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June 29, 2012
L-12-142

10 CFR 50, Appendix E

ATTN: Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

SUBJECT:
Beaver Valley Power Station, Unit Nos. 1 and 2
Docket No. 50-334, License No. DPR-66
Docket No. 50-412, License No. NPF-73
Supplemental Information to a Request for Licensing Action on a Proposed Emergency Preparedness Plan Revision (TAC Nos. ME7823 and ME7824)

FirstEnergy Nuclear Operating Company (FENOC), by letter dated December 21, 2011, (Accession Number ML11362A317) requested Nuclear Regulatory Commission (NRC) review of a proposed revision of the Beaver Valley Power Station, Unit Nos. 1 and 2 Emergency Preparedness Plan (EPP). The proposed revision converted the EPP from the current EAL scheme to the Nuclear Energy Institute (NEI) 99-01, "Methodology for Development of Emergency Action Levels," Revision 5 scheme, as clarified by a series of NRC-accepted frequently asked questions (FAQs) on the NEI methodology.

Minor administrative issues were identified in Appendix 2, "Proposed Beaver Valley Power Station, Unit Nos. 1 and 2 Emergency Preparedness Plan Revision to Section 4, 'Emergency Conditions';" Appendix 4, "Beaver Valley Power Station Unit No. 1 EAL Evaluation;" Appendix 5, "Beaver Valley Power Station Unit No. 2 EAL Evaluation;" and Appendix 6, "Proposed Beaver Valley Power Station, Unit Nos. 1 and 2 EAL Wallboards."

In Appendix 2, changes were made to pages 4-i, 4-9, 4-10, 4-12 through 4-17, 4-19 through 4-22, 4-24, 4-25, 4-31, 4-39, 4-44, 4-85, 4-95, 4-112, 4-123, 4-126, 4-157, 4-158, 4-173 through 4-175, 4-177 through 4-179, 4-181 through 4-184, 4-187, 4-193, 4-201, 4-206, 4-248, 4-258, 4-275, 4-285, and 4-288. On page 4-i, the page number reflecting the start of the Beaver Valley Power Station Unit No. 2 section was incorrect. On pages 4-9 and 4-173 the numerical values on the x-axis of the graphs did not align with the large hash marks on the x-axis of the graphs. The title for the x-axis of the graphs on pages 4-9, 4-31, 4-44, 4-173, 4-193, and 4-206 were either incomplete or

AXCS
NRR

inconsistent with each other. On pages 4-9, 4-12, 4-14 through 4-17, 4-19, 4-22, 4-173 through 4-175, 4-177 through 4-179, 4-181, and 4-184, a note at the bottom of the page was deleted because it was not referenced in the body of the page. On pages 4-10, 4-39, 4-174, and 4-201, for Subcategory RC5, the engineering units for several temperatures were added. On page 4-13, for Initiating Conditions (IC) RA1 and RU1, unneeded asterisks were deleted. On pages 4-24, 4-157, and 4-158, under IC CU8, an instrument designator was corrected. On pages 4-25 and 4-187, under IC CA10, the grammar in Emergency Action Level (EAL) Number 1 was corrected. On page 4-95, the word "EXPLOSION" was added into the second paragraph. On pages 4-85 and 4-248, the safety system and component verbiage, in the second paragraph, was changed from singular to plural. On pages 4-95 and 4-258, the safety system and component verbiage, in the third paragraph, was changed from singular to plural. On pages 4-20, 4-21, 4-112, 4-123, 4-126, 4-182, 4-183, 4-275, 4-285, and 4-288, the referenced Emergency Director note was modified to better reflect a similar note contained in NEI 99-01, Revision 5.

In Appendix 4, changes were made on pages 4, 19, 24, 47, and 48. On page 4, Bullet 4 was made consistent with changes made to the note at the bottom of the pages in Appendix 2. Page 19 was made consistent with the change in RC5 in Appendix 2. Page 24 had a duplicate phase deleted. Page 47 was made consistent with the change in CU8 in Appendix 2. Page 48 was made consistent with the change in CA10 in Appendix 2.

In Appendix 5, changes were made on pages 4, 19, and 47. On page 4, Bullet 4 was made consistent with changes made to the note at the bottom of the pages in Appendix 2. Page 19 was made consistent with the change in RC5 in Appendix 2. Page 47 was made consistent with the change in CA10 in Appendix 2.

In Appendix 6, the wallboards were revised to reflect the changes made to Appendix 2 with respect to the changes to the graphs and the EALs. Additionally, an Emergency Director note was made consistent with the wording in Appendix 2.

Replacement pages with these changes incorporated are attached for inclusion into the submittal dated December 21, 2011.

There are no regulatory commitments contained in this letter. If there are any questions or if additional information is required, please contact Mr. Phil H. Lashley, Supervisor - Fleet Licensing, at (330) 315-6808.

Sincerely,

Paul A. Harden Raymond A Lieb
for Harden

Attachment:
Replacement Pages for Appendices 2, 4, 5, and 6 of the Proposed Beaver Valley Power Station, Unit Nos. 1 and 2 Emergency Preparedness Plan Using Nuclear Energy Institute 99-01 Revision 5 Methodology

cc: NRC Region I Administrator
NRC Resident Inspector
NRC Project Manager
Director BRP/DEP
Site BRP/DEP Representative

Attachment
L-12-142

Replacement Pages for Appendices 2, 4, 5, and 6 of the Proposed Beaver Valley Power Station, Unit Nos. 1 and 2 Emergency Preparedness Plan Using Nuclear Energy Institute 99-01 Revision 5 Methodology
(Sixty pages follow)

Appendix 2
Proposed Beaver Valley Power Station, Unit Nos. 1 and 2 Emergency Preparedness Plan Revision to Section 4, "Emergency Conditions"

Section 4

EMERGENCY CONDITIONS

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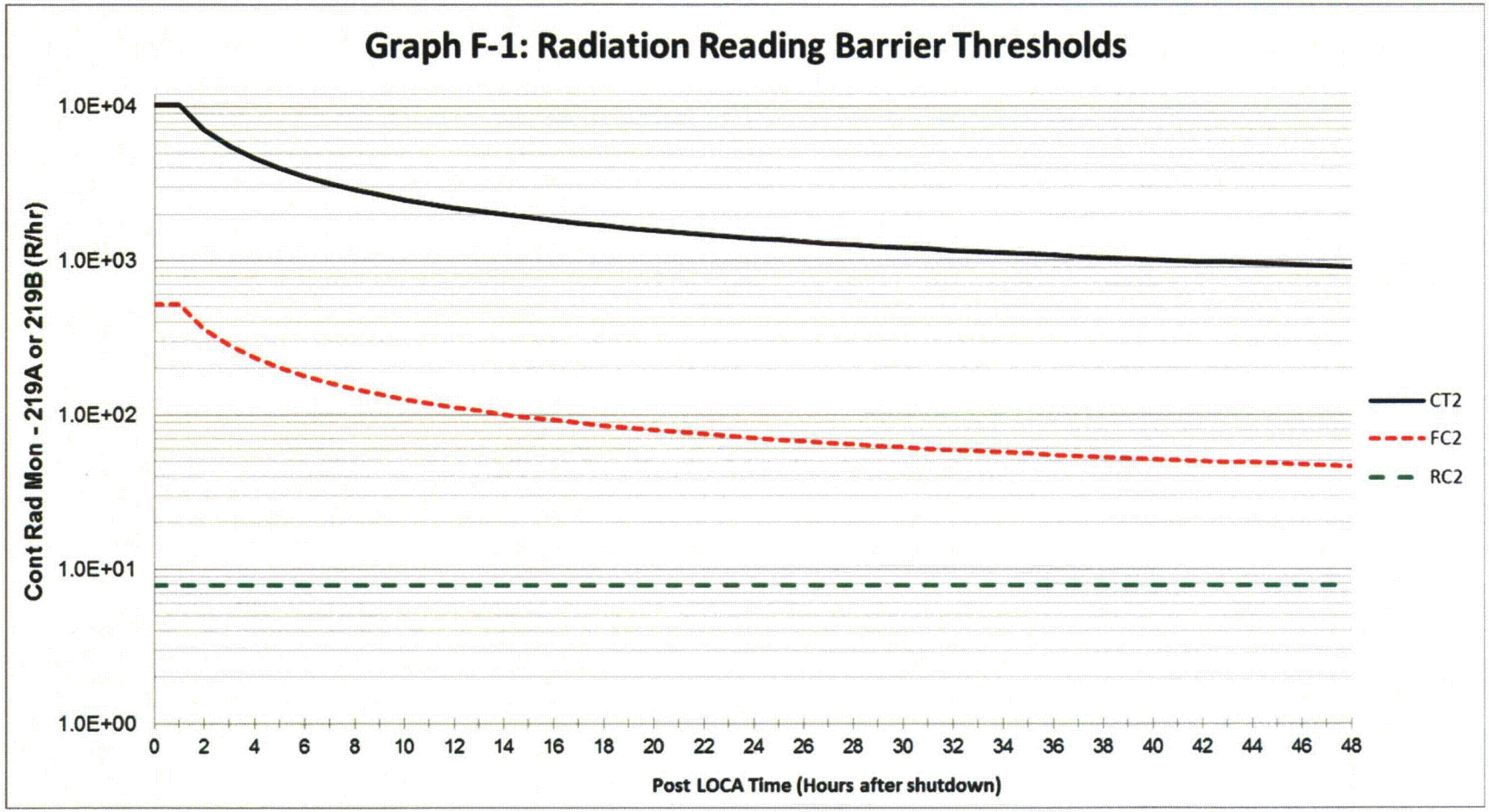
4.1	BVPS Unit No. 1 (BVPS-1) EMERGENCY ACTION LEVELS and Basis	4-1
4.2	BVPS Unit No. 2 (BVPS-2) EMERGENCY ACTION LEVELS and Basis	4-165

FISSION PRODUCT BARRIER DEGRADATION

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
FG1 1 2 3 4	**FS1** 1 2 3 4	**FA1** 1 2 3 4	**FU1** 1 2 3 4
1. Loss of any two barriers and loss or potential loss of the third barrier.	1. Loss or potential loss of any two barriers.	1. Any loss or any potential loss of either fuel clad or RCS.	1. Any loss or any potential loss of containment.



FISSION PRODUCT BARRIER DEGRADATION

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
FG1 [1][2][3][4] 1. Loss of any two barriers and loss or potential loss of the third barrier.	**FS1** [1][2][3][4] 1. Loss or potential loss of any two barriers.	**FA1** [1][2][3][4] 1. Any loss or any potential loss of either fuel clad or RCS.	**FU1** [1][2][3][4] 1. Any loss or any potential loss of containment.

	FC – Fuel Clad		RC – Reactor Coolant System		CT - Containment	
Sub-Category	**Loss**	**Potential Loss**	**Loss**	**Potential Loss**	**Loss**	**Potential Loss**
1. Critical Safety Function Status	1. Core Cooling - Red entry conditions met.	1. Core Cooling - Orange entry conditions met. **OR** 2. a. Heat Sink - Red entry conditions met. **AND** b. Heat Sink is required.		1. RCS Integrity - Red entry conditions met. **OR** 2. a. Heat Sink - Red entry conditions met. **AND** b. Heat sink is required.		1. Containment - Red entry conditions met.
2. Containment Rad Monitoring	1. Containment Radiation Monitor (RM-1RM-219A or B) **> FC2 Line on Graph F-1**.		1. Containment Radiation Monitor (RM-1RM-219A or B) **> 8 R/hr (RC2 Line on Graph F-1)**.			1. Containment Radiation Monitor (RM-1RM-219A or B) **> CT2 Line on Graph F-1**
3. Core Temperature	1. Five hottest core exit thermocouples **> 1200° F**.	1. Five hottest core exit thermocouples **> 719° F**.				1. a. Five hottest core exit thermocouples **> 2000° F**. **AND** b. Restoration procedures not effective within **15 minutes**. **OR** 2. a. Five hottest core exit thermocouples **> 1200° F**. **AND** b. RVLIS Full Range **< 40%** with no RCPs running. **AND** c. Restoration procedures not effective within **15 minutes**
4. RCS Level		1. RCS level **< Table F-1**.				
5. RCS Leak Rate	**Table F-1: RVLIS Thresholds** RVLIS / RCPs / Indication Full Range / 0 / 40% Dynamic Range / 1 / 25% Dynamic Range / 2 / 33% Dynamic Range / 3 / 60%		1. RCS leak rate greater than available makeup capacity as indicated by RCS subcooling **< 18° F normal containment** or **< 33° F adverse containment**.	1. UNISOLABLE RCS leak exceeding the capacity of one charging pump (129 gpm) in the normal charging mode.		
6. SG Tube Leakage / Rupture			1. RUPTURED SG results in an SI actuation.		**Note:** A prolonged release is greater than 4 hours. 1. RUPTURED SG is also FAULTED outside of containment. **OR** 2. a. Primary-to-Secondary leak rate **> 10 gpm**. **AND**	

FISSION PRODUCT BARRIER DEGRADATION

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
FG1 1 2 3 4 1. Loss of any two barriers and loss or potential loss of the third barrier.	**FS1** 1 2 3 4 1. Loss or potential loss of any two barriers.	**FA1** 1 2 3 4 1. Any loss or any potential loss of either fuel clad or RCS.	**FU1** 1 2 3 4 1. Any loss or any potential loss of containment.

	FC – Fuel Clad		RC – Reactor Coolant System		CT - Containment	
Sub-Category	**Loss**	**Potential Loss**	**Loss**	**Potential Loss**	**Loss**	**Potential Loss**
7. RCS Activity	1. Coolant activity **> 300 µCi/gm** dose equivalent I-131.					
8. Containment Pressure					1. A containment pressure rise followed by a rapid UNPLANNED drop in containment pressure. **OR** 2. Containment pressure or sump level response not consistent with LOCA conditions.	1. Containment pressure **> 45 psig** and rising. **OR** 2. Containment hydrogen **> 4%**. **OR** 3. a. Containment pressure **> 11 psig**. **AND** b. Less than one full train of depressurization equipment operating.
9. Containment Isolation Failure					**Note:** Direct pathways include filtered pathways (e.g., SLCRS). 1 a. Failure of **ALL** valves in any one line to close. **AND** b. Direct downstream pathway to the environment exists after containment isolation signal.	
10. EMERGENCY DIRECTOR Judgment	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates loss of the fuel clad barrier.	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates potential loss of the fuel clad barrier.	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates loss of the RCS barrier.	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates potential loss of the RCS barrier.	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates loss of the containment barrier.	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates potential loss of the containment barrier.

RADIOLOGICAL EFFLUENT / ABNORMAL RADIATION LEVELS

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

Radiological Effluent

GENERAL EMERGENCY

RG1 1 2 3 4 5 6 D

OFFSITE dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem CDE Child Thyroid for the actual or projected duration of the release using actual meteorology.

EALs:

Note:
If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. **ANY** of the following gaseous effluent monitors greater than the reading shown for **15 minutes*** or longer:
   - SLCRS Vent (RM-1VS-110 Ch 7) ..... **7.66E+02 cpm**
   - Ventilation Vent (RM-1VS-109 Ch 7).. **6.42E+02 cpm**

   OR
2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of **EITHER** of the following:
   - **> 1000 mRem** TEDE.
   - **> 5000 mRem** CDE Child Thyroid.

   OR
3. Field survey results at or beyond the site boundary indicate **EITHER** of the following:
   - Gamma (closed window) dose rate **> 1000 mR/hr** for **60 minutes*** or longer.
   - Air sample analysis **> 5000 mRem** CDE Child Thyroid for one hour of inhalation.

SITE AREA EMERGENCY

RS1 1 2 3 4 5 6 D

OFFSITE dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem CDE Child Thyroid for the actual or projected duration of the release using actual meteorology.

EALs:

Note:
If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. **ANY** of the following gaseous effluent monitors greater than the reading shown for **15 minutes*** or longer:
   - SLCRS Vent (RM-1VS-110 Ch 7)..... **7.66E+01 cpm**
   - Ventilation Vent (RM-1VS-109 Ch 7). **6.42E+01 cpm**

   OR
2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of **EITHER** of the following:
   - **> 100 mRem** TEDE.
   - **> 500 mRem** CDE Child Thyroid.

   OR
3. Field survey results at or beyond the site boundary indicate **EITHER** of the following:
   - Gamma (closed window) dose rate **> 100 mR/hr** for **60 minutes*** or longer.
   - Air sample analysis **> 500 mRem** CDE Child Thyroid for one hour of inhalation.

ALERT

RA1 1 2 3 4 5 6 D

Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM limit for 15 minutes or longer.

EALs:

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

1. **ANY** of the following gaseous effluent monitors greater than the reading shown for **15 minutes** or longer:
   - SLCRS Vent (RM-1VS-110 Ch 5)..... **6.76E+05 cpm**
   - Ventilation Vent (RM-1VS-109 Ch 5) . **2.94E+05 cpm**

   OR
2. **ANY** of the following liquid effluent monitors **> 200 times the High-High alarm setpoint, not to exceed 8.5E+05 cpm**, established by a current radioactivity discharge permit for **15 minutes** or longer:
   - Liquid Waste Effluent Monitor (RM-1LW-104)
   - Laundry and Contaminated Shower Drains Monitor (RM-1LW-116)

   OR
3. Confirmed sample analysis for gaseous or liquid releases **> 200 times the ODCM limit** for **15 minutes** or longer.

UNUSUAL EVENT

RU1 1 2 3 4 5 6 D

Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM limit for 60 minutes or longer.

EALs:

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

1. **ANY** of the following gaseous effluent monitors greater than the reading shown for **60 minutes** or longer:
   - SLCRS Vent (RM-1VS-110 Ch 5) ..... **6.76E+03 cpm**
   - Ventilation Vent (RM-1VS-109 Ch 5) . **2.94E+03 cpm**

   OR
2. **ANY** of the following liquid effluent monitors **> 2 times the High-High alarm setpoint** established by a current radioactivity discharge permit for **60 minutes** or longer:
   - Liquid Waste Effluent Monitor (RM-1LW-104)
   - Laundry and Contaminated Shower Drains Monitor (RM-1LW-116)

   OR
3. Confirmed sample analysis for gaseous or liquid releases **> 2 times the ODCM limit** for **60 minutes** or longer.

Abnormal Radiation Levels

GENERAL EMERGENCY

SITE AREA EMERGENCY

ALERT

RA2 1 2 3 4 5 6 D

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

EALs:

1. A water level drop in the spent fuel pool, transfer canal or reactor cavity that will result in irradiated fuel becoming uncovered.

   OR
2. **> 1000 mR/hr** reading on **ANY** of the following due to damage to irradiated fuel or loss of water level:
   - Manipulator Crane Area Monitor (RM-1RM-203)
   - Fuel Pool Bridge Area Monitor (RM-1RM-207)

UNUSUAL EVENT

RU2 1 2 3 4 5 6 D

UNPLANNED rise in plant radiation levels.

EALs:

1. a. UNPLANNED water level drop in the spent fuel pool, transfer canal or reactor cavity as indicated by level **< Tech Spec Minimum (23 feet)**.

   AND

   b. Area radiation monitor rise resulting in a High-High alarm on **ANY** of the following:
      - Manipulator Crane Area Monitor (RM-1RM-203)
      - Fuel Pool Bridge Area Monitor (RM-1RM-207)

   OR
2. UNPLANNED area radiation monitor or radiation survey **> 1000 times NORMAL LEVELS**.

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

RADIOLOGICAL EFFLUENT / ABNORMAL RADIATION LEVELS

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Abnormal Radiation Levels			**RA3** 1 2 3 4 5 6 D Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. **EALs:** 1. Dose rate **> 15 mR/hr** in **ANY** of the following areas requiring continuous occupancy to maintain plant safety functions: • CONTROL ROOM • Central Alarm Station • Secondary Alarm Station	

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Security	**HG1** 1 2 3 4 5 6 D HOSTILE ACTION resulting in loss of physical control of the facility. **EALs:** 1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions listed below: • Reactivity Control (ability to shut down the reactor and keep it shut down) • RCS inventory (ability to cool the core) • Secondary heat removal (ability to maintain a heat sink) **OR** 2. A HOSTILE ACTION has caused failure of spent fuel cooling systems and IMMINENT fuel damage is likely.	**HS1** 1 2 3 4 5 6 D HOSTILE ACTION within the PROTECTED AREA. **EALs:** 1. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the Security Shift Supervisor.	**HA1** 1 2 3 4 5 6 D HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. **EALs:** 1. A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the Security Shift Supervisor. **OR** 2. A validated notification from the NRC of a LARGE AIRCRAFT attack threat within **30 minutes** of the site.	**HU1** 1 2 3 4 5 6 D Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant. **EALs:** 1. A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by the Security Shift Supervisor. **OR** 2. A credible site specific security threat notification. **OR** 3. A validated notification from the NRC providing information of a LARGE AIRCRAFT threat.
CR Evacuation		**HS2** 1 2 3 4 5 6 D CONTROL ROOM evacuation has been initiated and plant control cannot be established. **EALs:** 1. a. CONTROL ROOM evacuation has been initiated. **AND** b. Control of **ANY** of the following safety functions is not established from an alternate location within **15 minutes**. • Reactivity Control (ability to shut down the reactor and keep it shut down) • RCS inventory (ability to cool the core) • Secondary heat removal (ability to maintain a heat sink)	**HA2** 1 2 3 4 5 6 D CONTROL ROOM evacuation has been initiated. **EALs:** 1. CONTROL ROOM evacuation has been initiated.	

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

Natural or Destructive Phenomena

GENERAL EMERGENCY / SITE AREA EMERGENCY

Table H-1
• Cable Tunnel (CV-3)
• CONTROL ROOM
• Containment Building
• Demin. Water Storage Tank (1WT-TK-10)
• Diesel Generator Building
• Fuel Building
• Intake Structure Pump Cubicles
• Safeguards (including AFW, Main Steam and Cable Vault Areas)
• Primary Auxiliary Building (except elev. 768')
• RWST (1QS-TK-1)
• Service Building (below elev. 735')

ALERT

HA3 1 2 3 4 5 6 D

Natural or destructive phenomena affecting VITAL AREAS.

EALs:

1. a. Seismic event **> 0.06g (OBE)** acceleration (as indicated by analysis of the **Accelerograph Recording System** or lit lamp on 2ERS-CCC-1 Seismic Instrumentation Central Control Cabinet)

   AND

   b. Earthquake confirmed by **ANY** of the following:
   - Earthquake felt in plant.
   - National Earthquake Center.
   - CONTROL ROOM indication of degraded performance of systems required for the safe shutdown of the plant.

   OR

2. Tornado or high winds **> 80 mph** resulting in **EITHER** of the following:
   - VISIBLE DAMAGE to **ANY** structures in **Table H-1** areas containing safety systems or components.
   - CONTROL ROOM indication of degraded performance of those safety systems.

   OR

3. Internal flooding in **Table H-1** areas resulting in **EITHER** of the following:
   - Electrical shock hazard that precludes access to operate or monitor safety equipment.
   - CONTROL ROOM indication of degraded performance of those safety systems.

   OR

4. High river level **> 705 feet MSL** resulting in **EITHER** of the following:
   - VISIBLE DAMAGE to **ANY** structures in **Table H-1** areas containing safety systems or components.
   - CONTROL ROOM indication of degraded performance of those safety systems.

   OR

5. Low river level (LR-1CW-101) **< 650 feet MSL** resulting in CONTROL ROOM indication of degraded performance of safety systems located in **Table H-1** areas.

   OR

6. Turbine failure-generated PROJECTILES resulting in **EITHER** of the following:
   - VISIBLE DAMAGE to or penetration of **ANY** structures in **Table H-1** areas containing safety systems or components.
   - CONTROL ROOM indication of degraded performance of those safety systems.

UNUSUAL EVENT

HU3 1 2 3 4 5 6 D

Natural or destructive phenomena affecting the PROTECTED AREA.

EALs:

1. a. Seismic event **> 0.01g** acceleration (as indicated by initiation of the **Accelerograph Recording System** on A11-59, Seismic Accelerograph Operation).

   AND

   b. Earthquake confirmed by **EITHER** of the following:
   - Earthquake felt in plant.
   - National Earthquake Center.

   OR

2. a. Tornado within the PROTECTED AREA.

   OR

   b. High winds **> 80 mph.**

   OR

3. Internal flooding in **Table H-1** areas that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

   OR

4. High river water level **> 705 feet MSL.**

   OR

5. Low river water level (LR-1CW-101) **< 650 feet MSL.**

   OR

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

		OR 7. Vehicle crash resulting in **EITHER** of the following: • VISIBLE DAMAGE to **ANY** structures in **Table H-1** areas containing safety systems or components. • CONTROL ROOM indication of degraded performance of those safety systems.	

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
EMERGENCY DIRECTOR Judgment	**HG6** 1 2 3 4 5 6 D Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of GENERAL EMERGENCY. EALs: 1. Other conditions exist which in the judgment of the EMERGENCY DIRECTOR indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA PROTECTIVE ACTION GUIDE exposure levels OFFSITE for more than the immediate site area.	**HS6** 1 2 3 4 5 6 D Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of SITE AREA EMERGENCY. EALs: 1. Other conditions exist which in the judgment of the EMERGENCY DIRECTOR indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts: (1) toward site personnel or equipment that could lead to the likely failure of or, (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA PROTECTIVE ACTION GUIDE exposure levels beyond the site boundary.	**HA6** 1 2 3 4 5 6 D Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of an ALERT. EALs: 1. Other conditions exist which in the judgment of the EMERGENCY DIRECTOR indicate that events are in progress or have occurred which involve actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA PROTECTIVE ACTION GUIDE exposure levels.	**HU6** 1 2 3 4 5 6 D Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of an UNUSUAL EVENT. EALs: 1. Other conditions exist which in the judgment of the EMERGENCY DIRECTOR indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring OFFSITE response or monitoring are expected unless further degradation of safety systems occurs.
DFSF				**E-HU1** Not Applicable Damage to a loaded cask CONFINEMENT BOUNDARY. EALs: 1. Damage to a loaded cask CONFINEMENT BOUNDARY.

SYSTEM MALFUNCTIONS - HOT

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Loss of AC Power	**SG1** [1][2][3][4] Prolonged loss of all OFFSITE and all ONSITE AC power to emergency busses. EALs: 1. a. Loss of **ALL** OFFSITE and **ALL** ONSITE AC power to **BOTH** AE and DF 4KV emergency busses. **AND** b. **EITHER** of the following: • Restoration of **EITHER** the AE 4KV emergency bus **OR** DF 4KV emergency bus within **4 hours** is not likely. • Core Cooling - Red entry conditions met.	**SS1** [1][2][3][4] Loss of all OFFSITE and all ONSITE AC power to emergency busses for 15 minutes or longer. EALs: **Note:** Credit cannot be taken for emergency busses being powered from the other unit's emergency diesel generators. 1. Loss of **ALL** OFFSITE and **ALL** ONSITE AC power to **BOTH** AE and DF 4KV emergency busses for **15 minutes*** or longer.	**SA1** [1][2][3][4] AC power capability to emergency busses reduced to a single source for 15 minutes or longer. EALs: 1. a. AC power to AE and DF 4KV emergency busses is reduced to a single power source for **15 minutes*** or longer. **AND** b. Any additional single power source failure will result in loss of **ALL** AC power to **BOTH** AE and DF 4KV emergency busses.	**SU1** [1][2][3][4] Loss of all OFFSITE AC power to emergency busses for 15 minutes or longer. EALs: 1. Loss of **ALL** OFFSITE AC power to **BOTH** AE and DF 4KV emergency busses for **15 minutes*** or longer.
Loss of DC Power		**SS2** [1][2][3][4] Loss of all vital DC power for 15 minutes or longer. EALs: 1. Bus voltage indication on **ALL** safety related DC busses less than the following for **15 minutes*** or longer: • **< 110.4 VDC** on Busses 1-1 and 1-2 • **< 110.0 VDC** on Busses 1-3 and 1-4		
Failure of RPS	**SG3** [1][2] Automatic trip and all manual actions failed to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists. EALs: 1. a. An automatic reactor trip failed to shutdown the reactor as indicated by reactor power **> 5%**. **AND** b. **ALL** manual trip actions failed to shutdown the reactor as indicated by reactor power **> 5%**. **AND** c. **EITHER** of the following has occurred: • Core Cooling - Red entry conditions met. • Heat Sink - Red entry conditions met.	**SS3** [1][2] Automatic trip and manual actions taken within the Controls Area (CA) failed to shutdown the reactor. EALs: 1. a. An automatic reactor trip failed to shutdown the reactor as indicated by reactor power **> 5%**. **AND** b. Manual trip actions taken within the Controls Area (CA) failed to shutdown the reactor as indicated by reactor power **> 5%**.	**SA3** [1][2] Automatic trip failed to shutdown the reactor and the manual actions taken from the Controls Area (CA) are successful in shutting down the reactor. EALs: 1. a. An automatic reactor trip failed to shutdown the reactor. **AND** b. Manual trip actions taken within the Controls Area (CA) successfully shutdown the reactor as indicated by reactor power **≤ 5%**.	**SU3** [3][4] Inadvertent criticality. EALs: 1. UNPLANNED sustained positive startup rate observed on nuclear instrumentation.

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

SYSTEM MALFUNCTIONS - HOT

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Annunciators	**Table S-1: Critical Safety Functions** • Reactivity Control (ability to shut down the reactor and keep it shut down) • RCS inventory (ability to cool the core) • Secondary heat removal (ability to maintain a heat sink) **Table S-2: Significant Transients** • Automatic turbine runback > 25% thermal power • Electrical load rejection > 25% full electrical load • Reactor trip • Safety Injection actuation	**SS4** 1 2 3 4 Inability to monitor a significant transient in progress. **EALs:** 1. a. Loss of **> 75%** of **EITHER** of the following for **15 minutes*** or longer: • CONTROL ROOM Annunciator Panels (A1 - A13). **OR** • CONTROL ROOM critical safety function indications (Table S-1). **AND** b. A **Table S-2** significant transient is in progress. **AND** c. COMPENSATORY INDICATIONS are unavailable.	**SA4** 1 2 3 4 Loss of safety system annunciation or indication in the CONTROL ROOM with either: (1) a significant transient in *progress, or* (2) COMPENSATORY INDICATIONS *are* unavailable. **EALs:** 1. a. Loss of **> 75%** of **EITHER** of the following for **15 minutes*** or longer: • CONTROL ROOM Annunciator Panels (A1 - A13). **OR** • CONTROL ROOM critical safety function indications (Table S-1). **AND** b. **EITHER** of the following: • A **Table S-2** significant transient is in progress. **OR** • COMPENSATORY INDICATIONS are unavailable.	**SU4** 1 2 3 4 Loss of safety system annunciation or indication in the CONTROL ROOM for 15 minutes or longer. **EALs:** 1. Loss of **> 75%** of **EITHER** the following for **15 minutes*** or longer: • CONTROL ROOM Annunciator Panels (A1 - A13). **OR** • CONTROL ROOM critical safety function indications (Table S-1).
T.S. Limits				**SU5** 1 2 3 4 Inability to reach required operating mode within Technical Specification limits. **EALs:** 1. Plant is not brought to required operating mode within Technical Specification LCO action statement time.

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

SYSTEM MALFUNCTIONS - HOT

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Communications				**SU6** [1][2][3][4] Loss of all ONSITE or OFFSITE communications capabilities. **EALs:** 1. Loss of **ALL** of the following ONSITE communication methods affecting the ability to perform routine operations: • Radios. • Plant page. • Plant telephone system (hardwired). **OR** 2. Loss of **ALL** of the following OFFSITE communications methods affecting the ability to perform OFFSITE notifications: • NRC Emergency Notification System – ENS (Red Phone). • NRC Health Physics Network – HPN. • Commercial telephones (hardwired and wireless).
RCS Leakage				**SU7** [1][2][3][4] RCS leakage. **EALs:** **Note:** • Identified, unidentified and pressure boundary RCS leakage as defined by Technical Specifications. • Relief valve normal operation should be excluded unless it fails to close and cannot be isolated. 1. Unidentified or pressure boundary leakage **> 10 gpm**. **OR** 2. Identified leakage **> 25 gpm**.
Fuel Clad Degradation				**SU9** [1][2][3][4] Fuel clad degradation. **EALs:** 1. Letdown Monitor (RM-1CH-101A or B) **> 6.0E+04 cpm**. **OR** 2. RCS activity > 21 µCi/gm dose equivalent I-131.

SYSTEM MALFUNCTIONS - COLD

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

RCS Leakage

GENERAL EMERGENCY

CG7 [5][6]

Loss of RCS inventory affecting fuel clad integrity with containment challenged.

EALs:

1. a. RCS level **< 56%** RVLIS Full Range (top of active fuel) for **30 minutes*** or longer.

   AND

   b. **ANY Table C-1** containment challenge indications.

   OR

2. a. RCS level cannot be monitored with core uncovery for **30 minutes*** or longer.

   AND

   b. Loss of RCS inventory as indicated by **ANY** of the following:
   - Containment Radiation Monitor (RM-1RM-219A or B) **> 15 R/hr**.
   - Erratic source range monitor indication.
   - UNPLANNED level rise in Containment sumps or incore instrument sump.

   AND

   c. **ANY Table C-1** containment challenge indications.

Table C-1: Containment Challenge Indications
• CONTAINMENT CLOSURE not established.
• Hydrogen concentration > 4% inside containment.
• UNPLANNED rise in containment pressure.

SITE AREA EMERGENCY

CS7 [5][6]

Loss of RCS inventory affecting core decay heat removal capability.

EALs:

1. a. CONTAINMENT CLOSURE not established.

   AND

   b. RCS level **< 64%** RVLIS Full Range (6" below bottom of hot leg).

   OR

2. a. CONTAINMENT CLOSURE established.

   AND

   b. RCS level **< 56%** RVLIS Full Range (top of active fuel).

   OR

3. a. RCS level cannot be monitored for **30 minutes*** or longer.

   AND

   b Loss of RCS inventory as indicated by **ANY** of the following:
   - Containment Radiation Monitor (RM-1RM-219A or B) **> 15 R/hr**.
   - Erratic source range monitor indication.
   - UNPLANNED level rise in Containment sumps or incore instrument sump.

ALERT

CA7 [5][6]

Loss of RCS inventory.

EALs:

1. Loss of RCS inventory as indicated by **ANY** of the following:
   - RVLIS Full Range Level (LT-1RC-1311) **< 65%** (bottom of hot leg).
   - Refueling Outage Temporary Level Instrument (LI-1RC-481C) **< 16 inches** (Reduced Inventory Only).
   - Refueling Outage Temporary Level Instrument (LI-1RC-482C) **< 6 inches** (Midloop Only).

   OR

2. a. RCS level cannot be monitored for **15 minutes*** or longer.

   AND

   b. Loss of RCS inventory as indicated by UNPLANNED level rise in Containment sumps or incore instrument sump.

UNUSUAL EVENT

CU7 [5]

RCS leakage.

EALs:

Note:
Relief valve normal operation should be excluded unless it fails to close and cannot be isolated.

1. RCS leakage results in the inability to maintain or restore RCS level **> Target Level Band** for **15 minutes*** or longer.

CU8 [6]

UNPLANNED loss of RCS inventory.

EALs:

1. UNPLANNED RCS level drop as indicated by **EITHER** of the following:
   - Refueling Outage Temporary Level Instrument (LI-1RC-481C) **< 97 inches** (vessel flange) for **15 minutes*** or longer when the RCS level band is established **above** the vessel flange.

     OR

   - RCS water level drop below the RCS level band for **15 minutes*** or longer when the RCS level band is established **below** the vessel flange.

   OR

2. a. RCS level cannot be monitored.

   AND

   b. Loss of RCS inventory as indicated by UNPLANNED level rise in containment sumps or incore instrument sump.

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

SYSTEM MALFUNCTIONS - COLD

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

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
RCS Leakage		**Table C-2: RCS Reheat Duration Thresholds** RCS: Intact with Full RCS Inventory — Cont Closure: N/A — Duration: > 60 min** RCS: Not Intact OR Not Full RCS Inventory — Cont Closure: Established — Duration: > 20 min** RCS: Not Intact OR Not Full RCS Inventory — Cont Closure: Not Established — Duration: 0 min ** If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, this EAL is not applicable.	**CA10** [5][6] Inability to maintain plant in cold shutdown. **EALs:** **Note:** Full inventory is pressurizer level ≥ 22% actual with loop stops either isolated or unisolated. 1. RCS temperature **> 200° F** due to an UNPLANNED loss of decay heat removal capability for greater than the specified duration on **Table C-2**. **OR** 2. a. RCS temperature cannot be monitored. **AND** b. RCS pressure rise **> 10 psi** due to an UNPLANNED loss of decay heat removal capability *(this EAL does not apply in RCS solid plant conditions).*	**CU10** [5][6] UNPLANNED Loss of decay heat removal capability. **EALs:** 1. RCS temperature **> 200° F** due to an UNPLANNED loss of decay heat removal capability. **OR** 2. Loss of **ALL** RCS temperature and RCS level indication for **15 minutes*** or longer.

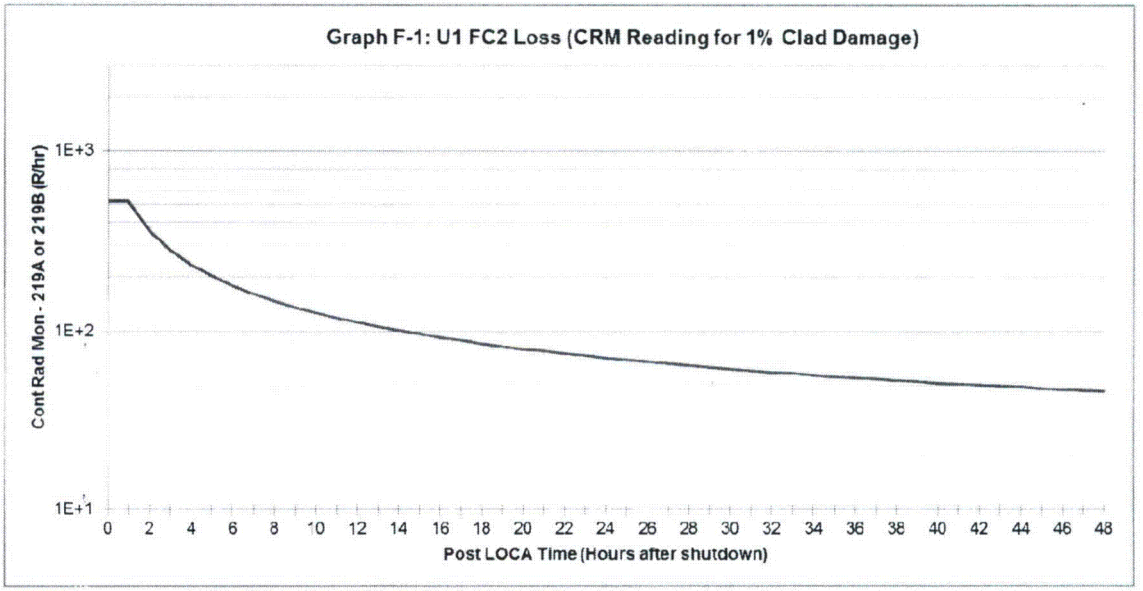
* The EMERGENCY DIRECTOR should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

Containment Radiation Monitoring

FC2

Loss:

1. Containment Radiation Monitor (RM-1RM-219A or B) **> FC2 Line on Graph F-1.**



Potential Loss:

None

Basis:

Generic

The site specific reading is a value which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the containment.

The reading should be 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.

This value is higher than that specified for RC2(L)1. Thus, this threshold indicates a loss of both the Fuel Clad barrier and RCS barrier that appropriately escalates the emergency classification to a SITE AREA EMERGENCY.

There is no potential loss threshold associated with this item.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

RCS Leak Rate — RC5

Loss:

1. RCS leak rate greater than available makeup capacity as indicated by RCS subcooling **< 18° F normal containment** or **< 33° F adverse containment**.

Potential Loss:

1. UNISOLABLE RCS leak exceeding the capacity of one charging pump (129 gpm) in the normal charging mode.

Basis:

Generic

Loss Threshold #1

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

Potential Loss Threshold #1

This threshold is based on the apparent 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 to be the flow rate equivalent to one charging/makeup pump discharging to the charging header. Isolating letdown is a standard abnormal operating procedure action and may prevent unnecessary classifications when a non-RCS leakage path such as a CVCS leak exists. The intent of this condition is met if attempts to isolate Letdown are NOT successful. Additional charging/makeup pumps being required is indicative of a substantial RCS leak.

Site Specific

Loss Threshold #1

RCS subcooling is determined by evaluation of the saturation temperature that corresponds to the indicated reactor coolant system pressure minus the average reactor coolant loop hot leg temperature.

Potential Loss Threshold #1

This threshold is based on the capacity of a single charging pump flow of 129 GPM per UFSAR table 9.1-2.

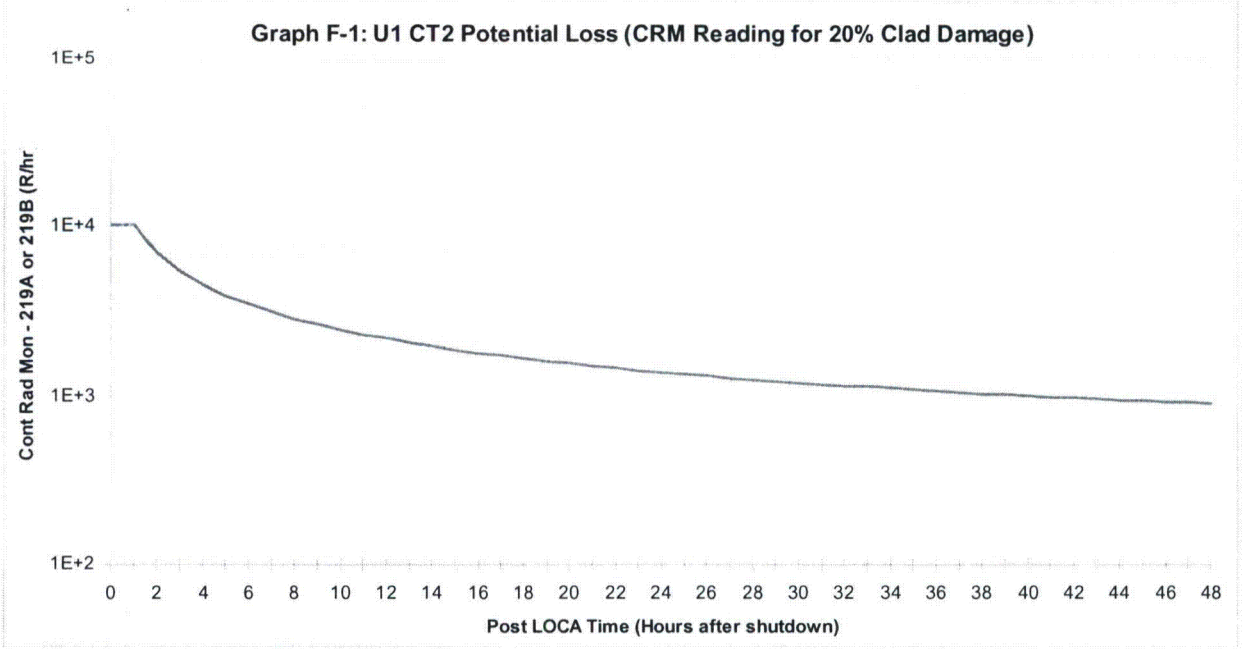
Containment Radiation Monitoring — CT2

Loss:

None

Potential Loss:

1. Containment Radiation Monitor (RM-1RM-219A or B) **> CT2 Line on Graph F-1.**



Basis:

Generic

There is no loss threshold associated with this item.

The site specific reading is a value which indicates significant fuel damage well in excess of the thresholds associated with both loss of fuel clad and loss of RCS barriers. As stated in Section 3.8 of NEI 99-01 Rev 5, 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 Term Estimation 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%.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY
HA3 (continued)

Generic

These EALs escalate from HU3 in that the occurrence of the event has resulted in VISIBLE DAMAGE to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by CONTROL ROOM indications of degraded system response or performance. The occurrence of VISIBLE DAMAGE and/or degraded system response is intended to discriminate against lesser events. The initial report should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of the damage. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

EALs #2 - #6

These EALs should specify site specific structures or areas that contain safety systems or components and functions required for safe shutdown of the plant. Site specific Safe Shutdown Analysis should be consulted for equipment and plant areas required to establish or maintain safe shutdown.

EAL #1

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

This threshold should be based on site specific FSAR design basis. See EPRI-sponsored "Guidelines for Nuclear Plant Response to an Earthquake", dated October 1989, for information on seismic event categories.

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

EAL #2

This EAL is based on a tornado striking (touching down) or high winds that have caused VISIBLE DAMAGE to structures containing functions or systems required for safe shutdown of the plant.

The high wind value should be based on site specific FSAR design basis as long as it is within the range of the instrumentation available for wind speed.

EAL #3

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

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4 (continued)

The use of VISIBLE DAMAGE should not be interpreted as mandating a lengthy damage assessment prior to classification. The declaration of an ALERT and the activation of the TECHNICAL SUPPORT CENTER will provide the EMERGENCY DIRECTOR with the resources needed to perform detailed damage assessments.

The EMERGENCY DIRECTOR also needs to consider any security aspects of the EXPLOSION.

This EAL should specify site specific structures or areas that contain safety systems or components and functions required for safe shutdown of the plant. Site specific Safe Shutdown Analysis should be consulted for equipment and plant areas required to establish or maintain safe shutdown.

Site Specific

Table H-1 lists areas that house equipment that is needed to ensure safe shutdown of the plant. Personnel access to those areas may be an important factor in monitoring and controlling equipment operability.

A steam line break or steam EXPLOSION that damages permanent structures or equipment in one of these areas would be classified under this EAL.

Basis Reference(s):

1. NEI 99-01 Rev 5, HU2
2. U1 UFSAR Table A.1-1, Category I Structures, Systems, and Components, Rev. 26

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS - HOT

SA1

INITIATING CONDITION:

AC power capability to emergency busses reduced to a single source for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4

EALs:

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

1. a. AC power to AE and DF 4KV emergency busses is reduced to a single power source for **15 minutes** or longer.

   AND

   b. Any additional single power source failure will result in loss of **ALL** AC power to **BOTH** AE and DF 4KV emergency busses.

Basis:

Generic

The condition indicated by this IC is the degradation of the OFFSITE and ONSITE AC power systems such that any additional single failure would result in a loss of all AC power to emergency buses. This condition could occur due to a loss of OFFSITE power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. Another related condition could be the loss of all OFFSITE power and loss of ONSITE emergency generators with only one train of emergency busses being backfed from the unit main generator, or the loss of ONSITE emergency generators with only one train of emergency busses being backfed from OFFSITE power.

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

Site Specific

None

Basis Reference(s):

1. NEI 99-01 Rev 5, SA5
2. NEI 99-01 Rev 5, FAQ# 36

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS - HOT

SS4

INITIATING CONDITION:

Inability to monitor a significant transient in progress.

Operating Mode Applicability:

1, 2, 3, 4

EALs:

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

1. a. Loss of **> 75%** of **EITHER** of the following for **15 minutes** or longer:

   - CONTROL ROOM Annunciator Panels (A1 - A13).

   OR

   - CONTROL ROOM critical safety function indications (Table S-1).

Table S-1: Critical Safety Functions
• Reactivity Control (ability to shut down the reactor and keep it shut down)
• RCS inventory (ability to cool the core)
• Secondary heat removal (ability to maintain a heat sink)

AND

b. A **Table S-2** significant transient is in progress.

Table S-2: Significant Transients
• Automatic turbine runback > 25% thermal reactor power
• Electrical load rejection > 25% full electrical load
• Reactor trip
• Safety Injection actuation

AND

c. COMPENSATORY INDICATIONS are unavailable.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS - HOT

SA4

INITIATING CONDITION:

Loss of safety system annunciation or indication in the CONTROL ROOM with either: (1) a significant transient in progress, or (2) COMPENSATORY INDICATIONS are unavailable.

Operating Mode Applicability:

1, 2, 3, 4

EALs:

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

1. a. Loss of **> 75%** of **EITHER** of the following for **15 minutes** or longer:

   - CONTROL ROOM Annunciator Panels (A1 - A13).

   OR

   - CONTROL ROOM critical safety function indications (Table S-1).

Table S-1: Critical Safety Functions
• Reactivity Control (ability to shut down the reactor and keep it shut down)
• RCS inventory (ability to cool the core)
• Secondary heat removal (ability to maintain a heat sink)

   AND

   b. **EITHER** of the following:

   - A **Table S-2** significant transient is in progress.

Table S-2: Significant Transients
• Automatic turbine runback > 25% thermal reactor power
• Electrical load rejection > 25% full electrical load
• Reactor trip
• Safety Injection actuation

   OR

   - COMPENSATORY INDICATIONS are unavailable.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS - COLD

CU8

INITIATING CONDITION:

UNPLANNED loss of RCS inventory.

Operating Mode Applicability:

6

EALs:

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

1. UNPLANNED RCS level drop as indicated by **EITHER** of the following:
   - Refueling Outage Temporary Level Instrument (LI-1RC-481C) **< 97 inches** (vessel flange) for **15 minutes** or longer when the RCS level band is established **above** the vessel flange.

     OR

   - RCS water level drop below the RCS level band for **15 minutes** or longer when the RCS level band is established **below** the vessel flange.

   OR

2. a. RCS level cannot be monitored.

      AND

   b. Loss of RCS inventory as indicated by UNPLANNED level rise in containment sumps or incore instrument sump.

Basis:

Generic

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

Refueling evolutions that decrease RCS water level below the RPV flange are carefully planned and procedurally controlled. An UNPLANNED event that results in water level decreasing below the RPV flange, or below the planned RCS water level for the given evolution (if the planned RCS water level is already below the RPV flange), warrants declaration of an UNUSUAL EVENT due to the reduced RCS inventory that is available to keep the core covered.

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

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS - COLD

CU8 (continued)

The difference between CU7 and CU8 deals with the RCS conditions that exist between cold shutdown and refueling modes. In cold shutdown the RCS will normally be intact and standard RCS inventory and level monitoring means are available. In the refueling mode the RCS is not intact and RPV level and inventory are monitored by different means.

EAL #1

This EAL involves a decrease in RCS level below the top of the RPV flange that continues for 15 minutes due to an UNPLANNED event. This EAL is not applicable to decreases in flooded reactor cavity level, which is addressed by RU2.1 until such time as the level decreases to the level of the vessel flange.

EAL #2

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

Site Specific

EAL #1

The Reactor Vessel flange is at 739 feet 2 3/8 inches (96.9 inches indicated). RCS level is normally monitored using the following instrument:

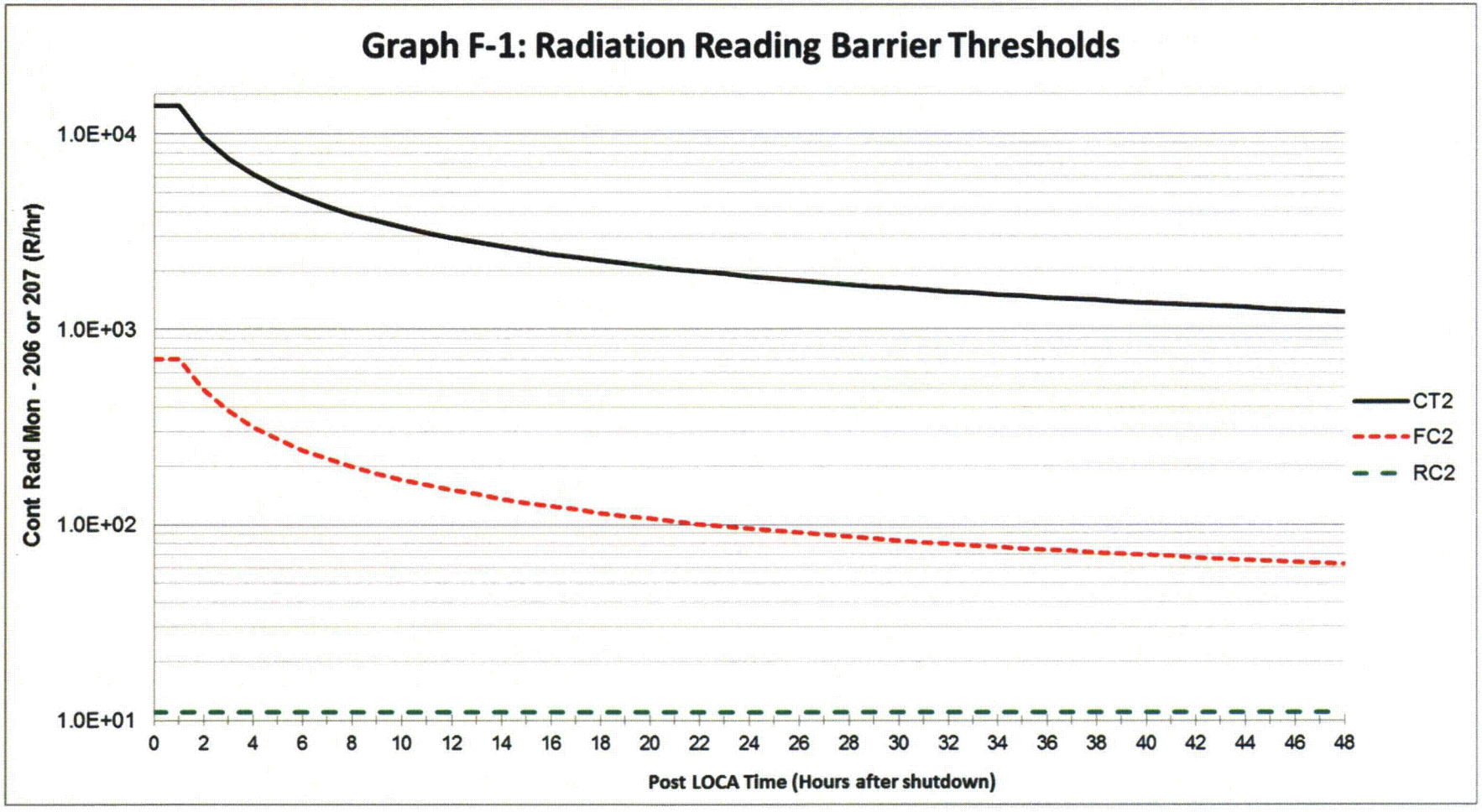
- LI-1RC-481C

Reactor vessel level indication (LI-1RC-481C) provide accurate indication of water level when the RCS is at atmospheric pressure and above the centerline of the hot leg nozzle elevation.

FISSION PRODUCT BARRIER DEGRADATION

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
FG1 [1][2][3][4] 1. Loss of any two barriers and loss or potential loss of the third barrier.	**FS1** [1][2][3][4] 1. Loss or potential loss of any two barriers.	**FA1** [1][2][3][4] 1. Any loss or any potential loss of either fuel clad or RCS.	**FU1** [1][2][3][4] 1. Any loss or any potential loss of containment.



FISSION PRODUCT BARRIER DEGRADATION

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
FG1 [1][2][3][4] 1. *Loss of any two barriers and loss or potential loss of the third barrier.*	**FS1** [1][2][3][4] 1. *Loss or potential loss of any two barriers.*	**FA1** [1][2][3][4] 1. *Any loss or any potential loss of either fuel clad or RCS.*	**FU1** [1][2][3][4] 1. *Any loss or any potential loss of containment.*

	FC – Fuel Clad		RC – Reactor Coolant System		CT - Containment	
Sub-Category	**Loss**	**Potential Loss**	**Loss**	**Potential Loss**	**Loss**	**Potential Loss**
1. Critical Safety Function Status	1. Core Cooling - Red entry conditions met.	1. Core Cooling - Orange entry conditions met. **OR** 2. a. Heat Sink - Red entry conditions met. **AND** b. Heat Sink is required.		1. RCS Integrity - Red entry conditions met. **OR** 2. a. Heat Sink - Red entry conditions met. **AND** b. Heat Sink is required.		1. Containment - Red entry conditions met.
2. Containment Rad Monitoring	1. Containment Radiation Monitor (2RMR-RQ206 or 207) **> FC2 Line on Graph F-1.**		1. Containment Radiation Monitor (2RMR-RQ206 or 207) **> 1.1E+01 R/hr (RC2 Line on *Graph F-1*).**			1. Containment Radiation Monitor (2RMR-RQ206 or 207) **> CT2 Line on Graph F-1.**
3. Core Temperature	1. Three max core exit thermocouples **> 1200° F.**	1. Three max core exit thermocouples **> 729°** F.				1. a. Three max core exit thermocouples **> 2000° F.** **AND** b. Restoration procedures not effective within **15 minutes.** **OR** 2. a. Three max core exit thermocouples **> 1200° F.** **AND** b. RVLIS Full Range **< 40%** with no RCPs running. **AND** c. Restoration procedures not effective within **15 minutes.**
4. RCS Level		1. RCS level **< Table F-1.**				
5. RCS Leak Rate			1. RCS leak rate greater than available makeup capacity as indicated by RCS subcooling **< 19° F normal containment** or **< 46° F adverse containment.**	1. UNISOLABLE RCS leak exceeding the capacity of one charging pump (130 gpm) in the normal charging mode.		
6. SG Tube Leakage / Rupture			1. RUPTURED SG results in an SI actuation.		**Note:** A prolonged release is greater than 4 hours. 1. RUPTURED SG is also FAULTED outside of containment. **OR** 2. a. Primary-to-Secondary leak rate **> 10 gpm.** **AND** b. UNISOLABLE prolonged steam release from affected SG to the environment.	

Table F-1: RVLIS Thresholds

RVLIS	RCPs	Indication
Full Range	0	40%
Dynamic Range	1	25%
	2	33%
	3	60%

FISSION PRODUCT BARRIER DEGRADATION

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
FG1 1 2 3 4 1. Loss of any two barriers and loss or potential loss of the third barrier.	**FS1** 1 2 3 4 1. Loss or potential loss of any two barriers.	**FA1** 1 2 3 4 1. Any loss or any potential loss of either fuel clad or RCS.	**FU1** 1 2 3 4 1. Any loss or any potential loss of containment.

	FC – Fuel Clad		RC – Reactor Coolant System		CT - Containment	
Sub-Category	**Loss**	**Potential Loss**	**Loss**	**Potential Loss**	**Loss**	**Potential Loss**
7. RCS Activity	1. Coolant activity > **300** µCi/gm dose equivalent I-131.					
8. Containment Pressure					1. A containment pressure rise followed by a rapid UNPLANNED drop in containment pressure. **OR** 2. Containment pressure or sump level response not consistent with LOCA conditions.	1. Containment pressure > **45 psig** and rising. **OR** 2. Containment hydrogen > **4%**. **OR** 3. a. Containment pressure > **11 psig**. **AND** c. Less than one full train of depressurization equipment operating.
9. Containment Isolation Failure					**Note:** Direct pathways include filtered pathway (e.g., SLCRS). 1. a. Failure of **ALL** valves in any one line to close. **AND** b. Direct downstream pathway to the environment exists after containment isolation signal.	
10. EMERGENCY DIRECTOR Judgment	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates loss of the fuel clad barrier.	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates potential loss of the fuel clad barrier.	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates loss of the RCS barrier.	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates potential loss of the RCS barrier.	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates loss of the containment barrier.	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates potential loss of the containment barrier.

RADIOLOGICAL EFFLUENT / ABNORMAL RADIATION LEVELS

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Abnormal Radiation Levels			**RA3** 1 2 3 4 5 6 D Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions. **EALs:** 1. Dose rate **> 15 mR/hr** in **ANY** of the following areas requiring continuous occupancy to maintain plant safety functions: • CONTROL ROOM • Central Alarm Station • Secondary Alarm Station	

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Security	**HG1** 1 2 3 4 5 6 D HOSTILE ACTION resulting in loss of physical control of the facility. **EALs:** 1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions listed below: • Reactivity Control (ability to shut down the reactor and keep it shut down) • RCS inventory (ability to cool the core) • Secondary heat removal (ability to maintain a heat sink) **OR** 2. A HOSTILE ACTION has caused failure of spent fuel cooling systems and IMMINENT fuel damage is likely.	**HS1** 1 2 3 4 5 6 D HOSTILE ACTION within the PROTECTED AREA. **EALs:** 1. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the Security Shift Supervisor.	**HA1** 1 2 3 4 5 6 D HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. **EALs:** 1. A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the Security Shift Supervisor. **OR** 2. A validated notification from the NRC of a LARGE AIRCRAFT attack threat within **30 minutes** of the site.	**HU1** 1 2 3 4 5 6 D Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant. **EALs:** 1. A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by the Security Shift Supervisor. **OR** 2. A credible site specific security threat notification. **OR** 3. A validated notification from the NRC providing information of a LARGE AIRCRAFT threat.
CR Evacuation		**HS2** 1 2 3 4 5 6 D CONTROL ROOM evacuation has been initiated and plant control cannot be established. **EALs:** 1. a. CONTROL ROOM evacuation has been initiated. **AND** b. Control of **ANY** of the following safety functions is not established from an alternate location within **15 minutes**. • Reactivity Control (ability to shut down the reactor and keep it shut down) • RCS inventory (ability to cool the core) • Secondary heat removal (ability to maintain a heat sink)	**HA2** 1 2 3 4 5 6 D CONTROL ROOM evacuation has been initiated. **EALs:** 1. CONTROL ROOM evacuation has been initiated.	

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

Natural or Destructive Phenomena

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT

Table H-1

- Cable Vault and Rod Control Bldg
- Containment Building
- Control Building
- Demin. Water Storage (2FWE-TK210)
- Diesel Generator Building
- Fuel Handling Building
- Intake Structure Pump Cubicles
- Main Steam Valve Room
- Primary Aux. Building (except elev. 773')
- RWST (2QSS-TK21)
- Safeguards Building
- Service Building (except FW Reg Vlv Rm)

HA3

1 2 3 4 5 6 D

Natural or destructive phenomena affecting VITAL AREAS.

EALs:

1. a. Seismic event **> 0.06g (OBE)** acceleration (as indicated by lit lamp on 2ERS-CCC-1, Seismic Instrumentation Central Control Cabinet).

   AND

   b. Earthquake confirmed by **ANY** of the following:
   - Earthquake felt in plant.
   - National Earthquake Center.
   - CONTROL ROOM *indication of degraded performance of systems* required for the safe shutdown of the plant.

   OR

2. Tornado or high winds **> 80 mph** resulting in **EITHER** of the following:
   - VISIBLE DAMAGE to **ANY** structures in **Table H-1** areas containing safety systems or components.
   - CONTROL ROOM indication of degraded performance of those safety systems.

   OR

3. Internal flooding in **Table H-1** areas resulting in **EITHER** of the following:
   - Electrical shock hazard that precludes access to operate or monitor safety equipment.
   - CONTROL ROOM indication of degraded performance of those safety systems.

   OR

4. High river level **> 705 feet MSL** resulting in **EITHER** of the following:
   - VISIBLE DAMAGE to **ANY** structures in **Table H-1** areas containing safety systems or components.
   - CONTROL ROOM indication of degraded performance of those safety systems.

   OR

5. Low river level (LR-1CW-101) **< 650 feet MSL** resulting in CONTROL ROOM indication of degraded performance of safety systems located in **Table H-1** areas.

   OR

6. Turbine failure-generated PROJECTILES resulting in **EITHER** of the following:
   - VISIBLE DAMAGE to or penetration of **ANY** structures in **Table H-1** areas containing safety systems or components.
   - CONTROL ROOM indication of degraded performance of those safety systems.

   OR

7. Vehicle crash resulting in **EITHER** of the following:
   - VISIBLE DAMAGE to **ANY** structures in **Table H-1** areas containing safety systems or components.
   - CONTROL ROOM indication of degraded performance of those safety systems.

HU3

1 2 3 4 5 6 D

Natural or destructive phenomena affecting the PROTECTED AREA.

EALs:

1. a. Seismic event **> 0.01g** acceleration (as indicated by initiation of the **Accelerograph Recording System** on Ann A10-5H, Init of Seismic Exceed Preset and/or Spectral Accelerations).

   AND

   b. Earthquake confirmed by **EITHER** of the following:
   - Earthquake felt in plant.
   - National Earthquake Center.

   OR

2. a. Tornado within the PROTECTED AREA.

   OR

   b. High winds **> 80 mph**.

   OR

3. Internal flooding in **Table H-1** areas that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

   OR

4. High river water level **> 705 feet MSL**.

   OR

5. Low river water level (LR-1CW-101) **< 650 feet MSL**.

   OR

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

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
EMERGENCY DIRECTOR Judgment	**HG6** 1 2 3 4 5 6 D Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of GENERAL EMERGENCY. **EALs:** 1. Other conditions exist which in the judgment of the EMERGENCY DIRECTOR indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA PROTECTIVE ACTION GUIDE exposure levels OFFSITE for more than the immediate site area.	**HS6** 1 2 3 4 5 6 D Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of SITE AREA EMERGENCY. **EALs:** 1. Other conditions exist which in the judgment of the EMERGENCY DIRECTOR indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts: (1) toward site personnel or equipment that could lead to the likely failure of or, (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA PROTECTIVE ACTION GUIDE exposure levels beyond the site boundary.	**HA6** 1 2 3 4 5 6 D Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of an ALERT. **EALs:** 1. Other conditions exist which in the judgment of the EMERGENCY DIRECTOR indicate that events are in progress or have occurred which involve actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA PROTECTIVE ACTION GUIDE exposure levels.	**HU6** 1 2 3 4 5 6 D Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of an UNUSUAL EVENT. **EALs:** 1. Other conditions exist which in the judgment of the EMERGENCY DIRECTOR indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring OFFSITE response or monitoring are expected unless further degradation of safety systems occurs.
DFSF				**E-HU1** Not Applicable Damage to a loaded cask CONFINEMENT BOUNDARY. **EALs:** 1. Damage to a loaded cask CONFINEMENT BOUNDARY.

SYSTEM MALFUNCTIONS - HOT

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Loss of AC Power	**SG1** [1][2][3][4] Prolonged loss of all OFFSITE and all ONSITE AC power to emergency busses. EALs: 1. a. Loss of **ALL** OFFSITE and **ALL** ONSITE AC power to **BOTH** AE and DF 4KV emergency busses. **AND** b. **EITHER** of the following: • Restoration of **EITHER** the AE 4KV emergency bus **OR** DF 4KV emergency bus within **4 hours** is not likely. • Core Cooling - Red entry conditions met.	**SS1** [1][2][3][4] Loss of all OFFSITE and all ONSITE AC power to emergency busses for 15 minutes or longer. EALs: **Note:** Credit cannot be taken for emergency busses being powered from the other unit's emergency diesel generators. 1. Loss of **ALL** OFFSITE and **ALL** ONSITE AC power to **BOTH** AE and DF 4KV emergency busses for **15 minutes*** or longer.	**SA1** [1][2][3][4] AC power capability to emergency busses reduced to a single source for 15 minutes or longer. EALs: 1. a. AC power to AE and DF 4KV emergency busses is reduced to a single power source for **15 minutes*** or longer. **AND** b. Any additional single power source failure will result in loss of **ALL** AC power to **BOTH** AE and DF 4KV emergency busses.	**SU1** [1][2][3][4] Loss of all OFFSITE AC power to emergency busses for 15 minutes or longer. EALs: 1. Loss of **ALL** OFFSITE AC power to **BOTH** AE and DF 4KV emergency busses for **15 minutes*** or longer.
Loss of DC Power		**SS2** [1][2][3][4] Loss of all vital DC power for 15 minutes or longer. EALs: 1. **< 110.4 VDC** on **ALL** safety related DC busses (2-1, 2-2, 2-3 and 2-4) for **15 minutes*** or longer.		
Failure of RPS	**SG3** [1][2] Automatic trip and all manual actions failed to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists. EALs: 1. a. An automatic reactor trip failed to shutdown the reactor as indicated by reactor power **> 5%**. **AND** b. **ALL** manual trip actions failed to shutdown the reactor as indicated by reactor power **> 5%**. **AND** c. **EITHER** of the following has occurred: • Core Cooling - Red entry conditions met. • Heat Sink - Red entry conditions met.	**SS3** [1][2] Automatic trip and manual actions taken within the Controls Area (CA) failed to shutdown the reactor. EALs: 1. a. An automatic reactor trip failed to shutdown the reactor as indicated by reactor power **> 5%** **AND** b. Manual trip actions taken within the Controls Area (CA) failed to shutdown the reactor as indicated by reactor power **> 5%**.	**SA3** [1][2] Automatic trip failed to shutdown the reactor and the manual actions taken from the Controls Area (CA) are successful in shutting down the reactor. EALs: 1. a. An automatic reactor trip failed to shutdown the reactor. **AND** b. Manual trip actions taken within the Controls Area (CA) successfully shutdown the reactor as indicated by reactor power **≤ 5%**.	**SU3** [3][4] Inadvertent criticality. EALs: 1. UNPLANNED sustained positive startup rate observed on nuclear instrumentation.

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

SYSTEM MALFUNCTIONS - HOT

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Annunciators	**Table S-1: Critical Safety Functions** • Reactivity Control (ability to shut down the reactor and keep it shut down) • RCS inventory (ability to cool the core) • Secondary heat removal (ability to maintain a heat sink) **Table S-2: Significant Transients** • Automatic turbine runback > 25% thermal power • Electrical load rejection > 25% full electrical load • Reactor trip • Safety Injection actuation	**SS4** [1][2][3][4] Inability to monitor a significant transient in progress. EALs: 1. a. Loss of **> 75%** of **EITHER** of the following for **15 minutes*** or longer: • CONTROL ROOM Annunciator Panels (A1, A2, A4 - A11). **OR** • CONTROL ROOM critical safety function indications (Table S-1). **AND** b. A **Table S-2** significant transient is in progress. **AND** c. COMPENSATORY INDICATIONS are unavailable.	**SA4** [1][2][3][4] Loss of safety system annunciation or indication in the CONTROL ROOM with either: (1) a significant transient in progress, or (2) COMPENSATORY INDICATIONS are unavailable. EALs: 1. a. Loss of **> 75%** of **EITHER** of the following for **15 minutes*** or longer: • CONTROL ROOM Annunciator Panels (A1, A2, A4 - A11). **OR** • CONTROL ROOM critical safety function indications (Table S-1). **AND** b. **EITHER** of the following: • A **Table S-2** significant transient is in progress. **OR** • COMPENSATORY INDICATIONS are unavailable.	**SU4** [1][2][3][4] Loss of safety system annunciation or indication in the CONTROL ROOM for 15 minutes or longer. EALs: 1. Loss of **> 75%** of **EITHER** of the following for **15 minutes*** or longer: • CONTROL ROOM Annunciator Panels (A1, A2, A4 - A11). **OR** • CONTROL ROOM critical safety function indications (Table S-1).
T.S. Limits				**SU5** [1][2][3][4] Inability to reach required operating mode within Technical Specification limits. EALs: 1. Plant is not brought to required operating mode within Technical Specification LCO action statement time.
Communications				**SU6** [1][2][3][4] Loss of all ONSITE or OFFSITE communications capabilities. EALs: 1. Loss of **ALL** of the following ONSITE communication methods affecting the ability to perform routine operations: • Radios. • Plant page. • Plant telephone system (hardwired). **OR** 2. Loss of **ALL** of the following OFFSITE communications methods affecting the ability to perform OFFSITE notifications: • NRC Emergency Notification System – ENS (Red Phone). • NRC Health Physics Network – HPN. • Commercial telephones (hardwired and wireless).

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

SYSTEM MALFUNCTIONS - HOT

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
RCS Leakage				**SU7** [1][2][3][4] RCS leakage. EALs: Note: • Identified, unidentified and pressure boundary RCS leakage as defined by Technical Specifications. • Relief valve normal operation should be excluded unless it fails to close and cannot be isolated. 1. Unidentified or pressure boundary leakage **> 10 gpm.** OR 2. Identified leakage **> 25 gpm.**
Fuel Clad Degradation				**SU9** [1][2][3][4] Fuel clad degradation. EALs: 1. Letdown Monitor (2CHS-RQ101B) **> 2.98E+03 µCi/cc.** OR 2. RCS activity **> 21 µCi/gm** dose equivalent I-131.

SYSTEM MALFUNCTIONS - COLD

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

Heat Sink

GENERAL EMERGENCY

SITE AREA EMERGENCY

Table C-2: RCS Reheat Duration Thresholds

RCS	Cont Closure	Duration
Intact with Full RCS Inventory	N/A	> 60 min**
Not Intact	Established	> 20 min**
OR Not Full RCS Inventory	Not Established	0 min

** If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, this EAL is not applicable.

ALERT

CA10 [5] [6]

Inability to maintain plant in cold shutdown.

EALs:

Note:
Full inventory is pressurizer level ≥ 22% actual with loop stops either isolated or unisolated.

1. RCS temperature **> 200° F** due to an UNPLANNED loss of decay heat removal capability for greater than the specified duration on **Table C-2**.

   OR

2. a. RCS temperature cannot be monitored.

   AND

   b. RCS pressure rise **> 10 psi** due to an UNPLANNED loss of decay heat removal capability (this EAL does not apply in RCS solid plant conditions).

UNUSUAL EVENT

CU10 [5] [6]

UNPLANNED Loss of decay heat removal capability.

EALs:

1. RCS temperature **> 200° F** due to an UNPLANNED loss of decay heat removal capability.

   OR

2. Loss of **ALL** RCS temperature and RCS level indication for **15 minutes*** or longer.

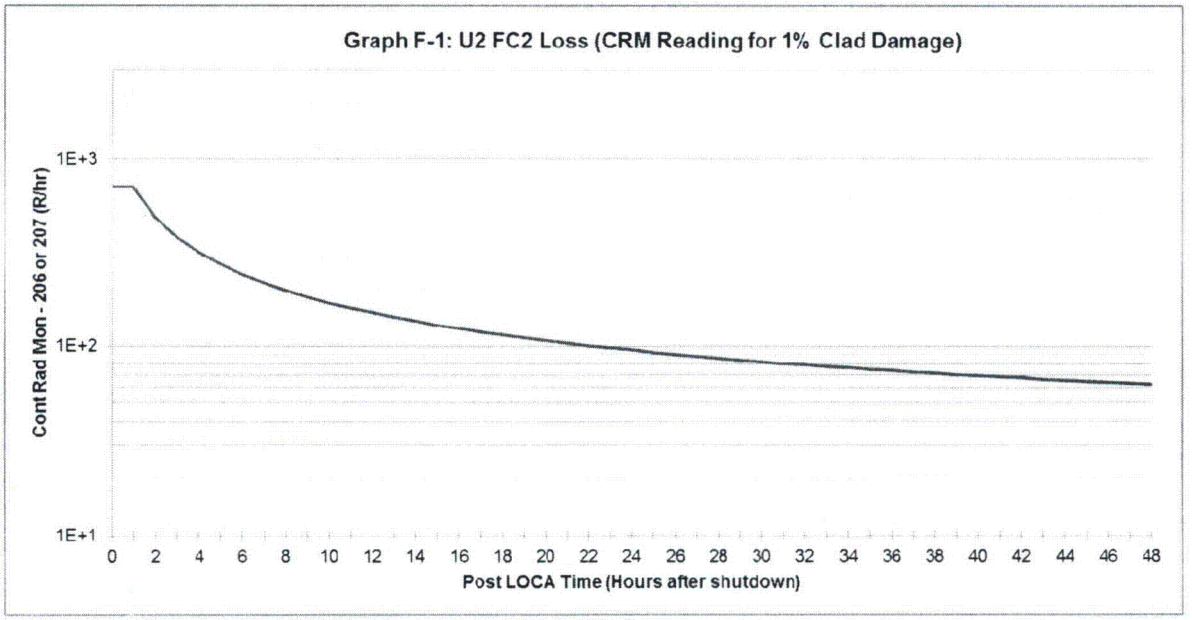
* The EMERGENCY DIRECTOR should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS - COLD

Containment Radiation Monitoring FC2

Loss:

1. Containment Radiation Monitor (2RMR-RQ206 or 207) **> FC2 Line on Graph F-1**.



Potential Loss:

None

Basis:

Generic

The site specific reading is a value which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the containment.

The reading should be 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.

This value is higher than that specified for RC2(L)1. Thus, this threshold indicates a loss of both the Fuel Clad barrier and RCS barrier that appropriately escalates the EMERGENCY CLASSIFICATION LEVEL to a SITE AREA EMERGENCY.

There is no potential loss threshold associated with this item.

RECOGNITION CATEGORY
FISSION PRODUCT BARRIER DEGRADATION

RCS Leak Rate — RC5

Loss:

1. RCS leak rate greater than available makeup capacity as indicated by RCS subcooling **< 19° F normal containment** or **< 46° F adverse containment**.

Potential Loss:

1. UNISOLABLE RCS leak exceeding the capacity of one charging pump (130 gpm) in the normal charging mode.

Basis:

Generic

Loss Threshold #1

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

Potential Loss Threshold #1

This threshold is based on the apparent 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 to be the flow rate equivalent to one charging/makeup pump discharging to the charging header. Isolating letdown is a standard abnormal operating procedure action and may prevent unnecessary classifications when a non-RCS leakage path such as a CVCS leak exists. The intent of this condition is met if attempts to isolate Letdown are NOT successful. Additional charging/makeup pumps being required is indicative of a substantial RCS leak.

Site Specific

Loss Threshold #1

RCS subcooling is determined by evaluation of the saturation temperature that corresponds to the indicated reactor coolant system pressure minus the average reactor coolant loop hot leg temperature or average in-core thermocouple.

Potential Loss Threshold #1

This threshold is based on the capacity of a single charging pump flow of 130 GPM per UFSAR 9.3.4.3.8.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS - COLD

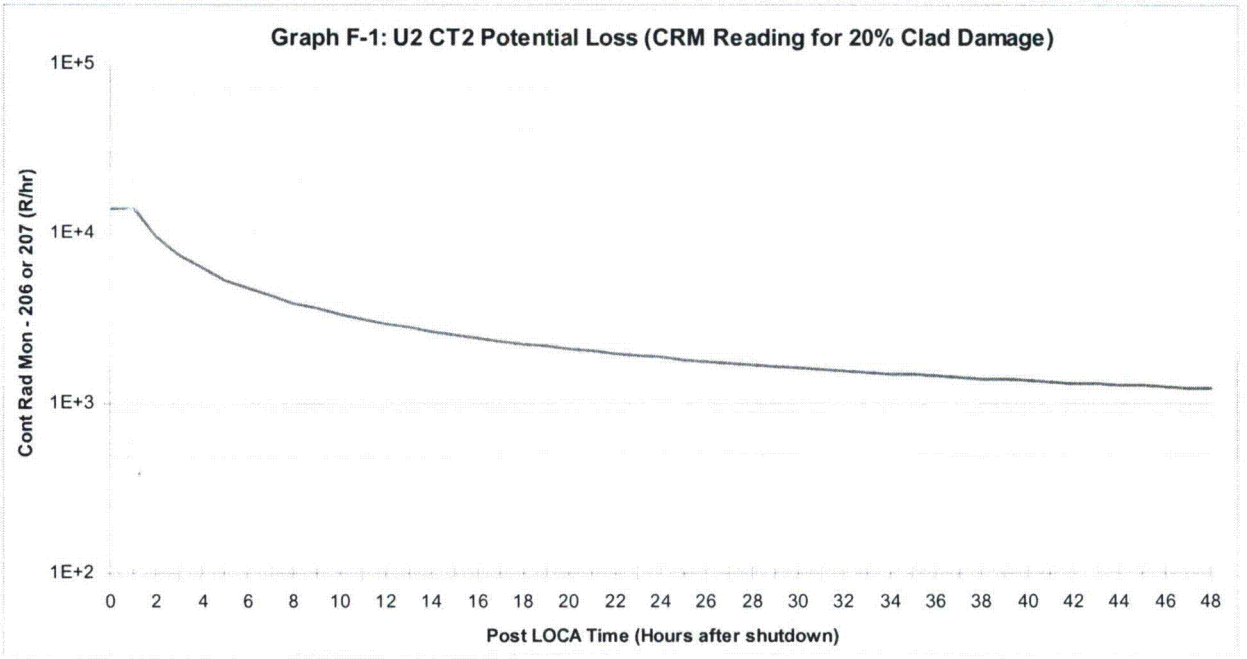
Containment Radiation Monitoring CT2

Loss:

None

Potential Loss:

1. Containment Radiation Monitor (2RMR-RQ206 or 207) **> CT2 Line on Graph F-1**.



Basis:

Generic

There is no loss threshold associated with this item.

The site specific reading is a value which indicates significant fuel damage well in excess of the thresholds associated with both loss of fuel clad and loss of RCS barriers. As stated in Section 3.8 of NEI 99-01 Rev 5, 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 Term Estimation 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%.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY
HA3 (continued)

Basis:

Generic

These EALs escalate from HU3 in that the occurrence of the event has resulted in VISIBLE DAMAGE to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by CONTROL ROOM indications of degraded system response or performance. The occurrence of VISIBLE DAMAGE and/or degraded system response is intended to discriminate against lesser events. The initial report should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of the damage. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

EALs #2 - #6

These EALs should specify site specific structures or areas that contain safety systems or components and functions required for safe shutdown of the plant. Site specific Safe Shutdown Analysis should be consulted for equipment and plant areas required to establish or maintain safe shutdown.

EAL #1

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

This threshold should be based on site specific FSAR design basis. See EPRI-sponsored "Guidelines for Nuclear Plant Response to an Earthquake", dated October 1989, for information on seismic event categories.

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

EAL #2

This EAL is based on a tornado striking (touching down) or high winds that have caused VISIBLE DAMAGE to structures containing functions or systems required for safe shutdown of the plant.

The high wind value should be based on site specific FSAR design basis as long as it is within the range of the instrumentation available for wind speed.

RECOGNITION CATEGORY
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY
HA4 (continued)

The use of VISIBLE DAMAGE should not be interpreted as mandating a lengthy damage assessment prior to classification. The declaration of an ALERT and the activation of the TECHNICAL SUPPORT CENTER will provide the EMERGENCY DIRECTOR with the resources needed to perform detailed damage assessments.

The EMERGENCY DIRECTOR also needs to consider any security aspects of the EXPLOSION.

This EAL should specify site specific structures or areas that contain safety systems or components and functions required for safe shutdown of the plant. Site specific Safe Shutdown Analysis should be consulted for equipment and plant areas required to establish or maintain safe shutdown.

Site Specific

Table H-1 lists areas that house equipment that is needed to ensure safe shutdown of the plant. Personnel access to those areas may be an important factor in monitoring and controlling equipment operability. Table H-1 includes structures that are in contact with or immediately adjacent to (directly impacts or obstructs) the areas that actually contain the equipment of concern.

A steam line break or steam EXPLOSION that damages permanent structures or equipment in one of these areas would be classified under this EAL.

Basis Reference(s):

1. NEI 99-01 Rev 5, HA2
2. U2 UFSAR Table 3.2-1, Quality Assurance Category I and Seismic Category I Systems and Components, Rev 19
3. U2 UFSAR, Table 3.2-2, Classification of Structures, Rev 19

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS - HOT

SA1

INITIATING CONDITION:

AC power capability to emergency busses reduced to a single source for 15 minutes or longer.

Operating Mode Applicability:

1, 2, 3, 4

EALs:

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

1. a. AC power to AE and DF 4KV emergency busses is reduced to a single power source for **15 minutes** or longer.

   AND

   b. Any additional single power source failure will result in loss of **ALL** AC power to **BOTH** AE and DF 4KV emergency busses.

Basis:

Generic

The condition indicated by this IC is the degradation of the OFFSITE and ONSITE AC power systems such that any additional single failure would result in a loss of all AC power to emergency buses. This condition could occur due to a loss of OFFSITE power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. Another related condition could be the loss of all OFFSITE power and loss of ONSITE emergency generators with only one train of emergency busses being backfed from the unit main generator, or the loss of ONSITE emergency generators with only one train of emergency busses being backfed from OFFSITE power.

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

Site Specific

None

Basis Reference(s):

1. NEI 99-01 Rev 5, SA5
2. NEI 99-01 Rev 5, FAQ# 36

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS - HOT

SS4

INITIATING CONDITION:

Inability to monitor a significant transient in progress.

Operating Mode Applicability:

1, 2, 3, 4

EALs:

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

1. a. Loss of **> 75%** of **EITHER** of the following for **15 minutes** or longer:

   - CONTROL ROOM Annunciator Panels (A1, A2, A4 - A11).

     OR

   - CONTROL ROOM critical safety function indications (Table S-1).

Table S-1: Critical Safety Functions
• Reactivity Control (ability to shut down the reactor and keep it shut down)
• RCS inventory (ability to cool the core)
• Secondary heat removal (ability to maintain a heat sink)

   AND

   b. A **Table S-2** significant transient is in progress.

Table S-2: Significant Transients
• Automatic turbine runback > 25% thermal reactor power
• Electrical load rejection > 25% full electrical load
• Reactor trip
• Safety Injection actuation

   AND

   c. COMPENSATORY INDICATIONS are unavailable.

RECOGNITION CATEGORY
SYSTEM MALFUNCTIONS - HOT

SA4

INITIATING CONDITION:

Loss of safety system annunciation or indication in the CONTROL ROOM with either: (1) a significant transient in progress, or (2) COMPENSATORY INDICATIONS are unavailable.

Operating Mode Applicability:

1, 2, 3, 4

EALs:

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

1. a. Loss of **> 75%** of **EITHER** of the following for **15 minutes** or longer:

   - CONTROL ROOM Annunciator Panels (A1, A2, A4 - A11).

     OR

   - CONTROL ROOM critical safety function indications (Table S-1).

Table S-1: Critical Safety Functions
• Reactivity Control (ability to shut down the reactor and keep it shut down)
• RCS inventory (ability to cool the core)
• Secondary heat removal (ability to maintain a heat sink)

   AND

   b. **EITHER** of the following:

   - A **Table S-2** significant transient is in progress.

Table S-2: Significant Transients
• Automatic turbine runback > 25% thermal reactor power
• Electrical load rejection > 25% full electrical load
• Reactor trip
• Safety Injection actuation

     OR

   - COMPENSATORY INDICATIONS are unavailable.

Appendix 4
Beaver Valley Power Station Unit No. 1 EAL Evaluation

DIFFERENCES – DEVIATIONS

The items considered to be differences or deviations are based on the definitions provided in RIS 2003-18, Supplement 2. Any plant EAL [or Initiating Condition (IC) or Fission Product Barrier (FPB) threshold value] that does not meet the intent of the NEI 99-01, Revision 5 guidance or may result in an event being classified differently from the guidance is identified as a deviation and will be listed as such in this evaluation. The basis section for each of the deviations documents the rationale for not adopting the NEI 99-01, Revision 5 guidance. Items identified as deviations will not be implemented without prior NRC review and approval.

ADMINISTRATIVE CHANGES

The following changes apply throughout the set of EALs and are not specifically identified in the comparison tables:

1. The NEI phrase "NOTIFICATION OF UNUSUAL EVENT" has been changed to "UNUSUAL EVENT" to sustain common terminology.

2. The IC identification numbering has been modified to allow consistent grouping by event category.

3. Numerical values, signs and key words of threshold values are **bolded** for emphasis.

4. The NEI note "[T]he Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the [condition will likely exceed the applicable time.] or [condition (duration) has exceeded, or will likely exceed, the applicable time.]" is included at the bottom of several pages of the EAL matrix located in the proposed Beaver Valley Power Station Emergency Preparedness Plan, Section 4, "Emergency Conditions." An asterisk is used as a marker in the EALs which require use of the note. In this evaluation, for simplicity, the note is included as part of the EAL.

5. Terms that are defined in Beaver Valley Power Station Emergency Preparedness Plan, Section 1, "Definitions," are indicated in the proposed BVPS-1 EALs as all capitals.

6. Used the term none instead of not applicable in the FPB matrix.

These changes are considered administrative in nature and are neither a difference nor a deviation in accordance with RIS 2003-18, Supplement 2.

NEI 99-01 Rev. 5	BVPS-1 EALs	Difference or Deviation
RCS Barrier		
1. Critical Safety Function Status **Loss** Not Applicable **Potential Loss** A. RCS Integrity - Red Entry Conditions Met. **OR** B. Heat Sink - Red Entry Conditions Met.	**RC1: Critical Safety Function Status** **Loss** None **Potential Loss** 1. RCS Integrity - Orange entry conditions met. **OR** 2. a. Heat Sink - Red entry conditions met. **AND** b. Heat Sink is required.	**Rev 5 Differences** None **Rev 5 Deviations** The conditional statement "Heat Sink is required" was added as a condition to potential loss threshold #2.
6. Containment Radiation Monitoring **Loss** A. Containment radiation monitor reading greater than (site specific value). **Potential Loss** Not Applicable	**RC2: Containment Radiation Monitoring** **Loss** 1. Containment Radiation Monitor (RM-1RM-219A or B) **> 8 R/hr (RC2 Line on Graph F-1)**. **Potential Loss** None	**Rev 5 Differences** Removed the word "reading" for human factors considerations (minimize extraneous words). **Rev 5 Deviations** None
2. RCS Leak Rate **Loss** A. RCS leak rate greater than available makeup capacity as indicated by a loss of RCS subcooling. **Potential Loss** A. RCS leak rate indicated greater than (site specific capacity of one charging pump in the normal charging mode) with Letdown isolated.	**RC5: RCS Leak Rate** **Loss** 1. RCS leak rate greater than available makeup capacity as indicated by RCS subcooling **< 18° F normal containment** or **< 33° F adverse containment**. **Potential Loss** 1. UNISOLABLE RCS leak exceeding the capacity of one charging pump (129 gpm) in the normal charging mode.	**Rev 5 Differences** (Potential Loss): Removed "with Letdown isolated" to simplify recognition conditions. (Potential Loss): Added "UNISOLABLE" to clarify that the intent is not to declare an emergency for a momentary leak that can be operationally isolated. **Rev 5 Deviations** None
4. SG Tube Rupture **Loss** A. RUPTURED SG results in an ECCS (SI) actuation **Potential Loss** Not Applicable	**RC6: SG Tube Leakage / Rupture** **Loss** 1. RUPTURED SG results in an SI actuation. **Potential Loss** None	**Rev 5 Differences** Added leakage to FPB category title to allow for consistent language with CT6 (NEI CT4) and fleet standardization. **Rev 5 Deviations** *None*
7. Other Site Specific Indications **Loss** A. (site specific) as applicable. **Potential Loss** A. (site specific) as applicable.	N/A	**Note:** BVPS-1 does not have any additional FPB thresholds in this category. **Rev 5 Differences** None **Rev 5 Deviations** None

NEI 99-01 Rev. 5	BVPS-1 EALs	Difference or Deviation
AA1 **Initiating Condition - ALERT** Any release of gaseous or liquid radioactivity to the environment greater than 200 times the Radiological Effluent Technical Specifications/ODCM for 15 minutes or longer. **Operating Mode Applicability:** All **Example Emergency Action Level:** (1 or 2 or 3 or 4 or 5) **Note:** The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown. 1. VALID reading on **ANY** of the following radiation monitors greater than the reading shown for 15 minutes or longer: (site specific monitor list and threshold values) 2. VALID reading on any effluent monitor reading that greater than 200 times the alarm setpoint established by a current radioactivity discharge permit for 15 minutes or longer. 3. Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates greater than 200 times (site specific RETS values) for 15 minutes or longer. 4. VALID reading on perimeter radiation monitoring system reading greater than 10.0 mR/hr above normal* background for 15 minutes or longer. [for sites having telemetered perimeter monitors] 5. VALID indication on automatic real-time dose assessment capability indicating greater than (site specific value) for 15 minutes or longer. [for sites having such capability] * Normal can be considered as the highest reading in the past twenty-four hours excluding the current peak value.	**RA1** **INITIATING CONDITION:** Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM limit for 15 minutes or longer. **Operating Mode Applicability:** 1, 2, 3, 4, 5, 6, D **EALs:** **Note:** • The EMERGENCY DIRECTOR should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown. 1. **ANY** of the following gaseous effluent monitors greater than the reading shown for **15 minutes** or longer: • SLCRS Vent (RM-1VS-110 Ch 5) ..... **6.76E+05 cpm** • Ventilation Vent (RM-1VS-109 Ch 5) ..... **2.94E+05 cpm** **OR** 2. **ANY** of the following liquid effluent monitors **> 200 times the High-High alarm setpoint, not to exceed 8.5E+05 cpm,** established by a current radioactivity discharge permit for **15 minutes** or longer • Liquid Waste Effluent Monitor (RM-1LW-104) • Laundry and Contaminated Shower Drains Monitor (RM-1LW-116) **OR** 3. Confirmed sample analysis for gaseous or liquid releases **> 200 times the ODCM limit** for **15 minutes** or longer.	**Rev 5 Differences** Removed "VALID" in accordance with NEI 99-01 Rev 5, FAQ# 4. Established "NORMAL LEVELS" as a defined term in accordance with NEI 99-01 Rev 5, FAQ# 5. Removed the words "reading" for human factors considerations (minimize extraneous words). NEI AA1.4 is N/A for BVPS-1 because the plant is not equipped with a perimeter radiation monitoring system. NEI AA1.5 is N/A for BVPS-1 because the plant is not equipped with a automatic real-time dose assessment system. **Rev 5 Deviations** None

NEI 99-01 Rev. 5	BVPS-1 EALs	Difference or Deviation
CU2 **Initiating Condition - NOTIFICATION OF UNUSUAL EVENT** UNPLANNED loss of RCS/RPV inventory. **Operating Mode Applicability:** Refueling **Example Emergency Action Level:** (1 or 2) **Note:** The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. 1. UNPLANNED RCS/RPV level drop as indicated by either of the following: • RCS/RPV water level drop below the RPV flange for 15 minutes or longer when the RCS/RPV level band is established above the RPV flange. • RCS/RPV water level drop below the RCS level band for 15 minutes or longer when the RCS/RPV level band is established below the RPV flange. 2 RCS/RPV level cannot be monitored with a loss of RCS/RPV inventory as indicated by an unexplained level rise in (site specific sump or tank).	**CU8** **INITIATING CONDITION:** UNPLANNED loss of RCS inventory. **Operating Mode Applicability:** 6 **EALs:** **Note:** The EMERGENCY DIRECTOR should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. 1. UNPLANNED RCS level drop as indicated by **EITHER** of the following: • Refueling Outage Temporary Level Instruments (LI-1RC-481C) **< 97 inches** (vessel flange) for **15 minutes** or longer when the RCS level band is established **above** the vessel flange. **OR** • RCS water level drop below the RCS level band for **15 minutes** or longer when the RCS level band is established **below** the vessel flange. ***OR*** 2. a. RCS level cannot be monitored. **AND** b. Loss of RCS inventory as indicated by UNPLANNED level rise in Containment sumps or incore instrument sump.	**Note:** Changes to the nesting format of EAL CU8.2 is considered administrative. **Rev 5 Differences** Replaced "unexplained" with "UNPLANNED" in accordance with NEI 99-01 Rev 5, FAQ# 10. **Rev 5 Deviations** None

NEI 99-01 Rev. 5	BVPS-1 EALs	Difference or Deviation
CA4 **Initiating Condition - ALERT** Inability to maintain plant in cold shutdown. **Operating Mode Applicability:** Cold Shutdown, Refueling **Example Emergency Action Level:** (1 or 2) 1. An UNPLANNED event results in RCS temperature greater than (site specific Technical Specification cold shutdown temperature limit) for greater than the specified duration on table. **Table: RCS Reheat Duration Thresholds** RCS / Containment Closure / Duration Intact (but not RCS Reduced Inventory [PWR]) / N/A / 60 minutes* Not Intact or RCS Reduced Inventory (PWR) / Established / 20 minutes* Not Established / 0 minutes * If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, the EAL is not applicable. 2. An UNPLANNED event results in RCS pressure increase greater than 10 psi due to a loss of RCS cooling. (PWR-This EAL does not apply in Solid Plant conditions.)	**CA10** **INITIATING CONDITION:** Inability to maintain plant in Cold Shutdown. **Operating Mode Applicability:** 5, 6 **EALs:** **Note:** Full inventory is pressurizer level ≥ 22% actual with loop stops either isolated or unisolated. 1. RCS temperature **> 200° F** due to an UNPLANNED loss of decay heat removal capability for greater than the specified duration on **Table C-2**. **Table C-2: RCS Reheat Duration Thresholds** RCS / CONTAINMENT CLOSURE / Duration Intact with Full RCS Inventory / N/A / 60 minutes* Not Intact OR Not Full RCS Inventory / Established / 20 minutes* Not Established / 0 minutes * If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, the EAL is not applicable. **OR** 2. a. RCS temperature cannot be monitored. **AND** b. RCS pressure rise **> 10 psi** due to an UNPLANNED loss of decay heat removal capability (this EAL does not apply in RCS solid plant conditions).	**Rev 5 Differences** Specified the UNPLANNED event in BVPS-1 CA10.1 as being due to an UNPLANNED loss of decay heat removal capability to be consistent with NEI CU4 IC in accordance with NEI 99-01 Rev 5 FAQ#13. Added the site specific condition for full inventory to the site specific basis section and as a note in the EAL section. Reworded CA10.2 in accordance with NEI 99-01 Rev 5, FAQ# 13. Reworded the first RCS entry condition in Table C-2 to be a positive statement. Reworded the second condition for consistency with the wording in the first condition. These changes are considered administrative. **Rev 5 Deviations** The conditional statement "RCS temperature cannot be monitored" was added as a condition to CA10.2. This is consistent with the basis of CA4 in the proposed NEI 99-01 Rev 6.
CU4 **Initiating Condition - NOTIFICATION OF UNUSUAL EVENT** UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV. **Operating Mode Applicability:** Cold Shutdown, Refueling **Example Emergency Action Level:** (1 or 2) **Note:** The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. 1 UNPLANNED event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit. 2. Loss of all RCS temperature and RCS/RPV level indication for 15 minutes or longer.	**CU10** **INITIATING CONDITION:** UNPLANNED loss of decay heat removal capability. **Operating Mode Applicability:** 5, 6 **EALs:** **Note:** The EMERGENCY DIRECTOR should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. 1. RCS temperature **> 200° F** due to an UNPLANNED loss of decay heat removal capability. **OR** 2. Loss of **ALL** RCS temperature and RCS level indication for **15 minutes** or longer.	**Rev 5 Differences** Removed "with irradiated fuel in reactor vessel" from IC in accordance with NEI 99-01 Rev 5, FAQ# 11. Specified the UNPLANNED event in CU10.1 as being due to an UNPLANNED loss of decay heat removal capability to be consistent with NEI CU4 IC and the change to BVPS-1 CA10.2 in accordance with NEI 99-01 Rev 5 FAQ#13. **Rev 5 Deviations** None

Appendix 5
Beaver Valley Power Station Unit No. 2 EAL Evaluation

DIFFERENCES – DEVIATIONS

The items considered to be differences or deviations are based on the definitions provided in RIS 2003-18, Supplement 2. Any plant EAL [or Initiating Condition (IC) or Fission Product Barrier (FPB) threshold value] that does not meet the intent of the NEI 99-01, Revision 5 guidance or may result in an event being classified differently from the guidance is identified as a deviation and will be listed as such in this evaluation. The basis section for each of the deviations documents the rationale for not adopting the NEI 99-01, Revision 5 guidance. Items identified as deviations will not be implemented without prior NRC review and approval.

ADMINISTRATIVE CHANGES

The following changes apply throughout the set of EALs and are not specifically identified in the comparison tables:

1. The NEI phrase "NOTIFICATION OF UNUSUAL EVENT" has been changed to "UNUSUAL EVENT" to sustain common terminology.

2. The IC identification numbering has been modified to allow consistent grouping by event category.

3. Numerical values, signs and key words of threshold values are **bolded** for emphasis.

4. The NEI note "[T]he Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the [condition will likely exceed the applicable time.] or [condition (duration) has exceeded, or will likely exceed, the applicable time.]" is included at the bottom of several pages of the EAL matrix located in the proposed Beaver Valley Power Station Emergency Preparedness Plan, Section 4, "Emergency Conditions." An asterisk is used as a marker in the EALs which require use of the note. In this evaluation, for simplicity, the note is included as part of the EAL.

5. Terms that are defined in Beaver Valley Power Station Emergency Preparedness Plan, Section 1, "Definitions," are indicated in the proposed BVPS-2 EALs as all capitals.

6. Used the term none instead of not applicable in the FPB matrix.

These changes are considered administrative in nature and are neither a difference nor a deviation in accordance with RIS 2003-18, Supplement 2.

NEI 99-01 Rev. 5	BVPS-2 EALs	Difference or Deviation
RCS Barrier		
1. Critical Safety Function Status **Loss** Not Applicable **Potential Loss** A. RCS Integrity - Red Entry Conditions Met. **OR** B. Heat Sink - Red Entry Conditions Met.	**RC1: Critical Safety Function Status** **Loss** None **Potential Loss** 1. RCS Integrity - Orange entry conditions met. **OR** 2. a. Heat Sink - Red entry conditions met. **AND** b. Heat Sink is required.	**Rev 5 Differences** None **Rev 5 Deviations** The conditional statement "Heat Sink is required" was added as a condition to potential loss threshold #2.
6. Containment Radiation Monitoring **Loss** A. Containment radiation monitor reading greater than (site specific value). **Potential Loss** Not Applicable	**RC2: Containment Radiation Monitoring** **Loss** 1. Containment Radiation Monitor (2RMR-RQ206 or 207) **> 1.1E+01 R/hr (RC2 Line on Graph F-1)**. **Potential Loss** None	**Rev 5 Differences** Removed the word "reading" for human factors considerations (minimize extraneous words). **Rev 5 Deviations** None
2. RCS Leak Rate **Loss** A. RCS leak rate greater than available makeup capacity as indicated by a loss of RCS subcooling. **Potential Loss** A. RCS leak rate indicated greater than (site specific capacity of one charging pump in the normal charging mode) with Letdown isolated.	**RC5: RCS Leak Rate** **Loss** 1. RCS leak rate greater than available makeup capacity as indicated by RCS subcooling **< 19° F normal containment** or **< 46° F adverse containment**. **Potential Loss** 1. UNISOLABLE RCS leak exceeding the capacity of one charging pump *(130 gpm) in the normal charging mode.*	**Rev 5 Differences** (Potential Loss): Removed "with Letdown isolated" to simplify recognition conditions. (Potential Loss): Added "UNISOLABLE" to clarify that the intent is not to declare an emergency for a momentary leak that can be operationally isolated. **Rev 5 Deviations** None
4. SG Tube Rupture **Loss** A. RUPTURED SG results in an ECCS (SI) actuation. **Potential Loss** Not Applicable	**RC6: SG Tube Leakage / Rupture** **Loss** 1 RUPTURED SG results in an SI actuation. **Potential Loss** None	**Rev 5 Differences** Added leakage to FPB category title to allow for consistent language with CT6 (NEI CT4) and fleet standardization. **Rev 5 Deviations** None
7. Other Site Specific Indications **Loss** A. (site specific) as applicable. **Potential Loss** A. (site specific) as applicable.	N/A	**Note:** BVPS-2 does not have any additional FPB thresholds in this category. **Rev 5 Differences** None **Rev 5 Deviations** None

<table>
<tr><th>NEI 99-01 Rev. 5</th><th>BVPS-2 EALs</th><th>Difference or Deviation</th></tr>
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CA4

Initiating Condition - ALERT

Inability to maintain plant in cold shutdown.

Operating Mode Applicability: Cold Shutdown, Refueling

Example Emergency Action Level: (1 or 2)

1. An UNPLANNED event results in RCS temperature greater than (site specific Technical Specification cold shutdown temperature limit) for greater than the specified duration on table.

<table>
<tr><th colspan="3">Table: RCS Reheat Duration Thresholds</th></tr>
<tr><th>RCS</th><th>Containment Closure</th><th>Duration</th></tr>
<tr><td>Intact (but not RCS Reduced Inventory [PWR])</td><td>N/A</td><td>60 minutes*</td></tr>
<tr><td rowspan="2">Not Intact or RCS Reduced Inventory (PWR)</td><td>Established</td><td>20 minutes*</td></tr>
<tr><td>Not Established</td><td>0 minutes</td></tr>
<tr><td colspan="3">* If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, the EAL is not applicable.</td></tr>
</table>

2. An UNPLANNED event results in RCS pressure increase greater than 10 psi due to a loss of RCS cooling. (PWR-This EAL does not apply in Solid Plant conditions.)

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CA10

INITIATING CONDITION:

Inability to maintain plant in Cold Shutdown.

Operating Mode Applicability: 5, 6

EALs:

Note: Full inventory is pressurizer level ≥ 22% actual with loop stops either isolated or unisolated.

1. RCS temperature **> 200° F** due to an UNPLANNED loss of decay heat removal capability for greater than the specified duration on **Table C-2.**

<table>
<tr><th colspan="3">Table C-2: RCS Reheat Duration Thresholds</th></tr>
<tr><th>RCS</th><th>CONTAINMENT CLOSURE</th><th>Duration</th></tr>
<tr><td>Intact with Full RCS Inventory</td><td>N/A</td><td>60 minutes*</td></tr>
<tr><td rowspan="2">Not Intact
OR
Not Full RCS Inventory</td><td>Established</td><td>20 minutes*</td></tr>
<tr><td>Not Established</td><td>0 minutes</td></tr>
<tr><td colspan="3">* If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, the EAL is not applicable.</td></tr>
</table>

OR

2. a. RCS temperature cannot be monitored.

   AND

   b. RCS pressure rise **> 10 psi** due to an UNPLANNED loss of decay heat removal capability (this EAL does not apply in RCS solid plant conditions).

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Rev 5 Differences

Specified the UNPLANNED event in CA10.1 as being due to an UNPLANNED loss of decay heat removal capability to be consistent with NEI CU4 IC and the change to CA10.2 in accordance with NEI 99-01 Rev 5 FAQ#13.

Added the site specific condition for full inventory to the site specific basis section and as a note in the EAL section.

Reworded CA10.2 in accordance with NEI 99-01 Rev 5, FAQ# 13.

Reworded the first RCS entry condition in Table C-2 to be a positive statement. Reworded the second condition for consistency with the wording in the first condition. These changes are considered administrative.

Rev 5 Deviations

The conditional statement "RCS temperature cannot be monitored" was added as a condition to CA10.2. This is consistent with the basis of CA4 in the proposed NEI 99-01, Rev 6.

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CU4

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV.

Operating Mode Applicability: Cold Shutdown, Refueling

Example Emergency Action Level: (1 or 2)

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

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

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CU10

INITIATING CONDITION:

UNPLANNED Loss of decay heat removal capability.

Operating Mode Applicability: 5, 6

EALs:

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

1. RCS temperature **> 200° F** due to an UNPLANNED loss of decay heat removal capability.

   OR

2. Loss of **ALL** RCS temperature and RCS level indication for **15 minutes*** or longer.

</td>
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Rev 5 Differences

Removed "with irradiated fuel in reactor vessel" from IC in accordance with NEI 99-01 Rev 5, FAQ#11.

Specified the UNPLANNED event in CU10.1 as being due to an UNPLANNED loss of decay heat removal capability to be consistent with NEI CU4 IC and the change to BVPS-2 CA10.2 in accordance with NEI 99-01 Rev 5 FAQ#13.

Rev 5 Deviations

None

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</table>

Appendix 6
Proposed Beaver Valley Power Station, Unit Nos. 1 and 2 EAL Wallboards

COLD MODE EALs (RCS ≤ 200°F) BEAVER VALLEY UNIT 1 COLD MODE EALs (RCS ≤ 200°F)

BEAVER VALLEY UNIT 1

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY (H)

Columns: GENERAL EMERGENCY | SITE AREA EMERGENCY | ALERT | UNUSUAL EVENT

1 Security

HG1 (1 2 3 4 5 6 D) HOSTILE ACTION resulting in loss of physical control of the facility.

EALs:
1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions listed below:
   - Reactivity Control (ability to shut down the reactor and keep it shut down)
   - RCS inventory (ability to cool the core)
   - Secondary heat removal (ability to maintain a heat sink)

   OR
2. A HOSTILE ACTION has caused failure of spent fuel cooling systems and IMMINENT fuel damage is likely.

HS1 (1 2 3 4 5 6 D) HOSTILE ACTION within the PROTECTED AREA.

EALs:
1. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the Security Shift Supervisor.

HA1 (1 2 3 4 5 6 D) HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat.

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

   OR
2. A validated notification from the NRC of a LARGE AIRCRAFT attack threat within 30 minutes of the site.

HU1 (1 2 3 4 5 6 D) Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant.

EALs:
1. A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by the Security Shift Supervisor.

   OR
2. A credible site specific security threat notification.

   OR
3. A validated notification from the NRC providing information of a LARGE AIRCRAFT threat.

2 CR Evacuation

HS2 (1 2 3 4 5 6 D) Control Room evacuation has been initiated and plant control cannot be established.

EALs:
1. a. Control Room evacuation has been initiated.

   AND

   b. Control of ANY of the following safety functions is not established from an alternate location within 15 minutes.
   - Reactivity Control (ability to shut down the reactor and keep it shut down)
   - RCS inventory (ability to cool the core)
   - Secondary heat removal (ability to maintain a heat sink)

HA2 (1 2 3 4 5 6 D) Control Room evacuation has been initiated.

EALs:
1. Control Room evacuation has been initiated.

3 Natural or Destructive Phenomena

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

Table H-1
• Cable Tunnel (CV-3) • Control Room • Containment Building • Demin. Water Storage Tank (1WT-TK-10) • Diesel Generator Building • Fuel Building • Intake Structure Pump Cubicles • Safeguards (including AFW, Main Steam and Cable Vault Areas) • Primary Auxiliary Building (except elev. 768') • RWST (1QS-TK-1) • Service Building (below elev. 735')

HA3 (1 2 3 4 5 6 D) Natural or destructive phenomena affecting VITAL AREAS.

EALs:
1. a. Seismic event > 0.06g (OBE) acceleration (as indicated by analysis of the Accelerograph Recording System or B lamp on 2ERS-CCC-1 Seismic Instrumentation Central Control Cabinet).

   AND

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

   OR
2. Tornado or high winds > 80 mph resulting in EITHER of the following:
   - VISIBLE DAMAGE to ANY structures in Table H-1 areas containing safety systems or components.
   - Control Room indication of degraded performance of those safety systems.

   OR
3. Internal flooding in Table H-1 areas resulting in EITHER of the following:
   - Electrical shock hazard that precludes access to operate or monitor safety equipment.
   - Control room indication of degraded performance of those safety systems.

   OR
4. High river level > 705 feet MSL resulting in EITHER of the following:
   - VISIBLE DAMAGE to ANY structures in Table H-1 areas containing safety systems or components.
   - Control Room indication of degraded performance of those safety systems.

   OR
5. Low river level (LR-1CW-101) < 650 feet MSL resulting in Control Room indication of degraded performance of safety systems located in Table H-1 areas.

   OR
6. Turbine failure-generated PROJECTILES resulting in EITHER of the following:
   - VISIBLE DAMAGE to or penetration of ANY structures in Table H-1 areas containing safety systems or components.
   - Control Room indication of degraded performance of those safety systems.

   OR
7. Vehicle crash resulting in EITHER of the following:
   - VISIBLE DAMAGE to ANY structures in Table H-1 areas containing safety systems or components.
   - Control Room indication of degraded performance of those safety systems.

HU3 (1 2 3 4 5 6 D) Natural or destructive phenomena affecting the PROTECTED AREA.

EALs:
1. a. Seismic event > 0.01g acceleration (as indicated by initiation of the Accelerograph Recording System on A11-59, Seismic Accelerograph Operation).

   AND

   b. Earthquake confirmed by EITHER of the following:
   - Earthquake felt in plant.
   - National Earthquake Center.

   OR
2. a. Tornado within the PROTECTED AREA.

   OR

   b. High winds > 80 mph.

   OR
3. Internal flooding in Table H-1 areas that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

   OR
4. High river water level > 705 feet MSL.

   OR
5. Low river water level (LR-1CW-101) < 650 feet MSL.

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

4 FIRE / EXPLOSION

Table H-1
• Cable Tunnel (CV-3) • Control Room • Containment Building • Demin. Water Storage Tank (1WT-TK-10) • Diesel Generator Building • Fuel Building • Intake Structure Pump Cubicles • Safeguards (including AFW, Main Steam and Cable Vault Areas) • Primary Auxiliary Building (except elev. 768') • RWST (1QS-TK-1) • Service Building (below elev. 735')

HA4 (1 2 3 4 5 6 D) FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown.

EALs:
1. FIRE or EXPLOSION resulting in EITHER of the following:
   - VISIBLE DAMAGE to ANY structures in Table H-1 areas containing safety systems or components.
   - Control Room indication of degraded performance of those safety systems.

HU4 (1 2 3 4 5 6 D) FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA.

EALs:

Note: Immediately adjacent to applies to FIRES that directly impact or obstruct the areas of concern.

1. FIRE not extinguished within 15 minutes* of Control Room notification or verification of a Control Room FIRE alarm in actual contact with or immediately adjacent to ANY of the Table H-1 areas.

   OR
2. EXPLOSION within the PROTECTED AREA.

5 Toxic Gas

HA5 (1 2 3 4 5 6 D) Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor.

EALs:

Notes:
- If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.
- This EAL does not apply to FIRE fighting activities that automatically or manually activate a FIRE suppression system in an area.

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

HU5 (1 2 3 4 5 6 D) Release of toxic, corrosive, asphyxiant or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS.

EALs:

Note: This EAL does not apply to FIRE fighting activities that automatically or manually activate a FIRE suppression system in an area.

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

   OR
2. Report by local, county or state officials for evacuation or sheltering of site personnel based on an offsite event.

6 EMERGENCY DIRECTOR Judgment

HG6 (1 2 3 4 5 6 D) Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of GENERAL EMERGENCY.

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

HS6 (1 2 3 4 5 6 D) Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of SITE AREA EMERGENCY.

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

HA6 (1 2 3 4 5 6 D) Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of an ALERT.

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

HU6 (1 2 3 4 5 6 D) Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of an UNUSUAL EVENT.

EALs:
1. Other conditions exist which in the judgment of the EMERGENCY DIRECTOR indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

DRY FUEL STORAGE FACILITY (E)

Columns: GENERAL EMERGENCY | SITE AREA EMERGENCY | ALERT | UNUSUAL EVENT

1 Dry Fuel Storage Facility

E-HU1 (NOT APPLICABLE) Damage to a loaded cask CONFINEMENT BOUNDARY.

EALs:
1. Damage to a loaded cask CONFINEMENT BOUNDARY.

DRY FUEL STORAGE FACILITY

RADIOLOGICAL EFFLUENT / ABNORMAL RADIATION LEVELS (R)

Columns: GENERAL EMERGENCY | SITE AREA EMERGENCY | ALERT | UNUSUAL EVENT

1 Radiological Effluent

RG1 (1 2 3 4 5 6 D) Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem CDE Child Thyroid for the actual or projected duration of the release using actual meteorology.

EALs:

Note: If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. ANY of the following gaseous effluent monitors greater than the reading shown for 15 minutes* or longer:
   - SLCRS Vent (RM-1VS-110 Ch 7) .... 7.66E+02 cpm
   - Ventilation Vent (RM-1VS-109 Ch 7).. 8.42E+02 cpm

   OR
2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of EITHER of the following:
   - > 1000 mRem TEDE.
   - > 5000 mRem CDE Child Thyroid.

   OR
3. Field survey results at or beyond the site boundary indicate EITHER of the following:
   - Gamma (closed window) dose rate > 1000 mR/hr for 60 minutes* or longer.
   - Air sample analysis > 5000 mRem CDE Child Thyroid for one hour of inhalation.

RS1 (1 2 3 4 5 6 D) Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem CDE Child Thyroid for the actual or projected duration of the release using actual meteorology.

EALs:

Note: If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. ANY of the following gaseous effluent monitors greater than the reading shown for 15 minutes* or longer:
   - SLCRS Vent (RM-1VS-110 Ch 7) .... 7.66E+01 cpm
   - Ventilation Vent (RM-1VS-109 Ch 7).. 8.42E+01 cpm

   OR
2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of EITHER of the following:
   - > 100 mRem TEDE.
   - > 500 mRem CDE Child Thyroid.

   OR
3. Field survey results at or beyond the site boundary indicate EITHER of the following:
   - Gamma (closed window) dose rate > 100 mR/hr for 60 minutes* or longer.
   - Air sample analysis > 500 mRem CDE Child Thyroid for one hour of inhalation.

RA1 (1 2 3 4 5 6 D) Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM limit for 15 minutes or longer.

EALs:

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

1. ANY of the following gaseous effluent monitors greater than the reading shown for 15 minutes or longer:
   - SLCRS Vent (RM-1VS-110 Ch 5) .... 6.78E+05 cpm
   - Ventilation Vent (RM-1VS-109 Ch 5).. 2.94E+05 cpm

   OR
2. ANY of the following liquid effluent monitors > 200 times the High-High alarm setpoint, not to exceed 8.5E+05 cpm, established by a current radioactivity discharge permit for 15 minutes or longer:
   - Liquid Waste Effluent Monitor (RM-1LW-104)
   - Laundry and Contaminated Shower Drains Monitor (RM-1LW-116)

   OR
3. Confirmed sample analysis for gaseous or liquid releases > 200 times the ODCM limit for 15 minutes or longer.

RU1 (1 2 3 4 5 6 D) Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM limit for 60 minutes or longer.

EALs:

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

1. ANY of the following gaseous effluent monitors greater than the reading shown for 60 minutes or longer:
   - SLCRS Vent (RM-1VS-110 Ch 5) .... 6.76E+03 cpm
   - Ventilation Vent (RM-1VS-109 Ch 5).. 2.94E+03 cpm

   OR
2. ANY of the following liquid effluent monitors > 2 times the High-High alarm setpoint established by a current radioactivity discharge permit for 60 minutes or longer:
   - Liquid Waste Effluent Monitor (RM-1LW-104)
   - Laundry and Contaminated Shower Drains Monitor (RM-1LW-116)

   OR
3. Confirmed sample analysis for gaseous or liquid releases > 2 times the ODCM limit for 60 minutes or longer.

2 Abnormal Radiation Levels

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

RA2 (1 2 3 4 5 6 D) Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel.

EALs:
1. A water level drop in the spent fuel pool, transfer canal or reactor cavity that will result in irradiated fuel becoming uncovered.

   OR
2. > 1000 mR/hr reading on ANY of the following due to damage to irradiated fuel or loss of water level:
   - Manipulator Crane Area Monitor (RM-1RM-203)
   - Fuel Pool Bridge Area Monitor (RM-1RM-207)

RU2 (1 2 3 4 5 6 D) UNPLANNED rise in plant radiation levels.

EALs:
1. a. UNPLANNED water level drop in the spent fuel pool, transfer canal or reactor cavity as indicated by level < Tech Spec Minimum (23 feet).

   AND

   b. Area radiation monitor rise resulting in a High-High alarm on ANY of the following:
   - Manipulator Crane Area Monitor (RM-1RM-203)
   - Fuel Pool Bridge Area Monitor (RM-1RM-207)

   OR
2. UNPLANNED area radiation monitor or radiation survey > 1000 times NORMAL LEVELS.

3

RA3 (1 2 3 4 5 6 D) Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions.

EALs:
1. Dose rate > 15 mR/hr in ANY of the following areas requiring continuous occupancy to maintain plant safety functions:
   - Control Room
   - Central Alarm Station
   - Secondary Alarm Station

RADIOLOGICAL EFFLUENT / ABNORMAL RADIATION LEVELS

SYSTEM MALFUNCTIONS - COLD (C)

Columns: GENERAL EMERGENCY | SITE AREA EMERGENCY | ALERT | UNUSUAL EVENT

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

1 Loss of AC Power

CA1 (5 6 D) Loss of all offsite and all onsite AC power to emergency busses for 15 minutes or longer.

EALs:
1. Loss of ALL offsite and ALL onsite AC power to BOTH AE and DF 4KV emergency busses for 15 minutes* or longer.

CU1 (5 6) AC power capability to emergency busses reduced to a single source for 15 minutes or longer.

EALs:
1. a. AC power to AE and DF 4KV emergency busses is reduced to a single source for 15 minutes* or longer.

   AND

   b. Any additional single power source failure will result in loss of ALL AC power to BOTH AE and DF 4KV emergency busses.

2 Loss of DC Power

CU2 (5 6) Loss of required DC power for 15 minutes or longer.

EALs:
1. Bus voltage indication on the required DC busses less than the following for 15 minutes* or longer:
   - < 110.4 VDC on Bus 1-1 or Bus 1-2
   - < 110.0 VDC on Bus 1-3 or Bus 1-4

3 Failure of RPS

CU3 (5 6) Inadvertent criticality.

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

6 Communications

CU6 (5 6 D) Loss of all onsite or offsite communications capabilities.

EALs:
1. Loss of ALL of the following onsite communication methods affecting the ability to perform routine operations:
   - Radios.
   - Plant page.
   - Plant telephone system (hardwired).

   OR
2. Loss of ALL of the following offsite comunications methods affecting the ability to perform offsite notifications:
   - NRC Emergency Notification System - ENS (Red Phone)
   - NRC Health Physics Network - HPN.
   - Commercial telephones (hardwired and wireless).

7 / 8 RCS Leakage

CG7 (5 6) Loss of RCS inventory affecting fuel clad integrity with containment challenged.

EALs:
1. a. RCS level < 58% RVLIS Full Range (top of active fuel) for 30 minutes* or longer.

   AND

   b. ANY Table C-1 containment challenge indications.

   OR
2. a. RCS level cannot be monitored with core uncovery for 30 minutes* or longer.

   AND

   b. Loss of RCS inventory as indicated by ANY of the following:
   - Containment Radiation Monitor (RM-1RM-219A or B) > 15 R/hr.
   - Erratic source range monitor indication.
   - UNPLANNED level rise in Containment sumps or incore instrument sump.

   AND

   c. ANY Table C-1 containment challenge indications.

Table C-1: Containment Challenge Indications
• CONTAINMENT CLOSURE not established. • Hydrogen concentration > 4% inside containment. • UNPLANNED rise in containment pressure.

CS7 (5 6) Loss of RCS inventory affecting core decay heat removal capability.

EALs:
1. a. CONTAINMENT CLOSURE not established.

   AND

   b. RCS level < 64% RVLIS Full Range (6" below bottom of hot leg).

   OR
2. a. CONTAINMENT CLOSURE established.

   AND

   b. RCS level < 58% RVLIS Full Range (top of active fuel).

   OR
3. a. RCS level cannot be monitored for 30 minutes* or longer.

   AND

   b. Loss of RCS inventory as indicated by ANY of the following:
   - Containment Radiation Monitor (RM-1RM-219A or B) > 15 R/hr.
   - Erratic source range monitor indication.
   - UNPLANNED level rise in Containment sumps or incore instrument sump.

CA7 (5 6) Loss of RCS inventory.

EALs:
1. Loss of RCS inventory as indicated by ANY of the following:
   - RVLIS Full Range Level (LT-1RC-1311) < 65% (bottom of hot leg).
   - Refueling Outage Temporary Level Instrument (LI-1RC-481C) < 16 inches (Reduced Inventory Only).
   - Refueling Outage Temporary Level Instrument (LI-1RC-482C) < 6 inches (Midloop Only).

   OR
2. a. RCS level cannot be monitored for 15 minutes* or longer.

   AND

   b. Loss of RCS inventory as indicated by UNPLANNED level rise in Containment sumps or incore instrument sump.

CU7 (5) RCS leakage.

EALs:

Note: Relief valve normal operation should be excluded unless it fails to close and cannot be isolated.

1. RCS leakage results in the inability to maintain or restore RCS level > Target Level Band for 15 minutes* or longer.

CU8 (6) UNPLANNED loss of RCS inventory.

EALs:
1. UNPLANNED RCS level drop as indicated by EITHER of the following:
   - Refueling Outage Temporary Level Instruments (LI-1RC-481C) < 97 inches (vessel flange) for 15 minutes* or longer when when the RCS level band is established above the vessel flange.

     OR
   - RCS water level drop below the RCS level band for 15 minutes* or longer when the RCS level band is established below the vessel flange.

   OR
2. a. RCS level cannot be monitored.

   AND

   b. Loss of RCS inventory as indicated by UNPLANNED level rise in Containment sumps or incore instrument sump.

10 Heat Sink

Table C-2: RCS Reheat Duration Thresholds		
RCS	Cont Closure	Duration
Intact with Full RCS inventory	N/A	> 60 min**
Not Intact OR Not Full RCS Inventory	Established	> 20 min**
	Not Established	0 min

** If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, this EAL is not applicable.

CA10 (5 6) Inability to maintain plant in cold shutdown.

EALs:

Note: Full inventory is pressurizer level ≥ 22% actual with loop stops either isolated or unisolated.

1. RCS temperature > 200° F due to an UNPLANNED loss of decay heat removal capability for greater than the specified duration on Table C-2.

   OR
2. a. RCS temperature cannot be monitored.

   AND

   b. RCS pressure rise > 10 psi due to an UNPLANNED loss of decay heat removal capability (this EAL does not apply in RCS solid plant conditions).

CU10 (5 6) UNPLANNED Loss of decay heat removal capability.

EALs:
1. RCS temperature > 200° F due to an UNPLANNED loss of decay heat removal capability.

   OR
2. Loss of ALL RCS temperature and RCS level indication for 15 minutes* or longer.

SYSTEM MALFUNCTIONS - COLD

DEFINITIONS

The terms defined in this section are those which are used in special context in this document and/or are unique to the Beaver Valley Power Station (BVPS).

AFFECTING SAFE SHUTDOWN – Event in progress has adversely affected functions that are necessary to bring the plant to and maintain it in the applicable Hot or Cold Shutdown condition. Plant condition applicability is determined by Technical Specification LCOs in effect.

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

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

BOMB – An explosive device suspected of having sufficient force to damage plant systems or structures.

CIVIL DISTURBANCE – A group of persons violently protesting station operations or activities at the site. This event does not involve HOSTILE ACTIONs. Peaceful demonstrations are not CIVIL DISTURBANCES.

COMPENSATORY INDICATIONS – Computer points, In-Plant Computer - IPC (U1), Inadequate Core Cooling Monitor - ICCM (U1), Sequence of Events Recorder - SER (U1), Plant Computer System - PCS (U2), Plant Safety Monitoring System - PSMS (U2) and Pi Data (ProcessBook®).

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

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

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

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

- **UNUSUAL EVENT** – Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to the facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.
- **ALERT** – Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guide exposure levels.
- **SITE AREA EMERGENCY** – Events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to, equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guide exposure levels beyond the site boundary.
- **GENERAL EMERGENCY** – Events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guide exposure levels offsite for more than the immediate site area.

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

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

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

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

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

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

IMMINENT / IMPENDING – Means about to happen (generally within 30 minutes).

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

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

LARGE AIRCRAFT – Any size or type of aircraft with the potential for causing significant damage to the plant (refer to the Security Plan for a more detailed definition).

NORMAL LEVELS – The highest reading in the past twenty-four hours excluding the current peak value.

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

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

PROJECTILE – Means a fired, projected object, such as a bullet or pellet having no capacity for self propulsion directed towards a nuclear power plant that could cause concern for its continued operability, reliability or personnel safety.

PROTECTED AREA – Means an area encompassed by physical barriers and to which access is controlled.

RUPTURED – In a steam generator, existence of primary-to-secondary leakage of a magnitude sufficient to require or cause a reactor trip and safety injection.

SABOTAGE – Deliberate damage, mis-alignment, or mis-operation of plant equipment with the intent to render the equipment inoperable. Equipment found tampered with or damaged due to malicious mischief may not meet the definition of SABOTAGE until this determination is made by security supervision.

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

STRIKE ACTION – A work stoppage within the protected area by a body of workers to enforce compliance with demands made on management. The STRIKE ACTION must threaten to interrupt NORMAL PLANT OPERATIONS.

UNAFFECTED AREA – Any area or location which is known to be not significantly affected by radiation levels or other hazardous conditions.

UNISOLABLE – A breach or leak that cannot be promptly isolated.

UNPLANNED – A parameter change or an event, the reasons for which may be known or unknown, that is not the result of an intended evolution or expected plant response to a transient.

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

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

VITAL AREA – Means any area that contains VITAL EQUIPMENT.

VITAL EQUIPMENT – Means any equipment, system, device, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation. Equipment or systems which would be required to function to protect public health and safety following such failure, destruction, or release are also considered to be vital.

Beaver Valley Unit 1 COLD EAL WALL BOARD Revision 00 EAL Technical Basis Manual

FirstEnergy

WALL BOARDS FOR "INFORMATION ONLY"

EAL Identifier

XXX.X

- Category (R,H,E,S,F,C)
- Emergency classification (G,S,A,U)
- Subcategory number (1 if no subcategory)
- Sequential number within subcategory/classification

BEAVER VALLEY UNIT 1

Modes:

1	2	3	4	5	6	D
Power Operation >5% Rx Power	Startup ≤ 5% Rx Power	Hot Standby ≥ 350°F	Hot Shutdown >200°F	Cold Shutdown ≤ 200°F	Refueling	Defueled

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY (H)

Columns: GENERAL EMERGENCY | SITE AREA EMERGENCY | ALERT | UNUSUAL EVENT

H1 – Security

HG1 (Modes 1 2 3 4 5 6 D) – HOSTILE ACTION resulting in loss of physical control of the facility.
EALs:
1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions listed below:
   - Reactivity Control (ability to shut down the reactor and keep it shut down)
   - RCS inventory (ability to cool the core)
   - Secondary heat removal (ability to maintain a heat sink)

   OR
2. A HOSTILE ACTION has caused failure of spent fuel cooling systems and IMMINENT fuel damage is likely.

HS1 (Modes 1 2 3 4 5 6 D) – HOSTILE ACTION within the PROTECTED AREA.
EALs:
1. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the Security Shift Supervisor.

HA1 (Modes 1 2 3 4 5 6 D) – HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat.
EALs:
1. A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the Security Shift Supervisor.

   OR
2. A validated notification from the NRC of a LARGE AIRCRAFT attack threat within 30 minutes of the site.

HU1 (Modes 1 2 3 4 5 6 D) – Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant.
EALs:
1. A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by the Security Shift Supervisor.

   OR
2. A credible site specific security threat notification.

   OR
3. A validated notification from the NRC providing information of a LARGE AIRCRAFT threat.

H2 – CR Evacuation

HS2 (Modes 1 2 3 4 5 6 D) – Control Room evacuation has been initiated and plant control cannot be established.
EALs:
1. a. Control Room evacuation has been initiated.

   AND

   b. Control of ANY of the following safety functions is not established from an alternate location within 15 minutes.
   - Reactivity Control (ability to shut down the reactor and keep it shut down)
   - RCS inventory (ability to cool the core)
   - Secondary heat removal (ability to maintain a heat sink)

HA2 (Modes 1 2 3 4 5 6 D) – Control Room evacuation has been initiated.
EALs:
1. Control Room evacuation has been initiated.

H3 – Natural or Destructive Phenomena

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

Table H-1
- Cable Tunnel (CV-3)
- Control Room
- Containment Building
- Demin. Water Storage Tank (1WT-TK-10)
- Diesel Generator Building
- Fuel Building
- Intake Structure Pump Cubicles
- Safeguards (including AFW, Main Steam and Cable Vault Areas)
- Primary Auxiliary Building (except elev. 768')
- RWST (1QS-TK-1)
- Service Building (below elev. 735')

HA3 (Modes 1 2 3 4 5 6 D) – Natural or destructive phenomena affecting VITAL AREAS.
EALs:
1. a. Seismic event > 0.06g (OBE) acceleration (as indicated by analysis of the Accelerograph Recording System or lit lamp on 2ERS-CCC-1 Seismic Instrumentation Central Control Cabinet).

   AND

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

   OR
2. Tornado or high winds > 80 mph resulting in EITHER of the following:
   - VISIBLE DAMAGE to ANY structures in Table H-1 areas containing safety systems or components.
   - Control Room indication of degraded performance of those safety systems.

   OR
3. Internal flooding in Table H-1 areas resulting in EITHER of the following:
   - Electrical shock hazard that precludes access to operate or monitor safety equipment.
   - Control room indication of degraded performance of those safety systems.

   OR
4. High river level > 705 feet MSL resulting in EITHER of the following:
   - VISIBLE DAMAGE to ANY structures in Table H-1 areas containing safety systems or components.
   - Control Room indication of degraded performance of those safety systems.

   OR
5. Low river level (LR-1CW-101) < 650 feet MSL resulting in Control Room indication of degraded performance of safety systems located in Table H-1 areas.

   OR
6. Turbine failure-generated PROJECTILES resulting in EITHER of the following:
   - VISIBLE DAMAGE to or penetration of ANY structures in Table H-1 areas containing safety systems or components.
   - Control Room indication of degraded performance of those safety systems.

   OR
7. Vehicle crash resulting in EITHER of the following:
   - VISIBLE DAMAGE to ANY structures in Table H-1 areas containing safety systems or components.
   - Control Room indication of degraded performance of those safety systems.

HU3 (Modes 1 2 3 4 5 6 D) – Natural or destructive phenomena affecting the PROTECTED AREA.
EALs:
1. a. Seismic event > 0.01g acceleration (as indicated by initiation of the Accelerograph Recording System on A11-59, Seismic Accelerograph Operation).

   AND

   b. Earthquake confirmed by EITHER of the following:
   - Earthquake felt in plant.
   - National Earthquake Center.

   OR
2. a. Tornado within the PROTECTED AREA.

   OR

   b. High winds > 80 mph.

   OR
3. Internal flooding in Table H-1 areas that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

   OR
4. High river water level > 705 feet MSL.

   OR
5. Low river water level (LR-1CW-101) < 650 feet MSL.

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

H4 – FIRE / EXPLOSION

Table H-1
- Cable Tunnel (CV-3)
- Control Room
- Containment Building
- Demin. Water Storage Tank (1WT-TK-10)
- Diesel Generator Building
- Fuel Building
- Intake Structure Pump Cubicles
- Safeguards (including AFW, Main Steam and Cable Vault Areas)
- Primary Auxiliary Building (except elev. 768')
- RWST (1QS-TK-1)
- Service Building (below elev. 735')

HA4 (Modes 1 2 3 4 5 6 D) – FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown.
EALs:
1. FIRE or EXPLOSION resulting in EITHER of the following:
   - VISIBLE DAMAGE to ANY structures in Table H-1 areas containing safety systems or components.
   - Control Room indication of degraded performance of those safety systems.

HU4 (Modes 1 2 3 4 5 6 D) – FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA.
EALs:
Note: Immediately adjacent to applies to FIRES that directly impact or obstruct the areas of concern.
1. FIRE not extinguished within 15 minutes* of Control Room notification or verification of a Control Room FIRE alarm in actual contact with or immediately adjacent to ANY of the Table H-1 areas.

   OR
2. EXPLOSION within the PROTECTED AREA.

H5 – Toxic Gas

HA5 (Modes 1 2 3 4 5 6 D) – Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor.
EALs:
Notes:
- If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.
- This EAL does not apply to FIRE fighting activities that automatically or manually activate a FIRE suppression system in an area.

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

HU5 (Modes 1 2 3 4 5 6 D) – Release of toxic, corrosive, asphyxiant or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS.
EALs:
Note: This EAL does not apply to FIRE fighting activities that automatically or manually activate a FIRE suppression system in an area.
1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS.

   OR
2. Report by local, county or state officials for evacuation or sheltering of site personnel based on an offsite event.

H6 – EMERGENCY DIRECTOR Judgment

HG6 (Modes 1 2 3 4 5 6 D) – Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of GENERAL EMERGENCY.
EALs:
1. Other conditions exist which in the judgment of the EMERGENCY DIRECTOR indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guide exposure levels offsite for more than the immediate site area.

HS6 (Modes 1 2 3 4 5 6 D) – Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of SITE AREA EMERGENCY.
EALs:
1. Other conditions exist which in the judgment of the EMERGENCY DIRECTOR indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts: (1) toward site personnel or equipment that could lead to the likely failure of or, (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guide exposure levels beyond the site boundary.

HA6 (Modes 1 2 3 4 5 6 D) – Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of an ALERT.
EALs:
1. Other conditions exist which in the judgment of the EMERGENCY DIRECTOR indicate that events are in progress or have occurred which involve actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guide exposure levels.

HU6 (Modes 1 2 3 4 5 6 D) – Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of an UNUSUAL EVENT.
EALs:
1. Other conditions exist which in the judgment of the EMERGENCY DIRECTOR indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

DRY FUEL STORAGE FACILITY (E)

Columns: GENERAL EMERGENCY | SITE AREA EMERGENCY | ALERT | UNUSUAL EVENT

E1 – Dry Fuel Storage Facility

E-HU1 (NOT APPLICABLE) – Damage to a loaded cask CONFINEMENT BOUNDARY.
EALs:
1. Damage to a loaded cask CONFINEMENT BOUNDARY.

DRY FUEL STORAGE FACILITY

RADIOLOGICAL EFFLUENT / ABNORMAL RADIATION LEVELS (R)

Columns: GENERAL EMERGENCY | SITE AREA EMERGENCY | ALERT | UNUSUAL EVENT

R1 – Radiological Effluent

RG1 (Modes 1 2 3 4 5 6 D) – Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem CDE Child Thyroid for the actual or projected duration of the release using actual meteorology.
EALs:
Note: If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.
1. ANY of the following gaseous effluent monitors greater than the reading shown for 15 minutes* or longer:
   - SLCRS Vent (RM-1VS-110 Ch 7) ....7.66E+02 cpm
   - Ventilation Vent (RM-1VS-109 Ch 7)...6.42E+02 cpm

   OR
2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of EITHER of the following:
   - > 1000 mRem TEDE.
   - > 5000 mRem CDE Child Thyroid.

   OR
3. Field survey results at or beyond the site boundary indicate EITHER of the following:
   - Gamma (closed window) dose rate > 1000 mR/hr for 60 minutes* or longer.
   - Air sample analysis > 5000 mRem CDE Child Thyroid for one hour of inhalation.

RS1 (Modes 1 2 3 4 5 6 D) – Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem CDE Child Thyroid for the actual or projected duration of the release using actual meteorology.
EALs:
Note: If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.
1. ANY of the following gaseous effluent monitors greater than the reading shown for 15 minutes* or longer:
   - SLCRS Vent (RM-1VS-110 Ch 7) ....7.66E+01 cpm
   - Ventilation Vent (RM-1VS-109 Ch 7)...6.42E+01 cpm

   OR
2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of EITHER of the following:
   - > 100 mRem TEDE.
   - > 500 mRem CDE Child Thyroid.

   OR
3. Field survey results at or beyond the site boundary indicate EITHER of the following:
   - Gamma (closed window) dose rate > 100 mR/hr for 60 minutes* or longer.
   - Air sample analysis > 500 mRem CDE Child Thyroid for one hour of inhalation.

RA1 (Modes 1 2 3 4 5 6 D) – Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM limit for 15 minutes or longer.
EALs:
Note: The EMERGENCY DIRECTOR should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.
1. ANY of the following gaseous effluent monitors greater than the reading shown for 15 minutes or longer:
   - SLCRS Vent (RM-1VS-110 Ch 5) ....6.76E+05 cpm
   - Ventilation Vent (RM-1VS-109 Ch 5)...2.94E+05 cpm

   OR
2. ANY of the following liquid effluent monitors > 200 times the High-High alarm setpoint, not to exceed 8.5E+05 cpm, established by a current radioactivity discharge permit for 15 minutes or longer:
   - Liquid Waste Effluent Monitor (RM-1LW-104)
   - Laundry and Contaminated Shower Drains Monitor (RM-1LW-116)

   OR
3. Confirmed sample analysis for gaseous or liquid releases > 200 times the ODCM limit for 15 minutes or longer.

RU1 (Modes 1 2 3 4 5 6 D) – Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM limit for 60 minutes or longer.
EALs:
Note: The EMERGENCY DIRECTOR should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.
1. ANY of the following gaseous effluent monitors greater than the reading shown for 60 minutes or longer:
   - SLCRS Vent (RM-1VS-110 Ch 5) ....6.76E+03 cpm
   - Ventilation Vent (RM-1VS-109 Ch 5)...2.94E+03 cpm

   OR
2. ANY of the following liquid effluent monitors > 2 times the High-High alarm setpoint established by a current radioactivity discharge permit for 60 minutes or longer:
   - Liquid Waste Effluent Monitor (RM-1LW-104)
   - Laundry and Contaminated Shower Drains Monitor (RM-1LW-116)

   OR
3. Confirmed sample analysis for gaseous or liquid releases > 2 times the ODCM limit for 60 minutes or longer.

R2 – Abnormal Radiation Levels

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

RA2 (Modes 1 2 3 4 5 6 D) – Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel.
EALs:
1. A water level drop in the spent fuel pool, transfer canal or reactor cavity that will result in irradiated fuel becoming uncovered.

   OR
2. > 1000 mR/hr reading on ANY of the following due to damage to irradiated fuel or loss of water level:
   - Manipulator Crane Area Monitor (RM-1RM-203)
   - Fuel Pool Bridge Area Monitor (RM-1RM-207)

RU2 (Modes 1 2 3 4 5 6 D) – UNPLANNED rise in plant radiation levels.
EALs:
1. a. UNPLANNED water level drop in the spent fuel pool, transfer canal or reactor cavity as indicated by level < Tech Spec Minimum (23 feet).

   AND

   b. Area radiation monitor rise resulting in a High-High alarm on ANY of the following:
   - Manipulator Crane Area Monitor (RM-1RM-203)
   - Fuel Pool Bridge Area Monitor (RM-1RM-207)

   OR
2. UNPLANNED area radiation monitor or radiation survey > 1000 times NORMAL LEVELS.

R3 – Abnormal Radiation Levels

RA3 (Modes 1 2 3 4 5 6 D) – Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions.
EALs:
1. Dose rate > 15 mR/hr in ANY of the following areas requiring continuous occupancy to maintain plant safety functions:
   - Control Room
   - Central Alarm Station
   - Secondary Alarm Station

RADIOLOGICAL EFFLUENT / ABNORMAL RADIATION LEVELS

SYSTEM MALFUNCTIONS - HOT (S)

Columns: GENERAL EMERGENCY | SITE AREA EMERGENCY | ALERT | UNUSUAL EVENT

S1 – Loss of AC Power

SG1 (Modes 1 2 3 4) – Prolonged loss of all offsite and all onsite AC power to emergency busses.
EALs:
1. a. Loss of ALL offsite and ALL onsite AC power to BOTH AE and DF 4KV emergency busses.

   AND

   b. EITHER of the following:
   - Restoration of EITHER the AE 4KV emergency bus OR DF 4KV emergency bus with 4 hours is not likely.
   - Core Cooling - Red entry conditions met.

SS1 (Modes 1 2 3 4) – Loss of all offsite and all onsite AC power to emergency busses for 15 minutes or longer.
EALs:
Note: Credit cannot be taken for emergency busses being powered from the other unit's emergency diesel generators.
1. Loss of ALL offsite and ALL onsite AC power to BOTH AE and DF 4KV emergency busses for 15 minutes* or longer.

SA1 (Modes 1 2 3 4) – AC power capability to emergency busses reduced to a single source for 15 minutes or longer.
EALs:
1. a. AC power to AE and DF 4KV emergency busses is reduced to a single power source for 15 minutes* or longer.

   AND

   b. Any additional single power source failure will result in loss of ALL AC power to BOTH AE and DF 4KV emergency busses.

SU1 (Modes 1 2 3 4) – Loss of all offsite AC power to emergency busses for 15 minutes or longer.
EALs:
1. Loss of ALL offsite AC power to BOTH AE and DF 4KV emergency busses for 15 minutes* or longer.

S2 – Loss of DC Power

SS2 (Modes 1 2 3 4) – Loss of all vital DC power for 15 minutes or longer.
EALs:
1. Bus voltage indication on ALL safety related DC busses less than the following for 15 minutes* or longer:
   - < 110.4 VDC on Busses 1-1 and 1-2
   - < 110.0 VDC on Busses 1-3 and 1-4

S3 – Failure of RPS

SG3 (Modes 1 2) – Automatic trip and all manual actions failed to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists.
EALs:
1. a. An automatic reactor trip failed to shutdown the reactor as indicated by reactor power > 5%.

   AND

   b. ALL manual trip actions failed to shutdown the reactor as indicated by reactor power > 5%.

   AND

   c. EITHER of the following has occurred:
   - Core Cooling - Red entry conditions met.
   - Heat Sink - Red entry conditions met.

SS3 (Modes 1 2) – Automatic trip and manual actions taken within the Controls Area (CA) failed to shutdown the reactor.
EALs:
1. a. An automatic reactor trip failed to shutdown the reactor as indicated by reactor power > 5%.

   AND

   b. Manual trip actions taken within the Controls Area (CA) failed to shutdown the reactor as indicated by reactor power > 5%.

SA3 (Modes 1 2) – Automatic trip failed to shutdown the reactor and the manual actions taken from the Controls Area (CA) are successful in shutting down the reactor.
EALs:
1. a. An automatic reactor trip failed to shutdown the reactor.

   AND

   b. Manual trip actions taken within the Controls Area (CA) successfully shutdown the reactor as indicated by reactor power ≤ 5%.

SU3 (Modes 3 4) – Inadvertent criticality.
EALs:
1. UNPLANNED sustained positive startup rate observed on nuclear instrumentation.

S4 – Annunciators

Table S-1: Critical Safety Functions
- Reactivity Control (ability to shut down the reactor and keep it shut down)
- RCS inventory (ability to cool the core)
- Secondary heat removal (ability to maintain a heat sink)

Table S-2: Significant Transients
- Automatic turbine runback > 25% thermal power
- Electrical load rejection > 25% full electrical load
- Reactor trip
- Safety injection actuation

SS4 (Modes 1 2 3 4) – Inability to monitor a significant transient in progress.
EALs:
1. a. Loss of > 75% of EITHER of the following for 15 minutes* or longer:
   - Control Room Annunciator Panels (A1 - A13).

     OR
   - Control Room critical safety function indications (Table S-1).

   AND

   b. A Table S-2 significant transient is in progress.

   AND

   c. COMPENSATORY INDICATIONS are unavailable.

SA4 (Modes 1 2 3 4) – Loss of safety system annunciation or indication in the Control Room with either: (1) a significant transient in progress, or (2) COMPENSATORY INDICATIONS are unavailable.
EALs:
1. a. Loss of > 75% of EITHER of the following for 15 minutes* or longer.
   - Control Room Annunciator Panels (A1 - A13).

     OR
   - Control Room critical safety function indications (Table S-1).

   AND

   b. EITHER of the following:
   - A Table S-2 significant transient is in progress.

     OR
   - COMPENSATORY INDICATIONS are unavailable.

SU4 (Modes 1 2 3 4) – Loss of safety system annunciation or indication in the Control Room for 15 minutes or longer.
EALs:
1. Loss of > 75% of EITHER of the following for 15 minutes* or longer:
   - Control Room Annunciator Panels (A1 - A13).

     OR
   - Control Room critical safety function indications (Table S-1).

S5 – T.S. Limits

SU5 (Modes 1 2 3 4) – Inability to reach required operating mode within Technical Specification limits.
EALs:
1. Plant is not brought to required operating mode within Technical Specification LCO action statement time.

S6 – Communications

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

SU6 (Modes 1 2 3 4) – Loss of all onsite or offsite communications capabilities.
EALs:
1. Loss of ALL of the following onsite communication methods affecting the ability to perform routine operations:
   - Radios.
   - Plant page.
   - Plant telephone system (hardwired).

   OR
2. Loss of ALL of the following offsite communications methods affecting the ability to perform offsite notifications:
   - NRC Emergency Notification System - ENS (Red Phone).
   - NRC Health Physics Network - HPN.
   - Commercial telephones (hardwired and wireless).

S7 – RCS Leakage

SU7 (Modes 1 2 3 4) – RCS leakage.
EALs:
Notes:
- Identified, unidentified and pressure boundary RCS leakage as defined by Technical Specifications.
- Relief valve normal operation should be excluded unless it fails to close and cannot be isolated.

1. Unidentified or pressure boundary leakage > 10 gpm.

   OR
2. Identified leakage > 25 gpm.

S9 – Fuel Clad Degradation

SU9 (Modes 1 2 3 4) – Fuel clad degradation.
EALs:
1. Letdown Monitor (RM-1CH-101A or B) > 6.8E+04 cpm.

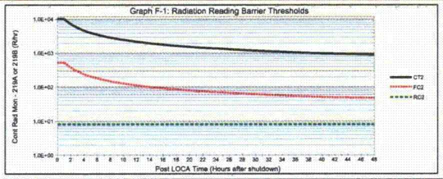
   OR
2. RCS activity > 21 μCi/gm dose equivalent I-131.

SYSTEM MALFUNCTIONS - HOT

FISSION PRODUCT BARRIER DEGRADATION (F)

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
FG1 (Modes 1 2 3 4) 1. Loss of any two barriers and loss or potential loss of the third barrier.	FS1 (Modes 1 2 3 4) 1. Loss or potential loss of any two barriers.	FA1 (Modes 1 2 3 4) 1. Any loss or any potential loss of either fuel clad or RCS.	FU1 (Modes 1 2 3 4) 1. Any loss or any potential loss of containment.

FPB Identifier
XXX
Barrier Abreviation (FC, RC, or CT) — Sub Category (1-10)



Sub-Category	FC - FUEL CLAD Loss	FC - FUEL CLAD Potential Loss	RC - REACTOR COOLANT SYSTEM Loss	RC - REACTOR COOLANT SYSTEM Potential Loss	CT - CONTAINMENT Loss	CT - CONTAINMENT Potential Loss
1. Critical Safety Function Status	1. Core Cooling - Red entry conditions met.	1. Core Cooling - Orange entry conditions met. OR 2. a. Heat Sink - Red entry conditions met. AND b. Heat Sink is required.		1. RCS Integrity - Red entry conditions met. OR 2. a. Heat Sink - Red entry conditions met AND b. Heat Sink is required.		1. Containment - Red entry conditions met.
2. Containment Rad Monitoring	1. Containment Radiation Monitor (RM-1RM-219A or B) > FC2 Line on Graph F-1.		1. Containment Radiation Monitor (RM-1RM-219A or B) > 8 R/hr. (RC2 Line on Graph F-1).			1. Containment Radiation Monitor (RM-1RM-219A or B) > CT2 Line on Graph F-1.
3. Core Temperature	1. Five hottest core exit thermocouples > 1200° F.	1. Five hottest core exit thermocouples > 719° F.				1. a. Five hottest core exit thermocouples > 2000°F. AND b. Restoration procedures not effective within 15 minutes. OR 2. a. Five hottest core exit thermocouples > 1200° F. AND b. RVLIS Full Range < 40% with no RCPs running. AND c. Restoration procedures not effective within 15 minutes.
4. RCS Level		1. RCS level < Table F-1.				
5. RCS Leak Rate			1. RCS leak rate greater than available makeup capacity as indicated by RCS subcooling < 18° F normal containment or < 33° F adverse containment.	1. UNISOLABLE RCS leak exceeding the capacity of one charging pump (129 gpm) in the normal charging mode.		
6. SG Tube Leakage / Rupture			1. RUPTURED SG results in an SI actuation.		Note: A prolonged release is greater than 4 hours. 1. RUPTURED SG is also FAULTED outside of containment. OR 2. a. Primary-to-Secondary leak rate > 10 gpm. AND b. UNISOLABLE prolonged steam release from affected SG to the environment.	
7. RCS Activity	1. Coolant activity > 300 μCi/gm dose equivalent I-131.					
8. Containment Pressure					1. A containment pressure rise followed by a rapid UNPLANNED drop in containment pressure. OR 2. Containment pressure or sump level response not consistent with LOCA conditions.	1. Containment pressure > 45 psig and rising. OR 2. Containment hydrogen > 4%. OR 3. a. Containment pressure > 11 psig. AND b. Less than one full train of depressurization equipment operating.
9. Containment Isolation Failure					Note: Direct pathways include filtered pathways (e.g., SLCRS). 1. a. Failure of ALL valves in any one line to close. AND b. Direct downstream pathway to the environment exists after containment isolation signal.	
10. EMERGENCY DIRECTOR Judgment	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates loss of the fuel clad barrier.	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates potential loss of the fuel clad barrier.	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates loss of the RCS barrier.	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates potential loss of the RCS barrier.	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates loss of the containment barrier.	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates potential loss of the containment barrier.

Table F-1: RVLIS Thresholds

RVLIS	RCPs	Indication
Full Range	0	40%
Dynamic Range	1	25%
	2	33%
	3	60%

FISSION PRODUCT BARRIER DEGRADATION

Beaver Valley Unit 1
HOT EAL WALL BOARD
Revision 00
EAL Technical Basis Manual

FirstEnergy

WALL BOARDS FOR "INFORMATION ONLY"

EAL Identifier
XXX.X
Category (R,H,E,S,F,C) — Sequential number within subcategory/classification
Emergency classification (G,S,A,U) — Subcategory number (1 if no subcategory)

Modes:

1	2	3	4	5	6	D
Power Operation >5% Rx Power	Startup ≤ 5% Rx Power	Hot Standby ≥ 350°F	Hot Shutdown >200°F	Cold Shutdown ≤ 200°F	Refueling	Defueled

COLD MODE EALs (RCS ≤ 200°F) — BEAVER VALLEY UNIT 2 — COLD MODE EALs (RCS ≤ 200°F)

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY (H)

H1 Security

GENERAL EMERGENCY — HG1 (Modes 1 2 3 4 5 6 D)
HOSTILE ACTION resulting in loss of physical control of the facility.

EALs:
1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions listed below:
   - Reactivity Control (ability to shut down the reactor and keep it shut down)
   - RCS inventory (ability to cool the core)
   - Secondary heat removal (ability to maintain a heat sink)

   OR
2. A HOSTILE ACTION has caused failure of spent fuel cooling systems and IMMINENT fuel damage is likely.

SITE AREA EMERGENCY — HS1 (Modes 1 2 3 4 5 6 D)
HOSTILE ACTION within the PROTECTED AREA.

EALs:
1. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the Security Shift Supervisor.

ALERT — HA1 (Modes 1 2 3 4 5 6 D)
HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat.

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

   OR
2. A validated notification from the NRC of a LARGE AIRCRAFT attack threat within 30 minutes of the site.

UNUSUAL EVENT — HU1 (Modes 1 2 3 4 5 6 D)
Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant.

EALs:
1. A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by the Security Shift Supervisor.

   OR
2. A credible site specific security threat notification.

   OR
3. A validated notification from the NRC providing information of a LARGE AIRCRAFT threat.

H2 CR Evacuation

SITE AREA EMERGENCY — HS2 (Modes 1 2 3 4 5 6 D)
Control Room evacuation has been initiated and plant control cannot be established.

EALs:
1. a. Control Room evacuation has been initiated.

   AND

   b. Control of ANY of the following safety functions is not established from an alternate location within 15 minutes.
   - Reactivity Control (ability to shut down the reactor and keep it shut down)
   - RCS inventory (ability to cool the core)
   - Secondary heat removal (ability to maintain a heat sink)

ALERT — HA2 (Modes 1 2 3 4 5 6 D)
Control Room evacuation has been initiated.

EALs:
1. Control Room evacuation has been initiated.

H3 Natural or Destructive Phenomena

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

Table H-1
Cable Vault and Rod Control Bldg
Containment Building
Control Building
Demin. Water Storage (2FWE-TK210)
Diesel Generator Building
Fuel Handling Building
Intake Structure Pump Cubicles
Main Steam Valve Room
Primary Aux. Building (except elev. 773')
RWST (2QSS-TK21)
Safeguards Building
Service Building (except FW Reg Vlv Rm)

ALERT — HA3 (Modes 1 2 3 4 5 6 D)
Natural or destructive phenomena affecting VITAL AREAS.

EALs:
1. a. Seismic event > 0.06g (OBE) acceleration (as indicated by lit lamp on 2ERS-CCC-1 Seismic Instrumentation Central Control Cabinet).

   AND

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

   OR
2. Tornado or high winds > 80 mph resulting in EITHER of the following:
   - VISIBLE DAMAGE to ANY structures in Table H-1 areas containing safety systems or components.
   - Control Room indication of degraded performance of those safety systems.

   OR
3. Internal flooding in Table H-1 areas resulting in EITHER of the following:
   - Electrical shock hazard that precludes access to operate or monitor safety equipment.
   - Control room indication of degraded performance of those safety systems.

   OR
4. High river level > 705 feet MSL resulting in EITHER of the following:
   - VISIBLE DAMAGE to ANY structures in Table H-1 areas containing safety systems or components.
   - Control Room indication of degraded performance of those safety systems.

   OR
5. Low river level (LR-1CW-101) < 650 feet MSL resulting in Control Room indication of degraded performance of safety systems located in Table H-1 areas.

   OR
6. Turbine failure-generated PROJECTILES resulting in EITHER of the following:
   - VISIBLE DAMAGE to or penetration of ANY structures in Table H-1 areas containing safety systems or components.
   - Control Room indication of degraded performance of those safety systems.

   OR
7. Vehicle crash resulting in EITHER of the following:
   - VISIBLE DAMAGE to ANY structures in Table H-1 areas containing safety systems or components.
   - Control Room indication of degraded performance of those safety systems.

UNUSUAL EVENT — HU3 (Modes 1 2 3 4 5 6 D)
Natural or destructive phenomena affecting the PROTECTED AREA.

EALs:
1. a. Seismic event > 0.01g acceleration (as indicated by initiation of the Accelerograph Recording System on Ann A10-5H, Init of Seismic Exceed Preset and/or Spectral Accelerations).

   AND

   b. Earthquake confirmed by EITHER of the following:
   - Earthquake felt in plant.
   - National Earthquake Center

   OR
2. a. Tornado within the PROTECTED AREA.

   OR

   b. High winds > 80 mph.

   OR
3. Internal flooding in Table H-1 areas that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

   OR
4. High river water level > 705 feet MSL.

   OR
5. Low river water level (LR-1CW-101) < 650 feet MSL.

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

H4 FIRE / EXPLOSION

Table H-1
Cable Vault and Rod Control Bldg
Containment Building
Control Building
Demin. Water Storage (2FWE-TK210)
Diesel Generator Building
Fuel Handling Building
Intake Structure Pump Cubicles
Main Steam Valve Room
Primary Aux. Building (except elev. 773')
RWST (2QSS-TK21)
Safeguards Building
Service Building (except FW Reg Vlv Rm)

ALERT — HA4 (Modes 1 2 3 4 5 6 D)
FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown.

EALs:
1. FIRE or EXPLOSION resulting in EITHER of the following:
   - VISIBLE DAMAGE to ANY structures in Table H-1 areas containing safety systems or components.
   - Control Room indication of degraded performance of those safety systems.

UNUSUAL EVENT — HU4 (Modes 1 2 3 4 5 6 D)
FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA.

EALs:
Note: Immediately adjacent to applies to FIRES that directly impact or obstruct the areas of concern.
1. FIRE not extinguished within 15 minutes* of Control Room notification or verification of a Control Room FIRE alarm in actual contact with or immediately adjacent to ANY of the Table H-1 areas.

   OR
2. EXPLOSION within the PROTECTED AREA.

H5 Toxic Gas

ALERT — HA5 (Modes 1 2 3 4 5 6 D)
Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor.

EALs:
Notes:
- If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.
- This EAL does not apply to FIRE fighting activities that automatically or manually activate a FIRE suppression system in an area.

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

UNUSUAL EVENT — HU5 (Modes 1 2 3 4 5 6 D)
Release of toxic, corrosive, asphyxiant or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS.

EALs:
Note: This EAL does not apply to FIRE fighting activities that automatically or manually activate a FIRE suppression system in an area.
1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS.

   OR
2. Report by local, county or state officials for evacuation or sheltering of site personnel based on an offsite event.

H6 EMERGENCY DIRECTOR Judgment

GENERAL EMERGENCY — HG6 (Modes 1 2 3 4 5 6 D)
Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of GENERAL EMERGENCY.

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

SITE AREA EMERGENCY — HS6 (Modes 1 2 3 4 5 6 D)
Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of SITE AREA EMERGENCY.

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

ALERT — HA6 (Modes 1 2 3 4 5 6 D)
Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of an ALERT.

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

UNUSUAL EVENT — HU6 (Modes 1 2 3 4 5 6 D)
Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of an UNUSUAL EVENT.

EALs:
1. Other conditions exist which in the judgment of the EMERGENCY DIRECTOR indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

SYSTEM MALFUNCTIONS - COLD (C)

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

C1 Loss of AC Power

ALERT — CA1 (Modes 5 6 D)
Loss of all offsite and all onsite AC power to emergency busses for 15 minutes or longer.

EALs:
1. Loss of ALL offsite and ALL onsite AC power to BOTH AE and DF 4KV emergency busses for 15 minutes* or longer.

UNUSUAL EVENT — CU1 (Modes 5 6)
AC power capability to emergency busses reduced to a single source for 15 minutes or longer.

EALs:
1. a. AC power to AE and DF 4KV emergency busses is reduced to a single source for 15 minutes* or longer.

   AND

   b. Any additional single power source failure will result in loss of ALL AC power to BOTH AE and DF 4KV emergency busses.

C2 Loss of DC Power

UNUSUAL EVENT — CU2 (Modes 5 6)
Loss of required DC power for 15 minutes or longer.

EALs:
1. < 116.4 VDC on the required DC busses for 15 minutes* or longer.

C3 Failure of RPS

UNUSUAL EVENT — CU3 (Modes 5 6)
Inadvertent criticality.

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

C6 Communications

UNUSUAL EVENT — CU6 (Modes 5 6 D)
Loss of all onsite or offsite communications capabilities.

EALs:
1. Loss of ALL of the following onsite communication methods affecting the ability to perform routine operations:
   - Radios.
   - Plant page.
   - Plant telephone system (hardwired).

   OR
2. Loss of ALL of the following offsite comunications methods affecting the ability to perform offsite notifications:
   - NRC Emergency Notification System - ENS (Red Phone).
   - NRC Health Physics Network - HPN.
   - Commercial telephones (hardwired and wireless).

C7 / C8 RCS Leakage

GENERAL EMERGENCY — CG7 (Modes 5 6)
Loss of RCS inventory affecting fuel clad integrity with containment challenged.

EALs:
1. a. RCS level < 58% RVLIS Full Range (top of active fuel) for 30 minutes* or longer.

   AND

   b. ANY Table C-1 containment challenge indications.

   OR
2. a. RCS level cannot be monitored with core uncovery for 30 minutes* or longer.

   AND

   b. Loss of RCS inventory as indicated by ANY of the following:
   - Containment Radiation Monitor (2RMR-RQ206 or 207) > 15 R/hr.
   - Erratic source range monitor indication.
   - UNPLANNED level rise in Containment sumps or incore instrument sump.

   AND

   c. ANY Table C-1 containment challenge indications.

Table C-1: Containment Challenge Indications
CONTAINMENT CLOSURE not established.
Hydrogen concentration > 4% inside containment.
UNPLANNED rise in containment pressure.

SITE AREA EMERGENCY — CS7 (Modes 5 6)
Loss of RCS inventory affecting core decay heat removal capability.

EALs:
1. a. CONTAINMENT CLOSURE not established.

   AND

   b. RCS level < 64% RVLIS Full Range (6" below bottom of hot leg).

   OR
2. a. CONTAINMENT CLOSURE established.

   AND

   b. RCS level < 58% RVLIS Full Range (top of active fuel).

   OR
3. a. RCS level cannot be monitored for 30 minutes* or longer.

   AND

   b. Loss of RCS inventory as indicated by ANY of the following:
   - Containment Radiation Monitor (2RMR-RQ206 or 207) > 15 R/hr.
   - Erratic source range monitor indication.
   - UNPLANNED level rise in Containment sumps or incore instrument sump.

ALERT — CA7 (Modes 5 6)
Loss of RCS inventory.

EALs:
1. Loss of RCS inventory as indicated by EITHER of the following:
   - RVLIS Full Range Level (2RCS-LT1321) < 68% (bottom of hot leg).
   - Refueling Outage Temporary Level Instrument (2RCS-LI102) ≤ 6 inches.

   OR
2. a. RCS level cannot be monitored for 15 minutes* or longer

   AND

   b. Loss of RCS inventory as indicated by UNPLANNED level rise in Containment sumps or incore instrument sump.

UNUSUAL EVENT — CU7 (Mode 5)
RCS leakage.

EALs:
Note: Relief valve normal operation should be excluded unless it fails to close and cannot be isolated.
1. RCS leakage results in the inability to maintain or restore RCS level > Target Level Band for 15 minutes* or longer.

UNUSUAL EVENT — CU8 (Mode 6)
UNPLANNED loss of RCS inventory.

EALs:
1. UNPLANNED RCS level drop as indicated by EITHER of the following:
   - Refueling Outage Temporary Level Instruments (2RCS-LI102) < 96 inches (vessel flange) for 15 minutes* or longer when the RCS level band is established above the vessel flange.

     OR
   - RCS water level drop below the RCS level band for 15 minutes* or longer when the RCS level band is established below the vessel flange.

   OR
2. a. RCS level cannot be monitored.

   AND

   b. Loss of RCS inventory as indicated by UNPLANNED level rise in Containment sumps or incore instrument sump.

C10 Heat Sink

Table C-2: RCS Reheat Duration Thresholds		
RCS	Cont Closure	Duration
Intact with Full RCS inventory	N/A	> 60 min**
Not Intact OR Not Full RCS Inventory	Established	> 20 min**
	Not Established	0 min

** If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, this EAL is not applicable.

ALERT — CA10 (Modes 5 6)
Inability to maintain plant in cold shutdown.

EALs:
Note: Full inventory is pressurizer level ≥ 22% actual with loop stops either isolated or unisolated.
1. RCS temperature > 200° F due to an UNPLANNED loss of decay heat removal capability for greater than the specified duration on Table C-2.

   OR
2. a. RCS temperature cannot be monitored.

   AND

   b. RCS pressure rise > 10 psi due to an UNPLANNED loss of decay heat removal capability (this EAL does not apply in RCS solid plant conditions).

UNUSUAL EVENT — CU10 (Modes 5 6)
UNPLANNED Loss of decay heat removal capability.

EALs:
1. RCS temperature > 200° F due to an UNPLANNED loss of decay heat removal capability.

   OR
2. Loss of ALL RCS temperature and RCS level indication for 15 minutes* or longer.

DRY FUEL STORAGE FACILITY (E)

E1 Dry Fuel Storage Facility

UNUSUAL EVENT — E-HU1 (NOT APPLICABLE)
Damage to a loaded cask CONFINEMENT BOUNDARY.

EALs:
1. Damage to a loaded cask CONFINEMENT BOUNDARY.

RADIOLOGICAL EFFLUENT / ABNORMAL RADIATION LEVELS (R)

R1 Radiological Effluent

GENERAL EMERGENCY — RG1 (Modes 1 2 3 4 5 6 D)
Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem CDE Child Thyroid for the actual or projected duration of the release using actual meteorology.

EALs:
Note: If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.
1. The following gaseous effluent monitor greater than the reading shown for 15 minutes* or longer:
   - SLCRS Vent (2HVS-RQ109E) ....1.95E+07 µCi/sec

   OR
2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of EITHER of the following:
   - > 1000 mRem TEDE.
   - > 5000 mRem CDE Child Thyroid.

   OR
3. Field survey results at or beyond the site boundary indicate EITHER of the following:
   - Gamma (closed window) dose rate > 1000 mR/hr for 60 minutes* or longer.
   - Air sample analysis > 5000 mRem CDE Child Thyroid for one hour of inhalation.

SITE AREA EMERGENCY — RS1 (Modes 1 2 3 4 5 6 D)
Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem CDE Child Thyroid for the actual or projected duration of the release using actual meteorology.

EALs:
Note: If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.
1. ANY of the following gaseous effluent monitors greater than the reading shown for 15 minutes* or longer:
   - SLCRS Vent (2HVS-RQ109E) ....1.95E+06 µCi/sec
   - Ventilation Vent (2HVS-RQ101B)....1.87E-01 µCi/cc

   OR
2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of EITHER of the following:
   - > 100 mRem TEDE.
   - > 500 mRem CDE Child Thyroid.

   OR
3. Field survey results at or beyond the site boundary indicate EITHER of the following:
   - Gamma (closed window) dose rate > 100 mR/hr for 60 minutes* or longer.
   - Air sample analysis > 500 mRem CDE Child Thyroid for one hour of inhalation.

ALERT — RA1 (Modes 1 2 3 4 5 6 D)
Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM limit for 15 minutes or longer.

EALs:
Note: The EMERGENCY DIRECTOR should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.
1. ANY of the following gaseous effluent monitors greater than the reading shown for 15 minutes or longer:
   - SLCRS Vent (2HVS-RQ109E) ....5.88E+05 µCi/sec
   - Ventilation Vent (2HVS-RQ101B)....8.02E-02 µCi/cc

   OR
2. Liquid Waste Effluent Monitor (2SGC-RQ100) > 200 times the High alarm setpoint, not to exceed 4.5E-02 µCi/cc, established by a current radioactivity discharge permit for 15 minutes or longer.

   OR
3. Confirmed sample analysis for gaseous or liquid releases > 200 times the ODCM limit for 15 minutes or longer.

UNUSUAL EVENT — RU1 (Modes 1 2 3 4 5 6 D)
Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM limit for 60 minutes or longer.

EALs:
Note: The EMERGENCY DIRECTOR should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.
1. ANY of the following gaseous effluent monitors greater than the reading shown for 60 minutes or longer:
   - SLCRS Vent (2HVS-RQ109E) ....5.88E+03 µCi/sec
   - Ventilation Vent (2HVS-RQ101B)....8.02E-04 µCi/cc

   OR
2. Liquid Waste Effluent Monitor (2SGC-RQ100) > 2 times the High alarm setpoint established by a current radioactivity discharge permit for 60 minutes or longer.

   OR
3. Confirmed sample analysis for gaseous or liquid releases > 2 times the ODCM limit for 60 minutes or longer.

R2 Abnormal Radiation Levels

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

ALERT — RA2 (Modes 1 2 3 4 5 6 D)
Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel.

EALs:
1. A water level drop in the spent fuel pool, transfer tube or reactor cavity that will result in irradiated fuel becoming uncovered.

   OR
2. > 1000 mR/hr reading on ANY of the following due to damage to irradiated fuel or loss of water level:
   - Manipulator Crane (2RMR-RQ203)
   - Fuel Pit Bridge (2RMF-RQ202)

UNUSUAL EVENT — RU2 (Modes 1 2 3 4 5 6 D)
UNPLANNED rise in plant radiation levels.

EALs:
1. a. UNPLANNED water level drop in the spent fuel pool, transfer canal or reactor cavity as indicated by level < Tech Spec Minimum (23 feet).

   AND

   b. Area radiation monitor rise resulting in a High alarm on ANY of the following:
   - Manipulator Crane (2RMR-RQ203)
   - Fuel Pit Bridge (2RMF-RQ202)

   OR
2. UNPLANNED area radiation monitor or radiation survey > 1000 times NORMAL LEVELS.

R3

ALERT — RA3 (Modes 1 2 3 4 5 6 D)
Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions.

EALs:
1. Dose rate > 15 mR/hr in ANY of the following areas requiring continuous occupancy to maintain plant safety functions:
   - Control Room
   - Central Alarm Station
   - Secondary Alarm Station

DEFINITIONS

The terms defined in this section are those which are used in special context in this document and/or are unique to the Beaver Valley Power Station (BVPS).

AFFECTING SAFE SHUTDOWN – Event in progress has adversely affected functions that are necessary to bring the plant to and maintain it in the applicable Hot or Cold Shutdown condition. Plant condition applicability is determined by Technical Specification LCOs in effect.

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

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

BOMB – An explosive device suspected of having sufficient force to damage plant systems or structures.

CIVIL DISTURBANCE – A group of persons violently protesting station operations or activities at the site. This event does not involve HOSTILE ACTIONs. Peaceful demonstrations are not CIVIL DISTURBANCES.

COMPENSATORY INDICATIONS – Computer points, In-Plant Computer - IPC (U1), Inadequate Core Cooling Monitor - ICCM (U1), Sequence of Events Recorder - SER (U1), Plant Computer System - PCS (U2), Plant Safety Monitoring System - PSMS (U2) and PI Data (ProcessBook®).

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

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

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

EMERGENCY CLASSIFICATION LEVEL (ECL) – One of a minimum set of names or titles established by the NRC for grouping of normal nuclear power plant conditions according to (1) their relative radiological seriousness, and (2) the time-sensitive onsite and offsite radiological emergency preparedness actions necessary to respond to such conditions. The existing radiological EMERGENCY CLASSIFICATION LEVELS, in ascending order of seriousness, are called:

- UNUSUAL EVENT – Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to the facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.
- ALERT – Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guide exposure levels.
- SITE AREA EMERGENCY – Events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to, equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guide exposure levels beyond the site boundary.
- GENERAL EMERGENCY – Events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guide exposure levels offsite for more than the immediate site area.

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

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

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

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

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

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

IMMINENT / IMPENDING – Means about to happen (generally within 30 minutes).

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

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

LARGE AIRCRAFT – Any size or type of aircraft with the potential for causing significant damage to the plant (refer to the Security Plan for a more detailed definition).

NORMAL LEVELS – The highest reading in the past twenty-four hours excluding the current peak value.

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

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

PROJECTILE – Means a fired, projected object, such as a bullet or pellet having no capacity for self propulsion directed towards a nuclear power plant that could cause concern for its continued operability, reliability or personnel safety.

PROTECTED AREA – Means an area encompassed by physical barriers and to which access is controlled.

RUPTURED – In a steam generator, existence of primary-to-secondary leakage of a magnitude sufficient to require or cause a reactor trip and safety injection.

SABOTAGE – Deliberate damage, mis-alignment, or mis-operation of plant equipment with the intent to render the equipment inoperable. Equipment found tampered with or damaged due to malicious mischief may not meet the definition of SABOTAGE until this determination is made by security supervision.

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

STRIKE ACTION – A work stoppage within the protected area by a body of workers to enforce compliance with demands made on management. The STRIKE ACTION must threaten to interrupt NORMAL PLANT OPERATIONS.

UNAFFECTED AREA – Any area or location which is known to be not significantly affected by radiation levels or other hazardous conditions.

UNISOLABLE – A breach or leak that cannot be promptly isolated.

UNPLANNED – A parameter change or an event, the reasons for which may be known or unknown, that is not the result of an intended evolution or expected plant response to a transient.

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

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

VITAL AREA – Means any area that contains VITAL EQUIPMENT.

VITAL EQUIPMENT – Means any equipment, system, device, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation. Equipment or systems which would be required to function to protect public health and safety following such failure, destruction, or release are also considered to be vital.

Beaver Valley Unit 2
COLD EAL WALL BOARD
Revision 00
EAL Technical Basis Manual

FirstEnergy

WALL BOARDS FOR "INFORMATION ONLY"

EAL Identifier

XXX.X
- Category (R,H,E,S,F,C)
- Emergency classification (G,S,A,U)
- Sequential number within subcategory/classification
- Subcategory number (1 if no subcategory)

BEAVER VALLEY UNIT 2

Modes:

1	2	3	4	5	6	D
Power Operation >5% Rx Power	Startup ≤ 5% Rx Power	Hot Standby ≥ 350°F	Hot Shutdown >200°F	Cold Shutdown ≤ 200°F	Refueling	Defueled

HOT MODE EALs (RCS > 200°F) — BEAVER VALLEY UNIT 2 — HOT MODE EALs (RCS > 200°F)

BEAVER VALLEY UNIT 2

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY (H)

Columns: GENERAL EMERGENCY | SITE AREA EMERGENCY | ALERT | UNUSUAL EVENT

1 Security

HG1 (Modes 1 2 3 4 5 6 D) HOSTILE ACTION resulting in loss of physical control of the facility.

EALs:
1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions listed below:
   - Reactivity Control (ability to shut down the reactor and keep it shut down)
   - RCS inventory (ability to cool the core)
   - Secondary heat removal (ability to maintain a heat sink)

OR

2. A HOSTILE ACTION has caused failure of spent fuel cooling systems and IMMINENT fuel damage is likely.

HS1 (Modes 1 2 3 4 5 6 D) HOSTILE ACTION within the PROTECTED AREA.

EALs:
1. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the Security Shift Supervisor.

HA1 (Modes 1 2 3 4 5 6 D) HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat.

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

OR

2. A validated notification from the NRC of a LARGE AIRCRAFT attack threat within 30 minutes of the site.

HU1 (Modes 1 2 3 4 5 6 D) Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant.

EALs:
1. A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by the Security Shift Supervisor.

OR

2. A credible site specific security threat notification.

OR

3. A validated notification from the NRC providing information of a LARGE AIRCRAFT threat.

2 CR Evacuation

HS2 (Modes 1 2 3 4 5 6 D) Control Room evacuation has been initiated and plant control cannot be established.

EALs:
1. a. Control Room evacuation has been initiated.

   AND

   b. Control of ANY of the following safety functions is not established from an alternate location within 15 minutes.
   - Reactivity Control (ability to shut down the reactor and keep it shut down)
   - RCS inventory (ability to cool the core)
   - Secondary heat removal (ability to maintain a heat sink)

HA2 (Modes 1 2 3 4 5 6 D) Control Room evacuation has been initiated.

EALs:
1. Control Room evacuation has been initiated.

3 Natural or Destructive Phenomena

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

Table H-1
- Cable Vault and Rod Control Bldg
- Containment Building
- Control Building
- Demin. Water Storage (2FWE-TK210)
- Diesel Generator Building
- Fuel Handling Building
- Intake Structure Pump Cubicles
- Main Steam Valve Room
- Primary Aux. Building (except elev. 773')
- RWST (2QSS-TK21)
- Safeguards Building
- Service Building (except FW Reg Vlv Rm)

HA3 (Modes 1 2 3 4 5 6 D) Natural or destructive phenomena affecting VITAL AREAS.

EALs:
1. a. Seismic event > 0.08g (OBE) acceleration (as indicated by lt lamp on 2ERS-CCC-1 Seismic Instrumentation Central Control Cabinet).

   AND

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

OR

2. Tornado or high winds > 80 mph resulting in EITHER of the following:
   - VISIBLE DAMAGE to ANY structures in Table H-1 areas containing safety systems or components.
   - Control Room indication of degraded performance of those safety systems.

OR

3. Internal flooding in Table H-1 areas resulting in EITHER of the following:
   - Electrical shock hazard that precludes access to operate or monitor safety equipment.
   - Control room indication of degraded performance of those safety systems.

OR

4. High river level > 705 feet MSL resulting in EITHER of the following:
   - VISIBLE DAMAGE to ANY structures in Table H-1 areas containing safety systems or components.
   - Control Room indication of degraded performance of those safety systems.

OR

5. Low river level (LR-1CW-101) < 650 feet MSL resulting in Control Room indication of degraded performance of safety systems located in Table H-1 areas.

OR

6. Turbine failure-generated PROJECTILES resulting in EITHER of the following:
   - VISIBLE DAMAGE to or penetration of ANY structures in Table H-1 areas containing safety systems or components.
   - Control Room indication of degraded performance of those safety systems.

OR

7. Vehicle crash resulting in EITHER of the following:
   - VISIBLE DAMAGE to ANY structures in Table H-1 areas containing safety systems or components.
   - Control Room indication of degraded performance of those safety systems.

HU3 (Modes 1 2 3 4 5 6 D) Natural or destructive phenomena affecting the PROTECTED AREA.

EALs:
1. a. Seismic event > 0.01g acceleration (as indicated by initiation of the Accelerograph Recording System on Ann A10-5H, Init of Seismic Exceed Preset and/or Spectral Accelerations).

   AND

   b. Earthquake confirmed by EITHER of the following:
   - Earthquake felt in plant.
   - National Earthquake Center.

OR

2. a. Tornado within the PROTECTED AREA.

   OR

   b. High winds > 80 mph.

OR

3. Internal flooding in Table H-1 areas that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

OR

4. High river water level > 705 feet MSL.

OR

5. Low river water level (LR-1CW-101) < 650 feet MSL.

OR

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

4 FIRE / EXPLOSION

Table H-1
- Cable Vault and Rod Control Bldg
- Containment Building
- Control Building
- Demin. Water Storage (2FWE-TK210)
- Diesel Generator Building
- Fuel Handling Building
- Intake Structure Pump Cubicles
- Main Steam Valve Room
- Primary Aux. Building (except elev. 773')
- RWST (2QSS-TK21)
- Safeguards Building
- Service Building (except FW Reg Vlv Rm)

HA4 (Modes 1 2 3 4 5 6 D) FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown.

EALs:
1. FIRE or EXPLOSION resulting in EITHER of the following:
   - VISIBLE DAMAGE to ANY structures in Table H-1 areas containing safety systems or components.
   - Control Room indication of degraded performance of those safety systems.

HU4 (Modes 1 2 3 4 5 6 D) FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA.

EALs:

Note: Immediately adjacent to applies to FIRES that directly impact or obstruct the areas of concern.

1. FIRE not extinguished within 15 minutes* of Control Room notification or verification of a Control Room FIRE alarm in actual contact with or immediately adjacent to ANY of the Table H-1 areas.

OR

2. EXPLOSION within the PROTECTED AREA.

5 Toxic Gas

HA5 (Modes 1 2 3 4 5 6 D) Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor.

EALs:

Notes:
- If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.
- This EAL does not apply to FIRE fighting activities that automatically or manually activate a FIRE suppression system in an area.

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

HU5 (Modes 1 2 3 4 5 6 D) Release of toxic, corrosive, asphyxiant or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS.

EALs:

Note: This EAL does not apply to FIRE fighting activities that automatically or manually activate a FIRE suppression system in an area.

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

OR

2. Report by local, county or state officials for evacuation or sheltering of site personnel based on an offsite event.

6 EMERGENCY DIRECTOR Judgment

HG6 (Modes 1 2 3 4 5 6 D) Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of GENERAL EMERGENCY.

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

HS6 (Modes 1 2 3 4 5 6 D) Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of SITE AREA EMERGENCY.

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

HA6 (Modes 1 2 3 4 5 6 D) Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of an ALERT.

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

HU6 (Modes 1 2 3 4 5 6 D) Other conditions exist which in the judgment of the EMERGENCY DIRECTOR warrant declaration of an UNUSUAL EVENT.

EALs:
1. Other conditions exist which in the judgment of the EMERGENCY DIRECTOR indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

DRY FUEL STORAGE FACILITY (E)

Columns: GENERAL EMERGENCY | SITE AREA EMERGENCY | ALERT | UNUSUAL EVENT

1 Dry Fuel Storage Facility

E-HU1 (NOT APPLICABLE) Damage to a loaded cask CONFINEMENT BOUNDARY.

EALs:
1. Damage to a loaded cask CONFINEMENT BOUNDARY.

DRY FUEL STORAGE FACILITY

RADIOLOGICAL EFFLUENT / ABNORMAL RADIATION LEVELS (R)

Columns: GENERAL EMERGENCY | SITE AREA EMERGENCY | ALERT | UNUSUAL EVENT

1 Radiological Effluent

RG1 (Modes 1 2 3 4 5 6 D) Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem TEDE or 5000 mRem CDE Child Thyroid for the actual or projected duration of the release using actual meteorology.

EALs:

Note: If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. The following gaseous effluent monitor greater than the reading shown for 15 minutes* or longer:
   - SLCRS Vent (2HVS-RQ109E) .... 1.95E+07 µCi/sec

OR

2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of EITHER of the following:
   - > 1000 mRem TEDE.
   - > 5000 mRem CDE Child Thyroid.

OR

3. Field survey results at or beyond the site boundary indicate EITHER of the following:
   - Gamma (closed window) dose rate > 1000 mR/hr for 60 minutes* or longer.
   - Air sample analysis > 5000 mRem CDE Child Thyroid for one hour of inhalation.

RS1 (Modes 1 2 3 4 5 6 D) Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem CDE Child Thyroid for the actual or projected duration of the release using actual meteorology.

EALs:

Note: If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. ANY of the following gaseous effluent monitors greater than the reading shown for 15 minutes* or longer:
   - SLCRS Vent (2HVS-RQ109E) .... 1.95E+06 µCi/sec
   - Ventilation Vent (2HVS-RQ101B) .... 1.67E-01 µCi/cc

OR

2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of EITHER of the following:
   - > 100 mRem TEDE.
   - > 500 mRem CDE Child Thyroid.

OR

3. Field survey results at or beyond the site boundary indicate EITHER of the following:
   - Gamma (closed window) dose rate > 100 mR/hr for 60 minutes* or longer.
   - Air sample analysis > 500 mRem CDE Child Thyroid for one hour of inhalation.

RA1 (Modes 1 2 3 4 5 6 D) Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM limit for 15 minutes or longer.

EALs:

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

1. ANY of the following gaseous effluent monitors greater than the reading shown for 15 minutes or longer:
   - SLCRS Vent (2HVS-RQ109E) .... 5.88E+05 µCi/sec
   - Ventilation Vent (2HVS-RQ101B) .... 6.02E-02 µCi/cc

OR

2. Liquid Waste Effluent Monitor (2SGC-RQ100) > 200 times the High alarm setpoint, not to exceed 4.5E-02 µCi/cc, established by a current radioactivity discharge permit for 15 minutes or longer.

OR

3. Confirmed sample analysis for gaseous or liquid releases > 200 times the ODCM limit for 15 minutes or longer.

RU1 (Modes 1 2 3 4 5 6 D) Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM limit for 60 minutes or longer.

EALs:

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

1. ANY of the following gaseous effluent monitors greater than the reading shown for 60 minutes or longer:
   - SLCRS Vent (2HVS-RQ109E) .... 5.88E+03 µCi/sec
   - Ventilation Vent (2HVS-RQ101B) .... 6.02E-04 µCi/cc

OR

2. Liquid Waste Effluent Monitor (2SGC-RQ100) > 2 times the High alarm setpoint established by a current radioactivity discharge permit for 60 minutes or longer.

OR

3. Confirmed sample analysis for gaseous or liquid releases > 2 times the ODCM limit for 60 minutes or longer.

2 Abnormal Radiation Levels

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

RA2 (Modes 1 2 3 4 5 6 D) Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel.

EALs:
1. A water level drop in the spent fuel pool, transfer tube or reactor cavity that will result in irradiated fuel becoming uncovered.

OR

2. > 1000 mR/hr reading on ANY of the following due to damage to irradiated fuel or loss of water level:
   - Manipulator Crane (2RMR-RQ203)
   - Fuel Pit Bridge (2RMF-RQ202)

RU2 (Modes 1 2 3 4 5 6 D) UNPLANNED rise in plant radiation levels.

EALs:
1. a. UNPLANNED water level drop in the spent fuel pool, transfer canal or reactor cavity as indicated by level < Tech Spec Minimum (23 feet).

   AND

   b. Area radiation monitor rise resulting in a High alarm on ANY of the following:
   - Manipulator Crane (2RMR-RQ203)
   - Fuel Pit Bridge (2RMF-RQ202)

OR

2. UNPLANNED area radiation monitor or radiation survey > 1000 times NORMAL LEVELS.

3

RA3 (Modes 1 2 3 4 5 6 D) Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions.

EALs:
1. Dose rate > 15 mR/hr in ANY of the following areas requiring continuous occupancy to maintain plant safety functions:
   - Control Room
   - Central Alarm Station
   - Secondary Alarm Station

RADIOLOGICAL EFFLUENT / ABNORMAL RADIATION LEVELS

SYSTEM MALFUNCTIONS - HOT (S)

Columns: GENERAL EMERGENCY | SITE AREA EMERGENCY | ALERT | UNUSUAL EVENT

1 Loss of AC Power

SG1 (Modes 1 2 3 4) Prolonged loss of all offsite and all onsite AC power to emergency busses.

EALs:
1. a. Loss of ALL offsite and ALL onsite AC power to BOTH AE and DF 4KV emergency busses.

   AND

   b. EITHER of the following:
   - Restoration of EITHER the AE 4KV emergency bus OR DF 4KV emergency bus with 4 hours is not likely.
   - Core Cooling - Red entry conditions met.

SS1 (Modes 1 2 3 4) Loss of all offsite and all onsite AC power to emergency busses for 15 minutes or longer.

EALs:

Note: Credit cannot be taken for emergency busses being powered from the other unit's emergency diesel generators.

1. Loss of ALL offsite and ALL onsite AC power to BOTH AE and DF 4KV emergency busses for 15 minutes* or longer.

SA1 (Modes 1 2 3 4) AC power capability to emergency busses reduced to a single power source for 15 minutes or longer.

EALs:
1. a. AC power to AE and DF 4KV emergency busses is reduced to a single power source for 15 minutes* or longer.

   AND

   b. Any additional single power source failure will result in loss of ALL AC power to BOTH AE and DF 4KV emergency busses.

SU1 (Modes 1 2 3 4) Loss of all offsite AC power to emergency busses for 15 minutes or longer.

EALs:
1. Loss of ALL offsite AC power to BOTH AE and DF 4KV emergency busses for 15 minutes* or longer.

2 Loss of DC Power

SS2 (Modes 1 2 3 4) Loss of all vital DC power for 15 minutes or longer.

EALs:
1. < 110.4 VDC on ALL safety related DC busses (2-1, 2-2, 2-3 and 2-4) for 15 minutes* or longer.

3 Failure of RPS

SG3 (Modes 1 2) Automatic trip and all manual actions failed to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists.

EALs:
1. a. An automatic reactor trip failed to shutdown the reactor as indicated by reactor power > 5%.

   AND

   b. ALL manual trip actions failed to shutdown the reactor as indicated by reactor power > 5%.

   AND

   c. EITHER of the following has occurred:
   - Core Cooling - Red entry conditions met.
   - Heat Sink - Red entry conditions met.

SS3 (Modes 1 2) Automatic trip and manual actions taken within the Controls Area (CA) failed to shutdown the reactor.

EALs:
1. a. An automatic reactor trip failed to shutdown the reactor as indicated by reactor power > 5%.

   AND

   b. Manual trip actions taken within the Controls Area (CA) failed to shutdown the reactor as indicated by reactor power > 5%.

SA3 (Modes 1 2) Automatic trip failed to shutdown the reactor and the manual actions taken from the Controls Area (CA) are successful in shutting down the reactor.

EALs:
1. a. An automatic reactor trip failed to shutdown the reactor.

   AND

   b. Manual trip actions taken within the Controls Area (CA) successfully shutdown the reactor as indicated by reactor power ≤ 5%.

SU3 (Modes 3 4) Inadvertent criticality.

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

4 Annunciators

Table S-1: Critical Safety Functions
- Reactivity Control (ability to shut down the reactor and keep it shut down)
- RCS inventory (ability to cool the core)
- Secondary heat removal (ability to maintain a heat sink)

Table S-2: Significant Transients
- Automatic turbine runback > 25% thermal power
- Electrical load rejection > 25% full electrical load
- Reactor trip
- Safety injection actuation

SS4 (Modes 1 2 3 4) Inability to monitor a significant transient in progress.

EALs:
1. a. Loss of > 75% of EITHER of the following for 15 minutes* or longer:
   - Control Room Annunciator Panels (A1, A2, A4-A11).

   OR

   - Control Room critical safety function indications (Table S-1).

   AND

   b. A Table S-2 significant transient is in progress.

   AND

   c. COMPENSATORY INDICATIONS are unavailable.

SA4 (Modes 1 2 3 4) Loss of safety system annunciation or indication in the Control Room with either: (1) a significant transient in progress, or (2) COMPENSATORY INDICATIONS are unavailable.

EALs:
1. a. Loss of > 75% of EITHER of the following for 15 minutes* or longer:
   - Control Room Annunciator Panels (A1, A2, A4-A11).

   OR

   - Control Room critical safety function indications (Table S-1).

   AND

   b. EITHER of the following:
   - A Table S-2 significant transient is in progress.

   OR

   - COMPENSATORY INDICATIONS are unavailable.

SU4 (Modes 1 2 3 4) Loss of safety system annunciation or indication in the Control Room for 15 minutes or longer.

EALs:
1. Loss of > 75% of EITHER of the following for 15 minutes* or longer:
   - Control Room Annunciator Panels (A1, A2, A4-A11).

   OR

   - Control Room critical safety function indications (Table S-1).

5 T.S. Limits

SU5 (Modes 1 2 3 4) Inability to reach required operating mode within Technical Specification limits.

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

6 Communications

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

SU6 (Modes 1 2 3 4) Loss of all onsite or offsite communications capabilities.

EALs:
1. Loss of ALL of the following onsite communication methods affecting the ability to perform routine operations:
   - Radios.
   - Plant page.
   - Plant telephone system (hardwired).

OR

2. Loss of ALL of the following offsite communications methods affecting the ability to perform offsite notifications:
   - NRC Emergency Notification System - ENS (Red Phone).
   - NRC Health Physics Network - HPN.
   - Commercial telephones (hardwired and wireless).

7 RCS Leakage

SU7 (Modes 1 2 3 4) RCS leakage.

EALs:

Notes:
- Identified, unidentified and pressure boundary RCS leakage as defined by Technical Specifications.
- Relief valve normal operation should be excluded unless it fails to close and cannot be isolated.

1. Unidentified or pressure boundary leakage > 10 gpm.

OR

2. Identified leakage > 25 gpm.

9 Fuel Clad Degradation

SU9 (Modes 1 2 3 4) Fuel clad degradation.

EALs:
1. Letdown Monitor (2CHS-RQ101B) > 2.98E+03 µCi/cc.

OR

2. RCS activity > 21 µCi/gm dose equivalent I-131.

SYSTEM MALFUNCTIONS - HOT

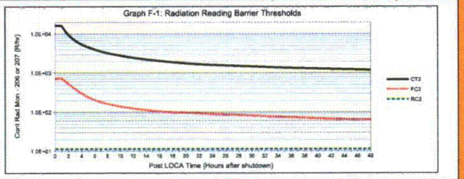
FISSION PRODUCT BARRIER DEGRADATION (F)

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
FG1 (Modes 1 2 3 4) 1. Loss of any two barriers and loss or potential loss of the third barrier.	**FS1** (Modes 1 2 3 4) 1. Loss or potential loss of any two barriers.	**FA1** (Modes 1 2 3 4) 1. Any loss or any potential loss of either fuel clad or RCS.	**FU1** (Modes 1 2 3 4) 1. Any loss or any potential loss of containment.

FPB Identifier

XXX

Barrier Abreviation (FC, RC, or CT) — Sub Category (1-10)



Sub-Category	FC - FUEL CLAD: Loss	FC - FUEL CLAD: Potential Loss	RC - REACTOR COOLANT SYSTEM: Loss	RC - REACTOR COOLANT SYSTEM: Potential Loss	CT - CONTAINMENT: Loss	CT - CONTAINMENT: Potential Loss
1. Critical Safety Function Status	1. Core Cooling - Red entry conditions met.	1. Core Cooling - Orange entry conditions met. OR 2. a. Heat Sink - Red entry conditions met. AND b. Heat Sink is required.		1. RCS Integrity - Red entry conditions met. OR 2. a. Heat Sink - Red entry conditions met. AND b. Heat Sink is required.		1. Containment - Red entry conditions met.
2. Containment Rad Monitoring	1. Containment Radiation Monitor (2RMR-RQ206 or 207) > FC2 Line on Graph F-1.		1. Containment Radiation Monitor (2RMR-RQ206 or 207) > 1.1E+01 R/hr (RC2 Line on Graph F-1).			1. Containment Radiation Monitor (2RMR-RQ206 or 207) > CT2 Line on Graph F-1
3. Core Temperature	1. Three max core exit thermocouples > 1200° F.	1. Three max core exit thermocouples > 720° F.				1. a. Three max core exit thermocouples > 2000°F. AND b. Restoration procedures not effective within 15 minutes. OR 2. a. Three max core exit thermocouples > 1200° F. AND b. RVLIS Full Range < 40% with no RCPs running. AND c. Restoration procedures not effective within 15 minutes.
4. RCS Level		1. RCS level < Table F-1.				
5. RCS Leak Rate			1. RCS leak rate greater than available makeup capacity as indicated by RCS subcooling < 18° F normal containment or < 46° F adverse containment.	1. UNISOLABLE RCS leak exceeding the capacity of one charging pump (130 gpm) in the normal charging mode.		
6. SG Tube Leakage / Rupture			1. RUPTURED SG results in an SI actuation.		Note: A prolonged release is greater than 4 hours. 1. RUPTURED SG is also FAULTED outside of containment. OR 2. a. Primary-to-Secondary leak rate > 10 gpm. AND b. UNISOLABLE prolonged steam release from affected SG to the environment.	
7. RCS Activity	1. Coolant activity > 300 µCi/gm dose equivalent I-131.					
8. Containment Pressure					1. A containment pressure rise followed by a rapid UNPLANNED drop in containment pressure. OR 2. Containment pressure or sump level response not consistent with LOCA conditions.	1. Containment pressure > 45 psig and rising. OR 2. Containment hydrogen > 4%. OR 3. a. Containment pressure > 11 psig. AND b. Less than one full train of depressurization equipment operating.
9. Containment Isolation Failure					Note: Direct pathways include filtered pathway (e.g., SLCRS). 1. a. Failure of ALL valves in any one line to close. AND b. Direct downstream pathway to the environment exists after containment isolation signal.	
10. EMERGENCY DIRECTOR Judgment	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates loss of the fuel clad barrier.	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates potential loss of the fuel clad barrier.	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates loss of the RCS barrier.	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates potential loss of the RCS barrier.	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates loss of the containment barrier.	1. Any condition in the opinion of the EMERGENCY DIRECTOR that indicates potential loss of the containment barrier.

Table F-1: RVLIS Thresholds

RVLIS	RCPs	Indication
Full Range	0	40%
Dynamic Range	1	25%
	2	33%
	3	60%

FISSION PRODUCT BARRIER DEGRADATION

Beaver Valley Unit 2
HOT EAL WALL BOARD
Revision 00
EAL Technical Basis Manual

FirstEnergy

WALL BOARDS FOR "INFORMATION ONLY"

EAL Identifier

XXX.X

Category (R,H,E,S,F,C) — Emergency classification (G,S,A,U) — Sequential number within subcategory/classification — Subcategory number (1 if no subcategory)

BEAVER VALLEY UNIT 2

Modes: 1 Power Operation >5% Rx Power | 2 Startup ≤ 5% Rx Power | 3 Hot Standby ≥ 350°F | 4 Hot Shutdown >200°F | 5 Cold Shutdown ≤ 200°F | 6 Refueling | D Defueled