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CALLAWAY PLANT

EMERGENCY PLAN IMPLEMENTING PROCEDURE

EIP-ZZ-00101

CLASSIFICATION OF EMERGENCIES

RESPONSIBLE DEPARTMENT **Emergency Preparedness**

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This procedure contains the following:

Pages	1	through	8
Attachments	1	through	3
Tables		through	
Figures		through	
Appendices		through	
Checkoff Lists		through	

This procedure has _____ checkoff list(s) maintained in the mainframe

Conversion of commitments to TRS reference/hidden text completed by Revision Number:

ITS Commitments 024 Non-T/S Commitments 024

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Attachment 2	Emergency Action Levels Indications Bases	52 Pages
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CLASSIFICATION OF EMERGENCIES

1 PURPOSE AND SCOPE

1.1 PURPOSE

This procedure provides guidelines for classification of emergencies.

1.2 SCOPE

Establishes indications for determining conditions at which specific emergency classifications are to be declared.

2 DEFINITIONS

2.1 Emergency Classifications -

- Unusual Event - This classification is characterized by events in progress or which have occurred indicating a potential degradation of the level of safety of the Plant. No releases of radioactive material requiring off-site response or monitoring are expected unless further degradation of safety systems occurs.

- Alert - This classification is characterized by events in progress or that 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.

- Site Emergency - The SITE EMERGENCY class includes accidents in which major failures of Plant functions needed for protection of the public have occurred or are likely to occur. Any releases are not expected to exceed EPA Protective Action Guideline exposure levels except near the site boundary.

- General Emergency - The GENERAL EMERGENCY class includes accidents which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity, and other accidents that have large radioactive release potential. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels off-site for more than the immediate site area.

2.2 Safe Shutdown Area - Section 5.4A.2 of the FSAR lists the systems required to achieve and maintain a safe shutdown. The following areas contain these required systems:

a) Area 5

b) Containment

c) Aux Feed Pump Rooms

d) Aux Building

e) Diesel Generator Building

f) UHS Cooling Tower

g) ESW Pumphouse

h) Control Building

i) RWST

j) Fuel Building

2.3 Transient - A transient is defined as a reactor power change of ± 10% or safety injection initiated.

2.4 Invalid - Invalid alarms and readings may be the result of electronic noise, radio frequency interference, electromagnetic frequency interference, or spurious spikes of unknown nature. A buildup of radioactivity within the monitor or an increase in the ambient background for the monitor would also cause invalid alarms and readings.

2.5 Valid - Valid alarms and readings are those verified by the operators to be the results of actual events or, in the case of effluent alarms and readings, verified to be the results of effluent concentrations.

3 RESPONSIBILITIES

3.1 SHIFT SUPERVISOR

3.1.1 Upon classification of an emergency, the Shift Supervisor assumes the position of Emergency Coordinator and initiates emergency actions including making Protective Action Recommendations to authorities responsible for implementing off-site emergency measures. The Shift Supervisor assigns on-shift personnel to emergency duties as deemed necessary, and notifies the EDO of the emergency. The Shift Supervisor continues as acting Emergency Coordinator until relieved by the EDO. When relieved, the Shift Supervisor will resume normal duties in directing Plant Operations activities from the Control room. (**COMN** 3314)

3.2 EMERGENCY COORDINATOR

3.2.1 The Emergency Coordinator is responsible for directing overall emergency response on-site. Initially, the Shift Supervisor assumes the responsibilities of Emergency Coordinator. At the ALERT (or higher) emergency classification levels, the EDO will relieve the Shift Supervisor and assume the Emergency Coordinator duties. The Emergency Coordinator directs the Emergency Response Organization from the TSC after relieving the Shift Supervisor. (**COMN** 3327)

3.3 PLANT PERSONNEL

3.3.1 Responsible for immediately reporting any abnormal condition or event to the Shift Supervisor.

4 INITIATING CONDITIONS

This procedure is initiated when:

4.1 Alarms, abnormal instrument readings, or reports of conditions that indicate an emergency situation (either real or potential) have occurred.

4.2 A subsequent action step in a plant operating off-normal, or Emergency Procedure which refers to this procedure for classification of the indicated plant conditions.

5 PROCEDURE

When abnormal or emergency conditions (real or potential) occur, the Shift Supervisor SHALL: (**COMN** 3384)

NOTE:	Initial classification should take place as soon as possible but not > 15 minutes after recognition of initiating conditions.

5.1 Ensure that immediate actions (e.g., use of Emergency Procedures, dispatch the Fire Brigade, personnel, etc.) are taken for the safe and proper operation of the plant.

5.2 Using the indications available (alarms, readings, reports, etc.) and Attachment 1, Emergency Action Levels, determine the appropriate emergency classification as follows: (**COMN** 42546)

NOTE:	Instrumentation listed in Attachment 1 is the primary means of determining conditions; if these are inoperative, others may be substituted.

5.2.1 Refer to the "Group" (in Attachment 1) that relates to the indications being received. The groups are:

Group One - Abnormal Radiation Events

Group Two - Fission Product Barriers (**COMN** 41525)

Group Three - Hazards Affecting Plant Safety

Group Four - System Malfunctions

5.2.2 Find the corresponding indication(s) and condition(s) appropriate to the actual indication(s).

5.2.2.1 Emergency Classification can also be based upon projected conditions/indications to ensure adequate measures are taken to mitigate any consequences of the emergency. (**COMN** 20606)

5.2.2.2 If extra personnel are desired when no conditions exist that in his opinion warrant the declaration emergency he may have the SAS operator activate the Emergency Paging System per **PROC KOA-ZZ-00200** for duty rapid responders using **MESSAGE #2** or for all available rapid responders, ERO Coordinators, and engineers using **MESSAGE #10.**

5.2.2.3 The Emergency Coordinator has the option to declare an UNUSUAL EVENT, ALERT, SITE EMERGENCY or GENERAL EMERGENCY when conditions exist that in his opinion warrant the declaration. This can be independent of any specific EAL.

5.2.2.4 Specific examples of other conditions which in the judgment of the Emergency Coordinator warrant declaration of an event: (**COMN** 43073)

a) Each Group 2 barrier could be considered for other factors that could determine whether a barrier is Potentially Lost or Lost. In addition, the inability to monitor the barrier could be a factor in considering the barrier Potentially Lost or Lost.

b) Specific examples of events that may require Emergency Coordinator judgment for the Unusual Event:

1) Aircraft crash on-site.

2) Near site explosion which may adversely affect normal site activities.

3) Near site release of toxic or flammable gas which may adversely affect normal site activities.

4) Uncontrolled RCS cool down due to Secondary Depressurization.

5) Unplanned loss of > 75% of plant annunciators due to event(s) not covered elsewhere.

6) Safeguards security events not covered elsewhere.

c) Specific examples of events that <u>may</u> require Emergency Coordinator judgment for the Alert:

1) Conditions exist that indicate that plant systems may be degraded, and that increased monitoring of plant functions is warranted.

2) Safeguards security events not covered elsewhere.

d) Specific examples of events that <u>may</u> require Emergency Coordinator judgment for the Site Emergency:

1) Conditions exist that indicate actual or likely major failures of plant functions needed for protection of the public.

e) Specific examples of events that <u>may</u> require Emergency Coordinator judgment for the General Emergency:

1) Conditions exist that indicate actual or imminent substantial core degradation with potential for loss of containment.

2) Conditions exist that indicate potential for uncontrolled radionuclide releases expected to exceed EPA PAG plume exposure levels outside the EAB.

3) Safeguards security events not covered elsewhere.

5.2.2.5 The possibility exists that situations may have characteristics in two or more classes. In such an event, the emergency SHALL be categorized in the more severe class to ensure a conservative approach is taken. (**COMN** 3383)

5.2.3 Declare the emergency classification that is listed corresponding to the condition derived from Step 5.2.2 to facility personnel.

<u>NOTE:</u>	Initial notifications to State and Local Agencies shall be initiated within 15 minutes after declaration of the emergency classification.

5.3 Perform the necessary emergency implementing actions as outlined in **EIP-ZZ-00102**, Emergency Implementing Actions, to ensure the proper response is taken to implement the Callaway Plant Radiological Emergency Response Plan.

NOTE:	If necessary, the EDO should be contacted to discuss emergency actions.

5.4 Reclassify the emergency as conditions dictate in accordance with this procedure.

6 FINAL CONDITIONS

6.1 Event Closeout or Plant Recovery has been declared per **EIP-ZZ-00260**, Event Closeout/Plant Recovery.

7 REFERENCES

7.1 Callaway Plant Radiological Emergency Response Plan

7.2 NUREG-0818, Emergency Action Levels for Light Water Reactors

7.3 **EIP-ZZ-00102**, Emergency Implementing Actions

7.4 **EIP-ZZ-00260**, Event Closeout/Plant Recovery

7.5 Callaway Plant Final Safety Analysis Report

7.6 Callaway Plant Technical Specifications

7.7 **APA-ZZ-00703**, Fire Protection Operability Criteria and Surveillance Requirements

7.8 **APA-ZZ-01003**, Off-Site Dose Calculation Manual

7.9 NESP-0007, Methodology for Development of Emergency Action Levels

7.10 Reg. Guide 1.101, Emergency Planning and Preparedness for Nuclear Power Reactors

7.11 **OTO-SG-00001**, Seismic Event

7.12 **OTO-ZZ-00001**, Control Room Inaccessibility

7.13 **CTP-ZZ-01300**, Atmospheric Hazard Control

7.14 **OTO-RK-00001**, Loss of Control Room Alarms

7.15 **EIP-ZZ-01211**, Management Action Guides For Nuclear Emergencies (MAGNEM)

7.16 Emergency Action Level (EAL) Descriptions

7.17 EPCI-98-01 Rev000 Calculation.

8 RECORDS

None

EMERGENCY ACTION LEVELS

Group 1 ABNORMAL RADIATION EVENTS
Offsite Events

UNUSUAL EVENT	ALERT	SITE EMERGENCY	GENERAL EMERGENCY
A. Any **Unplanned Release** of Radioactivity to the Environment That Exceeds **2 Times** the Radiological Effluent Control Limits in the ODCM, (APA-ZZ-01003) for **≥60** minutes. MODES: At All Times	B. Any **Unplanned Release** of Radioactivity to the Environment That Exceeds **200 Times** the Radiological Effluent Control Limits in the ODCM, (APA-ZZ-01003) for **≥15** minutes. MODES: At All Times	C. **EAB** Dose Resulting From an **Actual or Imminent** Release of Gaseous Radioactivity Exceeds **100 mrem TEDE** or **500 mrem CDE** Thyroid for the Actual or Projected Duration of the Release. MODES: At All Times	D. **EAB** Dose Resulting From an **Actual or Imminent** Release of Gaseous Radioactivity Exceeds **1000 mrem TEDE** or **5000 mrem CDE** Thyroid for the Actual or Projected Duration of the Release. MODES: At All Times
Indicators 1. All of the following: a. A **valid alarm** and reading on any of the following effluent monitors: HB-RE-18 GT-RE-21B GH-RE-10B b. The valid reading is 2 times the Hi Hi alarm setpoint value. c. The release cannot be terminated within 60 minutes of the alarm actuation. OR 2. Both of the following: a. **Confirmed** sample analysis indicates that a release exceeding 2 times the applicable values of the ODCM (APA-ZZ-01003), has occurred. b. The release **cannot** be terminated within 60 minutes.	**Indicators** 1. All of the following: a. A **valid alarm** and reading on any of the following effluent monitors: HB-RE-18 GT-RE-21B GH-RE-10B b. The valid reading is 200 times the Hi Hi alarm setpoint value. c. The release **cannot** be terminated within 15 minutes of the alarm actuation. OR **2. Both of the following: a. A **Valid reading** on any of the following monitors: AB-RE-0111 >27 mrem/hr AB-RE-0112 >27 mrem/hr AB-RE-0113 >27 mrem/hr AB-RE-0114 >27 mrem/hr FC-RE-0385 >150 mrem/hr b. The release **cannot** be terminated within 15 minutes. OR 3. Both of the following: a. **Confirmed** sample analysis indicates that a release exceeding 200 times the applicable values of the ODCM (APA-ZZ-01003), has occurred. b. The release **cannot** be terminated within 15 minutes. **Release values based on average meteorological data and a 1 hour release duration.	**Indicators** Any of the following: *1. A **valid reading** on the Unit Vent monitor, GT-RE-21B, > 2.42E+8 μCi/sec for 15 minutes or longer. **2. Both of the following: a. A **Valid reading** on any of the following monitors: AB-RE-0111 >146 mrem/hr AB-RE-0112 >146 mrem/hr AB-RE-0113 >146 mrem/hr AB-RE-0114 >146 mrem/hr FC-RE-0385 >850 mrem/hr b. The reading has been, or is expected to be, exceeded for 15 minutes or longer. 3. A **valid dose projection** indicates **>100 mrem TEDE** or **>500 mrem CDE** thyroid dose at, or beyond, the **EXCLUSION AREA BOUNDARY** using in plant rad data or field monitoring team survey results. 4. Field survey results at, or beyond, the EAB corresponding to **>100 mrem/hr TEDE** for 1 hour (or expected to continue for 1 hour) or **>500 mrem/hr CDE** thyroid for 1 hour of inhalation. *Declare the event using this indicator only if actual dose projections per Indicator 3 cannot be performed within 15 minutes of the monitors exceeding the reading. **Release values based on average meteorological data and a 1 hour release duration.	**Indicators** Any of the following: *1. A **valid reading** on the Unit Vent monitor, GT-RE-21B, > 2.42 E+9 μCi/sec for 15 minutes or longer. **2. Both of the following: a. A **Valid reading** on any of the following monitors: AB-RE-0111 >1460 mrem/hr AB-RE-0112 >1460 mrem/hr AB-RE-0113 >1460 mrem/hr AB-RE-0114 >1460 mrem/hr FC-RE-0385 >8500 mrem/hr b. The reading has been, or is expected to be, exceeded for 15 minutes or longer. 3. A **valid dose projection** indicates **>1000 mrem TEDE** or **>5000 mrem CDE** thyroid dose at, or beyond, the **EXCLUSION AREA BOUNDARY** using in plant rad data or field monitoring team survey results. 4. Field survey results at, or beyond, the EAB corresponding to **>1,000 mrem/hr TEDE** for 1 hour (or expected to continue for 1 hour) or **>5,000 mrem/hr CDE** thyroid for 1 hour of inhalation. *Declare the event using this indicator only if actual dose projections per Indicator 3 cannot be performed within 15 minutes of the monitors exceeding the reading. **Release values based on average meteorological data and a 1 hour release duration.

EMERGENCY ACTION LEVELS

Group 1 ABNORMAL RADIATION EVENTS
Onsite Events

UNUSUAL EVENT	ALERT	ALERT
E.* An Unexpected Increase in Plant Radiation. MODES: At All Times	F.* Major Damage to Irradiated Fuel or Loss of Water Level That Has or Will Result in the Uncovering of Irradiated Fuel Outside the Reactor Vessel. MODES: At All Times Unless Noted	G.* Release of Rad Material, or an Increase in Rad Level that Either Impedes Safe Operations or the Ability to Establish or Maintain Cold Shutdown. MODES: At All Times
Indicators Any of the following: 1. Spent Fuel Pool level is decreasing on EC-LI-0039A with Normal makeup being added, and all irradiated fuel assemblies remain covered. 2. Refueling Pool level is decreasing on BB-LI-0053A or B with Normal makeup being added, and all irradiated fuel assemblies remain covered. 3. Any valid (Confirmed by HP survey) ARM (other than a Group 1,G. Safe Shutdown ARM) >1000 times normal. (Normal levels can be considered as the monitor reading prior to the noticed increase.)	**Indicators** Any of the following: 1. A **VALID** Hi-Hi Alarm on Fuel Building exhaust monitors GG-RE-27 or 28 (Channel 273 or 283). 2. Containment refueling bridge area radiation monitor (SD-41) > 100 mR/hr. (Mode 6 only.) 3. Fuel building area radiation monitor (SD-37 or 38) > 30 mR/hr. 4. Report of visual observation of loss of water level resulting in irradiated fuel being uncovered.	**Indicators** Any of the following: 1. Valid (confirmed by HP) reading on SD-33 (Control Room) >15 mR/hr. 2. Valid (confirmed by HP) reading on the following Safe Shutdown ARMs: SDRE-26 AB 2026 PC Changeout SDRE-23 AB 2000 RHR Hx Area Corridor SDRE-15 AB 1974 West Corridor-Central SDRE-16 AB 1974 West Corridor-South > 1000 times normal (normal levels can be considered as the monitor reading prior to the noticed increase).
* This Initiating Condition is not meant to apply to anticipated temporary increases due to planned events (e.g., incore detector movement, radwaste container movement, depleted resin transfers, upper internal movements, etc.)	* This Initiating Condition is not meant to apply to anticipated temporary increases due to planned events (e.g., incore detector movement, radwaste container movement, depleted resin transfers, upper internal movements, etc.)	* This Initiating Condition is not meant to apply to anticipated temporary increases due to planned events (e.g., incore detector movement, radwaste container movement, depleted resin transfers, upper internal movements, etc.)

EMERGENCY ACTION LEVELS

Group 2 FISSION PRODUCT BARRIERS

A. UNUSUAL EVENT	B. ALERT	C. SITE EMERGENCY	D. SITE EMERGENCY	E. GENERAL EMERGENCY
Any **CONTAINMENT BARRIER** Indicator	Any **RCS BARRIER** Indicator **or** Any **FUEL CLAD BARRIER** Indicator	Any **RCS BARRIER** Indicator **and** Any **FUEL CLAD BARRIER** Indicator	A **CTMT BARRIER** Loss Indicator **and** Any **RCS** or **FUEL CLAD BARRIER** Indicator	A Loss Indicator from any two barriers **and** Any Indicator from the third

CONTAINMENT BARRIER
MODES: 1-4

Loss indicators:

1. Containment Pressure
   a) A rapid unexplained loss of CTMT pressure following an initial increase in pressure.
   or
   b) CTMT pressure or sump level not increasing with a LOCA.
2. Containment Isolation Valve Status
   Incomplete CTMT isolation allowing a direct release to the environment, following a valid CTMT isolation signal (CISA, CISB, CPIS).
3. SG Release with Primary-Secondary Leakage
   a) Pri-to-sec leakage verified greater than 150 gpd per SG. T. S. 3.4.6.2 (ITS 3.4.13)
   and
   b) Any of the following:
      1) The leaking SG pressure is decreasing in an uncontrolled manner or completely depressurized.
      2) Use of the ruptured SG PORV for cool down or temperature control.
      3) The leaking SG is supplying the TDAFW turbine.

Potential Loss indicators:

4. Critical Safety Function Status
   Meet the entry requirements for FRZ.1, Red Path Summary for CTMT.
5. Containment Pressure
   a) H2 concentration in containment >4%.
   or
   b) Less than 1 full train of Ctmt spray and Ctmt cooling fans, with Ctmt pressure greater than 27 psig.
6. Significant Radioactive Inventory in Ctmt
   GT-RE-59 or 60 (Channels 591 or 601) reading >1.5 E+4 R/hr
7. Core Exit Thermocouples
   a) Core exit TCs >1200°F and restoration procedures not effective in 15 minutes.
   or
   b) Core exit TCs >700°F and RVLIS (pumps off) <40% and restoration procedures not effective in 15 minutes.

RCS BARRIER
MODES: 1-4

Loss indicators:

1. RCS Leak Rate
   Safety Injection initiated with a loss of subcooling (less than instrument error) using Attachment 2 or 3 of Emerg. Procedure E-0.
2. SG Tube Rupture
   a) Any of the following:
      1) GE-RE-92 (Channel 925) >2.0E-5 μCi/cc
      2) BM-RE-25 (Channel 256) >1.0E-4 μCi/cc
      3) SJ-RE-02 (Channel 026) >1.0E-4 μCi/cc
      4) Level in any SG continues to increase in an uncontrolled manner
   and
   b) Any of the following:
      1) The ruptured SG pressure is decreasing in an uncontrolled manner or completely depressurized.
      2) Use of the ruptured SG PORV for cool down or temperature control.
      3) The leaking SG is supplying the TDAFW turbine.
3. Containment Radiation Monitoring
   GT-RE-59 or 60 (Channels 591 or 601) reading > 6.4 E+0 R/hr.

Potential Loss indicators:

4. Critical Safety Function Status
   Meet the entry requirement for FRH.1, Red Path Heat Sink or FRP.1, Red Path for Integrity.
5. RCS Leak Rate
   RCS leakage >50 gpm.
6. SG Tube Rupture
   a) Any of the following:
      1) GE-RE-92 (Channel 925) >2.0 E-5 μCi/cc
      2) BM-RE-25 (Channel 256) >1.0 E-4 μCi/cc
      3) SJ-RE-02 (Channel 026) >1.0 E-4 μCi/cc
      4) Level in any SG continues to increase in an uncontrolled manner.
   and
   b) the primary-to-secondary leak rate exceeds 50 gpm.

FUEL CLAD BARRIER
MODES: 1-4

Loss indicators:

1. Critical Safety Function Status
   Meet the entry requirements for FRC.1, Red Path for Core cooling.
2. Primary Coolant Activity Level
   RCS coolant activity >300μCi/cc dose equivalent I-131.
3. Containment Radiation Monitoring
   GT-RE-59 or 60 (Channels 591 or 601) reading >2.8E+3 R/hr.

Potential Loss indicator:

4. Critical Safety Function Status
   Meet the entry requirements for FRC.2, Orange Path for Core Cooling or FRH.1, Red Path for Heat Sink.
5. Core Exit Thermocouples
   Core exit TCs >700°F.
6. Reactor Vessel Water Level
   a) RVLIS (Pumps Off) less than 40%
   or
   b) RVLIS (Pumps On) less than minimum

RCP's on	Minimum
4	44
3	30
2	20
1	13

EMERGENCY ACTION LEVELS

Group 3 HAZARDS AFFECTING PLANT SAFETY
Security Events

UNUSUAL EVENT	ALERT	SITE EMERGENCY	GENERAL EMERGENCY
A. Confirmed Security Event Which Indicates a Potential Degradation in the Level of Safety of the Plant. MODES: At All Times	B. Security Event in the Plant Protected Area. MODES: At All Times	C. Security Event in a Safe Shutdown Area. MODES: At All Times	D. Security Event Resulting in a Loss of the Ability to Reach and Maintain Cold Shutdown. MODES: At All Times
Indicators Any of the following: 1. Bomb device discovered within the plant Protected Area and outside the following Safe Shutdown Areas: a. Area 5 b. Containment c. Aux Feed Pump Rooms d. Aux Building e. Diesel Generator Building f. UHS Cooling Tower g. ESW Pumphouse h. Control Building i. RWST j. Fuel Building 2. Confirmed report from the Shift Security Supervisor of an attempted entry, sabotage or security threat that cannot be properly compensated for within 10 minutes.	**Indicators** Confirmed report by the Shift Security Supervisor of an intrusion by a hostile force into the plant Protected Area.	**Indicators** Any of the following 1. Bomb device discovered within any of the following areas: a. Area 5 b. Containment c. Aux Feed Pump Rooms d. Aux Building e. Diesel Generator Building f. UHS Cooling Tower g. ESW Pumphouse h. Control Building i. RWST j. Fuel Building 2. Confirmed report from the Shift Security Supervisor of an intrusion by a hostile force into any of the following areas: a. Area 5 b. Containment c. Aux Feed Pump Rooms d. Aux Building e. Diesel Generator Building f. UHS Cooling Tower g. ESW Pumphouse h. Control Building i. RWST j. Fuel Building	**Indicators** Any of the following: 1. Occupation of the Control Room by a hostile force. 2. Occupation of the Aux Shutdown Panel by a hostile force.

EMERGENCY ACTION LEVELS

Group 3 HAZARDS AFFECTING PLANT SAFETY

Fires

UNUSUAL EVENT	ALERT
E. Fire Within Protected Area Boundary Not Extinguished Within 15 Minutes of Verification. MODES: At All Times	F. Fire Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown. MODES: At All Times
Indicators 1. Fire in or adjacent to any of the following: a. Area 5 b. Containment c. Aux Feed Pump Rooms d. Aux Building e. Diesel Generator Building f. UHS Cooling Tower g. ESW Pumphouse h. Control Building i. RWST j. Fuel Building and 2. Not extinguished within 15 minutes of control room verification of a fire.	**Indicators** 1. Fire in any of the following areas: a. Area 5 b. Containment c. Aux Feed Pump Rooms d. Aux Building e. Diesel Generator Building f. UHS Cooling Tower g. ESW Pumphouse h. Control Building i. RWST j. Fuel Building and 2. There is visible damage to permanent structures or equipment, affecting the operability of safety related equipment.

Natural and Destructive Events

UNUSUAL EVENT	ALERT
G. Natural and Destructive Phenomena Affecting the Protected Area. MODES: At All Times	H. Natural and Destructive Phenomena Affecting a Safe Shutdown Area. MODES: At All Times
Indicators Any of the following: 1. a. Response spectrum recorder operating annunciator 98E alarms in the Control Room and b. Verified to be a real event per OTO-SG-00001. 2. Report of a turbine rotating component failure resulting in casing penetration or major damage to seals causing a rapid loss of lubricating oil or hydrogen. 3. Explosion, vehicle crash or tornado in or adjacent to any of the following: a. Area 5 b. Containment c. Aux Feed Pump Rooms d. Aux Building e. Diesel Generator Building f. UHS Cooling Tower g. ESW Pumphouse h. Control Building i. RWST j. Fuel Building	**Indicators** Any of the following: 1. a. Operating basis earthquake annunciator 98D alarms in the Control Room and b. Earthquake greater than OBE levels (0.12g) in the horizontal and vertical directions as indicated by LIGHT "OSG-AE-1" or LIGHT "OSG-AE-2" 2. a. Report of a tornado, high wind, vehicle crash, explosion, or other natural or destructive phenomena to any of the following Safe Shutdown areas: 1. Area 5 2. Containment 3. Aux Feed Pump Rooms 4. Aux Building 5. Diesel Generator Building 6. UHS Cooling Tower 7. ESW Pumphouse 8. Control Building 9. RWST 10. Fuel Building and b. There is visible damage to permanent structures or equipment, affecting plant operations.

EMERGENCY ACTION LEVELS

Group 3 HAZARDS AFFECTING PLANT SAFETY

Toxic Gas

UNUSUAL EVENT	ALERT
I. Release of Toxic or Flammable Gases Deemed Detrimental to Safe Operation of the Plant. MODES: At All Times	J. Release of Toxic or Flammable Gases Within a Facility Structure Which Jeopardizes Operation of Systems Required to Establish or Maintain Cold Shutdown. MODES: At All Times
Indicators Any of the following: 1. Report or detection of toxic or flammable gases that enter within the Exclusion Area Boundary, that have created a HAZARDOUS ATMOSPHERE per CTP-ZZ-01300, deemed detrimental to safe operation. 2. Confirmed report by local, County or State Officials of potential evacuation of site personnel as determined from the DOT evacuation tables for selected hazardous materials in the DOT Emergency Response Guide for Hazardous Materials.	**Indicators** Any of the following: 1. Report or detection of toxic or flammable gases, not properly contained, within or adjacent to any of the following Safe Shutdown Areas, that have created a HAZARDOUS ATMOSPHERE per CTP-ZZ-01300,jeopardizing operation of systems required to establish or maintain Cold Shutdown a. Area 5 b. Containment c. Aux Feed Pump Rooms d. Aux Building e. Diesel Generator Building f. UHS Cooling Tower g. ESW Pumphouse h. Control Building i. RWST j. Fuel Building

Control Room Evacuation Events

ALERT	SITE EMERGENCY
K. Control Room Evacuation Has Been Initiated. MODES: At All Times	L. Control Room Evacuation Has Been Initiated and Plant Control Cannot Be Established. MODES: At All Times
Indicators Entry into OTO-ZZ-00001, Control Room Inaccessibility, is required.	**Indicators** 1. Entry into OTO-ZZ-00001, Control Room Inaccessibility, is required. and 2. Control of the Aux Feed System and a SG PORV for cooldown cannot be established within 15 minutes.

EMERGENCY ACTION LEVELS

Group 4 SYSTEM MALFUNCTIONS
Annunciator Events

UNUSUAL EVENT	ALERT	SITE EMERGENCY
A. Unplanned Loss of Most or All Alarms (Annunciators) for Greater Than 15 Minutes. MODES: 1-4	B. Unplanned Loss of Most or All Annunciators With Either a Transient In Progress, or the Plant Computer is Unavailable. MODES: 1-4	C. Inability to Monitor a Significant Transient in Progress. MODES: 1-4
Indicators 1. Any of the following: a. 3 of 4 field power supplies indicate < 105 volts for greater than 15 minutes (loss of all annunciators) and not a result of planned action. b. Field Power Supply Bus voltage is less than 105 volts for greater than 15 minutes (loss of all annunciators) and not a result of planned action. c. Ten or more logic power supplies have failed for greater than 15 minutes (loss of all annunciators) and not a result of planned action. d. Five or more Multiplexer Adapter Rack Fuses have failed for greater than 15 minutes and not a result of planned action. or 2. All of the following: a. Any combination of power supplies (including Optical Isolators) or Multiplexer Adapter Rack Fuses have failed for greater than 15 minutes. b. Any minimum compensatory actions, per OTO-RK-00001, cannot be maintained. c. The loss does not result from planned action.	**Indicators** 1. Any of the following: a. 3 of 4 field power supplies indicate < 105 volts for greater than 15 minutes (loss of all annunciators) and not a result of planned action. b. Field Power Supply Bus voltage is less than 105 volts for greater than 15 minutes (loss of all annunciators) and not a result of planned action. c. Ten or more logic power supplies have failed for greater than 15 minutes (loss of all annunciators) and not a result of planned action. d. Five or more Multiplexer Adapter Rack Fuses have failed for greater than 15 minutes and not a result of planned action. or 2. All of the following: a. Any combination of power supplies (including Optical Isolators) or Multiplexer Adapter Rack Fuses have failed for greater than 15 minutes. b. Any minimum compensatory actions, per OTO-RK-00001, cannot be maintained. c. The loss does not result from planned action. and 3. Any of the following: a. A change in reactor power greater than ±10%. b. Safety injection initiation. c. Compensatory plant parameters monitored via the plant computer, per OTO-RK-00001, are not valid or cannot be obtained.	**Indicators** 1. Any of the following: a. 3 of 4 field power supplies indicate < 105 volts (loss of all annunciators). b. Field Power Supply Bus voltage is less than 105 volts (loss of all annunciators). c. Ten or more logic power supplies have failed (loss of all annunciators). d. Five or more Multiplexer Adapter Rack Fuses have failed (loss of all annunciators). or 2. All of the following: a. Any combination of power supplies (including Optical Isolators) or Multiplexer Adapter Rack Fuses have failed. b. Any minimum compensatory actions, per OTO-RK-00001, cannot be maintained. and 3. Any of the following: a. A change in reactor power greater than ±10%. b. Safety injection initiation. and 4. Compensatory plant parameters monitored via the plant computer, per OTO-RK-00001, are not valid or cannot be obtained.

EMERGENCY ACTION LEVELS

Group 4 SYSTEM MALFUNCTIONS

Electrical Events (Operating)

UNUSUAL EVENT	ALERT	SITE EMERGENCY	SITE EMERGENCY	GENERAL EMERGENCY
D. Loss of All Offsite Power to Essential Busses for Greater Than 15 Minutes. MODES: 1-4	E. Only One AC Source to Essential Busses for >15 Minutes Such That Any Additional Single Failure Would Result in Station Blackout. MODES: 1-4	F. Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Busses. MODES: 1-4	G. Loss of All Vital DC Power MODES: 1-4	H. Prolonged Loss of All Offsite Power and Prolonged Loss of All Onsite AC Power. MODES: 1-4
Indicators All of the following: 1. Loss of offsite power to NB01 and NB02. * 2. The loss of offsite power has occurred for >15 minutes.	**Indicators** 1. Loss of any 3 of the following power sources: a. Offsite power to NB01 * b. Offsite power to NB02 * c. Emergency Diesel NE01 d. Emergency Diesel NE02 and 2. The loss of all 3 has occurred for >15 minutes.	**Indicators** 1. Loss of all 4 of the following power sources: a. Offsite power to NB01 * b. Offsite power to NB02 * c. Emergency Diesel NE01 d. Emergency Diesel NE02 and 2. The loss of all 4 has occurred for >15 minutes.	**Indicators** 1. Loss (Bus Voltage < 106.9 VDC) of all 4 of the following busses: a. NK01 b. NK02 c. NK03 d. NK04 and 2. Failure to restore power to at least one DC bus within 15 minutes.	**Indicators** All of the following: 1. Loss of offsite power to NB01 and NB02. * 2. Loss of both Emergency Diesel Generators NE01 and NE02. 3. a. Restoration of at least one emergency bus within 4 hours is not likely. or b. Meet the entry requirements for FRC.1, Red Path for Core Cooling.

Electrical Events (Shutdown)

UNUSUAL EVENT	UNUSUAL EVENT	ALERT
I. Loss of Required DC Power During Cold Shutdown or Refueling Mode for Greater Than 15 Minutes. MODES: 5, 6	J. Loss of All Offsite Power to Essential Busses for Greater Than 15 Minutes. MODES: 5,6	K. Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Busses During Cold Shutdown or Refueling. MODES: 5, 6, Defueled
Indicators 1. Loss of Division 1 Vital DC power as indicated by <106.9 VDC on NK01 or NK03. and Loss of Division 2 Vital DC power as indicated by <106.9 VDC NK02 or NK04. and 2. The loss of both Divisions has occurred for >15 minutes.	**Indicators** 1. Loss of offsite power to NB01 and NB02. * and 2. The loss of offsite power has occurred for >15 minutes.	**Indicators** 1. Loss of all 4 of the following power sources: a. Offsite power to NB01 * b. Offsite power to NB02 * c Emergency Diesel NE01 d. Emergency Diesel NE02 and 2. The loss of all 4 has occurred for >15 minutes.

* Note: Supply Breakers opening due to degraded switchyard voltage is considered a Loss of Offsite Power.

EMERGENCY ACTION LEVELS

Group 4 SYSTEM MALFUNCTIONS

Shutdown Capability

UNUSUAL EVENT	ALERT	SITE EMERGENCY	SITE EMERGENCY
L.* Inability to Perform a Required Shutdown Within Technical Specification Limits. MODES: 1-4	M. Inability to Maintain Plant in Cold Shutdown. MODES: 5, 6	N. Loss of Water Level That Has or Will Uncover Fuel in the Reactor Vessel. MODES: 5, 6	O. Complete Loss of Function Needed to Achieve or Maintain Hot Shutdown. MODES: 1-4
Indicators 1. The plant is not brought to a required operating mode within a Technical Specification LCO action completion time. * It is not intended to declare an Unusual Event due to an unknown condition or failure resulting in exceeding the allowable action statement time. The allowable action statement time is always available from the time of the discovery.	**Indicators** 1. Any of the following: a. Complete loss of both trains of RHR. b. Complete loss of both trains of CCW. c. Complete loss of both trains of ESW. and 2. Either of the following: a. Greater than 200°F on any valid incore thermocouple.* b. Uncontrolled temperature rise, with no actions available that will likely prevent approaching 200°F on any valid incore thermocouple.* * If a thermocouple is not available, use Wide Range Hot Leg temperature indications: • BBTI413A - Loop 1 • BBTI423A - Loop 2 • RECORDERS BBTR413 - Loop 1 BBTR423 - Loop 2 BBTR433 - Loop 3 BBTR443 - Loop 4	**Indicators** 1. Any of the following: a. Complete loss of both trains of RHR. b. Complete loss of both trains of CCW. c. Complete loss of both trains of ESW. and 2. Either of the following: a. Greater than 200°F on any valid incore thermocouple.* b. Uncontrolled temperature rise, with no actions available that will likely prevent approaching 200°F on any valid incore thermocouple.* and 3. a. Water level in the reactor vessel is less than 2.0 inches on BB-LI-0053A or B. or b. RVLIS (pumps off) <55% * If a thermocouple is not available, use Wide Range Hot Leg temperature indications: • BBTI413A - Loop 1 • BBTI423A - Loop 2 • RECORDERS BBTR413 - Loop 1 BBTR423 - Loop 2 BBTR433 - Loop 3 BBTR443 - Loop 4	**Indicators** 1. All of the following: a. Failure to bring the reactor subcritical with the control rods fully inserted. b. Complete loss of all Boron Injection Flowpaths. or 2. All of the following: a. All steam generator levels <10% wide range. b. All steam dump valves to condenser (AB UV-34, 35 and 36) are NOT responding to steam header pressure controller (AB PK-507 or AB UK-33). c. All steam generator steam dump valves to atmosphere are NOT operating properly (AB-PIC-1A, 2A, 3A and 4A). d. Complete loss of both RHR trains. (A complete loss of ESW or CCW constitutes a complete loss of RHR.) or 3. All of the following: a. The Ultimate Heat Sink (UHS) is inoperable as a result of level or temperature. b. Complete loss of both UHS Cooling Tower trains.

EMERGENCY ACTION LEVELS

Group 4 SYSTEM MALFUNCTIONS

Communication Events	RCS/Fuel Events		Reactor Protection System		
UNUSUAL EVENT	**UNUSUAL EVENT**	**UNUSUAL EVENT**	**ALERT**	**SITE EMERGENCY**	**GENERAL EMERGENCY**
P. Unplanned Loss of All Onsite or Offsite Communication Capabilities MODES: 1-6	Q. Fuel Clad Degradation MODES: 1-6	R. RCS Leakage MODES: 1-4	S. 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. MODES: 1, 2	T. 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. MODES: 1, 2	U. 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. MODES: 1, 2
Indicators 1. All of the following on-site systems: a. Complete failure of Plant telephone systems b. Complete failure of Gai-tronics systems c. Complete failure of Plant radios d. Complete failure of Plant Emergency Dedicated Phones. or 2. All of the following offsite systems: a. Complete failure of ENS (Red Phone) line. b. Complete failure of Back Up Radio System (BURS). c. Complete failure of Plant telephone system. d. Complete failure of the Sheriff's radio system. e. Complete failure of the SENTRY notification system.	**Indicators** 1. Any of the following: a. >1.0 µCi/gram Dose Equivalent I-131 for greater than a 48 hour continuous period. b. Dose Equivalent I-131 activity exceeding the limits of Tech Spec Fig. 3.4-1. (ITS Fig. 3.4.16-1) c. >100/E bar µ Ci/gram of gross radioactivity.	**Indicators** 1. Any of the following: a. Unidentified leakage greater than 10 gpm. b. Pressure boundary leakage greater than 10 gpm. c. Identified leakage greater than 25 gpm.	**Indicators** 1. All of the following: a. An automatic (not manual) reactor trip setpoint has been exceeded as listed in Attachment 1 of E-0. b. An automatic reactor trip is NOT successful. c. A manual reactor trip IS successful using manual trip switches SB-HS-1 on RL003 OR SB-HS-42 on RL006.	**Indicators** 1. All of the following: a. An automatic (not manual) reactor trip setpoint has been exceeded as listed in Attachment 1 of E-0. b. An automatic reactor trip is NOT successful. c. A manual reactor trip is NOT successful using manual trip switches SB-HS-1 on RL003 AND SB-HS-42 on RL006.	**Indicators** 1. All of the following: a. An automatic (not manual) reactor trip setpoint has been exceeded as listed in Attachment 1 of E-0. b. An automatic reactor trip is NOT successful. c. A manual reactor trip is NOT successful using manual trip switches SB-HS-1 on RL003 AND SB-HS-42 on RL006. d. Meet the entry requirements for FRC.1 OR FRH.1, red path summaries for core cooling and heat sink.

EMERGENCY ACTION LEVELS

INDICATIONS BASES

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 1 Abnormal Radiation Events

Initiating Condition	Emergency Classification
A. Any Unplanned Release of Radioactivity to the Environment That Exceeds **2 Times** the Radiological Effluent Control Limits in the ODCM (APA-ZZ-01003) for ≥60 minutes. MODES: At All Times	Unusual Event

Indications

1. All of the following:
   a. A valid alarm and reading on any effluent monitor:
      HB-RE-18 (Channel 186)
      GT-RE-21B (Channel 213)
      GT-RE-10B (Channel 103)
   b. The valid reading is 2 times the Hi Hi alarm setpoint (trip setpoint) value.
   c. The release cannot be terminated within 60 minutes of the alarm actuation.

   OR

2. Both of the following:
   a. Confirmed sample analysis indicates that a release exceeding 2 times the applicable values of the ODCM (APA-ZZ-01003), has occurred.
   b. The release cannot be terminated within 60 minutes.

Bases

The Radiological Effluent Control Limits (REC's) used are in APA-ZZ-01003, Offsite Dose Calculation Manual (ODCM).

Any Unplanned Release would be any inadvertent or accidental release of radioactive material. An Unplanned Release is also a release via normal pathways without a release permit or proper authorization, or without proper sampling and analysis, or resulting in significant deviation from the requirements of the release permit.
Valid alarms and readings are those verified by the operators to be the results of effluent concentrations. Invalid alarms and readings may be the result of electronic noise, radio frequency interference, electromagnetic frequency interference, or spurious spikes of unknown nature. A buildup of radioactivity within the monitor or an increase in the ambient background for the monitor would also cause an invalid alarm.

The time frame of 60 minutes is used to indicate a definite loss of control. This is also the time used in 10CFR50.72 for a continuing release that would require notification. This loss of control for ≥60 minutes is of more significance than the level of release in this EAL.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 1 Abnormal Radiation Events

Initiating Condition	Emergency Classification
B. Any Unplanned Release of Radioactivity to the Environment That Exceeds **200 Times** the Radiological Effluent Control Limits in the ODCM (APA-ZZ-01003) for ≥**15** minutes.	Alert

MODES: At All Times

Indications

1. All of the following:

   a. A valid alarm and reading on any effluent monitor:
      HB-RE-18
      GT-RE-21B
      GT-RE-10B
   b. The valid reading is 200 times the Hi Hi alarm setpoint (trip setpoint) value.
   c. The release cannot be terminated within 15 minutes of the alarm actuation.

   OR

2. Both of the following:

   a. A **Valid reading** on any of the following monitors:
      AB-RE-0111 >27 mrem/hr
      AB-RE-0112 >27 mrem/hr
      AB-RE-0113 >27 mrem/hr
      AB-RE-0114 >27 mrem/hr
      FC-RE-0385 >150 mrem/hr
   b. The release **cannot** be terminated within 15 minutes.

   OR

3. Both of the following:

   a. Confirmed sample analysis indicates that a release exceeding 200 times the applicable values of the ODCM (APA-ZZ-01003), has occurred.
   b. The release cannot be terminated within 15 minutes.

Bases

The Radiological Effluent Control Limits (REC's) used are in APA-ZZ-01003, Offsite Dose Calculation Manual (ODCM). The release values for 2.a. are based on average meteorological data and a 1 hour release duration.

This event escalates from the Unusual Event by escalating the magnitude of the release by a factor of 100. The increased level of release is the significant factor in this EAL. The duration is reduced to 15 minutes in recognition of the increased level.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 1 Abnormal Radiation Events

Initiating Condition	Emergency Classification
C. **EAB** Dose Resulting From an Actual or Imminent Release of Gaseous Radioactivity Exceeds **100 mrem** TEDE or **500 mrem** CDE Thyroid for the Actual or Projected Duration of the Release.	Site Emergency

MODES: At All Times

Indications

Any of the following:

*1. A valid reading on the Unit Vent monitor GT-RE-21B indicates >2.42E+8 µCi/sec for 15 minutes or longer.

*2. Both of the following:
   a. A **Valid reading** on any of the following monitors:
      AB-RE-0111 >146 mrem/hr
      AB-RE-0112 >146 mrem/hr
      AB-RE-0113 >146 mrem/hr
      AB-RE-0114 >146 mrem/hr
      FC-RE-0385 >850 mrem/hr
   b. The reading has been, or is expected to be, exceeded for 15 minutes or longer.

3. A valid dose projection indicates >100 mrem TEDE or >500 mrem CDE thyroid dose at, or beyond, the **EXCLUSION AREA BOUNDARY** using in plant rad data or field monitoring team survey results.

4. Field survey results at, or beyond, the EAB corresponding to >100 mrem/hr TEDE for 1 hour (or expected to continue for 1 hour) or >500 mrem/hr CDE thyroid for 1 hour of inhalation.

*Declare the event using this indicator only if an actual dose projections, per Indicator 3 cannot be performed within 15 minutes of the monitors exceeding the reading.

Bases

Valid alarms and readings are those verified by the operators to be the results of effluent concentrations. Invalid alarms and readings may be the result of electronic noise, radio frequency interference, electromagnetic frequency interference, or spurious spikes of unknown nature. A buildup of radioactivity within the monitor or an increase in the ambient background for the monitor would also cause an invalid alarm.

The 100 mrem integrated dose in this initiating condition provides a desirable gradient (one order of magnitude) between the Alert, Site Emergency, and General Emergency classes. It is deemed that exposures less than this limit are not consistent with the Site Emergency class description. The 500 mrem integrated thyroid dose was established in consideration of the 1:5 ratio of the EPA Protective Action Guidelines for whole body and thyroid.

The release values for 2.a. are based on average meteorological data and a 1 hour release duration. Actual Meteorology should be used whenever possible since it gives the most accurate dose assessment.

Thyroid doses are based upon EPA 400, manual of protective action guides and protective actions for nuclear incidents.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 1 Abnormal Radiation Events

Initiating Condition	Emergency Classification
D. **EAB** Dose Resulting From an Actual or Imminent Release of Gaseous Radioactivity Exceeds **1000 mrem** TEDE or **5000 mrem** CDE Thyroid for the Actual or Projected Duration of the Release.	General Emergency

MODES: At All Times

Indications

Any of the following:

*1. A valid reading on the Unit Vent monitor GT-RE-21B indicates >2.42E+9 µCi/sec for 15 minutes or longer.

*2. Both of the following:
   a. A **Valid reading** on any of the following monitors:
      AB-RE-0111 >1460 mrem/hr
      AB-RE-0112 >1460 mrem/hr
      AB-RE-0113 >1460 mrem/hr
      AB-RE-0114 >1460 mrem/hr
      FC-RE-0385 >8500 mrem/hr
   b. The reading has been, or is expected to be, exceeded for 15 minutes or longer.

3. A valid dose projection indicates >1000 mrem TEDE or >5000 mrem CDE thyroid dose at, or beyond, the **EXCLUSION AREA BOUNDARY** using inplant rad data or field monitoring team survey results.

4. Field survey results at, or beyond, the EAB corresponding to >1000 mrem/hr TEDE for 1 hour (or expected to continue for 1 hour) or >5000 mrem/hr CDE thyroid for 1 hour of inhalation.

*Declare the event using this indicator only if an actual dose projections per Indicator 3 cannot be performed within 15 minutes of the monitors exceeding the reading.

Bases

Valid alarms and readings are those verified by the operators to be the results of effluent concentrations. Invalid alarms and readings may be the result of electronic noise, radio frequency interference, electromagnetic frequency interference, or spurious spikes of unknown nature. A buildup of radioactivity within the monitor or an increase in the ambient background for the monitor would also cause an invalid alarm.

The setpoints in Indicator 1., are 10 times the values calculated for EAL 1C. The 1000 mrem whole body and the 5000 mrem thyroid integrated dose are based on the EPA protective action guidance which indicates that public protective actions are indicated if the dose exceeds 1 rem whole body or 5 rem thyroid. This is consistent with the emergency class description for a General Emergency. This level constitutes the upper level of the desirable gradient for the Site Emergency.

The release values for 2.a. are based on average meteorological data and a 1 hour release duration. Actual Meteorology should be used whenever possible since it gives the most accurate dose assessment.

Thyroid doses are based upon EPA 400, manual of protective action guides and protective actions for nuclear incidents.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 1 Abnormal Radiation Events

Initiating Condition	Emergency Classification
E.* An Unexpected Increase in Plant Radiation. MODES: At All Times	Unusual Event

Indications

Any of the following:

1. Spent Fuel Pool level is decreasing on EC-LI-0039A with Normal makeup being added, and all irradiated fuel assemblies remain covered.

2. Refueling Pool level is decreasing on BB-LI-0053A or B with Normal makeup being added, and all irradiated fuel assemblies remain covered.

3. Any valid (Confirmed by HP survey) ARM (other than a Group 1,G. Safe Shutdown ARM) >1000 times normal. (Normal levels can be considered as the monitor reading prior to the noticed increase.)

*This Initiating Condition is not meant to apply to anticipated temporary increases due to planned events (e.g., incore detector movement, radwaste container movement, depleted resin transfers, upper internal movements, etc.)

Bases

Valid alarms and readings are those verified by the operators to be the results of effluent concentrations. Invalid alarms and readings may be the result of electronic noise, radio frequency interference, electromagnetic frequency interference, or spurious spikes of unknown nature. A buildup of radioactivity within the monitor or an increase in the ambient background for the monitor would also cause an invalid alarm.

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

Indicator 3 addresses unplanned increases in in-plant radiation levels that represent a degradation in the control of radioactive material, and represent a potential degradation in the level of safety of the plant.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 1 Abnormal Radiation Events

Initiating Condition	Emergency Classification
F.* Major Damage to Irradiated Fuel or Loss of Water Level That Has or Will Result in the Uncovering of Irradiated Fuel Outside the Reactor Vessel. MODES: At All Times	Alert

Indications

Any of the following:

1. A **VALID** Hi-Hi Alarm on Fuel Building exhaust monitors GG-RE-27 or 28

2. Containment refueling bridge area radiation monitor (SD-41) >100 mR/hr.

3. Fuel building area radiation monitor (SD-37 or 38) >30 mR/hr.

4. Report of visual observation of loss of water level resulting in irradiated fuel being uncovered.

*This Initiating Condition is not meant to apply to anticipated temporary increases due to planned events (e.g., incore detector movement, radwaste container movement, depleted resin transfers, upper internal movements.

Bases

This Initiating Condition applies to spent fuel requiring water coverage.

NUREG-0818, "Emergency Action Levels for Light Water Reactors," forms the basis for these EALs.

For indicator 1, the Hi-Hi alarm setpoint is the Tech. Spec. 3.3.3.1-2.A (ITS 3.3.8-3) required trip setpoint value. This setpoint is established such that the actual submersion dose rate would not exceed 4 mR/hr in the fuel building. This would be representative of the conditions required for this EAL.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 1 Abnormal Radiation Events

For Indicator 2:

Containment Dose Rate

The Dose Rate Conversion Factor for this calculation is an EPA 400 based conversion factor. The source term originates from Calc ZZ-341, Rev. 1. See Attachment 3, Page 1 of 4. The Tech Spec (ITS FSAR 16.11.2.4.1.B) concentration of 5 E-3 µCi/cc will result in a dose rate of 100 mR/Hr to personnel inside containment.

D/R = (CONC) (DRCF)

This corresponds well to the Tech Spec (ITS FSAR 16.11.2.4.2) basis statement that the equivalent dose rate is "approximately 150 mR/Hr." Therefore, a dose rate on SD-41 of >100 mR/Hr would be an indication for declaration of an Alert (currently set to Alarm at 100 mR/Hr to indicate a High Radiation Area).

D/R > 100 mR/Hr (ARM SD-41)

For Indicator 3:

Fuel Building Dose Rates

The Dose Rate Conversion Factor for this calculation is an EPA 400 based conversion factor. The source term originates from Calc ZZ-341, Rev. 1. See Attachment 3, Page 2 of 4. A concentration of 1.46 E-3, the Hi-Hi alarm setpoint on GT-RE-27/28 will result in a dose rate of 30 mR/Hr to personnel inside the Fuel Building.

Therefore, a dose rate of >30 mR/Hr on SD-37 or -38 would be an indication for declaration of an Alert (Alarm setpoint is 15 mR/Hr per Tech Spec Table 3.3-6 (ITS FSAR 16.3.3.6) based on criticality monitoring).

D/R > 30 mR/Hr (ARM SD-37 or 38)

Indicator 4, eliminates the need for Spent Fuel Pool & Refueling Pool level indication, as at Callaway indication is not capable of displaying level as low as the top of a fuel assembly.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 1 Abnormal Radiation Events

Initiating Condition	Emergency Classification
G.* Release of Rad Material, or an Increase in Rad Level that Either Impedes Safe Operations or the Ability to Establish or Maintain Cold Shutdown. MODES: At All Times	Alert

Indications

Any of the following:

1. Valid (confirmed by HP) reading on SD-33 (Control Room) >15 mR/hr.

2. Valid (confirmed by HP) reading on the following Safe Shutdown Area ARMs:

SDRE-26	AB 2026	PC Changeout Area
SDRE-23	AB 2000	RHR Hx Area Corridor
SDRE-15	AB 1974	West Corridor-Central
SDRE-16	AB 1974	West Corridor-South

>1000 times normal (normal levels can be considered as the monitor reading prior to the noticed increase).

*This Initiating Condition is not meant to apply to anticipated temporary increases due to planned events (e.g., incore detector movement, radwaste container movement, depleted resin transfers, upper internal movements, etc.)

Bases

Valid means that a radiation monitor reading has been confirmed by the operators to be correct.

This Initiating Condition addresses increased radiation levels that impede necessary access to operating stations, or other areas containing equipment that must be operated manually, 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 increase in radiation levels is not a concern of this Initiating Condition. The Emergency Coordinator must consider the source or cause of the increased radiation levels and determine if any other Initiating Condition may be involved. For example, a dose rate of 15 mR/hr in the control room may be a problem in itself. However, the increase may also be indicative of high dose rates in the containment due to a LOCA. In this latter case, a Site Emergency or General Emergency may be indicated by the fission product barrier matrix ICs.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 1 Abnormal Radiation Events

Areas requiring continuous occupancy include the control room. The value of 15 mR/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 Indicator 2, 1000 times normal represents the factor used in the Unusual Event, however these particular monitors are located in areas of required infrequent access to maintain plant safety functions.

This Initiating Condition is not intended to apply to anticipated temporary increases due to planned events (e.g., incore detector movement, radwaste container movement, depleted resin transfers, etc.)

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 2 Fission Product Barriers

CONTAINMENT BARRIER EALs:

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.

Loss Indicators

1. Containment Pressure

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

2. Containment Isolation Valve Status

   This EAL is intended to address incomplete containment isolation that allows direct release to the environment. It represents a loss of the containment barrier. It is not intended to address failures during testing.

3. SG Release With Primary To Secondary Leakage

   This EAL addresses SG tube ruptures with secondary side releases to atmosphere including those from the atmospheric steam dump valves (manual or automatic), main steam safety valves and steam supplied to the TDAFW Turbine. For larger breaks **RCS BARRIER** SG Tube Rupture "Loss" or "Potential Loss" EALs would result in an Alert. For SG tube ruptures which may involve multiple steam generators or unisolable secondary line breaks, this EAL would exist in conjunction with **RCS BARRIER** "Loss" EAL 2 and would result in a Site Emergency. Escalation to General Emergency would be based on the addition of a "Loss" or "Potential Loss" of the **FUEL CLAD BARRIER**.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 2 Fission Product Barriers

CONTAINMENT BARRIER EALs (cont):

Potential Loss Indicators

4. Critical Safety Function Status

RED path indicates an extreme challenge to the safety function derived from appropriate instrument readings and/or sampling results, and thus represents a potential loss of containment. Conditions leading to a containment RED path result from RCS barrier and/or Fuel Clad Barrier Loss. Thus, this EAL is primarily a discriminator between Site Emergency and General Emergency representing a potential loss of the third barrier.

5. Containment Pressure

The second potential loss EAL represents a potential loss of containment in that the containment heat removal/depressurization system (e.g., 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 suppose to have actuated.

6. Significant Radioactive Inventory in Ctmt

The (>15,000 R/hr) reading 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%. The radiation monitor reading corresponding to 20% fuel clad damage was calculated using the Westinghouse Owners Group (WOG) " Post Accident Core Damage Assessment Methodology" (CDAM) dated November 1984. This document was approved by the NRC for core damage assessment. Based upon a Containment high Range Area Radiation Monitor (CHARM) reading, a percent clad damage (equivalent to percent noble gas release) can be estimated. Westinghouse makes the assumption that any percent noble gas release requires an equal percent clad damage. Conversely, a Radiation Monitor reading can be produced given the percent clad damage.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 2 Fission Product Barriers

CONTAINMENT BARRIER EALs (cont):

$$R/hr - MWt = \frac{\text{Radiation Monitor Reading (R/hr)} \times \text{CTMT Volume } (ft^3)}{\text{Plant Power (MWt)} \times 2x10^6 (ft^3)}$$

where:

R/hr - MWt = 5.5 for a 20% noble gas release equivalent to 20% clad failure.

CTMT Volume = $2.5x10^6 ft^3$

Plant Power = 3565 MWt

Solving for Radiation Monitor Reading:

$$\text{CHARM Reading} = \frac{5.5(3565\ MWt)(2x10^6 ft^3)}{2.5x10^6 ft^3}$$

$$= 15686\ R/hr$$

7. Core Exit Thermocouples

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 or if the vessel water level is increasing.

The conditions in this potential loss EAL represent imminent melt sequence which, if not corrected, could lead to vessel failure and an increased potential for containment failure. In conjunction with the core exit thermocouple EALs, **RCS BARRIER** indicator 1. and **FUEL CLAD BARRIER** indicator 1., 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.

Several 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 Emergency Coordinator should make the declaration as soon as it is determined that the procedures have been, or will be ineffective.

RCS BARRIER EALs:

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

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 2 Fission Product Barriers

Loss Indicators

1. RCS Leak Rate

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. Safety injection initiated indicates all available inventory control capacity is in service.

2. SG Tube Rupture

This EAL is intended to address the full spectrum of Steam Generator (SG) tube rupture events in conjunction with Containment Barrier "Loss" EAL 3 and Fuel Clad Barrier EALs. The "Loss" EAL addresses ruptured SG(s) with an unisolable Secondary Line Break corresponding to the loss of 2 of 3 fission product barriers (RCS Barrier and Containment Barrier, this EAL will always result in Containment Barrier "Loss" EAL 3). This allows the direct release of radioactive fission and activation products to the environment. Resultant offsite dose rates are a function of many variables. Examples include: Coolant Activity, Actual Leak Rate, SG Carry Over, Iodine Partitioning, and Meteorology. Therefore, dose assessment in accordance with EAL 1D., " Site Boundary Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity that Exceeds 1000 mR Whole Body or 5000 mR Thyroid for the Actual or Projected Duration of the Release Using Actual Meteorology" , is required when there is indication that the fuel matrix/clad is potentially lost.

Indications are consistent with the diagnostic activities of the Emergency Operating Procedures (EOPs). This includes indication of S/G level increasing uncontrollably, increased secondary radiation levels, and an uncontrolled or complete depressurization of the ruptured SG. Secondary radiation increases are observed via radiation monitoring of Condenser Air Ejector Discharge, SG Blowdown, and SG Sampling System. Determination of the "uncontrolled" depressurization of the ruptured SG should be based on indication that the pressure decrease in the ruptured steam generator is not a function of operator action. This should prevent declaration based on a depressurization that results from an EOP induced cooldown of the RCS that does not involve the prolonged release of contaminated secondary coolant from the affected SG to the environment. This EAL includes unisolable steam breaks, feed breaks, and stuck open safety or relief valves. The manual use of a ruptured SG PORV for cooldown and steam supplied to the TDAFW Turbine also meets this Initiating Condition.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 2 Fission Product Barriers

RCS BARRIER EALs (cont):

3. Containment Radiation Monitoring

The (6.4 R/hr) reading is a value which indicates the release of reactor coolant to the containment. The reading was calculated assuming the instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with normal operating concentrations (i.e., within T/S) into the containment atmosphere.

Table 6 of ANSI/ANS-18.1-1984 was used to determine the RCS source term for nominal concentrations of noble gas and iodine radionuclides. A containment radiation level of greater than 6.4 R/Hr on GT-RE-59/60 is used to indicate a loss of RCS barrier fission product barrier. See Attachment 3, Page 3 of 4.

Potential Loss Indicators

4. Critical Safety Function Status

RED path indicates an extreme challenge to the safety function derived from appropriate instrument readings, and these CSFs indicate a potential loss of RCS barrier.

5. RCS Leak Rate

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 Chemical and Volume Control System which is considered as any one of three centrifugal charging pumps discharging to the charging header. In conjunction with the SG Tube Rupture "Potential Loss" EAL this assures that any event that results in significant RCS inventory shrinkage or loss (e.g., events leading to reactor trip and ECCS actuation) will result in no lower than an "Alert" emergency classification. The 50 gpm indicator is based on 1 CCP in service with a 75 gpm letdown orifice in service.

6. SG Tube Rupture

The "Potential Loss" indications are consistent with the diagnostic activities of the Emergency Operating Procedures with indications based on the inability to maintain normal liquid inventory within the Reactor Coolant System (RCS) by normal operation of the Chemical and Volume Control System. This is considered as any one of three centrifugal charging pumps discharging to the charging header. In conjunction with the RCS Leak Rate "Potential Loss" EAL this assures that any event that results in significant RCS inventory shrinkage or loss (e.g., events leading to reactor trip and ECCS actuation) will result in no lower than an "Alert" emergency classification.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 2 Fission Product Barriers

FUEL CLAD BARRIER EALs:

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

Loss Indicators

1. Critical Safety Function Status

   RED path indicates an extreme challenge to the safety function. ORANGE path indicates a severe challenge to the safety function.

   Core Cooling - RED indicates significant superheating and core uncovery and is considered to indicate loss of the Fuel Clad Barrier.

   A separate core exit TC value is not used as a loss indicator, as a 1200° TC value is a red path for core cooling and would be a redundant indication.

2. Primary Coolant Activity Level

   Assessment by the NUMARC EAL Task Force indicates that this amount of coolant activity is well above that expected for iodine spikes and corresponds to about 2% to 5% fuel clad damage. This amount of clad damage indicates significant clad heating and thus the Fuel Clad Barrier is considered lost.

3. Containment Radiation Monitoring

   The >2800 R/hr reading 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 a concentration of 300 µCi/gm dose equivalent I-131 into the containment atmosphere. Reactor coolant concentrations of this magnitude are several times larger than the maximum concentrations (including iodine spiking) allowed within technical specifications and are therefore indicative of fuel damage (approximately 2 - 5% clad failure depending on core inventory and RCS volume). See Attachment 3, Page 4 of 4.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 2 Fission Product Barriers

FUEL CLAD BARRIER EALs (cont):

Potential Loss Indicators

RED path indicates an extreme challenge to the safety function. ORANGE path indicates a severe challenge to the safety function.

4. Critical Safety Function Status

   Core Cooling - ORANGE indicates subcooling has been lost and that some clad damage may occur. Heat Sink - RED indicates the ultimate heat sink function is under extreme challenge and thus these two items indicate potential loss of the Fuel Clad Barrier.

   A separate core exit TC value is not used as a potential loss indicator, as a 700° TC value is an orange path for core cooling and would be a redundant indication.

5. Core Exit Thermocouples

   The 700° corresponds to a loss of subcooling that will require at least a Core Cooling "ORANGE path".

6. Reactor Vessel Water Level

   This level is approximately at the top of the active fuel and corresponds to the Core Cooling "ORANGE path" values.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 3 Hazards Affecting Plant Safety

Initiating Condition	Emergency Classification
A. Confirmed Security Event Which Indicates a Potential Degradation in the Level of Safety of the Plant. MODES: At All Times	Unusual Event

Indications

Any of the following:

1. Bomb device discovered within the plant Protected Area and outside the following Safe Shutdown Areas:

   a. Area 5
   b. Containment
   c. Aux Feed Pump Rooms
   d. Aux Building
   e. Diesel Generator Building
   f. UHS Cooling Tower
   g. ESW Pumphouse
   h. Control Building
   i. RWST
   j. Fuel Building

2. Confirmed report from the Shift Security Supervisor of an attempted entry, sabotage or security threat that cannot be properly compensated for within 10 minutes.

Bases:

The 10 minute criteria to compensate is derived from 10 CFR 73.71, Reporting Of Physical Security Events.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 3 Hazards Affecting Plant Safety

Initiating Condition	Emergency Classification
B. Security Event in the Plant Protected Area. MODES: At All Times	Alert

Indicators

Confirmed report by the Shift Security Supervisor of an intrusion by a hostile force into the plant Protected Area.

Bases:

This class of security events represents an escalated threat to plant safety above that contained in the Unusual Event.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 3 Hazards Affecting Plant Safety

Initiating Condition	Emergency Classification
C. Security Event in a Safe Shutdown Area. MODES: At All Times	Site Emergency

Indications

Any of the following

1. Bomb device discovered within any of the following areas:

   a. Area 5
   b. Containment
   c. Aux Feed Pump Rooms
   d. Aux Building
   e. Diesel Generator Building
   f. UHS Cooling Tower
   g. ESW Pumphouse
   h. Control Building
   i. RWST
   j. Fuel Building

2. Confirmed report from the Shift Security Supervisor of an intrusion by a hostile force into any of the following areas:

   a. Area 5
   b. Containment
   c. Aux Feed Pump Rooms
   d. Aux Building
   e. Diesel Generator Building
   f. UHS Cooling Tower
   g. ESW Pumphouse
   h. Control Building
   i. RWST
   j. Fuel Building

Bases:

This class of security events represents an escalated threat to plant safety above that contained in the Alert Initiating Condition in that a hostile force has progressed from the Protected Area to a Safe Shutdown Area. These areas contain Safe Shutdown Systems as defined per the FSAR Appendix 5.4(A).

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 3 Hazards Affecting Plant Safety

Initiating Condition	Emergency Classification
D. Security Event Resulting in a Loss of the Ability to Reach and Maintain Cold Shutdown. MODES: At All Times	General Emergency

Indications

Any of the following:

1. Occupation of the Control Room by a hostile force.

2. Occupation of the Aux Shutdown Panel by a hostile force.

Bases:

This Initiating Condition encompasses conditions under which a hostile force has taken physical control of Safe Shutdown areas required to reach and maintain safe shutdown.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 3 Hazards Affecting Plant Safety

Initiating Condition	Emergency Classification
E. Fire Within Protected Area Boundary Not Extinguished Within 15 Minutes of Verification MODES: At All Times	Unusual Event

Indications

1. Fire in or adjacent to any of the following:

   a. Area 5
   b. Containment
   c. Aux Feed Pump Rooms
   d. Aux Building
   e. Diesel Generator Building
   f. UHS Cooling Tower
   g. ESW Pumphouse
   h. Control Building
   i. RWST
   j. Fuel Building

and

2. Not extinguished within 15 minutes of control room verification of a fire.

Bases:

The purpose of this Initiating Condition is to address the magnitude and extent of fires that may be potentially significant precursors to damage to safety systems. This excludes such times as fires within administration buildings, waste-baskets fires, and other small fires of no safety consequence. This Initiating Condition applies to buildings and areas adjacent to Safe Shutdown areas or other significant buildings or areas. The intent of this Initiating Condition is not to include buildings (i.e., warehouses) or areas that are not immediately adjacent to Safe Shutdown areas. These areas contain Safe Shutdown Systems as defined per the FSAR Appendix 5.4(A). Verification of the alarm in this context means those actions taken in the control room to determine that the control room alarm is not spurious.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 3 Hazards Affecting Plant Safety

Initiating Condition		Emergency Classification
F.	Fire Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown. MODES: At All Times	Alert

Indications

1. Fire in any of the following areas:

   a. Area 5
   b. Containment
   c. Aux Feed Pump Rooms
   d. Aux Building
   e. Diesel Generator Building
   f. UHS Cooling Tower
   g. ESW Pumphouse
   h. Control Building
   i. RWST
   j. Fuel Building

and

2. There is visible damage to permanent structures or equipment, affecting the operability of safety related equipment.

Bases:

Areas containing functions and systems required for the safe shutdown of the plant are specified per FSAR Appendix 5.4(A).

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 declaration of an Alert and the activation of the TSC will provide the Emergency Coordinator with the resources needed to perform these damage assessments.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 3 Hazards Affecting Plant Safety

Initiating Condition	Emergency Classification
G. Natural and Destructive Phenomena Affecting the Protected Area. MODES: At All Times	Unusual Event

Indications

Any of the following:

1. a. Response spectrum recorder operating annunciator 98E alarms in the Control Room
   and
   b. Verified to be a real event per OTO-SG-00001.

2. Report of a turbine rotating component failure resulting in casing penetration or major damage to seals causing a rapid loss of lubricating oil or hydrogen.

3. Explosion, vehicle crash or tornado in or adjacent to any of the following:

   a. Area 5
   b. Containment
   c. Aux Feed Pump Rooms
   d. Aux Building
   e. Diesel Generator Building
   f. UHS Cooling Tower
   g. ESW Pumphouse
   h. Control Building
   i. RWST
   j. Fuel Building

Bases:

The Protected Area Boundary is defined in the site security plan.

Indicator 1 was developed on a site-specific basis. Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate. Method of detection is response validated per OTO-SG-00001. As defined in the EPRI-sponsored "Guidelines for Nuclear Plant Response to an Earthquake", dated October 1989, a "felt earthquake" is:

> An earthquake of sufficient intensity such that: (a) the vibratory ground motion is felt at the nuclear plant site and recognized as an earthquake based on a consensus of control room operators on duty at the time, and (b) for plants with operable seismic instrumentation, the seismic switches of the plant are activated. For most plants with seismic instrumentation, the seismic switches are set at an acceleration of about 0.01g.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 3 Hazards Affecting Plant Safety

Indicator 2 is intended to address main turbine rotating component failures of significant magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Of major concern is the potential for rapid loss of combustible fluids (lubricating oils) and gases (hydrogen cooling) to the plant environs. This EAL is consistent with the definition of an Unusual Event while maintaining the anticipatory nature desired and recognizing the risk to non-safety related equipment.

In indicator 3 only those events in or adjacent to any area containing Safe Shutdown Systems, should be considered. As used here, an explosion is a rapid, violent, unconfined combustion, or a catastrophic failure of pressurized equipment, that potentially imparts significant energy to near-by structures and materials. 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 (e.g., deformation, scorching) is sufficient for declaration.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 3 Hazards Affecting Plant Safety

Initiating Condition	Emergency Classification
H. Natural and Destructive Phenomena Affecting a Safe Shutdown Area. MODES: At All Times	Alert

Indications

Any of the following:

1. a. Operating basis earthquake annunciator 98D alarms in the Control Room

   and

   b. Earthquake greater than OBE levels (0.12g)in the horizontal and vertical directions as indicated by LIGHT "OSG-AE-1"or LIGHT "OSG-AE-2"

2. a. Report of a tornado, high wind, vehicle crash, explosion, or other natural or destructive phenomena to any of the following Safe Shutdown areas:

   1. Area 5
   2. Containment
   3. Aux Feed Pump Rooms
   4. Aux Building
   5. Diesel Generator Building
   6. UHS Cooling Tower
   7. ESW Pumphouse
   8. Control Building
   9. RWST
   10. Fuel Building

   and

   b. There is visible damage to permanent structures or equipment, affecting plant operations.

Bases:

Indicator 1 is based on FSAR design basis. Seismic events of this magnitude can cause damage to safety functions.

Indicator 2 specifies areas containing systems and functions required for safe shutdown of the plant per FSAR Appendix 5.4(A). This indicator is intended to address such items as plane or helicopter crash into a plant vital area.

Each of these EALs is intended to address events that may have resulted 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. The initial "report" should not be interpreted as mandating a lengthy damage assessment magnitude of the damage. The declaration of an Alert and the activation of the TSC will provide the Emergency Coordinator with the resources needed to perform these damage assessments.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 3 Hazards Affecting Plant Safety

Initiating Condition	Emergency Classification
I. Release of Toxic or Flammable Gases Deemed Detrimental to Safe Operation of the Plant. MODES: At All Times	Unusual Event

Indications

Any of the following:

1. Report or detection of toxic or flammable gases that enter within the Exclusion Area Boundary, that have created a HAZARDOUS ATMOSPHERE per CTP-ZZ-01300, deemed detrimental to safe operation.

2. Confirmed report by local, County or State Officials of potential evacuation of site personnel as determined from the DOT evacuation tables for selected hazardous materials in the DOT Emergency Response Guide for Hazardous Materials.

Bases:

This Initiating Condition is based on releases in concentrations within the site boundary that will affect the health of plant personnel or affecting the safe operation of the plant with the plant being within the evacuation area of an offsite event (i.e., tanker truck accident releasing toxic gases, etc.) The evacuation area is as determined from the DOT Evacuation Tables for Selected Hazardous Materials, in the DOT Emergency Response Guide for Hazardous Materials.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 3 Hazards Affecting Plant Safety

Initiating Condition	Emergency Classification
J. Release of Toxic or Flammable Gases Within a Facility Structure Which Jeopardizes Operation of Systems Required to Establish or Maintain Cold Shutdown. MODES: At All Times	Alert

Indications

Any of the following:

1. Report or detection of a toxic or flammable gases, not properly contained, within or adjacent to any of the following Safe Shutdown Areas, that have created a HAZARDOUS ATMOSPHERE per CTP-ZZ-01300, jeopardizing operation of systems required to establish or maintain Cold Shutdown.

   a. Area 5
   b. Containment
   c. Aux Feed Pump Rooms
   d. Aux Building
   e. Diesel Generator Building
   f. UHS Cooling Tower
   g. ESW Pumphouse
   h. Control Building
   i. RWST
   j. Fuel Building

Bases:

This Initiating Condition is based on gases that have entered a plant structure affecting the safe operation of the plant. This Initiating Condition applies to Safe Shutdown Areas. The intent of this Initiating Condition is not to include buildings (i.e., warehouses) or other areas that are not immediately adjacent to Safe Shutdown Areas. It is appropriate that increased monitoring be done to ascertain whether consequential damage has occurred.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 3 Hazards Affecting Plant Safety

Initiating Condition	Emergency Classification
K. Control Room Evacuation Has Been Initiated. MODES: At All Times	Alert

Indications

Entry into OTO-ZZ-00001, Control Room Inaccessibility, is required.

Bases:

With the control room evacuated, additional support, monitoring and direction through the Technical Support Center and/or other Emergency Operations Center is necessary.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 3 Hazards Affecting Plant Safety

Initiating Condition	Emergency Classification
L. Control Room Evacuation Has Been Initiated and Plant Control Cannot Be Established. MODES: At All Times	Site Emergency

Indications

1. Entry into OTO-ZZ-00001, Control Room Inaccessibility is required.

and

2. Control of the Aux Feed System and a SG PORV for cooldown cannot be established within 15 minutes.

Bases:

Expeditious transfer of safety systems has not occurred but fission product barrier damage may not yet be indicated. The time for transfer is based on how quickly control must be reestablished without core uncovering and/or core damage. In cold shutdown and refueling modes, operator concern is directed toward maintaining core cooling such as is discussed in Generic Letter 88-17, "Loss of Decay Heat Removal." In power operation, hot standby, and hot shutdown modes, operator concern is primarily directed toward maintaining critical safety functions and thereby assuring fission product barrier integrity.

The 15 minutes is consistent with Westinghouse Response Plan for Immediate Evacuation of the Control Room Time Study. "Plant cooldown established" per OTO-ZZ-00001 would require Aux feed to be initiated and control of SG Power Operated Relief valves and the Aux feed pumps to be established from the Aux shutdown panel.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 4 System Malfunctions

Initiating Condition	Emergency Classification
A. Unplanned Loss of Most or All Alarms (Annunciators) for Greater Than 15 Minutes. MODES: 1-4	Unusual Event

Indications

1. Any of the following:
   a. 3 of 4 field power supplies have failed for greater than 15 minutes (loss of all annunciators) and not a result of planned action.
   b. Field Power Supply voltage is less than 105 volts for greater than 15 minutes (loss of all annunciators) and not a result of planned action.
   c. Ten or more logic power supplies have failed for greater than 15 minutes (loss of all annunciators) and not a result of planned action.
   d. Five or more Multiplexer Adapter Rack Fuses have failed for greater than 15 minutes and not a result of planned action.

or

2. All of the following:
   a. Any combination of power supplies (including Optical Isolators) or Multiplexer Adapter Rack Fuses have failed for greater than 15 minutes.
   b. Any minimum compensatory actions, per OTO-RK-00001, cannot be maintained.
   c. The loss does not result from planned action.

Bases:

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

Since the system is operating at just over 3 amps, and each power supply is rated for a maximum 3 amps, soon after losing the third power supply the fourth will fail due to overcurrent. Output voltage of the Field Power Supply less than 105 volts indicates that a degraded voltage situation exists. Under this condition, all Field Power Supplies are considered inoperable.

Losing 10 of the 14 logic power supplies is considered losing "Most" annunciators.

Losing 5 of the 7 annunciator racks is considered losing "Most" of the annunciators.

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 Initiating Condition is indicated during these modes of operation.

This Unusual Event will be escalated to an Alert if a transient is in progress during the loss of annunciation or indication.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 4 System Malfunctions

Initiating Condition	Emergency Classification
B. Unplanned Loss of Most or All Annunciators With Either a Transient In Progress, or the Plant Computer is Unavailable. MODES: 1-4	Alert

Indications

1. Any of the following:
   a. 3 of 4 field power supplies have failed for greater than 15 minutes (loss of all annunciators) and not a result of planned action.
   b. Field Power Supply voltage is less than 105 volts for greater than 15 minutes (loss of all annunciators) and not a result of planned action.
   c. Ten or more logic power supplies have failed for greater than 15 minutes (loss of all annunciators) and not a result of planned action.
   d. Five or more Multiplexer Adapter Rack Fuses have failed for greater than 15 minutes and not a result of planned action.

or

2. All of the following:
   a. Any combination of power supplies (including Optical Isolators) or Multiplexer Adapter Rack Fuses have failed for greater than 15 minutes.
   b. Any minimum compensatory actions, per OTO-RK-00001, cannot be maintained.
   c. The loss does not result from planned action.

and

3. Any of the following:
   a. A change in reactor power greater than ± 10%.
   b. Safety injection initiation.
   c. Compensatory plant parameters monitored via the plant computer, per OTO-RK-00001, are not valid or cannot be obtained.

Bases:

This Initiating Condition and its associated EAL are intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a transient. Recognition of the availability of computer based indication equipment is considered SPDS, plant computer, etc.)

Since the system is operating at just over 3 amps, and each power supply is rated for a maximum 3 amps, soon after losing the third power supply the fourth will fail due to overcurrent. Output voltage of the Field Power Supply less than 105 volts indicates that a degraded voltage situation exists. Under this condition, all Field Power Supplies are considered inoperable.

Losing 10 of the 14 logic power supplies is considered losing "Most" annunciators.

Losing 5 of the 7 annunciator racks is considered losing "Most" of the annunciators.

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

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 4 System Malfunctions

If both a major portion of the annunciation system and all computer monitoring are unavailable to the extent that additional operating personnel are required to monitor indications, the Alert is required.

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

This Alert will be escalated to a Site Emergency if the operating Crew cannot monitor the transient in progress.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 4 System Malfunctions

Initiating Condition	Emergency Classification
C. Inability to Monitor a Significant Transient in Progress. MODES: 1-4	Site Emergency

Indications

1. Any of the following:
   a. 3 of 4 field power supplies indicate < 105 volts (loss of all annunciators).
   b. Field Power Supply voltage is less than 105 volts (loss of all annunciators).
   c. Ten or more logic power supplies have failed (loss of all annunciators).
   d. Five or more Multiplexer Adapter Rack Fuses have failed (loss of all annunciators).

or

2. All of the following:
   a. Any combination of power supplies (including Optical Isolators) or Multiplexer Adapter Rack Fuses have failed.
   b. Any minimum compensatory actions, per OTO-RK-00001, cannot be maintained.

and

3. Any of the following:
   a. A change in reactor power greater than ±10 %.
   b. Safety injection initiation.

and

4. Compensatory plant parameters monitored via the plant computer, per OTO-RK-00001, are not valid or cannot be obtained.

Bases:

This Initiating Condition and its associated EAL are intended to recognize the inability of the control room staff to monitor the plant response to a transient. A Site Emergency is considered to exist if the control room staff cannot monitor safety functions needed for protection of the public.

Since the system is operating at just over 3 amps, and each power supply is rated for a maximum 3 amps, soon after losing the third power supply the fourth will fail due to overcurrent. Output voltage of the Field Power Supply less than 105 volts indicates that a degraded voltage situation exists. Under this condition, all Field Power Supplies are considered inoperable.

Losing 10 of the 14 logic power supplies is considered losing "Most" annunciators.

Losing 5 of the 7 annunciator racks is considered losing "Most" of the annunciators.

"Planned" actions are included in this EAL since the loss of instrumentation of this magnitude is of such significance during a transient that the cause of the loss is not important.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 4 System Malfunctions

Initiating Condition	Emergency Classification
D. Loss of All Offsite Power to Essential Busses for Greater Than 15 Minutes. MODES: 1-6	Unusual Event

Indications

All of the following:

1. Loss of offsite power to NB01 and NB02.

2. The loss of offsite power has occurred for >15 minutes.

Bases:

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 (Station Blackout). Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 4 System Malfunctions

Initiating Conditions	Emergency Classification
E. Only One AC Source to Essential Busses for >15 Minutes Such That Any Additional Single Failure Would Result In Station Blackout. MODES: 1-4	Alert

Indications

1. Loss of any 3 of the following power sources:

   a. Offsite power to NB01
   b. Offsite power to NB02
   c. Emergency Diesel NE01
   d. Emergency Diesel NE02

and

2. The Loss of all 3 has occurred for >15 minutes.

Bases:

The condition indicated by this Initiating Condition is the degradation of the off-site and on-site power systems such that any additional single failure would result in a station blackout. The subsequent loss of this single power source would escalate the event to a Site Emergency after an additional 15 minutes.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 4 System Malfunctions

Initiating Condition	Emergency Classification
F. Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Busses. MODES: 1-4	Site Emergency

Indications

1. Loss of all 4 of the following power sources:

   a. Offsite power to NB01
   b. Offsite power to NB02
   c. Emergency Diesel NE01
   d. Emergency Diesel NE02

and

2. The Loss of all 4 has occurred for >15 minutes.

Bases:

Loss of all AC power compromises all plant safety systems requiring electric power including RHR, 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 minutes ensures the loss is other than a transient or momentary power loss.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 4 System Malfunctions

Initiating Condition	Emergency Classification
G. Loss of All Vital DC Power MODES: 1-4	Site Emergency

Indications

1. Loss (Bus Voltage < 106.9 VDC) of all 4 of the following busses:

   a. NK01
   b. NK02
   c. NK03
   d. NK04

and

2. Failure to restore power to at least one DC bus within 15 minutes.

Bases:

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power will cause core uncovering and loss of containment integrity when there is significant decay heat and sensible heat in the reactor system. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 4 System Malfunctions

Initiating Condition	Emergency Classification
H. Prolonged Loss of All Offsite Power and Prolonged Loss of All Onsite AC Power. MODES: 1-4	General Emergency

Indications

All of the following:

1. Loss of offsite power to NB01 and NB02.

2. Loss of both Emergency Diesel Generators NE01 and NE02.

3. a. Restoration of at least one emergency bus within 4 hours is not likely.

   or

   b. Meet the entry requirements for FRC.1, Red Path for Core Cooling.

Bases:

Loss of all AC power compromises all plant safety systems requiring electric power including RHR, 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. The 4 hours to restore AC power is based on a site blackout coping analysis FSAR Appendix 8.3A "Station Blackout", performed in conformance with 10 CFR 50.63 and Regulatory Guide 1.155, "Station Blackout".

This Initiating Condition 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 Emergency Coordinator a reasonable idea of how quickly (s)he may need to declare a General Emergency based on two major considerations:

1. Are there any present indications that core cooling is already degraded to the point that Loss or Potential Loss of Fission Product Barriers is 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?

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 4 System Malfunctions

Initiating Condition	Emergency Classification
I. Loss of Required DC Power During Cold Shutdown or Refueling Mode for Greater Than 15 Minutes. MODES: 5,6	Unusual Event

Indications

1. Loss of Division 1 Vital DC power as indicated by <106.9 VDC on:
   NK01 or NK03
   and
   Loss of Division 2 Vital DC power as indicated by <106.9 VDC on:
   NK02 or NK04.

and

2. Failure to restore power to at least one operable Division of Vital DC power within 15 minutes.

Bases:

The purpose of this Initiating Condition 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 in as much as the operating crew may not have necessary indication and control of equipment needed to respond to the loss.

Unplanned was not used in this Initiating Condition and EAL, because as written one Division of Vital DC power can be inoperable for planned maintenance activities. The loss of the remaining operable train would require an Unusual Event. In no instance would maintenance be planned on both divisions.

The 106.9 VDC bus voltage in Indicator 1, is based on the minimum bus voltage necessary for the operation of safety related equipment.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 4 System Malfunctions

Initiating Condition	Emergency Classification
J. Loss of All Offsite Power to Essential Busses for Greater Than 15 Minutes. MODES: 5-6	Unusual Event

Indications

All of the following:

1. Loss of offsite power to NB01 and NB02.
2. The loss of offsite power has occurred for >15 minutes.

Bases:

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 (Station Blackout). Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 4 System Malfunctions

Initiating Condition	Emergency Classification
K. Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Busses During Cold Shutdown or Refueling. MODES: 5,6, and Defueled	Alert

Indications

1. Loss of all 4 of the following power sources:

   a. Offsite power to NB01
   b. Offsite power to NB02
   c. Emergency Diesel NE01
   d. Emergency Diesel NE02

and

2. The loss of all 4 has occurred for >15 minutes.

Bases:

Loss of all AC power compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal, Spent Fuel Heat Removal and the Ultimate Heat Sink. When in cold shutdown, refueling, or defueled mode the event can be classified as an Alert, because of the significantly reduced decay heat, lower temperature and pressure, increasing the time to restore one of the emergency busses, relative to that specified for the Site Emergency EAL. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 4 System Malfunctions

Initiating Condition	Emergency Classification
L.* Inability to Perform a Required Shutdown Within Technical Specification Limits. MODES: 1-4	Unusual Event

Indications

1. The plant is not brought to a required operating mode within a Technical Specification LCO action completion time.

*It is not intended to declare an Unusual Event due to an unknown condition or failure resulting in exceeding the allowable action statement time. The allowable action completion time is always available from the time of discovery.

Bases:

Limiting Conditions of 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 one 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 completion time in the Technical Specifications. An immediate Notification of an Unusual Event is required when the plant is not brought to the required operating mode within the allowable action completion time in the Technical Specifications.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 4 System Malfunctions

Initiating Condition		Emergency Classification
M.	Inability to Maintain Plant in Cold Shutdown MODES: 5,6	Alert

Indications

1. Any of the following:

   a. Complete loss of both trains of RHR.
   b. Complete loss of both trains of CCW.
   c. Complete loss of both trains of ESW.

and

2. Either of the following:

   a. Greater than 200°F on any valid incore thermocouple.*

   b. Uncontrolled temperature rise, with no actions available that will likely prevent approaching 200°F on any valid incore thermocouple.*

   *If a thermocouple is not available, use Wide Range Hot Leg temperature indications:
   - BBTI413A - Loop 1
   - BBTI423A - Loop 2
   - RECORDERS
     BBTR413 - Loop 1
     BBTR423 - Loop 2
     BBTR433 - Loop 3
     BBTR443 - Loop 4

Bases:

Indications 1 and 2 indicate a complete loss of Technical Specification required functions to maintain Cold Shutdown.

For PWRs, this Initiating Condition and its associated EAL 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 uncovery can occur. NRC analyses show that sequences that can cause core uncovery in 15 to 20 minutes and severe core damage within an hour after decay heat removal is lost. Under these conditions, RCS integrity is lost and fuel clad integrity is lost or potentially lost, which is consistent with a Site Emergency.

"Uncontrolled" means that system temperature increase is not the result of planned actions by the plant staff. The intent is to declare the ALERT when less than 200°F, only when temperature is increasing and it is known that there is not time to take action to stop the temp from exceeding 200°F.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 4 System Malfunctions

Initiating Condition	Emergency Classification
N. Loss of Water Level That Has or Will Uncover Fuel in the Reactor Vessel. MODES: 5, 6	Site Emergency

Indications

1. Any of the following:

   a. Complete loss of both trains of RHR.
   b. Complete loss of both trains of CCW.
   c. Complete loss of both trains of ESW.

and

2. Either of the following:

   a. Greater than 200°F on any valid incore thermocouple.*
   b. Uncontrolled temperature rise, with no actions available that will likely prevent approaching 200°F on any valid incore thermocouple.*

and

3. a. Water level in the reactor vessel is less than 2.0 inches on BB-LI-0053A or B.

   or

   b. RVLIS (pumps off) <55%.

*If a thermocouple is not available, use Wide Range Hot Leg temperature indications:

- BBTI413A - Loop 1
- BBTI423A - Loop 2
- RECORDERS
  BBTR413 - Loop 1
  BBTR423 - Loop 2
  BBTR433 - Loop 3
  BBTR443 - Loop 4

Bases:

Under the conditions specified by this Initiating Condition, severe core damage can occur and reactor coolant system pressure boundary integrity may not be assured.

For indicator 3.a. 2.0 inches is used as the lowest readable level on the instruments within their accuracy. For indicator 3.b. RVLIS (pumps off) is used. If a Reactor Coolant pump is running, void fraction rather than core water level would have to be considered.

This Initiating Condition covers sequences such as prolonged boiling following loss of decay heat removal. Thus, declaration of a Site Emergency is warranted under the conditions specified by the Initiating Condition. Escalation to a general emergency is via radiological effluence.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 4 System Malfunctions

Initiating Condition	Emergency Classification
0. Complete Loss of Function Needed to Achieve or Maintain Hot Shutdown. MODES: 1-4	Site Emergency

Indications

1. All of the following:

   a. Failure to bring the reactor subcritical with the control rods fully inserted.
   b. Complete loss of all Boron Injection Flowpaths.

or

2. All of the following:

   a. All steam generator levels <10% wide range.
   b. All steam dump valves to condenser (ABUV34, 35, and 36) are NOT responding to steam header pressure controller (AB PK507 or AB UK-33).
   c. All steam generator steam dump valves to atmosphere are NOT operating properly (AB-PIC-1A, 2A, 3A, and 4A).
   d. Complete loss of both RHR trains. (A complete loss of ESW or CCW constitutes a complete loss of RHR.)

or

3. All of the following:

   a. The Ultimate Heat Sink (UHS) is inoperable as a result of level or temperature.
   b. Complete loss of both UHS Cooling Tower trains.

Bases:

This EAL addresses complete loss of functions, including ultimate heat sink and reactivity control, required for hot shutdown with the reactor at pressure and temperature. Under these conditions, there is an actual major failure of a system intended for protection of the public. Thus, declaration of a Site Emergency is warranted.

Indication 1. a., control rods, defines the inability to shutdown the reactor normally.

Indication 1.b., defines the inability to add boric acid to the RCS. A complete loss of Boron Injection is defined as a loss of the required FSAR 16.1.2.2 Boron Injection flowpath(s).

Indication 2 indicates a complete loss of Heat Sink.

Indication 3 indicates a complete loss of the Ultimate Heat Sink.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 4 System Malfunctions

Initiating Condition		Emergency Classification
P.	Unplanned Loss of All Onsite or Offsite Communication Capabilities MODES: 1-6	Unusual Event

Indications

1. All of the following on-site systems:

   a. Complete failure of Plant telephone systems.
   b. Complete failure of Gai-tronics systems.
   c. Complete failure of Plant radios.
   d. Complete failure of Plant Emergency Dedicated Phones.

or

2. All of the following offsite systems:

   a. Complete failure of ENS (Red Phone) line.
   b. Complete failure of Back Up Radio System (BURS).
   c. Complete failure of Plant telephone system.
   d. Complete failure of the Sheriff's radio system.
   e. Complete failure of the Sentry notification system.

Bases:

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

Indicator 1, encompasses the total loss of all means of routine communications.

Indicator 2, encompasses the loss of all means of communications with offsite authorities.

This EAL is intended to be used only when extraordinary means are being utilized to make communications possible (relaying of information from radio transmissions, individuals being sent to offsite locations, etc.)

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 4 System Malfunctions

Initiating Condition	Emergency Classification
Q. Fuel Clad Degradation	Unusual Event

MODES: 1-6

Indications

1. Any of the following:

   a. >1.0 µCi/gram Dose Equivalent I-131 for greater than a 48 hour continuous period.
   b. Dose Equivalent I-131 activity exceeding the limits of Tech Spec Fig. 3.4-1 (ITS Fig. 3.4.16-1) .
   c. >100/E bar µCi/gram of gross radioactivity.

Bases:

This Initiating Condition is included as an Unusual Event 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.

Indications 1, 2 and 3 are Technical Specification 3.4.8 (ITS 3.4.16) limits.

The Alert alarm for the Chemical and Volume Control System Letdown Monitor (Failed Fuel Monitor) SJ-RE-01 was not used as an indicator for high coolant activity. If the monitor alarms, our procedures require sampling to confirm hi activity. Listing it as an indicator duplicates the other indicators.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 4 System Malfunctions

Initiating Condition	Emergency Classification
R. RCS Leakage MODES: 1-4	Unusual Event

Indications

1. Any of the following:

   a. Unidentified leakage greater than 10 gpm.
   b. Pressure boundary leakage greater than 10 gpm.
   c. Identified leakage greater than 25 gpm.

Bases:

This Initiating Condition is included as an Unusual Event because it may be a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified 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.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 4 System Malfunctions

Initiating Condition	Emergency Classification
S. 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. MODES: 1,2	Alert

Indications

1. All of the following:

   a. An automatic (not manual) reactor trip setpoint has been exceeded as listed in Attachment 1 of E-0.
   b. An automatic reactor trip is NOT successful.
   c. A manual reactor trip IS successful using manual trip switches SB-HS-1 on RL003 OR SB-HS-42 on RL006.

Bases:

This condition indicates failure of the automatic protection system to trip the reactor. This condition is more than a potential degradation of a safety system in that a front line automatic protection system did not function in response to a plant transient 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. A reactor protection system setpoint being exceeded (rather than limiting safety system setpoint being exceeded) is specified here because failure of the automatic protection system is the issue.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 4 System Malfunctions

Initiating Condition	Emergency Classification
T. 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. MODES: 1, 2	Site Emergency

Indications

1. All of the following:

   a. An automatic (not manual) reactor trip setpoint has been exceeded as listed in Attachment 1 of E-0.
   b. An automatic reactor trip is NOT successful.
   c. A manual reactor trip is NOT successful using manual trip switches SB-HS-1 on RL003 AND SB-HS-42 on RL006.

Bases:

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 may produce more heat than the maximum decay heat load for which the safety systems are designed.

A Site Emergency is indicated because conditions exist that may lead to imminent loss or potential loss of both fuel clad and RCS. Although this Initiating Condition may be viewed as redundant to the Fission Product Barrier Degradation Initiating Condition, its inclusion is necessary to better assure timely recognition and emergency response.

EMERGENCY ACTION LEVEL INDICATIONS BASES

Group 4 System Malfunctions

Initiating Condition	Emergency Classification
U. 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. MODES: 1, 2	General Emergency

Indications

1. All of the following:

   a. An automatic (not manual) reactor trip setpoint has been exceeded as listed in Attachment 1 of E-0.
   b. An automatic reactor trip is NOT successful.
   c. A manual reactor trip is NOT successful using manual trip switches SB-HS-1 on RL003 AND SB-HS-42 on RL006.
   d. Meet the entry requirements for FRC.1 OR FRH.1, red path summaries for core cooling or heat sink.

Bases:

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

Under the conditions of this Initiating Condition and its associated EALs, 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.

The entry requirements for FRC.1 indicate an extreme challenge to the ability to cool the core. The entry requirements for FRH.1 indicate a extreme challenge to the ability to initially remove heat during the early stages of this sequence.

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 to permit maximum off-site intervention time.

Containment ARM Dose Rate for Abnormal Radiation Events

FHA-RB

ISOTOPE	Source Term from calc ZZ-341 rev1 (Ci)	Iodine Filter Correction Factor* (unitless)	Corrected for pre-filtration (Ci)	PERCENT OF TOTAL in Cont. Dec. equiv	EPA-400 EDE Table 5-3 Dose Conversion FACTOR (rem-cm3/uCi-Hr)	Weighted Dose Conversion FACTOR (rem-cm3/uCi-Hr)	Unit correction factor (mr/rem)	Weighted Dose Conversion FACTOR (mr-cm3/uCi-Hr)	Tech Spec value for ont. Conc (uCi/cc)	Dose Rate equivalent to Tech Spec value of 5.0E-3 uCi/cc (mR/hr)**
Kr-83m	0.00E+00	1	0.00E+00	0.000	0.00E+00	0.00E+00	1.00E+03	0.00E+00	5.00E-03	0.00E+00
Kr-85	2.46E+02	1	2.46E+02	0.019	1.30E+00	2.42E-02	1.00E+03	2.42E+01	5.00E-03	1.21E-01
Kr-85m	0.00E+00	1	0.00E+00	0.000	9.30E+01	0.00E+00	1.00E+03	0.00E+00	5.00E-03	0.00E+00
Kr-87	0.00E+00	1	0.00E+00	0.000	5.10E+02	0.00E+00	1.00E+03	0.00E+00	5.00E-03	0.00E+00
Kr-88	0.00E+00	1	0.00E+00	0.000	1.30E+03	0.00E+00	1.00E+03	0.00E+00	5.00E-03	0.00E+00
Kr-89	0.00E+00	1	0.00E+00	0.000	1.20E+03	0.00E+00	1.00E+03	0.00E+00	5.00E-03	0.00E+00
I-131	1.29E-01	100	1.29E+01	0.001	2.20E+02	2.15E-01	1.00E+03	2.15E+02	5.00E-03	1.07E+00
Xe-131m	9.75E+01	1	9.75E+01	0.007	4.90E+00	3.61E-02	1.00E+03	3.61E+01	5.00E-03	1.81E-01
I-132	1.09E-01	100	1.09E+01	0.001	1.40E+03	1.15E+00	1.00E+03	1.15E+03	5.00E-03	5.77E+00
I-133	1.36E-02	100	1.36E+00	0.000	3.50E+02	3.60E-02	1.00E+03	3.60E+01	5.00E-03	1.80E-01
Xe-133	1.26E+04	1	1.26E+04	0.952	2.00E+01	1.90E+01	1.00E+03	1.90E+04	5.00E-03	9.52E+01
Xe-133m	2.38E+02	1	2.38E+02	0.018	1.70E+01	3.06E-01	1.00E+03	3.06E+02	5.00E-03	1.53E+00
I-134	0.00E+00	100	0.00E+00	0.000	1.60E+03	0.00E+00	1.00E+03	0.00E+00	5.00E-03	0.00E+00
I-135	9.71E-06	100	9.71E-04	0.000	9.50E+02	6.97E-05	1.00E+03	6.97E-02	5.00E-03	3.49E-04
Xe-135	2.31E+01	1	2.31E+01	0.002	1.40E+02	2.44E-01	1.00E+03	2.44E+02	5.00E-03	1.22E+00
Xe-135m	7.79E-02	1	7.79E-02	0.000	2.50E+02	1.47E-03	1.00E+03	1.47E+00	5.00E-03	7.36E-03
Xe-138	0.00E+00	1	0.00E+00	0.000	7.10E+02	0.00E+00	1.00E+03	0.00E+00	5.00E-03	0.00E+00
TOTALS			1.32E+04	1.000				2.11E+04		1.05E+02

* The source term in calc zz-341, rev1 is a post filter source term based on a 99% Iodine removal efficiency. Since the EAL dose rate is for the atmosphere within containment (upstream of the filter), the removed portions of the iodines had to be refactored back into the equation.

** Assumes 1mr/hr=1mR/hr

Fuel Bldg ARM Dose Rate for Abnormal Radiation Events

FHA-FB

ISOTOPE	Source Term from calc ZZ-341 rev1 (Ci)	Iodine Filter Correction Factor* (unitless)	Corrected for pre-filtration (Ci)	PERCENT OF TOTAL in FB Dec. equiv	EPA-400 EDE Table 5-3 Dose Conversion FACTOR (rem-cm3/uCi-Hr)	Weighted Dose Conversion FACTOR (rem-cm3/uCi-Hr)	Unit correction factor (mr/rem)	Weighted Dose Conversion FACTOR (mr-cm3/uCi-Hr)	Hi-Hi alarm setpoint on GT-RE-27/28 (uCi/cc)	Dose Rate equivalent to Hi-Hi alarm on GT-RE-27/28 (mR/hr)**
Kr-83m	0.00E+00	1	0.00E+00	0.000	0.00E+00	0.00E+00	1.00E+03	0.00E+00	1.46E-03	0.00E+00
Kr-85	5.89E+02	1	5.89E+02	0.019	1.30E+00	2.41E-02	1.00E+03	2.41E+01	1.46E-03	3.53E-02
Kr-85m	0.00E+00	1	0.00E+00	0.000	9.30E+01	0.00E+00	1.00E+03	0.00E+00	1.46E-03	0.00E+00
Kr-87	0.00E+00	1	0.00E+00	0.000	5.10E+02	0.00E+00	1.00E+03	0.00E+00	1.46E-03	0.00E+00
Kr-88	0.00E+00	1	0.00E+00	0.000	1.30E+03	0.00E+00	1.00E+03	0.00E+00	1.46E-03	0.00E+00
Kr-89	0.00E+00	1	0.00E+00	0.000	1.20E+03	0.00E+00	1.00E+03	0.00E+00	1.46E-03	0.00E+00
I-131	3.33E-01	100	3.33E+01	0.001	2.20E+02	2.31E-01	1.00E+03	2.31E+02	1.46E-03	3.37E-01
Xe-131m	2.34E+02	1	2.34E+02	0.007	4.90E+00	3.62E-02	1.00E+03	3.62E+01	1.46E-03	5.28E-02
I-132	2.82E-01	100	2.82E+01	0.001	1.40E+03	1.24E+00	1.00E+03	1.24E+03	1.46E-03	1.82E+00
I-133	3.52E-02	100	3.52E+00	0.000	3.50E+02	3.88E-02	1.00E+03	3.88E+01	1.46E-03	5.67E-02
Xe-133	3.02E+04	1	3.02E+04	0.952	2.00E+01	1.90E+01	1.00E+03	1.90E+04	1.46E-03	2.78E+01
Xe-133m	5.70E+02	1	5.70E+02	0.018	1.70E+01	3.06E-01	1.00E+03	3.06E+02	1.46E-03	4.46E-01
I-134	0.00E+00	100	0.00E+00	0.000	1.60E+03	0.00E+00	1.00E+03	0.00E+00	1.46E-03	0.00E+00
I-135	2.51E-05	100	2.51E-03	0.000	9.50E+02	7.52E-05	1.00E+03	7.52E-02	1.46E-03	1.10E-04
Xe-135	5.55E+01	1	5.55E+01	0.002	1.40E+02	2.45E-01	1.00E+03	2.45E+02	1.46E-03	3.58E-01
Xe-135m	1.87E-01	1	1.87E-01	0.000	2.50E+02	1.47E-03	1.00E+03	1.47E+00	1.46E-03	2.15E-03
Xe-138	0.00E+00	1	0.00E+00	0.000	7.10E+02	0.00E+00	1.00E+03	0.00E+00	1.46E-03	0.00E+00
TOTALS			3.17E+04	1.000				2.12E+04		3.09E+01

* The source term in calc zz-341, rev1 is a post filter source term based on a 99% Iodine removal efficiency. Since the EAL dose rate is for the atmosphere within the fuel building (upstream of the filter), the removed portions of the iodines had to be refactored back into the equation.

**Assumes 1mR=1mr

Containment ARM Dose Rate for RCS Barrier EAL

ISOTOPE	RCS Source Term Normal concentration ANS-18.1, 1984 (uCi/gm)	Unit Conversion Factor (gm/cc)*	Source Term ANS-18.1, 1984 corrected for units (uCi/cc)	RCS Volume (cc)	Total activity Dispersed within the RCS (uCi)	Containment Volume (cc)	Concentration of activity dispersed into Containment (uCi/cc)	EPA-400 EDE Table 5-3 Dose Conversion FACTOR (rem-cm3/uCi-Hr)	Dose Rate (R/hr)**
Kr-85	4.30E-01	6.92E-01	2.98E-01	3.46E+08	1.03E+08	7.08E+10	1.45E-03	1.30E+00	1.89E-03
Kr-85m	1.60E-01	6.92E-01	1.11E-01	3.46E+08	3.83E+07	7.08E+10	5.41E-04	9.30E+01	5.03E-02
Kr-87	1.50E-01	6.92E-01	1.04E-01	3.46E+08	3.59E+07	7.08E+10	5.07E-04	5.10E+02	2.59E-01
Kr-88	2.80E-01	6.92E-01	1.94E-01	3.46E+08	6.70E+07	7.08E+10	9.47E-04	1.30E+03	1.23E+00
I-131	4.50E-02	6.92E-01	3.11E-02	3.46E+08	1.08E+07	7.08E+10	1.52E-04	2.20E+02	3.35E-02
Xe-131m	7.30E-01	6.92E-01	5.05E-01	3.46E+08	1.75E+08	7.08E+10	2.47E-03	4.90E+00	1.21E-02
I-132	2.10E-01	6.92E-01	1.45E-01	3.46E+08	5.03E+07	7.08E+10	7.10E-04	1.40E+03	9.94E-01
I-133	1.40E-01	6.92E-01	9.69E-02	3.46E+08	3.35E+07	7.08E+10	4.73E-04	3.50E+02	1.66E-01
Xe-133	2.60E+00	6.92E-01	1.80E+00	3.46E+08	6.23E+08	7.08E+10	8.79E-03	2.00E+01	1.76E-01
Xe-133m	7.00E-02	6.92E-01	4.84E-02	3.46E+08	1.68E+07	7.08E+10	2.37E-04	1.70E+01	4.02E-03
I-134	3.40E-01	6.92E-01	2.35E-01	3.46E+08	8.14E+07	7.08E+10	1.15E-03	1.60E+03	1.84E+00
I-135	2.60E-01	6.92E-01	1.80E-01	3.46E+08	6.23E+07	7.08E+10	8.79E-04	9.50E+02	8.35E-01
Xe-135	8.50E-01	6.92E-01	5.88E-01	3.46E+08	2.04E+08	7.08E+10	2.87E-03	1.40E+02	4.02E-01
Xe-135m	1.30E-01	6.92E-01	9.00E-02	3.46E+08	3.11E+07	7.08E+10	4.40E-04	2.50E+02	1.10E-01
Xe-137	3.40E-02	6.92E-01	2.35E-02	3.46E+08	8.14E+06	7.08E+10	1.15E-04	1.10E+02	1.26E-02
Xe-138	1.20E-01	6.92E-01	8.30E-02	3.46E+08	2.87E+07	7.08E+10	4.06E-04	7.10E+02	2.88E-01
									6.42E+00

*ANS-18.1 units are in uCi/gm. Assuming an average temperature of 600 degrees F and 2250 psi, 1uCi/gm= 0.692 uCi/cc.
Keenan & Keys Steam Tables 1970
**Assumes 1 R= 1 Rem.

Containment ARM Dose Rate for Fuel Clad Barrier EAL

ISOTOPE	Source Term 1% failed fuel from FSAR Table 11.1-5 (uCi/gm)	DEI-131 Factor TID-14844 (unitless)	Converted to DEI-131 Iodines only (uCi/gm)	Source Term equivalent to 300 uCi/gm DEI-131* (uCi/gm)	Mass of RCS FSAR table 11.1A-1 (gm)	Total activity Dispersed within the RCS (uCi)	Containment Volume (cc)	Concentration of activity dispersed into Containment (uCi/cc)	EPA-400 EDE Table 5-3 Dose Conversion FACTOR (rem-cm3/uCi-Hr)	Dose Rate (R/hr)**
Kr-83m	1.82E-01	0	0.00E+00	1.67E+01	2.40E+08	4.00E+09	7.08E+10	5.65E-02	0.00E+00	0.00E+00
Kr-85	6.70E-02	0	0.00E+00	6.14E+00	2.40E+08	1.47E+09	7.08E+10	2.08E-02	1.30E+00	2.70E-02
Kr-85m	9.00E-01	0	0.00E+00	8.24E+01	2.40E+08	1.98E+10	7.08E+10	2.79E-01	9.30E+01	2.60E+01
Kr-87	5.27E-01	0	0.00E+00	4.83E+01	2.40E+08	1.16E+10	7.08E+10	1.64E-01	5.10E+02	8.35E+01
Kr-88	1.69E+00	0	0.00E+00	1.55E+02	2.40E+08	3.72E+10	7.08E+10	5.25E-01	1.30E+03	6.82E+02
Kr-89	4.53E-02	0	0.00E+00	4.15E+00	2.40E+08	9.96E+08	7.08E+10	1.41E-02	1.20E+03	1.69E+01
I-131	2.25E+00	1.000	2.25E+00	2.06E+02	2.40E+08	4.95E+10	7.08E+10	6.99E-01	2.20E+02	1.54E+02
Xe-131m	1.59E-01	0	0.00E+00	1.46E+01	2.40E+08	3.50E+09	7.08E+10	4.94E-02	4.90E+00	2.42E-01
I-132	8.33E-01	0.036	3.00E-02	7.63E+01	2.40E+08	1.83E+10	7.08E+10	2.59E-01	1.40E+03	3.62E+02
I-133	3.17E+00	0.270	8.56E-01	2.90E+02	2.40E+08	6.97E+10	7.08E+10	9.84E-01	3.50E+02	3.44E+02
Xe-133	4.33E+01	0	0.00E+00	3.97E+03	2.40E+08	9.52E+11	7.08E+10	1.34E+01	2.00E+01	2.69E+02
Xe-133m	8.67E-01	0	0.00E+00	7.94E+01	2.40E+08	1.91E+10	7.08E+10	2.69E-01	1.70E+01	4.58E+00
I-134	3.92E-01	0.017	6.66E-03	3.59E+01	2.40E+08	8.62E+09	7.08E+10	1.22E-01	1.60E+03	1.95E+02
I-135	1.58E+00	0.084	1.33E-01	1.45E+02	2.40E+08	3.47E+10	7.08E+10	4.91E-01	9.50E+02	4.66E+02
Xe-135	2.58E+00	0	0.00E+00	2.36E+02	2.40E+08	5.67E+10	7.08E+10	8.01E-01	1.40E+02	1.12E+02
Xe-135m	1.18E-01	0	0.00E+00	1.08E+01	2.40E+08	2.59E+09	7.08E+10	3.66E-02	2.50E+02	9.16E+00
Xe-137	8.15E-02	0	0.00E+00	7.47E+00	2.40E+08	1.79E+09	7.08E+10	2.53E-02	1.10E+02	2.78E+00
Xe-138	3.96E-01	0	0.00E+00	3.63E+01	2.40E+08	8.71E+09	7.08E+10	1.23E-01	7.10E+02	8.73E+01
		Total DEI-131	3.28E+00							2.81E+03

* Multiply the Source term in column 2 by 300/3.28 total for I-131 DEI.

**Assumes 1 R = 1 Rem.