925-1 or 2RE-8925-2 for ANO-2) is a value which indicates the release of reactor coolant to the containment. This reading was derived assuming the instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with an RCS concentration of 60 µCi/gm dose equivalent I-131 into the containment atmosphere. This reading is an order of magnitude lower than that specified for fuel clad barrier EAL FCB5. Thus, this EAL would be indicative of an RCS leak only. If the radiation monitor reading increased to that specified by fuel clad barrier EAL FCB5, 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.

There is no potential loss EAL associated with this item.

Reference Documents

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

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Attachment 3
FISSION PRODUCT BARRIER DEGRADATION

RCS BARRIER EALs: RCB1 OR RCB2 OR RCB3 OR RCB4 OR RCB5

The RCS barrier is the reactor coolant system pressure boundary and includes the reactor vessel and all reactor coolant system piping up to the isolation valves.

5. SM/TSC Director/EOF Director Judgment (RCB5)

Any condition in the opinion of the SM/TSC Director/EOF Director that indicates loss or potential loss of the RCS barrier based on:

- Imminent barrier degradation (within 2 hours) due to degraded safety system performance
- Degraded ability to monitor 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. (See also IC SG1, "Prolonged Loss of All Offsite Power and Prolonged Loss of All Onsite AC Power", for additional information.)

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Attachment 3
FISSION PRODUCT BARRIER DEGRADATION

CONTAINMENT BARRIER EALs: CNB1 OR CNB2 OR CNB3 OR CNB4 OR CNB5 OR
CNB6 OR CNB7

The containment barrier includes the containment building, its 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:

Rapid unexplained containment pressure loss following initial rise

OR

Containment parameters not consistent with expected event response

Potential Loss:

ANO-1: 73.7 PSIA (59 PSIG) and rising

ANO-2: 73.7 PSIA and rising

OR

Containment Hydrogen Concentration greater than 4.0%

OR

Containment Pressure greater than containment spray actuation setpoint with less than one full train of spray operating

ANO-1 44.7 PSIA (30 PSIG)

ANO-2 23.3 PSIA

Basis:

Rapid unexplained loss of pressure (i.e., not attributable to containment spray or condensation effects) following an initial pressure rise indicates a loss of containment integrity. Containment pressure and sump levels should rise as a result of the mass and energy release into containment from a LOCA. Thus, sump level or pressure or humidity (ANO-2) not rising indicates containment bypass and a loss of containment integrity. The containment pressure setpoint for potential loss of containment is based on the containment design pressure. 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

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FISSION PRODUCT BARRIER DEGRADATION (CNB1)

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. Conditions leading to these indications result from RCS barrier and/or fuel clad barrier loss. Thus, this EAL is primarily a discriminator between Site Area Emergency and General Emergency representing a potential loss of the third barrier.

The second potential loss EAL based on containment pressure represents a potential loss of containment in that the containment heat removal/depressurization system (containment sprays, 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. ANO-1 OP-1105.003, "Engineering Safeguards Actuation System"
2. ANO-1 SAR Sections 1.4.43, 5.2.1.2.1, 14.2.2.5.5.1 (reactor building design pressure)
3. ANO-1 SAR Section 6.6 Post-Loss of Coolant Accident Hydrogen Control
4. ANO-1 TS Table 3.3.5-1
5. ANO-2 SAR Section 6.2.5 Combustible Gas Control In Containment
6. ANO-2 SAR Section 3.8.1.3.1.D (Containment Design Pressure)
7. ANO-2 TS Table 3.3-4
8. Regulatory Guide 1.7, Control of Combustible Gas Concentrations in Containment Following a Loss-of-Coolant Accident, Rev. 2 1978

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Attachment 3
FISSION PRODUCT BARRIER DEGRADATION

CONTAINMENT BARRIER EALs: CNB1 OR CNB2 OR CNB3 OR CNB4 OR CNB5 OR
CNB6 OR CNB7

The Containment Barrier includes the containment building, its 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.

2. Core Exit Thermocouples (CNB2)

Loss: None

Potential Loss:

ANO-1: Significant ICC exists as evidenced by CETs indicating superheated conditions and restoration procedures not effective within 15 minutes

ANO-2: CETs greater than 1200°F AND restoration procedures not effective within 15 minutes

Basis:

In this EAL, 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 decreasing.

Severe accident analyses (e.g., NUREG-1150) have concluded that function restoration procedures can arrest core degradation within the reactor vessel in a significant fraction of the core damage scenarios, and that the likelihood of containment failure is very small in these events. Given this, it is appropriate to provide a reasonable period to allow function restoration procedures to arrest the core melt sequence. 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.

The conditions in this potential loss EAL represent an imminent 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 heat sink criteria in the fuel and RCS barrier columns, this EAL would result in the declaration of a General Emergency (loss of two barriers and the potential loss of a third). If the function restoration procedures are ineffective, there is no success path.

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Attachment 3
FISSION PRODUCT BARRIER DEGRADATION

CONTAINMENT BARRIER EALs: CNB1 OR CNB2 OR CNB3 OR CNB4 OR CNB5 OR CNB6 OR CNB7)

The containment barrier includes the containment building, its 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.

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

Loss: Primary-to-secondary leakrate greater than 10 gpm with nonisolable steam release from affected SG 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. Secondary side release paths to environment include atmospheric relief valves and main steam line safety valves, as well as discharges direct to the environment from an unisolable secondary or steam line break. The threshold for establishing the nonisolable 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., SGTR with concurrent loss of offsite power and the RUPTURED steam generator is required for plant cooldown or has a stuck open relief valve). 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 a nonisolable release path to the environment. These minor releases are assessed using Abnormal Rad Levels/Radiological Effluent ICs.

For smaller breaks, not exceeding the Normal Makeup Capacity for ANO-1 or the capacity of one charging pump in the normal charging lineup for ANO-2, but exceeding 10 gpm, this EAL results in an Unusual Event.

For breaks that exceed the Normal Makeup Capacity for ANO-1 or the capacity of one charging pump in the normal charging lineup for ANO-2 or result in ECCS actuation, RCS barrier EALs RCB2 or RCB3 would result in an Alert if the ruptured SG is isolated. If the SG remains unisolated, this EAL will be a discriminator for Site Area Emergencies. Escalation to General Emergency would be based on Loss or Potential Loss of the fuel clad barrier.

There is no equivalent potential loss EAL for this item.

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FISSION PRODUCT BARRIER DEGRADATION

CONTAINMENT BARRIER EALs: CNB1 OR CNB2 OR CNB3 OR CNB4 OR CNB5
OR CNB6 OR CNB7

The containment barrier includes the containment building, its 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.

4. Containment Isolation Valve Status after Containment Isolation (CNB4)

Loss: Unisolable breach of containment with a direct release path to the environment following containment isolation actuation

Potential Loss: NONE

Basis:

This EAL is intended to address incomplete containment isolation that allows direct release to the environment. It represents a loss of the containment barrier. 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. This EAL is not intended to prohibit overriding containment isolation valves when directed by plant procedures. A manually overridden containment isolation valve is considered isolable until proven otherwise.

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.

There is no potential loss EAL associated with this item.

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FISSION PRODUCT BARRIER DEGRADATION

CONTAINMENT BARRIER EALs: CNB1 OR CNB2 OR CNB3 OR CNB4 OR CNB5
OR CNB6 OR CNB7

The containment barrier includes the containment building, its 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.

5. Significant Radioactive Inventory in Containment (CNB5)

Loss: None

Potential Loss: Containment high range Rad Monitor reading greater than 4000 R/hr

Basis:

The 4000 R/hr reading on the containment high range radiation monitors (RE-8060 or RE-8061 for ANO-1, 2RE-8925-1 or 2RE-8925-2 for ANO-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 offsite 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. NUREG-1228, "Source Estimations During Incident Response to Severe Nuclear Power Plant Accidents," indicates that such conditions do not exist when the amount of clad damage is less than 20%.

There is no loss EAL associated with this item.

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

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FISSION PRODUCT BARRIER DEGRADATION

CONTAINMENT BARRIER EALs: CNB1 OR CNB2 OR CNB3 OR CNB4 OR CNB5
OR CNB6 OR CNB7

The containment barrier includes the containment building, its 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.

6. Core Damage Assessment (CNB6)

Loss: None

Potential Loss: At least 20% fuel clad failure as determined from core damage assessment

Basis:

Twenty percent fuel cladding failure 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 offsite 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. NUREG-1228, "Source Estimations During Incident Response to Severe Nuclear Power Plant Accidents," indicates that such conditions do not exist when the amount of clad damage is less than 20%.

This EAL is consistent with the intent of EAL CNB5, but uses core damage assessment evaluations by Technical Support personnel.

There is no 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 Procedure OP-1302.022, "Core Damage Assessment"

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CONTAINMENT BARRIER EALs: CNB1 OR CNB2 OR CNB3 OR CNB4 OR CNB5
OR CNB6 OR CNB7

The containment barrier includes the containment building, its 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.

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 based on:

- Imminent barrier degradation (within 2 hours) due to degraded safety system performance
- Degraded ability to monitor 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. (See also IC SG1, "Prolonged Loss of All Offsite Power and Prolonged Loss of All Onsite AC Power", for additional information.)

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Attachment 3
Hazards and Other Conditions Affecting Plant Safety

HU1

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

Confirmed security event which indicates a potential degradation in the level of safety of the plant

Operating Mode Applicability:

All

Emergency Action Level: 1 OR 2

1. Security events as determined from the Safeguards Contingency Plan and reported by the Security Shift Commander.
2. A credible security threat notification.

Basis:

The Security Shift Commander 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.

EAL #1 is based on the Site Security Plan. 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. Examples of security events that indicate potential degradation in the level of safety of the plant are provided below for consideration.

Consideration should be given to the following types of events when evaluating an event against the criteria of the Security Contingency Plan: SABOTAGE, HOSTAGE/EXTORTION, CIVIL DISTURBANCE, and STRIKE ACTION.

INTRUSION into the plant PROTECTED AREA by a HOSTILE FORCE would result in EAL escalation to an ALERT.

The intent of EAL #2 is to ensure that appropriate notifications for the security threat are made in a timely manner. The determination of "credible" is made through use of information found in the Safeguards Contingency Plan.

A higher initial classification could be made based upon the nature and timing of the 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 Plans.

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HU2

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

Other conditions exist which in the judgment of the SM/TSC Director/EOF Director warrant declaration of an NUE

Operating Mode Applicability:

All

Emergency Action Level:

1. Other conditions exist which in the judgment of the SM/TSC Director/EOF Director indicate that events are in process or have occurred which indicate a potential degradation of the level of safety of the plant. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Basis:

This EAL is intended to address 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 NUE emergency class.

From a broad perspective, one area that may warrant SM/TSC Director/EOF Director judgment is related to likely or actual breakdown of site-specific event mitigating actions. Examples to consider include inadequate emergency response procedures, transient response either unexpected or not understood, failure or unavailability of emergency systems during an accident in excess of that assumed in accident analysis, or insufficient availability of equipment and/or support personnel.

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HU4

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

FIRE within PROTECTED AREA Boundary not extinguished within 15 minutes of detection

Operating Mode Applicability:

All

Emergency Action Level:

1. FIRE in Table H1 buildings or areas adjacent to any of Table H1 areas on either unit not extinguished within 15 minutes of Control Room notification or verification of a Control Room alarm:

<p>Table H1 Intake Structure Containment Auxiliary Building Aux Extension Building QCST/RWT/BWST Diesel Fuel Oil Vault Transformer Yard Turbine Building</p>

Basis:

The purpose of this IC is to address the magnitude and extent of FIRES that may be potentially significant precursors to damage to safety systems. As used here, Detection is visual observation and report by plant personnel or sensor alarm indication. The 15 minute time period begins with a credible notification that a FIRE is occurring, or indication of a VALID fire detection system alarm. Verification of a fire detection system alarm includes actions that can be taken within the Control Room to ensure that the alarm is not spurious. A verified 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). Table H1 applies to buildings and areas adjacent (in actual contact with or immediately adjacent) to plant VITAL AREAS or other significant buildings or areas. The intent of this EAL is not to include buildings (i.e., warehouses) or areas that are not adjacent (in actual contact with or immediately adjacent) to plant VITAL AREAS. This IC excludes FIRES within administration buildings, waste-basket FIRES, and other small FIRES of no safety consequence. Escalation to a higher emergency class is by HA4.

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Hazards and Other Conditions Affecting Plant Safety

HU5

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

Release of toxic or flammable gases deemed detrimental to normal operation of the plant

Operating Mode Applicability:

All

Emergency Action Level: 1 OR 2

1. Report or detection of toxic or flammable gases that have or could enter normally occupied areas of the site in amounts that can affect NORMAL PLANT OPERATIONS.
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 existence of uncontrolled releases of toxic or flammable gas that may enter the site boundary and affect normal plant operations. It is intended that releases of toxic or flammable gases are of sufficient quantity, and the release point of such gases is such that normal plant operations would be affected. This would exclude small or incidental releases, or releases that do not impact structures needed for plant operation. The EALs are intended to not require significant assessment or quantification. The EALs assume an uncontrolled process that has the potential to affect plant operations, or personnel safety.

Escalation of this EAL is via HA5, which involves a quantified release of toxic or flammable gas affecting VITAL AREAS.

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HU6

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

Natural and destructive phenomena affecting the PROTECTED AREA

Operating Mode Applicability:

All

Emergency Action Level: 1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8

1. An earthquake is felt and the 0.01g acceleration alarm annunciates indicating an earthquake has occurred.
2. Report by plant personnel of tornado or high winds greater than 67 mph striking within PROTECTED AREA boundary.
3. Vehicle crash into plant structures or systems within PROTECTED AREA boundary.
4. Report by plant personnel of an unanticipated EXPLOSION within PROTECTED AREA boundary resulting in VISIBLE DAMAGE to permanent structure or equipment.
5. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.
6. Uncontrolled flooding in areas of the plant that has the potential to affect safety related equipment needed for the current operating mode.
7. Lake Dardanelle level greater than 345 feet.
8. Lake Dardanelle level less than 335 feet.

Basis:

An NUE would be declared on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators. Areas identified in the EALs define the location of the event based on the potential for damage to equipment contained therein. Escalation of the event to an Alert occurs when the magnitude of the event is sufficient to result in damage to equipment contained in the specified location.

EAL #1 is based on damage that may be caused to some portions of the site, but should not affect ability of safety functions to operate. The method of detection is based on instrumentation, validated by a reliable source, or operator assessment. As defined in the EPRI sponsored "Guidelines for Nuclear Plant Response to an Earthquake", dated October 1989, a "felt earthquake" is:

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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.

EAL #2 is based on the assumption that a tornado striking (touching down) or high winds within the PROTECTED AREA may have potentially damaged plant 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. If damage is confirmed visually or by other plant indications, the event may be escalated to Alert.

EAL #3 is intended to address crashes of vehicle types large enough to cause significant damage to plant structures containing functions and systems required for safe shutdown of the plant. If the crash is confirmed to affect a plant VITAL AREA, the event may be escalated to Alert.

For EAL #4 only those EXPLOSIONs of sufficient force to damage permanent structures or equipment within the PROTECTED AREA should be considered. No attempt is made in this EAL to assess the actual magnitude of the damage. The occurrence of the EXPLOSION with reports of evidence of damage is sufficient for declaration. The SM/TSC Director/EOF Director also needs to consider any security aspects of the EXPLOSION, if applicable.

EAL #5 is based on main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. 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. 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. This EAL is consistent with the definition of a NUE while maintaining the anticipatory nature desired and recognizing the risk to non-safety related equipment. Escalation of the emergency classification is based on potential damage done by missiles generated by the failure or in conjunction with a steam generator tube rupture. The latter event would be classified by the radiological EALs or fission product barrier EALs.

EAL #6 addresses the effect of flooding caused by internal events such as component failures, equipment misalignment, or outage activity mishaps. The site-specific areas include those areas that contain systems required for safe shutdown of the plant and that are not designed to be wetted or submerged. Escalation of the emergency classification is based on the damage caused or by access restrictions that prevent necessary plant operations or systems monitoring.

EAL #7 and #8 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"

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HA1

ALERT

Initiating Condition:

Confirmed security event within a plant PROTECTED AREA

Operating Mode Applicability:

All

Emergency Action Level: 1 OR 2

1. INTRUSION into the plant PROTECTED AREA by a HOSTILE FORCE.
2. Other security events as determined from the Safeguards Contingency Plan and reported by the Security Shift Commander.

Basis:

This class of security events represents an escalated threat to plant safety above that contained in the NUE. A confirmed INTRUSION report is satisfied if physical evidence indicates the presence of a HOSTILE FORCE within the PROTECTED AREA.

Consideration should be given to the following types of events when evaluating an event against the criteria of the Security Contingency Plan: SABOTAGE, HOSTAGE/EXTORTION, and STRIKE ACTION. The Safeguards Contingency Plan identifies numerous events/conditions that constitute a threat/compromise to a Station's security. Only those events that involve actual or potential substantial degradation to the level of safety of the plant need to be considered. The following events would not normally meet this requirement; (e.g., Failure by a Member of the Security Force to carry out an assigned/required duty, internal disturbances, loss/compromise of safeguards materials or strike actions).

INTRUSION into a VITAL AREA by a HOSTILE FORCE will escalate this event to a Site Area Emergency.

The Security Shift Commander is the designated person 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 Security Plan.

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HA2

ALERT

Initiating Condition:

Other conditions exist which in the judgment of the SM/TSC Director/EOF Director warrant declaration of an Alert

Operating Mode Applicability:

All

Emergency Action Level:

1. Other conditions exist which in the judgment of the SM/TSC Director/EOF Director indicate that events are in process or have occurred which involve actual or likely potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Basis:

This EAL is intended to address 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 class.

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HA3

ALERT

Initiating Condition:

Control Room evacuation has been initiated

Operating Mode Applicability:

All

Emergency Action Level:

Control Room evacuation in progress

Basis:

1. With the Control Room evacuated, additional support, monitoring and direction through the Technical Support Center and/or other emergency response facilities is necessary. Inability to establish plant control from outside the Control Room within 15 minutes will escalate this event to a Site Area Emergency.

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HA4

ALERT

Initiating Condition:

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

Operating Mode Applicability:

All

Emergency Action Level:

1. FIRE or EXPLOSION in any Table H1 area on either unit.

<p><u>Table H1</u> Intake Structure Containment Auxiliary Building Aux Extension Building QCST/RWT/BWST Diesel Fuel Oil Vault Transformer Yard Turbine Building</p>

AND

Affected system parameter indications show degraded performance or plant personnel report VISIBLE DAMAGE to permanent structures or equipment within the specified area.

Basis:

This EAL addresses a FIRE/EXPLOSION and not the degradation in performance of affected systems. System degradation is addressed in the System Malfunction EALs. The reference to damage of systems is used to identify the magnitude of the FIRE/EXPLOSION and to discriminate against minor FIRES/EXPLOSIONs. The reference to safety systems is included to discriminate against FIRES/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/EXPLOSION was large enough to cause damage to these systems.

This situation is not the same as removing equipment for maintenance that is covered by the plant's Technical Specifications. Removal of equipment for maintenance is a planned activity controlled in accordance with procedures and, as such, does not constitute a substantial degradation in the level of safety of the plant. A FIRE/EXPLOSION is an UNPLANNED activity and, as such, does constitute a substantial degradation in the level of safety of the plant. In this situation, an Alert classification is warranted.

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Hazards and Other Conditions Affecting Plant Safety (HA4)

The inclusion of a "report of VISIBLE DAMAGE" 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 occurrence of the EXPLOSION with reports of evidence of damage is sufficient for declaration. 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 these damage assessments. The SM/TSC Director/EOF Director also needs to consider any security aspects of the EXPLOSIONs, if applicable.

Escalation to a higher emergency class, if appropriate, will be based on System Malfunction, Fission Product Barrier Degradation, Abnormal Rad Levels/Radiological Effluent, or SM/TSC Director/EOF Director Judgment EALs.

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Attachment 3
Hazards and Other Conditions Affecting Plant Safety

HA5

ALERT

Initiating Condition:

Release of toxic or flammable gases within or adjacent to a VITAL AREA which jeopardizes operation of systems required to establish or maintain safe shutdown

Operating Mode Applicability:

All

Emergency Action Level: 1 OR 2

1. Report or detection of toxic gases within or adjacent to a VITAL AREA in concentrations that may result in an atmosphere IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH).
2. Report or detection of gases in concentration greater than the LOWER FLAMMABILITY LIMIT within or adjacent to a VITAL AREA.

Basis:

This IC is based on gases that affect the safe operation of the plant. This IC applies to buildings and areas adjacent to plant VITAL AREAS or other significant buildings or areas (i.e., service water intake). The intent of this IC is not to include buildings (e.g., warehouses) or other areas that are not immediately adjacent to plant VITAL AREAS. It is appropriate that increased monitoring be done to ascertain whether consequential damage has occurred.

EAL #1 is met if measurement of toxic gas concentration results in an atmosphere that is IDLH within a VITAL AREA or any area or building adjacent to a VITAL AREA. Exposure to an IDLH atmosphere will result in immediate harm to unprotected personnel, and would preclude access to any such affected areas. Areas that require only temporary access that can be supported by the use of respiratory protection should not be considered as exceeding this threshold.

EAL #2 is met when the flammable gas concentration in a VITAL AREA or any building or area adjacent to a VITAL AREA exceeds the LOWER FLAMMABILITY LIMIT. 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 addresses concentrations at which gases can ignite/support combustion. 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. Once it has been determined that an uncontrolled release is occurring, then sampling must be done to determine if the concentration of the released gas is within this range.

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Hazards and Other Conditions Affecting Plant Safety (HA5)

Escalation to a higher emergency class, if appropriate, will be based on System Malfunction, Fission Product Barrier Degradation, Abnormal Rad Levels/ Radioactive Effluent, or SM/TSC Director/EOF Director Judgment EALs.

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Attachment 3
Hazards and Other Conditions Affecting Plant Safety

HA6

ALERT

Initiating Condition:

Natural and destructive phenomena affecting the plant VITAL AREA

Operating Mode Applicability:

All

Emergency Action Level: 1 OR 2 OR 3 OR 4 OR 5 OR 6

1. An earthquake is felt and the 0.1g acceleration alarm annunciates indicating an Operating Basis Earthquake has occurred.
2. Tornado or high winds greater than 67 mph within PROTECTED AREA boundary resulting in VISIBLE DAMAGE to any of the plant structures/equipment in Table H2 or Control Room indication of degraded performance of those systems on either unit.
3. Vehicle crash within PROTECTED AREA boundary resulting in VISIBLE DAMAGE to any of the plant structures/equipment in Table H2 or Control Room indication of degraded performance of those systems.
4. Turbine failure-generated missiles resulting in VISIBLE DAMAGE to or penetration of any of the plant structures/equipment in Table H2 or Control Room indication of degraded performance of those systems.
5. Uncontrolled flooding in areas of the plant that results in degraded safety system performance as indicated in the control room or that creates industrial safety hazards (e.g., electric shock) that precludes access necessary to operate or monitor safety equipment.
6. Lake Dardanelle level less than 335 feet and Emergency Cooling Pond inoperable

<u>Table H2</u>
Intake Structure
Fuel Handling Building
Containment
Auxiliary Building
QCST/RWT/BWST
Diesel Fuel Oil Vault
Start Up Transformer
Emergency Cooling Pond
Control Room

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Hazards and Other Conditions Affecting Plant Safety (HA6)

Basis:

These EALs escalate from the NUE EALs in 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 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 to higher classifications occurs on the basis of other EALs (e.g., System Malfunction).

EAL #1 is based on seismic events of a magnitude that can result in a plant VITAL AREA being subjected to forces beyond design limits, and thus damage may be assumed to have occurred to plant safety systems. See EPRI-sponsored "Guidelines for Nuclear Plant Response to an Earthquake", dated October 1989, for information on seismic event categories.

EAL #2 is based on the assumption that a tornado striking (touching down) or high winds within the PROTECTED AREA may have potentially damaged plant 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. If damage is confirmed visually or by other plant indications, escalation to Alert is appropriate.

EAL #3 is intended to address crashes of vehicle types large enough to cause significant damage to plant structures containing functions and systems required for safe shutdown of the plant. If the crash is confirmed to affect a plant VITAL AREA, escalation to Alert is appropriate.

EAL #4 is intended to address the threat to safety related equipment imposed by missiles generated by main turbine rotating component failures. The list of areas includes all areas containing safety-related equipment, their controls, and their power supplies. This EAL is, therefore, consistent with the definition of an ALERT in that if missiles have damaged or penetrated areas containing safety-related equipment the potential exists for substantial degradation of the level of safety of the plant.

EAL #5 addresses the effect of internal flooding that has resulted in degraded performance of systems affected by the flooding, or has created industrial safety hazards (e.g., electrical shock) that preclude necessary access to operate or monitor safety equipment. The inability to operate or monitor safety equipment represents a potential for substantial degradation of the level of safety of the plant. This flooding may have been caused by internal events such as component failures, equipment misalignment, or outage activity mishaps. The areas include those areas that contain systems required for safe shutdown of the plant that are not designed to be wetted or submerged.

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Attachment 3

Hazards and Other Conditions Affecting Plant Safety (HA6)

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"

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Attachment 3
Hazards and Other Conditions Affecting Plant Safety

HS1

SITE AREA EMERGENCY

Initiating Condition:

Confirmed security event in a plant VITAL AREA

Operating Mode Applicability:

All

Emergency Action Level: 1 OR 2

1. INTRUSION into the plant VITAL AREA by a HOSTILE FORCE.
2. Other security events as determined from Safeguards Contingency Plan and reported by the Security Shift Commander.

Basis:

This class of security events represents an escalated threat to plant safety above that contained in the Alert ICs in that a HOSTILE FORCE has progressed from the PROTECTED AREA to a VITAL AREA.

Consideration should be given to the following types of events when evaluating an event against the criteria of the site specific Security Contingency Plan: SABOTAGE and HOSTAGE/EXTORTION. The Safeguards Contingency Plan identifies numerous events/conditions that constitute a threat/compromise the Station's security. Only those events that involve actual or likely major failures of plant functions needed for protection of the public need to be considered. The following events would not normally meet this requirement: failure by a member of the security force to carry out an assigned/required duty, internal disturbances, loss/compromise of safeguards materials or strike actions.

Loss of plant control would escalate this event to a GENERAL EMERGENCY.

The Security Shift Commander is the designated person 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 Security Plan.

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Hazards and Other Conditions Affecting Plant Safety

HS2

SITE AREA EMERGENCY

Initiating Condition:

Other conditions exist which in the judgment of the SM/TSC Director/EOF Director warrant declaration of Site Area Emergency

Operating Mode Applicability:

All

Emergency Action Level:

1. Other conditions exist which in the judgment of the SM/TSC Director/EOF Director indicate that events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the exclusion area.

Basis:

This EAL is intended to address 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 class description for Site Area Emergency.

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Attachment 3
Hazards and Other Conditions Affecting Plant Safety

HS3

SITE AREA EMERGENCY

Initiating Condition:

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

Operating Mode Applicability:

All

Emergency Action Level: 1 AND 2

1. a. Control room evacuation has been initiated.

AND

- b. Control of the plant cannot be established within 15 minutes.

Basis:

Expeditious transfer of safety systems has not occurred but fission product barrier damage may not yet be indicated. The intent of this IC is to capture those events where control of the plant cannot be reestablished in a timely manner. The determination of whether or not control is established outside of the Control Room 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 control of the plant has or has not been established.

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 secondary heat removal (ability to maintain a heat sink).

Escalation of this event, if appropriate, would be by Fission Product Barrier Degradation, Abnormal Rad Levels/Radiological Effluent, or SM/TSC Director/EOF Director Judgment EALs.

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Attachment 3
Hazards and Other Conditions Affecting Plant Safety

HG1

GENERAL EMERGENCY

Initiating Condition:

Security event resulting in loss of physical control of the facility

Operating Mode Applicability:

All

Emergency Action Level:

1. A HOSTILE FORCE has taken control of plant equipment such that plant personnel are unable to operate equipment required to maintain safety functions.

Basis:

This IC encompasses conditions under which a HOSTILE FORCE has taken 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). If control of the plant equipment necessary to maintain safety functions can be transferred to another location, then the above initiating condition is not met.

This EAL should also address loss of physical control of spent fuel pool cooling systems if imminent fuel damage is likely (e.g., freshly off-loaded reactor core in pool).

Loss of physical control of the Control Room or remote shutdown/alternate shutdown capability alone may not prevent the ability to maintain safety functions. Design of the remote shutdown/alternate capability and the location of the transfer switches should be taken into account.

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Attachment 3
Hazards and Other Conditions Affecting Plant Safety

HG2

GENERAL EMERGENCY

Initiating Condition:

Other conditions exist which in the judgment of the SM/TSC Director/EOF Director warrant declaration of General Emergency

Operating Mode Applicability:

All

Emergency Action Level:

1. Other conditions exist which in the judgment of the SM/TSC Director/EOF Director indicate that events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels beyond the exclusion area.

Basis:

This EAL is intended to address 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 General Emergency class.

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Attachment 3
SYSTEM MALFUNCTION

SU1

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

Loss of all offsite power to vital 4.16 KV busses for greater than 15 minutes

Operating Mode Applicability:

Power Operation (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

Emergency Action Level:

1. Loss of power to all Unit Auxiliary and Startup Transformers on either unit for greater than 15 minutes.

Unit 1

SU1
SU2
Unit Aux

Unit 2

SU3
SU2
Unit Aux

AND

Both vital 4.16 KV busses supplied power from independent diesel generator.

Unit 1

1DG1
1DG2
AACG

Unit 2

2DG1
2DG2
AACG

Basis:

Prolonged loss of 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 (e.g., Station Blackout). Fifteen minutes was selected as a threshold to exclude transient or momentary power losses. This EAL is based on a failure of offsite power sources resulting in a loss of RCPs, loss of turbine load, and a loss of main feedwater. This leaves the electrical distribution system with only one or both of the vital ES busses energized. Loss of the 6.9 KV busses and non-vital 4.16 KV busses puts the plant in a natural circulation mode with decay heat being removed by the EFW system. Maintaining the required components for natural circulation cooling is of vital importance. Loss of any component function necessary to maintain natural circulation may require escalation.

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Attachment 3
SYSTEM MALFUNCTION (SU1)

The EAL allows credit for operation of installed design feature (Alternate AC Diesel Generator).

Reference Documents:

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

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Attachment 3
SYSTEM MALFUNCTION

SU2

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

Inability to reach required shutdown within Technical Specification limits

Operating Mode Applicability:

Power Operation (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

Emergency Action Level:

1. Plant is not brought to required operating mode within Technical Specifications LCO action statement time.

Basis:

Limiting Conditions for Operation (LCOs) require the plant to be brought to a required shutdown 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 a 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. Other required Technical Specification shutdowns that involve precursors to more serious events are addressed by other System Malfunction, Hazards, or Fission Product Barrier Degradation ICs.

Reference Documents:

1. ANO2 Technical Specifications
2. ANO1 Technical Specifications

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Attachment 3
SYSTEM MALFUNCTION

SU3

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

UNPLANNED loss of most or all safety system annunciation or indication in the Control Room for greater than 15 minutes

Operating Mode Applicability:

Power Operation (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

Emergency Action Level: 1 OR 2

1. UNPLANNED loss of annunciators or indicators associated with safety systems for greater than 15 minutes as follows:

Unit 1: Loss of AC AND DC to greater than or equal to 50% of Control Room annunciators

Unit 2: Loss of AC AND DC to greater than or equal to 9 Control Room annunciator panels

OR

2. UNPLANNED loss of 75% of indicators associated with safety systems for greater than 15 minutes.

Basis:

This IC and its associated EALs 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.).

Quantification of "Most" is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is a higher 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 each plant design provides 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

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Attachment 3
SYSTEM MALFUNCTION (SU3)

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 SU2.

Annunciators or indicators for this EAL must include those identified in the Abnormal Operating Procedures, in the Emergency Operating Procedures, and in other EALs (e.g., area, process, and/or effluent rad monitors, etc.). The loss of control room annunciators increases the difficulty to recognize changing plant conditions. It is estimated that if approximately 75% of the safety system annunciators or indications are lost, there is an increased risk that a degraded plant condition could go undetected. For ANO2 the selection of 9 annunciator panels was chosen since if greater than 9 annunciator panels were lost this would mean that all AC and DC was lost to either the Red or Green safety system. Any less than 9 annunciator panels would mean that a localized problem exists that does not affect the annunciators for an entire train.

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

Due to the limited number of safety systems in operation during cold shutdown, refueling, and defueled modes, no EAL is indicated during these modes of operation.

This NUE will be escalated to an Alert if a transient is in progress during the loss of annunciation or indication (SA4).

Basis Documents:

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

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Attachment 3
SYSTEM MALFUNCTION

SU4

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

Fuel clad degradation

Operating Mode Applicability:

Power Operation (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

Emergency Action Level:

1. RCS sample activity value indicating fuel clad degradation greater than Technical Specification allowable limits.

Unit 1:

RCS Sample Analysis: greater than 3.50 $\mu\text{Ci/gm IDE}$
RCS Sample Analysis: greater than 72/E $\mu\text{Ci/gm Gross Activity}$

Unit 2:

RCS Sample Analysis: greater than 1.0 $\mu\text{Ci/gm IDE}$
RCS Sample Analysis: greater than 100/E $\mu\text{Ci/gm Gross Activity}$

Basis:

This IC and its associated EALs are included as an NUE because it is considered to be a potential degradation in the level of safety of the plant and a potential precursor of more serious problems. EAL #1 addresses coolant samples exceeding coolant technical specifications for iodine spike. Escalation of this EAL to the Alert level is via the Fission Product Barrier Degradation Monitoring EALs. Though the referenced Technical Specification limits are mode dependent, it is appropriate that the EALs be applicable in all modes, as they indicate a potential degradation in the level of safety of the plant. The companion EAL to SU4 for the Cold Shutdown/Refueling modes is CU5.

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Attachment 3
SYSTEM MALFUNCTION

SU5

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

RCS leakage

Operating Mode Applicability:

Power Operation (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

Emergency Action Level: 1 OR 2

1. Unidentified or pressure boundary leakage greater than 10 gpm.
2. Identified leakage greater than 25 gpm.

Basis:

This IC is included as an NUE because the condition 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 and 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). 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. In either case, escalation of this IC to the Alert level is via FA1.

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Attachment 3
SYSTEM MALFUNCTION

SU6

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

UNPLANNED loss of all onsite or offsite communications capabilities

Operating Mode Applicability:

- Power Operation (Mode 1)
- Startup (Mode 2)
- Hot Standby (Mode 3)
- Hot Shutdown (Mode 4)

Emergency Action Level: 1 OR 2

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

Table M1 Onsite Communications Equipment
Station radio system
Plant paging system
In-plant telephones
Plant cell phones
Gaitronics

2. Loss of all offsite communications capability (Table M2)

Table M2 Offsite Communications Equipment
All telephone lines (commercial and microwave)
Station radio system
ENS
Cellular phones

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's ability to perform routine tasks necessary for plant operations or the ability to communicate problems with offsite authorities. The loss of offsite communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

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Attachment 3
SYSTEM MALFUNCTION (SU6)

The availability of one method of ordinary offsite communications is sufficient to inform state and local authorities of plant problems. 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.

Basis Documents:

1. 1903.062, "Communications System Operating Procedure"

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Attachment 3
SYSTEM MALFUNCTION

SU8

NOTIFICATION OF UNUSUAL EVENT

Initiating Condition:

Inadvertent criticality

OPERATING MODE APPLICABILITY:

Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

Emergency Action Level:

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

Unit 1:

Greater than 2 DPM (Source Range)
Greater than 3 DPM (Intermediate Range)

Unit 2:

Greater than 1.6 DPM

Basis:

This IC addresses inadvertent criticality events. While the primary concern is criticality events that occur in cold shutdown or refueling modes (NUREG 1449, Shutdown and Low-Power Operation at Commercial Nuclear Power Plants in the United States), this IC is applicable in other modes in which inadvertent criticalities are possible. This IC indicates a potential degradation of the level of safety of the plant, warranting a NUE classification. This IC excludes inadvertent criticalities that occur during planned reactivity changes associated with reactor startups (e.g., criticality earlier than estimated). The Cold Shutdown/Refueling IC is CU8.

This condition can be identified using the startup rate monitor. The term "sustained" is used in order to allow exclusion of expected short term positive startup rates from planned control rod movements 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 EALs, as appropriate to the operating mode at the time of the event, or by SM/TSC Director/EOF Director Judgment.

Reference Documents:

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

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Attachment 3
SYSTEM MALFUNCTION

SA2

ALERT

Initiating Condition:

Failure of Reactor Protection System instrumentation to complete or initiate an automatic reactor trip once a Reactor Protection System setpoint has been exceeded and manual trip was successful

Operating Mode Applicability:

Power Operation (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)

Emergency Action Level:

1. Indication(s) exist that indicate that reactor protection system setpoint was exceeded and automatic trip did not occur, and a successful manual trip or DSS trip occurred.

Basis:

This condition indicates failure of the reactor 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 and thus the plant safety has been compromised, and design limits of the fuel may have been exceeded. An Alert is indicated because conditions exist that lead to potential loss of fuel clad or RCS barriers. Reactor protection system setpoint being exceeded, rather than limiting safety system setpoint being exceeded, is specified here because failure of the reactor protection system is the issue. A manual trip is any set of actions by the reactor operator(s) at the reactor control console which causes control rods to be rapidly inserted into the core and brings the reactor subcritical (e.g., manual reactor trip, diverse trip initiation, de-energizing rod drive mechanisms). Failure of manual trip would escalate the event to a Site Area Emergency (SS2).

The operator may not detect the RPS failure prior to performing the manual trip. The failure would be detected by reviewing the post trip sequence of events printout from the plant computer and the emergency class would be declared, at that time.

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Attachment 3
SYSTEM MALFUNCTION

SA4

ALERT

Initiating Condition:

UNPLANNED loss of most or all safety system annunciation or indication in Control Room with either (1) a PLANT TRANSIENT in progress, or (2) SPDS and PMS dynamic alarm functions are unavailable

Operating Mode Applicability:

Power Operation (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

Emergency Action Level:

1. UNPLANNED loss of annunciators or indicators associated with safety systems for greater than 15 minutes as follows:

Unit 1:

Loss of AC AND DC to greater than or equal to 50% of Control Room annunciators

Unit 2:

Loss of AC AND DC to greater than or equal to 9 Control Room annunciator panels

AND

Either of the following: (a or b)

- a. PLANT TRANSIENT is in progress.

OR

- b. SPDS and PMS dynamic alarm functions are unavailable.

Basis:

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

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

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Attachment 3
SYSTEM MALFUNCTION (SA4)

Quantification of "Most" is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is higher 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 more 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 SU2

Due to the limited number of safety systems in operation during cold shutdown, refueling and defueled modes, no EAL is indicated during these modes of operation.

This Alert will be escalated to a Site Area Emergency (SS6) if the operating crew cannot monitor the transient in progress.

Reference Documents:

1. 1015.037, "Post Transient Review"
2. 1203.043, "Loss Control Room Annunciator"
3. 2203.042, "Loss of Annunciators"

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Attachment 3
SYSTEM MALFUNCTION

SA5

ALERT

Initiating Condition:

AC power capability to vital 4.16 KV busses reduced to a single power source for greater than 15 minutes such that any additional single failure would result in station blackout

Operating Mode Applicability:

Power Operation (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

Emergency Action Level:

1. Only ONE vital 4.16 KV bus energized from a single power source for greater than 15 minutes.

<u>Unit 1</u>	<u>Unit 2</u>
A3	2A3
A4	2A4

AND

Any additional single failure will result in station blackout.

Basis:

This IC and its associated EAL is intended to provide an escalation from SU1, "Loss of All Offsite Power To Vital 4.16 KV Busses for Greater Than 15 Minutes." The condition indicated is the degradation of the offsite and onsite 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 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 diesels with only one train of emergency busses being backfed from the unit main generator, or the loss of onsite emergency diesels 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

Loss of the 6.9 KV busses and non-vital 4.16 KV busses puts the plant in a natural circulation mode with decay heat being removed by the EFW System. Maintaining the required components for natural circulation cooling is of vital importance.

The EAL allows credit for operation of installed design feature (Alternate AC Diesel Generator).

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Attachment 3
SYSTEM MALFUNCTION (SA5)

Even though a vital 4.16 KV bus may be energized, if necessary loads (i.e., loads that if lost would inhibit decay heat removal capability or reactor vessel makeup capability) are not operable on the energized bus then the bus should not be considered operable. If this bus was the only energized bus then a Site Area Emergency per SS1 should be declared.

Reference Documents:

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

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Attachment 3
SYSTEM MALFUNCTION

SS1

SITE AREA EMERGENCY

Initiating Condition:

Loss of all offsite power and loss of all onsite AC power to vital 4.16 KV busses

Operating Mode Applicability:

Power Operation (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

Emergency Action Level:

1. Loss of power to ALL Unit Auxiliary and Startup transformers on a unit.

<u>Unit 1</u>	<u>Unit 2</u>
SU1	SU3
SU2	SU2
Unit Aux	Unit Aux

AND

NO vital 4.16 KV bus being supplied power from ANY diesel generator for greater than 15 minutes.

<u>Unit 1 DG</u>	<u>Unit 2 DG</u>	<u>Unit 1 Bus</u>	<u>Unit 2 Bus</u>
1DG1	2DG1	A3	2A3
1DG2	2DG2	A4	2A4
AACG	AACG		

Basis:

Loss of all AC power compromises all plant safety systems requiring electric power including DHR or SDC, ECCS, containment heat removal and the ultimate heat sink. Prolonged loss of all AC power will cause core uncovering and loss of containment integrity, thus this event can escalate to a General Emergency. The 15 minute duration is selected to exclude transient or momentary power losses.

Escalation to General Emergency is via fission product barrier degradation FG1 or SG1.

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Attachment 3
SYSTEM MALFUNCTION (SS1)

Loss of the 6.9 KV busses and non-vital 4.16 KV busses puts the plant in a natural circulation mode with Decay Heat being removed by the EFW System. Maintaining the required components for Natural Circulation Cooling is of vital importance. Consideration should be given to operable loads necessary to remove decay heat or provide Reactor Vessel makeup capability when evaluating loss of AC power to vital 4.16 KV busses. Even though a vital bus may be energized, if necessary loads (i.e., loads that if lost would inhibit decay heat removal capability or Reactor Vessel makeup capability) are not operable on the energized bus, then the bus should not be considered operable for this IC. If this bus was the only energized bus, than a Site Area Emergency per SS1 should be declared.

Reference Documents:

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

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Attachment 3
SYSTEM MALFUNCTION

SS2

SITE AREA EMERGENCY

Initiating Condition:

Failure of Reactor Protection System instrumentation to complete or initiate an automatic reactor trip once a Reactor Protection System setpoint has been exceeded and manual trip was NOT successful

Operating Mode Applicability:

Power Operation (Mode 1)
Startup (Mode 2)

Emergency Action Level:

1. Indication(s) exist that automatic and manual reactor trips were not successful.

Basis:

Automatic and manual trip are not considered successful if action away from the reactor control console was required to trip the reactor.

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed. A Site Area Emergency is indicated because conditions exist that lead to imminent loss or potential loss of both fuel clad and RCS barriers. 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. Escalation of this event to a General Emergency would be via FG1 or HG2.

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Attachment 3
SYSTEM MALFUNCTION

SS3

SITE AREA EMERGENCY

Initiating Condition:

Loss of all vital DC power

Operating Mode Applicability:

Power Operation (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

Emergency Action Level:

1. Loss of ALL of the following busses has occurred for greater than 15 minutes:

Unit 1:
D01 and D02

Unit 2:
2D01 and 2D02

Basis:

Battery bus voltage indicating less than 105 volts constitutes loss of DC associated busses. 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. Escalation to a General Emergency would occur via AG1 or FG1. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

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Attachment 3
SYSTEM MALFUNCTION

SS4

SITE AREA EMERGENCY

Initiating Condition:

Complete loss of heat removal capability

Operating Mode Applicability:

Power Operation (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

Emergency Action Level:

1. Loss of core cooling and heat sink as indicated by:

a. Loss of ALL Normal Feedwater

AND

b. Loss of ALL Emergency/Auxiliary Feedwater

AND

c. High Pressure Injection (Unit 1)/Once-Through Core Cooling (Unit 2)
NOT established.

Basis:

This EAL addresses complete loss of functions, including ultimate heat sink, required for hot shutdown with the reactor at pressure and temperature. Reactivity control is addressed in other EALs.

Under these conditions, there is an actual major failure of a system intended for protection of the public. Thus, declaration of a Site Area Emergency is warranted. Escalation to General Emergency would be via AG1 or FG1.

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Attachment 3
SYSTEM MALFUNCTION

SS6

SITE AREA EMERGENCY

Initiating Condition:

Inability to monitor a TRANSIENT in progress

Operating Mode Applicability:

Power Operation (Mode 1)
 Startup (Mode 2)
 Hot Standby (Mode 3)
 Hot Shutdown (Mode 4)

Emergency Action Level:

1. a. Loss of most or all annunciators associated with safety systems.

Unit 1: Loss of greater than or equal to 50% of Control Room
 Annunciators

Unit 2: Loss of AC AND DC to greater than or equal to 9 Control Room
 Annunciator panels

AND

b. SPDS and PMS dynamic alarm functions are unavailable.

AND

c. Loss of 75% of indicators associated with safety systems.

AND

d. A TRANSIENT in progress.

Basis:

This IC and it associated EAL is intended to recognize the inability of the Control Room staff to monitor the plant response to a transient. A Site Area Emergency is considered to exist if the control room staff cannot monitor safety functions needed for protection of the public.

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Attachment 3
SYSTEM MALFUNCTION (SS6)

Indications needed to monitor safety functions necessary for protection of the public must include Control Room indications, computer generated indications and dedicated annunciation capability. The specific indications should be those used to determine such functions as the ability to shut down the reactor, maintain the core cooled, to maintain the reactor coolant system intact, and to maintain containment intact (FS1, FG1).

"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 of "Most" is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is a higher 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 more monitoring of system operation.

Reference Documents:

1. 1015.037, "Post Transient Review"
2. 1203.043, "Loss Control Room Annunciator"
3. 2203.042, "Loss of Annunciators"

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Attachment 3
SYSTEM MALFUNCTION

SG1

GENERAL EMERGENCY

Initiating Condition:

Prolonged loss of all offsite power and prolonged loss of all onsite AC power to vital 4.16 KV busses

Operating Mode Applicability:

Power Operation (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

Emergency Action Level:

1. Loss of power to all unit auxiliary and startup transformers on a unit.

<u>Unit 1</u>	<u>Unit 2</u>
SU1	SU3
SU2	SU2
Unit Aux	Unit Aux

AND

NO vital 4.16 KV bus being supplied power from ANY diesel generator.

<u>Unit 1 DG</u>	<u>Unit 2 DG</u>	<u>Unit 1 Bus</u>	<u>Unit 2 Bus</u>
1DG1	2DG1	A3	2A3
1DG2	2DG2	A4	2A4
AACG	AACG		

AND

Either of the following: (a or b)

- a. Restoration of at least one emergency bus within four (4) hours is not likely

OR

- b. FA1 entry conditions met.

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Attachment 3
SYSTEM MALFUNCTION (SG1)

Basis:

Loss of all AC power compromises all plant safety systems requiring electric power including DHR, SDC, ECCS, containment heat removal and the ultimate heat sink. Prolonged loss of all AC power will lead to loss of fuel clad, RCS, and containment barriers. The 4 hours to restore AC power is based on the results of the calculations referenced below. Appropriate allowance for offsite emergency response including evacuation of surrounding areas should be considered. Although this IC may be viewed as redundant to the Fission Product Barrier Degradation ICs, 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 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. 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 the need to declare a General Emergency may be 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 imminent.
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 imminent Loss or Potential Loss of fission product barriers and degraded ability to monitor fission product barriers.

Reference Documents:

1. ANO-1 Calculation 85-E-0072-02, "Time from Loss of All AC Power to Loss of Subcooling"
2. ANO-2 Calculation 85-E-0072-01, "Time from Loss of All AC Power to Loss of Subcooling"

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Attachment 3
SYSTEM MALFUNCTION

SG2

GENERAL EMERGENCY

Initiating Condition:

Failure of the Reactor Protection System to complete an automatic trip and manual trip was NOT successful and there is indication of an extreme challenge to the ability to cool the core

Operating Mode Applicability:

Power Operation (Mode 1)
Startup (Mode 2)

Emergency Action Level:

1. Indications exist that automatic and manual reactor trips were NOT successful.

AND

Either of the following: (a or b)

- a. Indication(s) exists that core cooling is extremely challenged.

Unit 1: OUTSIDE Region 1 of EOP Figure 4

Unit 2: CET average temperature greater than 700°F

OR

- b. Indication(s) exist that heat removal is extremely challenged with ALL of the following being TRUE:

- Loss of ALL normal Feedwater
- Loss of ALL Emergency/Auxiliary Feedwater
- Unit 1: High Pressure Injection NOT established
- Unit 2: Once-Through Core Cooling NOT established

Basis:

Automatic and manual trip are not considered successful if action away from the reactor control console is required to trip the reactor.

Under the conditions of this IC and its associated EALs, the efforts to bring the reactor subcritical have been unsuccessful and, as a result, the reactor is producing more heat than the maximum decay heat load for which the safety systems were designed. Although there are capabilities away from the reactor control console, such as emergency boration, the continuing temperature rise indicates that these capabilities are not effective. This situation could be a precursor for a core melt sequence.

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Attachment 3
SYSTEM MALFUNCTION (SG2)

The extreme challenge to the ability to cool the core is intended to mean that the core exit temperatures are at or approaching 1200°F or that the reactor vessel water level is below the top of active fuel.

Another consideration is the inability to initially remove heat during the early stages of this sequence. If emergency feedwater flow is insufficient to remove the amount of heat required by design from at least one steam generator, an extreme challenge should be considered to exist.

In the event either of these challenges exist at a time that the reactor has not been brought below the power associated with the safety system design (typically 3 to 5% power) 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 matrix declaration (FG1) to permit maximum offsite intervention time.

Attachment 4

OCAN020407

**Arkansas Nuclear One Deviations and Differences from the NEI 99-01, Revision 4
Emergency Action Levels**



**ARKANSAS NUCLEAR ONE
DEVIATIONS AND DIFFERENCES
FROM
NEI 99-01, REV 4
EMERGENCY ACTION LEVELS**

GENERAL COMMENTS ON DIFFERENCES AND DEVIATIONS:

ANO uses formatting such as ALL CAPS, **bold** and underline to aid the user in applying these EALs; particularly to set apart units, time frames or quality of a value or data (such as the term "valid"). Formatting choices may also involve minor grammatical differences between the ANO EALs and NEI 99-01 such as "that exceeds" vice "exceeding", use of "If, then" statements for conditional statements, or the use of symbols (>, <). Such formatting differences between the ANO EALs and NEI 99-01 will not be noted in this document as differences or deviations when they represent format choices alone and do not change the intent or materially change the content of NEI 99-01 Initiating Conditions or EALs.

At ANO, the terms "Notification of Unusual Event", "NUE", "Unusual Event" and "UE" are used interchangeably. The term "NOUE" is not used at ANO.

At ANO, all Radiological Effluent Technical Specifications are included in the ODCM, thus "ODCM" is used in place of Technical Specifications references.

"SM/TSC Director/EOF Director" is used instead of "Emergency Director".

"Trip" is used instead of "scram".

"Safeguards Contingency Plan" is the term used to encompass all security plans/documents.

Other words were substituted for "increase" or "decrease" such as "rise", "rising", "elevated", "lowering", "dropping", etc. These substitutions were used in ICs and EALs.

Arkansas Nuclear One used the following definitions:

Deviation: An instance in which ANO elects not to implement one or more NEI 99-01 EALs, proposes an EAL not found in NEI 99-01, or changes an NEI 99-01 IC or EAL where such an action is not stated or implied as an option in the NEI document and the action by ANO results in substantial differences in the intent of the IC or resulting classifications using the IC.

Example: Using a factor of 300, 100, 50, or 20 in AA1 vice the factor of 200 would be a deviation because it is not only different from the NEI factor, but would result in classification differences.

Example: Changing FU1 to "any loss or potential loss of any barrier" vice a loss of the containment barrier only is a deviation because it changes the intent of the IC.

Example: ANO did not include an EAL for plant perimeter radiation monitors because ANO does not have these monitors. This is not a deviation because NEI 99-01 specifically refers to the EAL parenthetically as “for sites having telemetered perimeter monitors.”

ANO identified no deviations from NEI 99-01 in this proposed EAL scheme.

Difference: Instances in which the ANO and NEI 99-01 corresponding IC or EAL are different. In some cases, ANO may have substantially changed the wording of the IC or EAL, but the intent or even the specific application of NEI 99-01 was retained, just in a different presentation style and it is not believed that different classifications would result between the two systems.

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT**AU1****Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT**

Any UNPLANNED Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds Two Times the Radiological Effluent Technical Specifications for 60 Minutes or Longer.

Operating Mode Applicability: All

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

1. VALID reading on any effluent monitor that exceeds two times the alarm setpoint established by a current radioactivity discharge permit for 60 minutes or longer.
2. VALID reading on one or more of the following radiation monitors that exceeds the reading shown for 60 minutes or longer:

(site-specific list)
3. Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates, with a release duration of 60 minutes or longer, in excess of two times (site-specific technical specifications).
4. VALID reading on perimeter radiation monitoring system greater than 0.10 mR/hr above normal background sustained for 60 minutes or longer [for sites having telemetered perimeter monitors].
5. VALID indication on automatic real-time dose assessment capability greater than (site-specific value) for 60 minutes or longer [for sites having such capability].

Differences:

1. EAL #5 of NEI 99-01, Rev. 4 was renumbered EAL #4 for ANO's EALs.
2. ANO's EAL #4 does not use "60 minutes or longer" as stated by NEI 99-01 Rev. 4. RDACS (a real-time dose assessment system) uses a 60 minute rolling calculation.

3. ANO has no perimeter radiation monitoring system, thus EAL #4 of NEI 99-01 Rev. 4 is not applicable.

Deviations:

None.

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT**AU2****Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT**

Unexpected Increase in Plant Radiation.

Operating Mode Applicability: All**Example Emergency Action Levels: (1 or 2)**

1. a. VALID (site-specific) indication of uncontrolled water level decrease in the reactor refueling cavity, spent fuel pool, or fuel transfer canal with all irradiated fuel assemblies remaining covered by water.

AND

- b. Unplanned VALID (site-specific) Direct Area Radiation Monitor reading increases
2. Unplanned VALID Direct Area Radiation Monitor readings increases by a factor of 1000 over normal* levels.

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

Differences:

1. The word "direct" was not used at ANO for EAL #1 or #2 of ANO's EALs. ANO terminology uses "area radiation monitors" instead of "direct area radiation monitors".
2. Reworded EAL #1 for ANO terminology (e.g., refueling canal instead of reactor refueling cavity).

Deviations:

None

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT**AA1****Initiating Condition -- ALERT**

Any UNPLANNED Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds 200 Times the Radiological Effluent Technical Specifications for 15 Minutes or Longer.

Operating Mode Applicability: All

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

1. VALID reading on any effluent monitor that exceeds 200 times the alarm setpoint established by a current radioactivity discharge permit for 15 minutes or longer.
2. VALID reading on one or more of the following radiation monitors that exceeds the reading shown for 15 minutes or longer:

(site-specific list)
3. Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates, with a release duration of 15 minutes or longer, in excess of 200 times (site-specific technical specifications).
4. VALID reading on perimeter radiation monitoring system greater than 10.0 mR/hr above normal background sustained for 15 minutes or longer [for sites having telemetered perimeter monitors].
5. VALID indication on automatic real-time dose assessment capability greater than (site-specific value) for 15 minutes or longer [for sites having such capability].

Differences:

1. EAL # 5 of NEI 99-01 Rev. 4 was renumbered EAL #4 of ANO's EALs. EAL #4 of ANO's EALs does not use "15 minutes" since the current real-time dose assessment program uses a rolling average calculation.
2. ANO has no perimeter radiation monitoring system, thus EAL #4 of NEI 99-01 Rev. 4 is not applicable.

Deviations:

None

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

AA2

Initiating Condition -- ALERT

Damage to Irradiated Fuel or Loss of Water Level that Has or Will Result in the Uncovering of Irradiated Fuel Outside the Reactor Vessel.

Operating Mode Applicability: All

Example Emergency Action Levels: (1 or 2)

1. A VALID (site-specific) alarm or reading on one or more of the following radiation monitors: (site-specific monitors)

Refuel Floor Area Radiation Monitor
Fuel Handling Building Ventilation Monitor
Refueling Bridge Area Radiation Monitor

2. Water level less than (site-specific) feet for the reactor refueling cavity, spent fuel pool and fuel transfer canal that will result in irradiated fuel uncovering.

Differences:

ANO used "water level drop in the refueling canal or spent fuel pool exceeds makeup capacity" in lieu of a specific water level as described in NEI 99-01 Rev. 4 guidance for EAL #2. EAL #2 of NEI 99-01 Rev. 4 was also reworded to fit ANO terminology.

Deviations:

None

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT**AA3****Initiating Condition -- ALERT**

Release of Radioactive Material or Increases in Radiation Levels Within the Facility That Impedes Operation of Systems Required to Maintain Safe Operations or to Establish or Maintain Cold Shutdown

Operating Mode Applicability: All

Example Emergency Action Levels: (1 or 2)

1. VALID (site-specific) radiation monitor readings GREATER THAN 15 mR/hr in areas requiring continuous occupancy to maintain plant safety functions:

(Site-specific) list

2. VALID (site-specific) radiation monitor readings GREATER THAN <site specific> values in areas requiring infrequent access to maintain plant safety functions.

(Site-specific) list

Differences:

For EAL #1 and #2 of ANO's EALs, a site specific list is not provided since the possible plant conditions and configurations are very diverse. The SM/TSC Director/EOF Director will have to take into consideration the plant configuration and the ability to access areas necessary to maintain safe operation or perform a safe shutdown.

Deviations:

None

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT**AS1****Initiating Condition -- SITE AREA EMERGENCY**

Offsite Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 100 mR TEDE or 500 mR Thyroid CDE for the Actual or Projected Duration of the Release.

Operating Mode Applicability: All

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

Note: If dose assessment results are available at the time of declaration, the classification should be based on EAL #2 instead of EAL #1. While necessary declarations should not be delayed awaiting results, the dose assessment should be initiated / completed in order to determine if the classification should be subsequently escalated.

1. VALID reading on one or more of the following radiation monitors that exceeds or is expected to exceed the reading shown for 15 minutes or longer:

(site-specific list)

2. Dose assessment using actual meteorology indicates doses greater than 100 mR TEDE or 500 mR thyroid CDE at or beyond the site boundary.
3. A VALID reading sustained for 15 minutes or longer on perimeter radiation monitoring system greater than 100 mR/hr. [for sites having telemetered perimeter monitors]
4. Field survey results indicate closed window dose rates exceeding 100 mR/hr expected to continue for more than one hour; or analyses of field survey samples indicate thyroid CDE of 500 mR for one hour of inhalation, at or beyond the site boundary.

Differences:

1. Child thyroid was used for EAL #2 and #3 of ANO's EALs instead of CDE used in NEI 99-01 Rev. 4. Child thyroid is more conservative than CDE. RDACS is designed for child thyroid calculation.
2. EAL #4 in NEI 99-01 Rev. 4 was renumbered EAL #3 in ANO's EALs.

3. EAL #3 of NEI 99-01 Rev. 4 was not used at ANO. ANO has no perimeter radiation monitoring system.

Deviations:

None.

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT**AG1****Initiating Condition -- GENERAL EMERGENCY**

Offsite Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 1000 mR TEDE or 5000 mR Thyroid CDE for the Actual or Projected Duration of the Release Using Actual Meteorology.

Operating Mode Applicability: All

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

Note: If dose assessment results are available at the time of declaration, the classification should be based on EAL #2 instead of EAL #1. While necessary declarations should not be delayed awaiting results, the dose assessment should be initiated / completed in order to determine if the classification should be subsequently escalated.

1. VALID reading on one or more of the following radiation monitors that exceeds or expected to exceed the reading shown for 15 minutes or longer:

(site-specific list)

2. Dose assessment using actual meteorology indicates doses greater than 1000 mR TEDE or 5000 mR thyroid CDE at or beyond the site boundary.
3. A VALID reading sustained for 15 minutes or longer on perimeter radiation monitoring system greater than 1000 mR/hr. [for sites having telemetered perimeter monitors]
4. Field survey results indicate closed window dose rates exceeding 1000 mR/hr expected to continue for more than one hour; or analyses of field survey samples indicate thyroid CDE of 5000 mR for one hour of inhalation, at or beyond site boundary.

Differences:

1. Child thyroid was used for EAL #2 and #3 of ANO's EALs instead of CDE used in NEI 99-01 Rev. 4. Child thyroid is more conservative than CDE. RDACS is designed for child thyroid calculation.

2. EAL #3 of NEI 99-01 Rev. 4 was not used at ANO. ANO has no perimeter radiation monitoring system.
3. EAL #4 of NEI 99-04 was renumbered EAL #3 in ANO's EALs.

Deviations:

None.

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU1

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Reactor Coolant System Leakage

Operating Mode Applicability: Cold Shutdown

Emergency Action Levels: (1 or 2)

1. Unidentified or pressure boundary leakage greater than 10 gpm.
2. Identified leakage greater than 25 gpm.

Differences:

None

Deviations:

None

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU2

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Reactor Coolant System Leakage

Operating Mode Applicability: Refueling

Emergency Action Levels: (1 or 2)

1. UNPLANNED RCS level decrease below the RPV flange for > 15 minutes
2. a. Loss of RPV inventory as indicated by unexplained {site-specific} sump and tank level increase

AND

- b. RPV level cannot be monitored

Differences:

ANO re-worded the IC to be consistent with the wording in CA2.

Deviations:

None

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU3

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Loss of all offsite power to Essential busses for greater than 15 minutes.

Operating Mode Applicability: Cold Shutdown
Refueling

Emergency Action Levels:

1. a. Loss of power to (site-specific) transformers for greater than 15 minutes.

AND

b. At least (site-specific) emergency generators are supplying power to emergency busses.

Differences:

1. EAL #1b of ANO's EALs was reworded for ANO terminology.
2. Initiating Condition of CU3 in ANO's EALs was reworded to use "vital" instead of "essential".
3. ANO chose to apply this IC in a "defueled" condition as well as in cold shutdown and refueling.

Deviations:

None

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU4

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
Refueling

Emergency Action Levels: (1 or 2)

1. An UNPLANNED event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit
2. Loss of all RCS temperature and RPV level indication for > 15 minutes.

Differences:

None

Deviations:

None

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION**CU5****Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT**

Fuel clad degradation

Operating Mode Applicability: Cold Shutdown
Refueling**Example Emergency Action Levels: (1 or 2)**

1. (Site-specific) radiation monitor readings indicating fuel clad degradation greater than Technical Specification allowable limits.
2. (Site-specific) coolant sample activity value indicating fuel clad degradation greater than Technical Specification allowable limits.

Differences:

1. NEI 99-01 Rev. 4 EAL #2 was renumbered EAL #1 for ANO's EALs.
2. ANO does not provide a radiation monitor reading equivalent to NEI 99-01 Rev. 4 EAL #1. ANO uses the letdown radiation monitor (if available) as a qualitative indication of potential fuel clad degradation. Indications on the letdown radiation monitor (if available) are used to prompt plant personnel to take an RCS sample for radiochemistry analysis. The results from the analyses are compared to the IDE and specific activity levels to determine the emergency classification.

Deviations:

None.

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU6

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

UNPLANNED Loss of All Onsite or Offsite Communications Capabilities.

Operating Mode Applicability: Cold Shutdown
Refueling

Example Emergency Action Levels: (1 or 2)

1. Loss of all (site-specific list) onsite communications capability affecting the ability to perform routine operations.
2. Loss of all (site-specific list) offsite communications capability.

Differences:

None

Deviations:

None

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU7

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

UNPLANNED Loss of Required DC Power for Greater than 15 Minutes.

Operating Mode Applicability: Cold Shutdown
Refueling

Example Emergency Action Level:

- 1. a. UNPLANNED Loss of Vital DC power to required DC busses based on (site-specific) bus voltage indications.

AND

- b. Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

Differences:

None

Deviations:

None

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU8

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Inadvertent Criticality.

Operating Mode Applicability:	Cold Shutdown Refueling
Example Emergency Action Levels:	(1 or 2)

1. An UNPLANNED extended positive period observed on nuclear instrumentation.
2. An UNPLANNED sustained positive startup rate observed on nuclear instrumentation.

Differences:

1. EAL # 2 of NEI 99-01 Rev. 4 was renumbered EAL # 1 in ANO's EALs.
2. EAL #1 of NEI 99-01 Rev. 4 was not used at ANO. ANO does not have a period meter.

Deviations:

None

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA1

Initiating Condition -- ALERT

Loss of RCS Inventory.

Operating Mode Applicability: Cold Shutdown

Example Emergency Action Levels: (1 or 2)

- 1. Loss of RCS inventory as indicated by RPV level less than {site-specific level}.
 - (low-low ECCS actuation setpoint) (BWR)
 - (bottom ID of the RCS loop) (PWR)
- 2. a. Loss of RCS inventory as indicated by unexplained {site-specific} sump and tank level increase

AND

- b. RCS level cannot be monitored for > 15 minutes

Differences:

- 1. EAL #2 of NEI 99-01 Rev. 4 was renumbered EAL #1 in ANO's EALs.
- 2. ANO does not use EAL #1 of NEI 99-01 Rev. 4 that provides for a specific level indication. RVLMS will not monitor level below the bottom ID of the RCS loop.
- 3. In EAL #1 of ANO's EALs, "reactor vessel inventory" was used in place of "RCS inventory".

Deviations:

None

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION**CA2****Initiating Condition -- ALERT**

Loss of RPV Inventory with Irradiated Fuel in the RPV.

Operating Mode Applicability: Refueling**Example Emergency Action Levels:** (1 or 2)

1. Loss of RPV inventory as indicated by RPV level less than {site-specific level}.

(low-low ECCS actuation setpoint)	(BWR)
(bottom ID of the RCS loop)	(PWR)
2. a. Loss of RPV inventory as indicated by unexplained {site-specific} sump and tank level increase

AND

- b. RPV level cannot be monitored for > 15 minutes

Differences:

1. EAL #2 of NEI 99-01 Rev. 4 was renumbered EAL #1 in ANO's EALs
2. ANO does not use EAL #1 of NEI 99-01 Rev. 4 that provides for a specific level indication. RVLMS will not monitor level below the bottom ID of the RCS loop.

Deviations:

None

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA3

Initiating Condition -- ALERT

Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Busses.

Operating Mode Applicability: Cold Shutdown
Refueling
Defueled

Example Emergency Action Level:

- 1. a. Loss of power to (site-specific) transformers.

AND
- b. Failure of (site-specific) emergency generators to supply power to emergency busses.

AND
- c. Failure to restore power to at least one emergency bus within 15 minutes from the time of loss of both offsite and onsite AC power.

Differences:

- 1. The word "required" was used in ANO's CA3 in place of "essential" as used in NEI 99-01 Rev. 4 CA3 for ANO terminology.
- 2. EAL 1b was reworded for human factors concerns.

Deviations:

None

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION**CA4****Initiating Condition -- ALERT**

Inability to Maintain Plant in Cold Shutdown with Irradiated Fuel in the RPV.

Operating Mode Applicability: Cold Shutdown
Refueling**Example Emergency Action Levels:** (EAL 1 or 2 or 3)

1. With **CONTAINMENT CLOSURE** and RCS integrity not established an **UNPLANNED** event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit.
2. With **CONTAINMENT CLOSURE** established and RCS integrity not established or RCS inventory reduced an **UNPLANNED** event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit for greater than 20 minutes.
3. An **UNPLANNED** event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit for greater than 60 minutes or results in an RCS pressure increase of greater than {site specific} psig.

Differences:

None

Deviations:

None

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION**CS1****Initiating Condition -- SITE AREA EMERGENCY**

Loss of RPV Inventory Affecting Core Decay Heat Removal Capability.

Operating Mode Applicability: Cold Shutdown**Example Emergency Action Levels:** (1 or 2)

1. With CONTAINMENT CLOSURE not established:
 - a. RPV inventory as indicated by RPV level less than {site-specific level}
 - (6" below the low-low ECCS actuation setpoint)
 - (BWR)
 - (6" below the bottom ID of the RCS loop)
 - (PWR)
- OR**
- b. RPV level cannot be monitored for > 30 minutes with a loss of RPV inventory as indicated by unexplained {site-specific} sump and tank level increase
2. With CONTAINMENT CLOSURE established
 - a. RPV inventory as indicated by RPV level less than TOAF
- OR**
- b. RPV level cannot be monitored for > 30 minutes with a loss of RPV inventory as indicated by either:
 - Unexplained {site-specific} sump and tank level increase
 - Erratic Source Range Monitor Indication

Differences:

1. ANO added Core Exit Thermocouples to ANO's EAL #2a as another means of monitoring core decay heat removal capabilities.
2. ANO does not use EAL #1a or EAL #2a of NEI 99-01 Rev. 4 that provides for a specific level indication. RVLMS will not monitor level below the bottom ID of the RCS loop. For EAL 1a, a loss of reactor vessel inventory as indicated by various sump and tank level changes was used in place of reactor vessel level indications.

Deviations:

None

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION**CS2****Initiating Condition -- SITE AREA EMERGENCY**

Loss of RPV Inventory Affecting Core Decay Heat Removal Capability with Irradiated Fuel in the RPV.

Operating Mode Applicability: Refueling

Example Emergency Action Levels: (1 or 2)

1. With CONTAINMENT CLOSURE not established:
 - a. RPV inventory as indicated by RPV level less than {site-specific level}

(6" below the low-low ECCS actuation setpoint)	(BWR)
(6" below the bottom ID of the RCS loop)	(PWR)

OR

 - b. RPV level cannot be monitored with Indication of core uncover as evidenced by one or more of the following:
 - Containment High Range Radiation Monitor reading > {site-specific} setpoint
 - Erratic Source Range Monitor Indication
 - Other {site-specific} indications
2. With CONTAINMENT CLOSURE established
 - a. RPV inventory as indicated by RPV level less than TOAF

OR

 - b. RPV level cannot be monitored with Indication of core uncover as evidenced by one or more of the following:
 - Containment High Range Radiation Monitor reading > {site-specific} setpoint
 - Erratic Source Range Monitor Indication
 - Other {site-specific} indications

Differences:

1. ANO added Core Exit Thermocouples to ANO EAL #2a as another means of monitoring core decay heat removal capabilities.
2. ANO added monitoring of tank and sump levels to ANO EAL #2a as another means of monitoring core decay heat removal capabilities.

3. ANO did not use a setpoint for Containment High Range Radiation Monitor in EAL #2b because ANO's Containment High Range Radiation Monitors have not been analyzed for a setpoint that corresponds to core uncover.
4. ANO does not use EAL #1a or EAL #2a of NEI 99-01 Rev. 4 that provides for a specific level indication. RVLMS will not monitor level below the bottom ID of the RCS loop. Various sump and tank and level rises were used as an indication of the loss of reactor vessel inventory.
5. In ANO's EAL #1, a loss of reactor vessel inventory in conjunction with the inability to monitor reactor vessel level for greater than 30 minutes was used as the EAL for conditions when containment closure was not established.

Deviations:

None

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION**CG1****Initiating Condition -- GENERAL EMERGENCY**

Loss of RPV Inventory Affecting Fuel Clad Integrity with Containment Challenged with Irradiated Fuel in the RPV.

Operating Mode Applicability: Cold Shutdown
Refueling

Example Emergency Action Level: (1 and 2 and 3)

1. Loss of RPV inventory as indicated by unexplained {site-specific} sump and tank level increase
2. RPV Level:
 - a. less than TOAF for > 30 minutes

OR

- b. cannot be monitored with Indication of core uncover for > 30 minutes as evidenced by one or more of the following:
 - Containment High Range Radiation Monitor reading > {site-specific} setpoint
 - Erratic Source Range Monitor Indication
 - Other {site-specific} indications
3. {Site specific} indication of CONTAINMENT challenged as indicated by one or more of the following:
 - Explosive mixture inside containment
 - Pressure above {site specific} value
 - CONTAINMENT CLOSURE not established
 - Secondary Containment radiation monitors above {site specific} value (BWR only)

Differences:

1. ANO did not use a setpoint for Containment High Range Radiation Monitor in EAL #2 b because ANO's Containment High Range Radiation Monitors have not been analyzed for a setpoint that corresponds to core uncover.
2. ANO added Core Exit Thermocouples to ANO EAL #2b as another means of monitoring for core uncover.

3. ANO does not use EAL #2a of NEI 99-01 Rev. 4 that provides for a specific level indication. RVLMS will not monitor level below the bottom ID of the RCS loop.

Deviations:

None

EVENTS RELATED TO ISFSI

E-HU1

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Damage to a loaded cask CONFINEMENT BOUNDARY.

Operating Mode Applicability: Not applicable

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

1. Natural phenomena events affecting a loaded cask CONFINEMENT BOUNDARY.

(site-specific list)

2. Accident conditions affecting a loaded cask CONFINEMENT BOUNDARY.

(site-specific list)

3. Any condition in the opinion of the Emergency Director that indicates loss of loaded fuel storage cask CONFINEMENT BOUNDARY.

Differences:

None

Deviations:

None

EVENTS RELATED TO ISFSI

E-HU2

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Confirmed Security Event with potential loss of level of safety of the ISFSI.

Operating Mode Applicability: Not applicable

Example Emergency Action Levels:

1. Security Event as determined from (site-specific) Security Plan and reported by the (site-specific) security shift supervision.

Differences:

The word "Commander" was used in EAL #1 instead of "supervision" as used in NEI 99-01 Rev. 4 EAL #1 to be consistent with ANO terminology.

Deviations:

None

FUEL CLAD BARRIER EXAMPLE EALS (1 or 2 or 3 or 4 or 5 or 6)**1. Critical Safety Function Status****LOSS** Core Cooling - Red**POTENTIAL LOSS:** Core Cooling Orange OR Heat Sink – Red**Differences:**

1. This EAL was numbered **FCB1** in ANO's Fuel Clad Barrier section.
2. ANO-2 does not use Critical Safety Function Status Trees (CSFSTs). ANO-2 uses Safety Function Status Checks developed by the Combustion Engineering Owner's Group (CEOG) which are based on logic similar to that used for CSFSTs developed for Westinghouse PWRs. However, there is no Safety Function Status Check condition that corresponds directly to Core Cooling – RED path as a loss EAL. Therefore, the loss EAL is incorporated into FCB2 based on Core Exit Thermocouple readings. Similarly, the Potential Loss EAL corresponding to Core Cooling = Orange is addressed through the FCB2 Potential Loss EAL based on CET readings corresponding to a loss of subcooling. A similar approach was taken for ANO-1, which doesn't use the Critical Safety Function concept in EOPs. This is consistent with the NEI 99-01 basis for the Fuel Clad Barrier CET EALs, which states that they are included for plants which don't have a CSF scheme.

To implement the NEI concern for Heat Sink - Red, indicating an extreme challenge to the Heat Sink Safety Function, the decision to implement Once Through Cooling due to a loss of the SGs as an effective means of removing heat from the RCS was used. The SGs are the preferred means of core heat removal, and Once Through Cooling is the method of last resort for core cooling. As in NEI 99-01, this is considered to be a challenge to both the Fuel Clad Barrier and the RCS Barrier. Used safety function status/functional recovery instead of critical safety function stated for terminology terms for ANO.

Deviations:

None

FUEL CLAD BARRIER EXAMPLE EALS

2. Primary Coolant Activity Level

LOSS Coolant Activity GREATER THAN (site specific) Value

POTENTIAL LOSS: Not Applicable

Differences:

This EAL was numbered FCB2 in ANO's Fuel Clad Barrier section.

Deviations:

None

FUEL CLAD BARRIER EXAMPLE EALS

3. Core Exit Thermocouple Readings

LOSS Greater THAN (site specific) degree F
POTENTIAL LOSS: Greater THAN (site specific) degree F

Differences:

This EAL was numbered **FCB3** in ANO's Fuel Clad Barrier section.

Deviations:

None

FUEL CLAD BARRIER EXAMPLE EALS

4. Reactor Vessel Water Level

LOSS Not Applicable
POTENTIAL LOSS: Level LESS than (site specific) value

Differences:

1. This EAL was numbered **FCB4** in ANO's Fuel Clad Barrier section.
2. The Reactor Vessel Level Monitoring Systems at ANO do not provide positive indication of core uncover. The 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. Consistent with this approach, RVLMS is used as an indication of potential core uncover only if CET indication is unavailable. ANO does not use CSFSTs.

Deviations:

None

FUEL CLAD BARRIER EXAMPLE EALS

5. Containment Radiation Monitoring

LOSS Containment rad monitor reading GREATER THAN (site specific) R/hr

POTENTIAL LOSS: Not Applicable

Differences:

This EAL was numbered **FCB5** in ANO's Fuel Clad Barrier section.

Deviations:

None

FUEL CLAD BARRIER EXAMPLE EALS

6. Other (Site-Specific) Indications

LOSS (Site specific) as applicable

POTENTIAL LOSS: (Site specific) as applicable

Differences:

1. This EAL was numbered **FCB6** in ANO's Fuel Clad Barrier section.
2. ANO used core damage assessment as the "other" indication of fuel clad barrier loss.

Deviations:

None

FUEL CLAD BARRIER EXAMPLE EALS

7. Emergency Director Judgment

Any condition in the opinion of the Emergency Director that indicates Loss or Potential Loss of the Fuel Clad Barrier

Differences:

This EAL was numbered **FCB7** in ANO's Fuel Clad Barrier section.

Deviations:

None

RCS BARRIER EXAMPLE EALs: (1 or 2 or 3 or 4 or 5 or 6)**1. Critical Safety Function Status**

LOSS Not Applicable

POTENTIAL LOSS: RCS Integrity – Red or Heat Sink- Red

Differences:

1. This EAL was numbered **RCB1** in ANO's RCS Barrier section.
2. ANO-2 does not use Critical Safety Function Status Trees (CSFSTs). ANO-2 uses Safety Function Status Checks developed by the Combustion Engineering Owner's Group (CEOG) which are based on logic similar to that used for CSFSTs developed for Westinghouse PWRs. ANO-1 doesn't use the Critical Safety Function concept in its EOPs.

To implement the NEI concern for Heat Sink - Red, indicating an extreme challenge to the Heat Sink Safety Function, the decision to implement Once Through Cooling due to a loss of the SGs as an effective means of removing heat from the RCS was used. The SGs are the preferred means of core heat removal, and Once Through Cooling is the method of last resort for core cooling. As in NEI 99-01, this is considered to be a challenge to both the Fuel Clad Barrier and the RCS Barrier.

If RCS pressure is greater than 2450 PSIG (Unit 1) and 2465 PSIA (Unit 2) and NOT lowering, RCS integrity is challenged, in that it represents a possible uncontrolled overpressurization of the RCS. For ANO-1, the combination of the ERV setpoint, the Pressurizer Code Safety Setpoints, the RCS High Pressure Trip, and the DSS High pressure trip, in conjunction with recovery actions are all expected to be able to lower RCS pressure below 2450 PSIG. For ANO-2, the Pressurizer Code Safety Setpoints, the RCS High Pressure Trip, and the DSS High pressure trip, in conjunction with recovery actions are all expected to be able to lower RCS pressure below 2465 PSIA. Therefore, indications of sustained RCS pressure above 2465 PSIA and not lowering is regarded as a challenge to RCS integrity.

Deviations:

None

RCS BARRIER EXAMPLE EALS

2. RCS Leak Rate

LOSS

GREATER THAN available makeup capacity as indicated by a loss of RCS subcooling

POTENTIAL LOSS:

Unisolable leak exceeding the capacity of one charging pump in the normal charging mode

Differences:

This EAL was numbered RCB2 in ANO's RCS Barrier section.

Deviations:

None

RCS BARRIER EXAMPLE EALs

3. SG Tube Rupture

LOSS SGTR that results in an ECCS (SI) Actuation

POTENTIAL LOSS: Not Applicable

Differences:

This EAL was numbered **RCB3** in ANO's RCS Barrier section.

Deviations:

None

RCS BARRIER EXAMPLE EALs

4. Containment Radiation Monitoring

LOSS Containment rad monitor reading GREATER than (site-specific) R/hr
POTENTIAL LOSS: Not Applicable

Differences:

This EAL was numbered RCB4 in ANO's RCS barrier section.

Deviations:

None

RCS BARRIER EXAMPLE EALs

5. Other (Site-Specific) Indications

LOSS (Site-specific) as applicable

POTENTIAL LOSS: (Site-specific) as applicable

Differences:

This EAL was not implemented at ANO because there are no other site-specific indicators available for this EAL.

Deviations:

None

RCS BARRIER EXAMPLE EALs

6. Emergency Director Judgment

Any condition in the opinion of the Emergency Director that indicate Loss or Potential Loss of the RCS Barrier

Differences:

This EAL was numbered RCB5 in ANO's RCS Barrier section.

Deviations:

None

CONTAINMENT BARRIER EXAMPLE EALs: (1 or 2 or 3 or 4 or 5 or 6 or 7 or 8)**1. Critical Safety Function Status**

LOSS Not Applicable
POTENTIAL LOSS: Containment - Red

Differences:

ANO-2 does not use Critical Safety Function Status Trees (CSFSTs). ANO-2 uses Safety Function Status Checks developed by the Combustion Engineering Owner's Group (CEOG) which are based on logic similar to that used for CSFSTs developed for Westinghouse PWRs. However, there is no Safety Function Status Check condition that corresponds directly to Containment – Red. ANO-1 doesn't use the Safety Function Status concept in its EOPs. Therefore, this EAL was not used for ANO. The Containment Barrier is adequately addressed in the other Containment Barrier EALs.

Deviations:

None

CONTAINMENT BARRIER EXAMPLE EALs**3. Core Exit Thermocouples****LOSS** Not Applicable**POTENTIAL LOSS:** Core exit thermocouples in excess of 1200 degrees and restoration procedures not effective within 15 minutes; or core exit thermocouples in excess of 700 degrees with reactor vessel level below top of active fuel and restoration procedures not effective within 15 minutes**Differences:**

1. The Reactor Vessel Level Monitoring Systems at ANO do not provide positive indication of core uncover. The 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. Consistent with this approach, RVLMS is used as an indication of potential core uncover only if CET indication is unavailable. Therefore this EAL was written in terms of CET temperatures only. The 700 degrees with reactor vessel level below the top of active fuel does not apply at ANO.
2. This EAL was numbered **CNB2** in ANO's Containment Barrier section.

Deviations:

None

CONTAINMENT BARRIER EXAMPLE EALs

5. Containment Isolation Valve Status After Containment Isolation

LOSS Valve(s) not closed AND downstream pathway to the environment exists

POTENTIAL LOSS: Not Applicable

Differences:

This EAL was numbered **CNB4** in ANO's Containment Barrier section.

Deviations:

None

CONTAINMENT BARRIER EXAMPLE EALs

6. Significant Radioactive Inventory in Containment

LOSS Not Applicable
POTENTIAL LOSS: Containment rad monitor reading GREATER THAN
(site-specific) R/hr

Differences:

This EAL was numbered **CNB5** in ANO's Containment Barrier section.

Deviations:

None

CONTAINMENT BARRIER EXAMPLE EALs

7. Other (Site-Specific) Indications

LOSS (Site specific) as applicable
POTENTIAL LOSS: (Site-specific) as applicable

Differences:

1. This EAL was numbered **CNB6** in ANO's Containment Barrier section.
2. ANO used Core Damage assessment as other site specific indications.

Deviations:

None

CONTAINMENT BARRIER EXAMPLE EALs

8. Emergency Director Judgment

Any condition in the opinion of the Emergency Director that indicates Loss or Potential Loss of the Containment barrier.

Differences:

This EAL was numbered **CNB7** in ANO's Containment Barrier section.

Deviations:

None

HAZARDS AND OTHER CONDITIONS
AFFECTING PLANT SAFETY

HU1

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Natural and 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 or 7)

1. (Site-Specific) method indicates felt earthquake.
2. Report by plant personnel of tornado or high winds greater than (site-specific) mph striking within PROTECTED AREA boundary.
3. Vehicle crash into plant structures or systems within PROTECTED AREA boundary.
4. Report by plant personnel of an unanticipated EXPLOSION within PROTECTED AREA boundary resulting in VISIBLE DAMAGE to permanent structure or equipment.
5. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.
6. Uncontrolled flooding in (site-specific) areas of the plant that has the potential to affect safety related equipment needed for the current operating mode.
7. (Site-Specific) occurrences affecting the PROTECTED AREA.

Differences:

1. NEI 99-01 Rev. 4 HU1 was renumbered to HU6 in ANO's EALs for formatting purposes.
2. ANO divided EAL #7 of NEI 99-01 Rev. 4 into EAL #7 and EAL #8.

Deviations:

None

HAZARDS AND OTHER CONDITIONS
AFFECTING PLANT SAFETY

HU2

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

FIRE Within PROTECTED AREA Boundary Not Extinguished Within 15 Minutes of Detection.

Operating Mode Applicability: All

Example Emergency Action Level:

1. FIRE in buildings or areas contiguous to any of the following (site-specific) areas not extinguished within 15 minutes of control room notification or verification of a control room alarm:

(Site-specific) list

Differences:

NEI 99-01 Rev. 4 HU2 was renumbered to HU4 in ANO's EALs for formatting purposes.

Deviations:

None

**HAZARDS AND OTHER CONDITIONS
AFFECTING PLANT SAFETY**

HU3

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

Release of Toxic or Flammable Gases Deemed Detrimental to Normal Operation of the Plant.

Operating Mode Applicability: All

Example Emergency Action Levels: (1 or 2)

1. Report or detection of toxic or flammable gases that has or could enter the site area boundary in amounts that can affect NORMAL PLANT OPERATIONS.
2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.

Differences:

1. NEI 99-01 Rev. 4 HU3 was renumbered to HU5 in ANO's EALs for formatting purposes.
2. In EAL #1, ANO used "occupied areas of the site" in place of "site area boundary" as used in the NEI EAL.

Deviations:

None

HAZARDS AND OTHER CONDITIONS
AFFECTING PLANT SAFETY

HU4

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

Confirmed Security Event Which Indicates a Potential Degradation in the Level of Safety of the Plant.

Operating Mode Applicability: All

Example Emergency Action Levels:

1. Security events as determined from (site-specific) Safeguards Contingency Plan and reported by the (site-specific) security shift supervision
2. A credible site specific security threat notification.

Differences:

1. NEI 99-01 Rev. 4 HU4 was renumbered to HU1 in ANO's EALs for formatting purposes.
2. ANO used "Security Shift Commander" instead of "Security shift supervision".

Deviations:

None

HAZARDS AND OTHER CONDITIONS
AFFECTING PLANT SAFETY

HU5

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

Other Conditions Existing Which in the Judgment of the Emergency Director Warrant Declaration of a NOUE.

Operating Mode Applicability: All

Example Emergency Action Level:

1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in process or have occurred which indicate a potential degradation of the level of safety of the plant. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Differences:

NEI 99-01 Rev. 4 HU5 was renumbered to HU2 in ANO's EALs for formatting purposes.

Deviations:

None

HAZARDS AND OTHER CONDITIONS
AFFECTING PLANT SAFETY

HA1

Initiating Condition -- ALERT

Natural and Destructive Phenomena Affecting the Plant VITAL AREA.

Operating Mode Applicability: All

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

1. (Site-Specific) method indicates Seismic Event greater than Operating Basis Earthquake (OBE).
2. Tornado or high winds greater than (site-specific) mph within PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the following plant structures / equipment or Control Room indication of degraded performance of those systems.
 - Reactor Building
 - Intake Building
 - Ultimate Heat Sink
 - Refueling Water Storage Tank
 - Diesel Generator Building
 - Turbine Building
 - Condensate Storage Tank
 - Control Room
 - Other (Site-Specific) Structures.
3. Vehicle crash within PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the following plant structures or equipment therein or control indication of degraded performance of those systems:
 - Reactor Building
 - Intake Building
 - Ultimate Heat Sink
 - Refueling Water Storage Tank
 - Diesel Generator Building
 - Turbine Building
 - Condensate Storage Tank
 - Control Room
 - Other (Site-Specific) Structures.
4. Turbine failure-generated missiles result in any VISIBLE DAMAGE to or penetration of any of the following plant areas: (site-specific) list.

5. Uncontrolled flooding in (site-specific) areas of the plant that results in degraded safety system performance as indicated in the control room or that creates industrial safety hazards (e.g., electric shock) that precludes access necessary to operate or monitor safety equipment.
6. (Site-Specific) occurrences within PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to plant structures containing equipment necessary for safe shutdown, or has caused damage as evidenced by control room indication of degraded performance of those systems.

Differences:

NEI 99-01 Rev. 4 HA1 was renumbered to HA6 in ANO's EALs for formatting purposes.

ANO's EAL #2 and EAL #3 did not use "Turbine Building" since no vital area is within the Turbine building.

Deviations:

None

HAZARDS AND OTHER CONDITIONS
AFFECTING PLANT SAFETY

HA2

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:

1. FIRE or EXPLOSION in any of the following (site-specific) areas:

(Site-specific) list

AND

Affected system parameter indications show degraded performance or plant personnel report **VISIBLE DAMAGE** to permanent structures or equipment within the specified area.

Differences:

NEI 99-01 Rev. 4 HA2 was renumbered to HA4 in ANO's EALs for formatting purposes.

Deviations:

None

HAZARDS AND OTHER CONDITIONS
AFFECTING PLANT SAFETY

HA3

Initiating Condition -- ALERT

Release of Toxic or Flammable Gases Within or Contiguous to a VITAL AREA Which Jeopardizes Operation of Systems Required to Maintain Safe Operations or Establish or Maintain Safe Shutdown.

Operating Mode Applicability: All

Example Emergency Action Levels: (1 or 2)

1. Report or detection of toxic gases within or contiguous to a VITAL AREA in concentrations that may result in an atmosphere IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH).
2. Report or detection of gases in concentration greater than the LOWER FLAMMABILITY LIMIT within or contiguous to a VITAL AREA.

Differences:

NEI 99-01 Rev. 4 HA3 was renumbered to HA5 in ANO's EALs for formatting purposes.

ANO's EALs use the word "adjacent" instead of "contiguous" to fit ANO terminology.

Deviations:

None

HAZARDS AND OTHER CONDITIONS
AFFECTING PLANT SAFETY

HA4

Initiating Condition -- ALERT

Confirmed Security Event in a Plant PROTECTED AREA.

Operating Mode Applicability: All

Example Emergency Action Levels: (1 or 2)

1. INTRUSION into the plant PROTECTED AREA by a HOSTILE FORCE.
2. Other security events as determined from (site-specific) Safeguards Contingency Plan and reported by the (site-specific) security shift supervision

Differences:

1. NEI 99-01 Rev. 4 was renumbered to HA1 in ANO's EALs for formatting purposes.
2. ANO's EALs use the word "Commander" instead of "supervision" to fit ANO terminology.

Deviations:

None

HAZARDS AND OTHER CONDITIONS
AFFECTING PLANT SAFETY

HA5

Initiating Condition -- ALERT

Control Room Evacuation Has Been Initiated.

Operating Mode Applicability: All

Example Emergency Action Level:

1. Entry into (site-specific) procedure for control room evacuation.

Differences:

1. NEI 99-01 Rev. 4 HA5 was renumbered to HA3 in ANO's EALs for formatting purposes.
2. ANO re-worded the EAL to "Control Room evacuation in progress" since, in some cases, entry into the remote or alternate shutdown procedure may not require the evacuation of the Control Room.

Deviations:

None

HAZARDS AND OTHER CONDITIONS
AFFECTING PLANT SAFETY

HA6

Initiating Condition -- ALERT

Other Conditions Existing Which in the Judgment of the Emergency Director Warrant Declaration of an Alert.

Operating Mode Applicability: All

Example Emergency Action Level:

1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in process or have occurred which involve actual or likely potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Differences:

NEI 99-01 Rev. 4 HA6 was renumbered to HA2 in ANO's EALs for formatting purposes.

Deviations:

None

HAZARDS AND OTHER CONDITIONS
AFFECTING PLANT SAFETY

HS1

Initiating Condition – SITE AREA EMERGENCY

Confirmed Security Event in a Plant VITAL AREA.

Operating Mode Applicability: All

Example Emergency Action Levels: (1 or 2)

1. INTRUSION into the plant VITAL AREA by a HOSTILE FORCE.
2. Other security events as determined from (site-specific) Safeguards Contingency Plan and reported by the (site-specific) security shift supervision

Differences:

ANO used the word "Commander" in EAL #2 instead of "supervision" as used in EAL #2 of NEI 99-01 Rev. 4.

Deviations:

None

HAZARDS AND OTHER CONDITIONS
AFFECTING PLANT SAFETY

HS2

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:

1. Control room evacuation has been initiated.

AND

Control of the plant cannot be established per (site-specific) procedure within (site-specific) minutes.

Differences:

NEI 99-01 Rev. 4 HS2 was renumbered to HS3 in ANO's EALs for formatting purposes.

Deviations:

None

HAZARDS AND OTHER CONDITIONS
AFFECTING PLANT SAFETY

HS3

Initiating Condition – SITE AREA EMERGENCY

Other Conditions Existing Which in the Judgment of the Emergency Director Warrant Declaration of Site Area Emergency.

Operating Mode Applicability: All

Example Emergency Action Level:

1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in process or have occurred which involve actual or likely major failures of plant functions needed for 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.

Differences:

NEI 99-01 Rev. 4 HS3 was renumbered to HS2 in ANO's EALs for formatting purposes.

Deviations:

None

HAZARDS AND OTHER CONDITIONS
AFFECTING PLANT SAFETY

HG1

Initiating Condition – GENERAL EMERGENCY

Security Event Resulting in Loss Of Physical Control of the Facility.

Operating Mode Applicability: All

Example Emergency Action Level:

1. A HOSTILE FORCE has taken control of plant equipment such that plant personnel are unable to operate equipment required to maintain safety functions.

Differences:

None

Deviations:

None

HAZARDS AND OTHER CONDITIONS
AFFECTING PLANT SAFETY

HG2

Initiating Condition – GENERAL EMERGENCY

Other Conditions Existing Which in the Judgment of the Emergency Director Warrant Declaration of General Emergency.

Operating Mode Applicability: All

Example Emergency Action Level:

1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Differences:

None

Deviations:

None

SYSTEM MALFUNCTION

SU1

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Loss of All Offsite Power to essential Busses for Greater Than 15 Minutes.

Operating Mode Applicability:

Power Operation (1)
Startup (2)
Hot Standby (3)
Hot Shutdown (4)

Example Emergency Action Level:

1. Loss of power to (site-specific) transformers for greater than 15 minutes.

AND

At least (site-specific) emergency generators are supplying power to emergency busses.

Differences:

The word "essential" in NEI 99-01 Rev. 4 was changed in ANO's EALs to "vital" 4.16 KV for ANO terminology and plant design.

Deviations:

None

SYSTEM MALFUNCTION

SU2

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Inability to Reach Required Shutdown Within Technical Specification Limits.

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

Example Emergency Action Level:

1. Plant is not brought to required operating mode within (site-specific) Technical Specifications LCO Action Statement Time.

Differences:

None

Deviations:

None

SYSTEM MALFUNCTION

SU3

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

UNPLANNED Loss of Most or All Safety System Annunciation or Indication in the Control Room for Greater Than 15 Minutes

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Hot Shutdown

Example Emergency Action Level:

1. UNPLANNED loss of most or all (site-specific) annunciators or indicators associated with safety systems for greater than 15 minutes.

Differences:

NEI 99-01 Rev. 4 SU3 was reformatted to fit ANO's two different plants into one EAL. The EAL for SU3 was also divided into 2 EALs for human factors concerns because of the two different plants.

Deviations:

None

SYSTEM MALFUNCTION**SU4****Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT**

Fuel Clad Degradation.

Operating Mode Applicability: Power Operation
Startup
Hot Standby
Hot Shutdown

Example Emergency Action Levels: (1 or 2)

1. (Site-specific) radiation monitor readings indicating fuel clad degradation greater than Technical Specification allowable limits.
2. (Site-specific) coolant sample activity value indicating fuel clad degradation greater than Technical Specification allowable limits.

Differences:

1. NEI 99-01 Rev. 4 EAL #2 was renumbered EAL #1 in ANO's EALs.
2. ANO does not provide a radiation monitor reading equivalent to NEI 99-01 Rev. 4 EAL #1. ANO uses the letdown radiation monitor as a qualitative indication of potential fuel clad degradation. Indications on the letdown radiation monitor are used to prompt plant personnel to sample the RCS for radiochemistry analysis. The results from the analyses are compared to the IDE and specific activity levels to determine the emergency classification.

Deviations:

None

SYSTEM MALFUNCTION

SU5

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

RCS Leakage.

Operating Mode Applicability: Power Operation
Startup
Hot Standby
Hot Shutdown

Example Emergency Action Levels: (1 or 2)

1. Unidentified or pressure boundary leakage greater than 10 gpm.
2. Identified leakage greater than 25 gpm.

Differences:

None

Deviations:

None

SYSTEM MALFUNCTION

SU6

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

UNPLANNED Loss of All Onsite or Offsite Communications Capabilities.

Operating Mode Applicability: Power Operation
Startup
Hot Standby
Hot Shutdown

Example Emergency Action Levels: (1 or 2)

1. Loss of all (site-specific list) onsite communications capability affecting the ability to perform routine operations.
2. Loss of all (site-specific list) offsite communications capability.

Deviations:

None

Differences:

None

SYSTEM MALFUNCTION

SU8

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Inadvertent Criticality.

OPERATING MODE APPLICABILITY

Hot Standby
Hot Shutdown

Example Emergency Action Level: (1 or 2)

1. An UNPLANNED extended positive period observed on nuclear instrumentation.
2. An UNPLANNED sustained positive startup rate observed on nuclear instrumentation.

Differences:

1. NEI 99-01 Rev. 4 EAL #2 was renumbered EAL #1 in ANO's EALs.
2. EAL #1 of NEI 99-01 Rev. 4 was not used at ANO. ANO does not have a period meter.

Deviations:

None

SYSTEM MALFUNCTION

SA2

Initiating Condition -- ALERT

Failure of Reactor Protection System Instrumentation to Complete or Initiate an Automatic Reactor Scram Once a Reactor Protection System Setpoint Has Been Exceeded and Manual Scram Was Successful.

Operating Mode Applicability: Power Operation
Startup
Hot Standby

Example Emergency Action Level:

1. Indication(s) exist that indicate that reactor protection system setpoint was exceeded and automatic scram did not occur, and a successful manual scram occurred.

Differences:

ANO added wording to SA2 to fit ANO terminology.

Deviations:

None

SYSTEM MALFUNCTION**SA4****Initiating Condition -- ALERT**

UNPLANNED Loss of Most or All Safety System Annunciation or Indication in Control Room With Either (1) a SIGNIFICANT TRANSIENT in Progress, or (2) Compensatory Non-Alarming Indicators are Unavailable.

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Hot Shutdown

Example Emergency Action Level:

1. UNPLANNED loss of most or all (site-specific) annunciators or indicators associated with safety systems for greater than 15 minutes.

AND

Either of the following: (a or b)

- a. A SIGNIFICANT TRANSIENT is in progress.

OR

- b. Compensatory non-alarming indications are unavailable.

Differences:

ANO's SA4 uses SPDS and PMS for specified systems that would provide dynamic alarm functions. The word "plant" is used instead of "significant" to fit ANO terminology.

Deviations:

None

SYSTEM MALFUNCTION

SA5

Initiating Condition -- ALERT

AC power capability to essential busses reduced to a single power source for greater than 15 minutes such that any additional single failure would result in station blackout.

Operating Mode Applicability: Power Operation
Startup
Hot Standby
Hot Shutdown

Example Emergency Action Level:

1. AC power capability to site-specific essential busses reduced to a single power source for greater than 15 minutes

AND

Any additional single failure will result in station blackout.

Differences:

ANO's SA5 used the term "vital" 4.16 KV instead of "essential" as used in NEI 99-01 Rev. 4 SA5.

Deviations:

None

SYSTEM MALFUNCTION

SS1

Initiating Condition -- SITE AREA EMERGENCY

Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Busses.

Operating Mode Applicability: Power Operation
Startup
Hot Standby
Hot Shutdown

Example Emergency Action Level:

1. Loss of power to (site-specific) transformers.

AND

Failure of (site-specific) emergency generators to supply power to emergency busses.

AND

Failure to restore power to at least one emergency bus within (site-specific) minutes from the time of loss of both offsite and onsite AC power.

Differences:

1. NEI 99-01 Rev. 4 SS1 was reworded and reformatted for ANO terminology.
2. ANO combined the second and third condition statements from the NEI EAL.

Deviations:

None

SYSTEM MALFUNCTION

SS2

Initiating Condition -- SITE AREA EMERGENCY

Failure of Reactor Protection System Instrumentation to Complete or Initiate an Automatic Reactor Scram Once a Reactor Protection System Setpoint Has Been Exceeded and Manual Scram Was NOT Successful.

Operating Mode Applicability: Power Operation
Startup

Example Emergency Action Level:

1. Indication(s) exist that automatic and manual scram were not successful.

Differences:

None

Deviations:

None

SYSTEM MALFUNCTION

SS3

Initiating Condition -- SITE AREA EMERGENCY

Loss of All Vital DC Power.

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Hot Shutdown

Example Emergency Action Level:

1. Loss of All Vital DC Power based on (site-specific) bus voltage indications for greater than 15 minutes.

Differences:

None

Deviations:

None

SYSTEM MALFUNCTION

SS4

Initiating Condition -- SITE AREA EMERGENCY

Complete Loss of Heat Removal Capability.

Operating Mode Applicability: Power Operation
Startup
Hot Standby
Hot Shutdown

Example Emergency Action Level:

- 1. Loss of core cooling and heat sink (PWR).
- 1. Heat Capacity Temperature Limit Curve exceeded (BWR).

Differences:

NEI 99-01 Rev. 4 SS4 was reformatted and reworded for ANO terminology.

Deviations:

None

SYSTEM MALFUNCTION

SS6

Initiating Condition -- SITE AREA EMERGENCY

Inability to Monitor a SIGNIFICANT TRANSIENT in Progress.

Operating Mode Applicability:	Power Operation Startup Hot Standby Hot Shutdown
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Example Emergency Action Level:

- 1. a. Loss of most or all (site-specific) annunciators associated with safety systems.

AND

- b. Compensatory non-alarming indications are unavailable.

AND

- c. Indications needed to monitor (site-specific) safety functions are unavailable.

AND

- d. SIGNIFICANT TRANSIENT in progress.

Differences:

- 1. ANO's EALs use the word "TRANSIENT" which is drawn from ANO documentation and terminology instead of "Significant Transient" as used in NEI 99-01 Rev. 4.
- 2. SPDS and PMS are specified as systems that would provide dynamic alarm functions.

Deviations:

None

SYSTEM MALFUNCTION**SG1****Initiating Condition -- GENERAL EMERGENCY**

Prolonged Loss of All Offsite Power and Prolonged Loss of All Onsite AC Power to Essential Busses.

Operating Mode Applicability:

- Power Operation
- Startup
- Hot Standby
- Hot Shutdown

Example Emergency Action Level:

1. Loss of power to (site-specific) transformers.

AND

Failure of (site-specific) emergency diesel generators to supply power to emergency busses.

AND

Either of the following: (a or b)

- a. Restoration of at least one emergency bus within (site-specific) hours is not likely

OR

- b. (Site-Specific) Indication of continuing degradation of core cooling based on Fission Product Barrier monitoring.

Differences:

NEI 99-01 Rev. 4 SG1 was reformatted for two different plants.

Deviations:

None

SYSTEM MALFUNCTION

SG2

Initiating Condition -- GENERAL EMERGENCY

Failure of the Reactor Protection System to Complete an Automatic Scram and Manual Scram was NOT Successful and There is Indication of an Extreme Challenge to the Ability to Cool the Core.

Operating Mode Applicability: Power Operation
Startup

Example Emergency Action Level:

1. Indications exist that automatic and manual scram were not successful.

AND

Either of the following: (a or b)

- a. Indication(s) exists that the core cooling is extremely challenged.

OR

- b. Indication(s) exists that heat removal is extremely challenged.

Differences:

None

Deviations:

None